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Fourth Grade Creativity of Urban, Rural, and Indian Children in an Experimental Program

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FOURTH GRADE CREATIVITY OF URBAN, RURAL, AND INDIAN CHILDREN IN AN EXPERIMENTAL PROGRAM

by

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ABSTRACT

The primary purposes of this study were to determine if any differences exist in creativity between New School and non-New School fourth grade children, between Indian and non-Indian fourth graders, and among urban, rural, and Indian fourth grade children.

Procedure

The research population used in this study consisted of 237 fourth graders enrolled in North Dakota elementary schools. The experimental group consisted of 62 boys and 64 girls who had been enrolled in New School classrooms for a minimum period of six months during the 1969-1970 school year. The reference group consisting of 111 students, with 55 boys and 56 girls was drawn from the same geographical location as the experimental group. All students were given the Torrance Tests of Creative Thinking which measured verbal fluency, verbal flexibility, and verbal originality, figural fluency, figural flexibility, figural originality, and figural elaboration. The primary statistical procedures used were multivariate T^2 tests, multiple linear regression, and analysis of variance.

Results

The major conclusions which emerged from this study are as follows:

1. Non-Indian children had a significantly higher mean score in verbal flexibility than the Indian children as measured by the Torrance Tests of Creative Thinking.

2. Non-New School Indian children had significantly higher mean scores in figural fluency and figural elaboration than the New School Indian children as measured by the Torrance Tests of Creative Thinking.

3. There was a significant difference between the New School and non-New School rural children on figural elaboration as measured by the Torrance Tests of Creative Thinking. However, this one significant subtest favoring the non-New School group was not considered sufficient to reject the overall hypothesis.

4. The non-New School urban group scored significantly higher on figural originality as measured by the Torrance Tests of Creative Thinking than the New School urban group.

5. The non-New School group scored significantly higher in figural originality, as measured by the Torrance Tests of Creative Thinking, than the New School group.

6. Among the rural, urban, and Indian groups, the rural group was found to have significantly higher mean scores in verbal fluency and verbal flexibility as measured by the Torrance Tests of Creative Thinking.

CHAPTER I

INTRODUCTION

Background of the Problem

Unleashing the creative potential in man is increasingly becoming understood as a necessity in today's society. Creativity is especially important today when both constructive and destructive knowledge is advancing by the most incredible leaps and bounds. It appears that genuine creative adaptation seems to represent the only possibility that man has in keeping abreast of the great changes taking place in the world.

Rogers (1959) stated that with the rapid advance of scientific discovery and invention, a generally passive and culture-bound people cannot cope with the multiple issues and problems. He felt that unless individuals, groups, and nations can imagine, construct, and creatively devise new ways of relating to these complex changes our culture will perish.

In times of rapid social change and unprecedented scientific advances, people who are rigid and resistant as well as unresourceful, habitbound, and reactionary in their outlook are likely to find, as Zirbes (1959) declared, such a period one of extreme anxiety, confusion, and insecurity for them. Such people become increasingly and cumulatively unadjusted to reality as they continue to resist change

and to seek to hold on to the past. Zirbes felt that children who grow up in this kind of atmosphere are not likely to be the hope of the world unless generous provisions are made for creative release and guidance. Furthermore, she thought that the rising standard of living in the United States has increased the pressures for relief from want in other lands and that this poses a challenge to the creative initiative of the United States to satisfy human needs the world over. Zirbes also declared that creatively perceptive people in time of social change will want to give creative expression to change itself, showing how they see things and themselves in this new light. Thus in giving creative expression to change itself in art forms of their choosing, they enrich not only their own lives and the lives of others, but they also shape change. Finally, Zirbes mentioned that there is something about the strains and tensions of modern living which makes for heightened interest in opportunities for release and recreation. Therefore, increasing hours of leisure need to be matched with fuller and more equitable provisions for creative, non-exploitive uses of leisure.

Another reason for the interest in creativity probably arises from boredom as Guilford (1959) explained. Boredom has been felt to be a creeping disease in modern industry where much of the work no longer requires men and women to do constructive thinking or to make decisions. Creativity can offer release from boredom and add dignity to man.

Peet (1960) felt that creative work helps people to become part of their society by sharing experiences that lead to mutual understanding and consideration. When through the art of communication, an individual wins respective for creative work he has done, he breaks down

the barriers between people and builds up a feeling of unity that brings satisfaction and joy. Without any loss of his identity and sense of power, an individual, through his appreciation of creative work, is brought into close sympathy with others. According to Peet, it is this feeling of sharing a common humanity and common aims that helps each person reach a high degree of development both as an individual and as a social being.

Kubie (1958) maintained that in order to keep children and adults mentally healthy their creative processes must be freed. Barron (1963) thought that if people were helped to become more creative they would as a result also become more successful in their personality integration. Both Rogers (1959) and Kneller (1965) believed that to be creative is to fulfill oneself as a person and thus to become what one has the potential to be. For Bergson (1954) the primary significance of man's creativity is that it represents the core of genuine freedom, for he firmly thought that only a free man can create.

Since creativity is seen to be important to the individual, one would think that in our nation and our culture schools would foster creativity. However still too many schools are organized in a manner that utilizes the closed-structure learning experience in which the goals are established by the teacher with materials, methods, and activity or action specified. Characteristics of the closed-structure learning experience are conformity, importance of product, teacher orientation, autocratic, rigid, other dependent, and convergent thinking. In this type of learning experience there would seem to be limited opportunity for creativity, curiosity, inventiveness, or originality. Guilford (1962) felt that children's creativity could be encouraged by having

children taught in a manner calling for productive thinking rather than rote memorization. Kneller (1965) stated that to learn creatively is above all to learn on one's own initiative. Torrance (1963a, b) also agreed that independent learning fosters creativity. He furthermore recommended experimenting, manipulating, and even aimless play as being conducive to creativity. Combs (1965) stated that creativity is not learned from restraint but calls for an atmosphere that encourages daring and venturing forth.

Statement of the Problem

The major purpose of this study was to determine what differences exist in the creativity of fourth grade Indian, rural, and urban students who have been enrolled in New School classrooms for a minimum of six months and a reference group who have not been enrolled in New School classrooms. This seems appropriate as the New School is fostering individualized and personalized modes of instruction and has as one of its goals increased levels of creativity. The particular aspects of creativity considered in this study were verbal fluency, verbal flexibility, verbal originality, figural fluency, figural flexibility, figural originality, and figural elaboration as measured by the Torrance Tests of Creative Thinking (1966).

Hypotheses

Stated as null hypotheses, the aspects which were studied are as follows:

1. There are no significant differences in creative thinking ability on the verbal and figural sections of the test between Indian and non-Indian children.

2. There are no significant differences in creative thinking ability on the verbal and figural sections of the test between New School and non-New School Indian children.
3. There are no significant differences in creative thinking ability on the verbal and figural sections of the test between New School and non-New School rural children.
4. There are no significant differences in creative thinking ability on the verbal and figural sections of the test between New School and non-New School urban children.
5. There are no significant differences in creative thinking ability on the verbal and figural sections of the test between New School and non-New School children.
6. There are no significant differences in creative thinking ability on the Torrance Tests of Creative Thinking on the verbal and figural sections of the test among Indian, urban, and rural fourth grade children.

Delimitations of the Study

This study involved fourth grade students who were enrolled in New School classrooms during the 1969-1970 school year and a reference group who were not enrolled in New School classrooms. New School students had to be enrolled a minimum of six months in a New School classroom of North Dakota.

Limitations of the Study

This study was conducted under the following limitations and assumptions:

1. It will be assumed that the instruments used in this study are reliable and valid for measuring the variables under consideration.
2. The degree to which creativity was fostered in New School classrooms is limited due to the minimum experience of the teachers in this method of instruction.
3. The time of day the various measures were obtained, the physical health of the children and the testing environment were not specifically controlled in this study.
4. Students who had been in a New School classroom had been so for only a short time (six months minimum) as compared to three or four years of previous non-New School educational experience. Thus, the study is concerned with the short term effects of this approach, rather than measuring long term effects.

Significance of the Study

Creative ability can be seen as one of the most prized of human qualities. Therefore, it would seem that educational programs should foster creativity in the classroom. However, Torrance (1965) indicated that most school children are inadequately prepared for creative thinking. Furthermore, the closed-structure type of learning experience with its emphasis upon the learning of facts rather than the development of creativity is still prominent in many classrooms. An "open-ended" curriculum plus emphasis on creative expression as advocated by the New School, would seem to do much to foster creativity in children.

Evaluation is an important and essential part of any new experimental program in education. This study attempts to evaluate the effects of such an "open-ended" curriculum with its emphasis on creative expression as advocated by the New School as compared with many non-New School classrooms. Because of the short duration of the exposure of the students to a New School classroom (six months minimum), the short term effects of such a school arrangement are the concern of the present study. Future studies that could be conducted might then be directed to the long term effects of the New School classrooms.

Definition of Terms

The following terms as they are used throughout this study are defined as follows:

Creativity, Creativeness, and Creative Ability: These terms refer to the process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; the finding of new solutions to a problem, filling in gaps of knowledge, finding missing elements, disharmonies, new modes of artistic expression, and so on; and finally communicating the results. "Creativity," "creativeness," and "creative ability" are used synonymously in this study.

Verbal Fluency: The scores obtained from Torrance Tests of Creative Thinking prepared by Torrance (1966). These scores reflect the test taker's ability to produce a larger number of ideas with words.

Figural Fluency: The scores obtained from Torrance Tests of Creative Thinking prepared by Torrance (1966). These scores reflect

the test taker's ability to produce a larger number of ideas with figural representations.

Verbal Flexibility: The scores obtained from Torrance Tests of Creative Thinking prepared by Torrance (1966). These scores reflect the test taker's ability to produce a variety of kinds of ideas, to shift from one approach to another, or to use a variety of strategies.

Figural Flexibility: The scores obtained from Torrance Tests of Creative Thinking prepared by Torrance (1966). These scores reflect the test taker's ability to produce a variety of kinds of ideas through figural representations.

Verbal and Figural Originality: The scores obtained from Torrance Tests of Creative Thinking prepared by Torrance (1966). These scores represent the test taker's ability to produce verbal and figural ideas that are away from the obvious, commonplace, banal, or established.

Figural Elaboration: Scores obtained from Torrance Tests of Creative Thinking prepared by Torrance (1966). These scores represent the test taker's ability to develop, embroider, embellish, carry out, or otherwise elaborate ideas.

New School Classroom: Classroom conducted by a New School intern during the 1969-1970 school year.

Non-New School Classroom: Classroom conducted by a teacher not enrolled in the New School program.

New School Intern: One who has participated in the New School preparation program for teachers of elementary school children. The basic content of such teacher education being in the humanities and the behavioral sciences. Since the New School subscribes to the belief that each child's educational needs be considered as paramount

and that flexibility so permeate the schools that the interests, abilities, and needs of each student be taken into account and since the New School also seeks to maximize the development of creative expression and quanitative reasoning, the teacher preparation program is so constructed as to give the same consideration to its students. Some of the interns who entered at the beginning of their master's degree program have only had the benefit of one summer of study under the New School program, whereas a few who entered the program in their senior year had at least a year and a summer under the New School teacher preparation program.

Indian: Those children who are listed on the tribal records as being full blooded Indian or having part Indian blood.

Rural: Communities having a population of less than 2,500.

Urban: Communities having a population over 2,500.

Organization of the Study

The remainder of this study is organized as follows:

1. Chapter II contains a review of literature pertaining to creativity, information about the New School, and related research.

2. Chapter III includes a description of the research population, instruments used, and the procedures used in analyzing the data.

3. Chapter IV includes the results of the study.

4. Chapter V is composed of the summary and conclusions.

CHAPTER II

REVIEW OF LITERATURE

There is no single widely accepted definity or theory of creativity, therefore during the first part of this chapter, various definitions and theories of creativity will be considered. None of the theories is exhaustive or complete, but each contributes its own insights to this complex problem. In the second part of the chapter, classroom conditions that foster creativity will be considered. A description of the New School is also included in this part as the New School is central to the construct of this study. Research pertinent to creativity in the classroom and to the problems under consideration will be reviewed in the final section of this chapter.

Definitions of Creativity

The definition and the identification of creativity is a question that has troubled researchers for years. Ghiselin (1958, p. 141) summed up the difficulty regarding the elusiveness of the term "creativity" when he stated the following:

> Investigation of creativity has been hampered by a most crucial difficulty: The very subject of investigation is ill-defined and elusive. There is yet no settled agreement upon exactly what modes of behavior and what characteristics of products can with truly clear justification be called creative. In the lack of adequate criteria, judgment has been guided by impressions, mainly proximate criteria, thoughtfully developed and employed, yet uncorrected by those ultimate criteria which alone could assure their validity.

Fromm (1959) wrote that producing something new which can be seen or heard by others, such as a painting, a sculpture, a musical composition, a poem, or a novel is creative if the product is of novel construction. This novelty would be the result of the unique qualities of the individual in his interaction with the materials of experience. According to Fromm, this kind of creativity always has the stamp of the individual upon its product, but at the same time the product is not the result of the individual or his materials, but partakes of the relationship between the two. This kind of creativity elicits a certain degree of recognition as being valuable either to others or to the person himself.

A slight variation in the previous definition of creativity was given by Drevdahl (1956, pp. 21-26) who defined creativity as " . . . the capacity of persons to produce compositions, products, or ideas of any sort which are essentially new or novel, and previously unknown to the producer." According to Drevdahl it need not have immediate practical application or be a perfect product.

Eisner (1963) defined creativity as the process of using one's intelligence in finding answers or solutions to problematic situations that are personally novel. This definition implies that the answers or solutions need not be new to others.

Newell, Shaw, and Simon (1962) thought that creativity is simply a special class of problem-solving activity characterized by novelty, unconventionality, and persistence. Their analysis indicated that unconventionality is a necessary but not sufficient condition of creativity.

Stein (1953) also stated creativity to be that process which results in a novel work, but he added that the work be accepted as tenable or useful or satisfying to a group at some point in time. He defended the use of the value criterion on the grounds that almost any criterion of creativity has its roots in the judgment of others.

In his definition Selye (1962, p. 402) stated that basic discoveries or creative contributions possess to a high degree and simultaneously three qualities: "They are true not merely as facts but also in the way they are interpreted, they are generalizable, and they are surprising in the light of what was known at the time of the discovery."

Spearman (1930) saw creative thinking basically as a process for seeing or creating relationships, with both conscious and subconscious processes operating. He believed that when two or more concepts or ideas are given, a person may perceive them to be in various ways related and also that when any item and a relation to it are cognized, then the mind can generate in itself another item so related.

A number of investigators (e.g., Crutchfield, 1962; Wilson, 1956) have defined creativity by contrasting it with conformity. Conformity has been seen as doing what is expected and not disturbing or causing trouble for others and creativity has generally been seen as contributing original ideas, different points of view, and new ways of looking at problems.

Fromm (1959) also defined creativity as an attitude. It is simply the ability to see (or be aware of). In full awareness there is no abstraction as in conceptual knowledge. This awareness pertains to both people and objects. In regard to human beings it means

seeing the other person as he really is, in his uniqueness, without the distorting influence of one's own projections and emotions.

Creativity is also defined as a process of self-realization, as a means of growth of the personality and the spirit. Forslund (1961) termed it "creative living" and Maslow (1959) called it "self-actualization." This refers to a deep involvement with the self, seen as a distinctive part of the environment--curious, imaginative, free, yet requiring no internalized discipline. It embodies keen and clarified perceptions, sensitivity to experience, honest and unprejudiced reaction, complete absorption in the experience, and willingness to work for fresh insight. To each person it gives a means of organizing his own feelings and perceptions into a sense of individual wholeness. Recognizing this unique self as the only thing an individual has to give to the world, creativity is here the act of discovering "I" and one's relationship to the exterior world. This sense of "I" means that one experience oneself as the true originator of one's acts. Maslow (1959, p. 94) stated that this type of self-actualizing creativeness " . . . must ultimately be defined as the coming to pass of the fullest humanness . . ."

After analyzing the diverse ways of defining creativity and after considering the requirements necessary for keeping a program of research focused on factors affecting creative growth in context, Torrance (1966, p. 6) defined creativity as follows:

> . . . a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on: identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies; testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results.

Torrance stated that he favored this definition for several reasons, one reason being the strong human needs involved at each stage. He thought that when a person sensed any incompleteness, something missing or out of place, tension is aroused. Then in order to relieve this tension one would begin investigating, asking questions, manipulating things, making guesses and the like. This tension, Torrance stated, continues through testing, modifying, and retesting of the guesses or hypotheses, finally to be relieved when one communicates what one had discovered. A second reason for favoring this definition of creativity, Torrance explained, is that it permits the operational definition of the kinds of abilities, mental functions, and personality characteristics that facilitate or inhibit the creative process. A third reason for favoring the definition was that it provided an approach for specifying the kinds of products that result from the process, the kinds of persons who can engage most successfully in the process, and the conditions that facilitate the process.

Selected Theories of Creativity

At the present there does not appear to be a universally accepted theory of creativity, but there are a number of different theories. One view of creativity maintains that it derives its force from God. Berdyaev (1937, p. 163) held this view when he wrote "Creativeness is only possible because the world is created, because there is a Creator. Man, made by God in His own image and likeness, is also a creator and is called to creative work."

The biologist Sinnott (1959) regarded creativity as response to environment. The life of the mind, like all life, has its basis

in the genetic constitution of the individual, but its changes are the result of the enormously varied responses of a given genetic constitution to environmental differences. Later, Sinnott (1962) came to think that life itself is creative because it organizes and regulates itself and constantly engenders novelties. He stated that while in physical evolution these novelties arise in response to genetic change and to changes in the environment, in man there consciously appears the power to initiate novelty, namely, the power of creative imagination. This power, Sinnott stated, is evident in man's ability to find order in a mass of particulars and to impose meaning and pattern on a multitude of things or experiences that at first seem unrelated.

Gutman (1961) also attempted to establish a link between the creative abilities of man and the creative processes inherent in life. His main thesis is that " . . . the creative activity of man is essentially a reenactment of the biological principle of self duplication, projected into the behavioral level" (Gutman, 1961, p. 424). As evidence, Gutman cited the self-duplication of the DNA molecule. He stated that while the exact nature of the process is unknown, it is known that they construct their doubles from material they find in their environment. When the DNA molecule duplicates itself it is a direct copying of its own structure that takes place. In all other instances " . . . the process of self-duplication makes use of construction plans which are 'decoded' or 'translated' into directive 'commands' or instructions" (Gutman, 1961, p. 427). Gutman further explained that man's creations are not really duplications of self but rather symbolic representations of some of his structural or functional aspects. Man, he believed, utilizes methods analogous

to the self-duplicative activities on the biological level. Either his body is used as a template or he uses his own inherent structural or functional organization as a blueprint for the construction of his own creation.

Gutman further attempted to unite man and his creativity with nature and the entire cosmos. Man is seen as one more example of the universal principle of periodicity when Gutman stated that:

> Man's creativity is related to his own biological nature as life is related to the cosmos of the inanimate world. In his creative activity he extraverts his biological nature and uses the principles he finds in it as themes upon which he elaborates. But, since his biological nature, in turn, is founded upon inanimate cosmos which constitutes the material basis of his soma, he shares in all of cosmos (Gutman, 1961, p. 456).

Kneller (1965) believed that Freudian psychoanalysis has provided the fundamental ideas that guide contemporary research into creativity. Freud (1949) stated that creativity originates in a conflict with the unconscious mind (the id). In time the unconscious produces a "solution" to this conflict. If the solution reinforces an activity intended by the conscious part of the personality then it will result in creative behavior. However, if the id is at odds with the ego, the id will either be represeed altogether or it will emerge as a neurosis. According to this theory both creativity and neurosis share the same source--conflict in the unconscious and both the creative person and the neurotic are driven by the same force--the energy of the unconscious. Thus, according to Freud, the creative person accepts the free rising ideas of his unconscious mind and is able to slacken to ego's control over the id so that the creative impulses, generated by the unconscious to solve its conflicts may cross the threshold of consciousness.

Kubie (1958) held to the principle that creativity is the product of the preconscious rather than the unconscious mind. Kubie stated that the preconscious is similar to the computer in that it can be the direct recipient and utilizer of data, thus bypassing the slower conscious processes. This phenomena Kubie demonstrated in an experiment. A subject was shown a strange room for several minutes. Then he was asked to list the items he saw in that room. The subject remembered about thirty items. However, under hypnosis he was able to recall some two hundred other items. This, Kubie maintained, was evidence of the great amount of intake, registering, recording, and recalling which occurs without conscious awareness. Thus, he reasoned that the preconscious can contribute to creative activity because of its ability to range freely among ideas, in its ability to gather, assemble, compare, and reshuffle ideas into new patterns. Kubie thought that either end of the psychological spectrum is characterized by rigidity--the conscious in precise literal conceptual and perceptual units and the unconscious in unreality, in disguised, impenetrable symbols, but that it is the preconscious type of symbolization which frees man's psychic apparatus from rigidity. Two concurrent goals are thought to be accomplished by the free play of the preconscious. It provides a stream of old data rearranged into new patterns and combinations and " . . . it exercises a continuous selective influence not only on free associations, but also on the minutiae of living, thinking, walking, talking, dreaming, and indeed in every moment of life (Kubie, 1958, p. 39).

Kubie posited that after the new patterns are developed, then the conscious process of checking and testing takes over. This would

require the ability to transcend oneself and look at the product as a third person. It would involve a transition from preconscious functioning to conscious objective self-criticism. At the same time, Kubie thought that it also required a " . . . purging of conscious and preconscious processes of the unconscious ax grinding which arises out of deeper levels of conflict and pain" (Kubie, 1958, p. 58).

Synectics is a theory that applies to the " . . . integration of diverse individuals into a problem-stating, problem solving group. It is an operational theory for the conscious use of the preconscious psychological mechanisms present in man's creative activity" (Gordon, 1961, p. 3). The purpose of the Synectics' process is to increase the probability of successful creative activity involving the making of the strange familiar and the making of the familiar strange.

Gordon pointed out that in any problem-stating, problem-solving situation, the individual has to first understand the problem. This the human mind attempts to accomplish by making the strange familiar. "The mind," Gordon (p. 34) stated, "when faced with strangeness attempts to engorge this strangeness by forcing it into an acceptable pattern or changing its (the mind's) private geometry of bias to make room for the strangeness."

While Gordon believed that most problems are not new, the challenge is to view them in a new way which opens the way to a new basic solution. In this the second Synectics process is involved--making the familiar strange. Gordon (1961, p. 34) explained this process as follows:

> To make the familiar strange is to distort, invert, or transpose the everyday ways of looking and responding which render the world a secure and familiar place. . . . It is the conscious attempt to achieve a new look at the same old world, people, ideas, feelings, and things.

Four mechanisms have been identified for making the familiar strange. These mechanisms, each metaphorical in character, are: (1) Personal Analogy, which requires the individual to make a personal identification with the elements of a problem; (2) Direct Analogy, which requires the individual to make actual comparisons of parallel facts, knowledge, or technology; (3) Symbolic Analogy, which requires that the individual uses objective and impersonal images to describe a problem; and (4) Fantasy Analogy.

Koestler (1964) believed that all creative processes share a common pattern which he called bisociation. Bisociation is the connecting of previously unrelated levels of experience or frames of reference. Thus, Koestler thought that in creative thinking a man thinks simultaneously on more than one plane of experience, whereas in routine thinking he follows paths worn by past association.

Guilford advanced the factor analysis theory of creativity. Guilford (1959, 1966) maintained that the intellect consists of 120 separate abilities, 80 of which are known. Using a theoretical model--The Structure of Intellect, he organized these abilities according to three dimensions or classifications. One dimension for classifying intellectual abilities is by the operation involved. There are five major operations--memory, cognitions, divergent production, convergent production, and evaluation. A second dimension for classifying intellectual abilities is according to the content or material utilized. The content factors identified are the

figural, the symbolic, the semantic, and the behavioral. The third dimension in the classification of intellectual abilities is that of the product obtained from the combination of an operation with a material. Thus far, six types of products are known--units, classes, relations, systems, transformations, and implications.

Guilford (1966), hypothesized divergent production to contain some of the most directly relevant intellectual abilities for creative thinking and creative production. Sixteen of the twenty-four factors of the potential divergent thinking operation have been identified. The identified factors are: figural fluency, word fluency, ideational fluency, figural spontaneous flexibility, symbolic spontaneous flexibility, semantic spontaneous flexibility, divergent production of symbolic relations, associational fluency, divergent production of figural systems, divergent production of symbolic systems, expressional fluency, figural adaptive flexibility, originality, figural elaboration, symbolic elaboration, and semantic elaboration. Divergent thinking was defined by Guilford as reaching toward novelty, being fluid with associations, words, ideas, and manifesting flexibility in changing classes of objects. It also involves a probing for new dimensions of problems.

Fostering Creativity in the Classroom

The teacher appears to be one of the prime factors in developing creativity in children. Mearns (1935) stated that the teacher must possess a positive attitude toward the creative life, for without it the teacher is not likely to be discriminative enough to make sound judgments or choices that pertain to it. Teachers, Mearns continued,

also need to approve behavior which shows creativeness. Furthermore, Mearns stated, teachers must help children grow in taste; for if there is no one to suggest to children the difference between good and bad work, they may even turn away from the sure voice of the instinctive creative spirit within them to copy inferior work. Finally, Mearns stated, that once the teacher has uncovered a bit of genuine creative expression, she must begin the cultivation of a liking for it in the child who brought it forth, for it is not often a thing the child himself would prefer at first among the many offerings of his mind.

Zirbes (1959) would have teachers foster creativity by creating a warmly human classroom environment in which regimented routines do not take priority over human values. Teachers, she said, must value the student as a person if creative potentials are to flower. Next, she stated that teachers should possess the insights and understandings of the human or behavioral sciences on the one hand and with the other evoke and sustain aspirations. The teacher, Zirbes continued, should act as the catalyzer in developing the creative potential for it is she who brings children, experience, and expression together. It is the teacher who opens the doors to every media of expression.

Forslund (1961) stated that teachers must seek to know the individual child, for when the child's interests, desires, and tolerances are known then the teacher is more apt to provide the time and psychological climate for creativity. Forslund would also have the teachers train themselves to spot the crude manifestations of real creativity so that they may be able to convince the young creator of its merit and in so doing lead other children

to express themselves more freely. Teachers, Forslund said, should teach children that their every day happenings are alive, important, and interesting to others. To foster creativity, Forslund mentioned that teachers hold up the child's worthwhile efforts so that he may see it, even if it is only a phrase, a partial idea, an imperfect result that catches a tiny grain of the real self. This, Forslund stated, helps a child in discovering his best. Perhaps one of the most important requirements for the creative teacher, Forslund wrote, is that she keep alive some of her own child-like individuality, some of her unique and egoistic self if she hopes to inspire in children a zest for life and learning.

Wilt (1963) stated that the teacher should possess humility. The teacher should recognize, Wilt said, that she cannot possibly know everything, that there is much that children can teach her, and that she may never equal some children in perception and awareness. Wilt further stated that teachers should have an honest concern for building habits of self-respect, direction, and control; for creative learning requires the giving of oneself wholly to whatever is being done at present, not in rebellion, or indulgence, not in feverish activity, but in quiet, patient discipline and concentration. Wilt also said that teachers who value creativeness will teach children to let no man be their measuring stick, for the creative work is not always immediately recognized as such by others.

Torrance (1963a) suggested that teachers establish a creative relationship with children. He said that such a relationship requires a willingness on the teacher's part to permit one thing to lead to another, to embark with the child on an unknown pathway. To allow the child to feel free to express his genuine feelings, Torrance

stated, the teacher must provide the child with the necessary psychological safety. Torrance also felt that teachers must reward creative behavior if they want children to think creatively. This, he said, could be done through the kinds of personal characteristics teachers encourage or discourage and by the way they treat children's curiosity needs. To further foster creativity, Torrance stated that teachers should make assignments which call for original work, self-initiated learning, experiments and the like. Torrance (1961) also suggested the following ways of facilitating creativity: (1) be respectful of unusual questions asked by children, (2) respect imaginative or unusual ideas given by children, (3) show children that their ideas have value, (4) occasionally have pupils do something "for practice" without the threat of evaluation, and (5) tie in evaluation with causes and consequences.

Peterson (1970) stated that the creative teacher's primary task is to find and give direction and his second responsibility is to enable each student to become his own teacher. The student's creative task, as stated by Peterson, is to create anew out of how and what he has learned.

Hollister (1961) also suggested that integration of learning is desirable for creative performance for it allows for a new synthesis of constructs; better and more complete meshing of thoughts, feelings, and time sequences; better ability to cope with and handle process, more complicated mental strategies, and a higher level of adaptation. The end result of the integrative process, Hollister said, would be to make students more creative since they are able to bridge wider gaps and to make more complex closures.

Nash also mentioned that teachers who wish to encourage creativity must resolutely oppose the concept of education as information feeding, for ready made thoughts that have to be absorbed into the memory work against originality.

Some of the hypotheses raised by Barron (1963) about creative people have educational implications as stated by Gowan (1967). Barron hypothesized that original persons prefer complexity and some degree of apparent imbalance in phenomena. This caused Gowan to suggest that teachers should not attempt to structure too highly the experiences of children. Barron further hypothesized that original persons are more independent in their judgments. Thus, Gowan suggested that teachers encourage the child's personal ability to evaluate. A third hypothesis made by Barron stated that original persons are more self-assertive and dominant and that their organization of their environment is more complete. This organization, Gowan advised, needs wise help, not smothering by the teacher. A fourth hypothesis of Barron's stated that original persons reject suppression as a mechanism for impulse control. Teachers, Gowan advised, should try to discriminate such children's constructive nonconformity from the nonconformity of the true problem case. A fifth hypothesis of Barron's concerned the characteristics of energy, femininity of interests, and general effectiveness of performance found in many original people. Each of these traits, Gowan felt, involve facilitating adaptions by teachers in providing activities to consume the child's unbounded energy, in emphasizing feminine (verbal) interests, and rewarding effectively in a wide range of performance and not just in the narrow nexus of grade-getting. Differentiation, Gowan stated, also helps to promote

creativity. He thought that fostering discrimination in the growing child between self and others, between reality and fantasy, between symbol and reality, between the subjective and the objective, between emotions and body feelings, between the ideal self and the real self, between means and ends, between the concrete and the symbolic all help the child to become more mentally healthy and therefore more creative.

Nash (1966) made a number of statements regarding the fostering of creativity in the classroom. He felt that the educational process must not neglect the nurture of the beautiful, for one of the greatest fruits of an esthetic education is that it enables an individual to better understand himself and thus find within himself the hidden sources of his creative energies. In order for the child to be creative, the teacher should teach him to see, to use his eyes for observing and comparing as well as recognizing. Furthermore, Nash felt that too often children are taught what to feel and what is respectable or fashionable to feel, but if they are to be creative, then they must be enabled to experience their own genuine emotions. Submission to the discipline of work is also necessary for creativity. Nash suggested that teachers arrange the classroom situation so that the child can involve himself deeply with the material studied and with the learning process. Nash also believed that if a child is to learn new concepts, new ways of perceiving and thinking about the world, he must become aware of his preconceptions, recognize his familiar habitual patterns, and what has been built into his frame of reference and so guides, directs, or even coercively controls what he learns.

From the foregoing it would seem that it is the responsibility of the teacher to set conditions in the classroom that are

conducive to fostering creativity. To achieve a creative society it may be necessary, as Gowan, Demos, and Torrance (1967) indicated, to educate and develop teachers who think and teach for creativity.

Description of the New School

The New School of Behavioral Studies in Education was established in the spring of 1968 by the State Board of Higher Education as an experimental college component of the University of North Dakota. A major reason for the establishment of the New School (1970) was to initiate constructive change in the schools of North Dakota.

Perrone and Strandberg (1971) stated that the basic thrust of the New School program is to prepare teachers who are better equipped, both in psychological disposition and in academic preparation, to individualize and personalize the instructional programs in their classrooms. It is hoped, they said, that such teachers will be better able to create classrooms that are more conducive to the affective and cognitive growth of the children. Furthermore, it is anticipated that the classroom environment created by such teachers will improve the quality of interpersonal relationships between students and teachers and also that the levels of critical thinking and creative expression will rise. Operating on the assumption that teachers teach essentially as they have been taught, and since the New School wants its teachers to be able to infuse a spirit of inquiry and to develop a capacity for discovery among elementary school children, it was felt that these qualities be nurtured in the college academic program--even to the point of giving students the opportunity to formulate and operate on their own beliefs what is essential for teaching.

The New School (1970) desires to foster classrooms where learning is rooted in the child's experiences and where what is learned is relevant to the child and can be put to some use. It desires classrooms where an atmosphere of mutual trust and respect exists between teachers and pupils and where children are able to initiate activities, direct themselves, and take responsibility for their learning. While basic curricular skills will still need to be developed, teachers are not bound to a fixed method or schedule. In regard to the communication skills, the New School believes that reading, writing, speaking, and thinking develop more effectively if they are taught in the context of learning situations which stimulate children's imagination and thought and which as a consequence foster their desire to communicate. The New School would also have its teachers able to diagnose the common learning problems that children have and make provisions for working with individuals or groups to remedy the problem so that a steady skill development can take place in each pupil.

While no two classrooms are alike, most of them share a number of common characteristics. There is available to the children a rich assortment of materials to explore, manipulate, construct, and use in various ways. Space is divided into flexible activity areas that are inviting to children. There may be science centers, mathematics centers, language arts centers, cooking centers, and whatever else the teacher feels may help to develop the children's skills, understandings, and appreciations.

Children engage in a variety of activities, working both individually and in small groups. Furthermore, children are provided with many options that will get them actively involved in learning but which

still will permit them to set their own priorities. This makes it possible for children to test their ideas, find their strengths and weaknesses, and share what they have learned with others.

The teacher's primary role is one of observing, stimulating, and assisting children in their learning. The teacher tends to give children small concentrated amounts of her time rather than giving general attention to the children as a class all day. Instead of concentrating on giving assignments, the teacher amplifies and extends the possibilities of the activities children have chosen through individual conferences and the introduction of related material. Evaluation is used by the teachers to secure information on how to better encourage and provide for children's learning.

Pederson (1971, p. 248) described entering a New School classroom as follows:

> To enter one of the New School classrooms is to enter a sea of activity; children are involved simultaneously in a variety of operations. Some are working individually; others with partners, in teams and in small groups. Older children are tutoring younger children. Fives and sixes may be together in one classroom with the seven- and eight-year olds together in another room. Also noticeable is the flow of children from one room to another. A hum of industry permeates the classrooms. You can readily observe that the emphasis has shifted from teaching to learning.

The foregoing remarks appear to agree with a statement made by the dean of the New School (Perrone, 1969), in which he stated that "The program presupposes that children come with an intrinsic interest in learning. If the options are wide they will find something that will help them learn. It requires a great deal of interaction with them on an individual basis."

The New School for Behavioral STudies in Education and the College of Education were combined into one unit on July 1, 1972. While several changes could be expected in the new organization, the emphasis on individual freedom could be expected to continue.

Related Research

One frequently cited research study in the measurement of creativity was reported by Getzels and Jackson (1962). In an attempt to find out what variables were significant in differentiating the highly creative adolescent from the highly intelligent adolescent, Getzels and Jackson drew upon a sample from a midwestern private secondary school. The measures of intelligence used were the Stanford-Binet, WISC, or Henmon-Nelson. Scores on the latter two tests were converted by regression equations to comparable Stanford-Binet I.Q.'s. The measures of creativity were tests adapted from Guilford or Cattell, or constructed by the investigators. Summated scores on the five creativity measures and intelligence scores were used to set up two experimental groups: one, a high creativity group composed of students in the top twenty per cent in creativity, but not in the top twenty per cent in I.Q.; the second, a high intelligence group composed of students in the top twenty per cent in I.Q., but not in the top twenty per cent in creativity. There were 26 students in the high creativity group. The average I.Q. of this group was 127. In the high intelligence group there were 28 students. The average I.Q. of this group was 150.

The first two and most essential findings of this study were: (1) A relatively low relationship was found between the I.Q. measure

and measures of creativity (at least at the I.Q. levels of these subjects). (2) Despite the 23-point difference in I.Q., the high I.Q. group (average I.Q. 150) and the high creativity group (average I.Q. 127) demonstrated equal superiority in scholastic performance as measured by standard achievement tests.

Getzels and Jackson also found that teachers favor high achievers who are high I.Q.'s, but not high achievers who are high creatives. Both high I.Q.'s and high creatives agreed on what qualities teachers prefer in their students. If was found that for the high I.Q. students the relationship between the qualities they value for themselves and those they believe lead to "success" in adult life were quite close. However, for the high creativity students the relationship between the qualities they value and those they believe lead to "success" as adults was virtually nil. These students appeared not to be highly success oriented (at least not by conventional standards of adult success). The study also indicated other findings which are not given here.

Williams, Harlow, and Borgen (1971) studied the relationship between achievement in arithmetic with three measures of creativity and a measure of dogmatism. The Iowa Tests of Basic Skills (ITBS) were administered to 483 fourth, fifth, and sixth grade students in Minot, North Dakota. Two groups were formed on the basis of total scores on the two arithmetic subtests of the ITBS: a high arithmetic achievement group, and a low arithmetic achievement group. Each group had 161 members. However, only the high arithmetic achievement group (those who had scored 38 or higher on the total score of the two arithmetic subtests) and the low arithmetic

achievement group (those who had scored below 28 on the total scores of the arithmetic subtests) were used in the study. Four additional tests were given to the high and low arithmetic achievement groups--three tests of creativity originally developed by Guilford and one test to measure dogmatism. The three tests of creativity each measured one dimension of creativity. The dimensions of creativity measured were fluency, flexibility, and originality. A measure of dogmatism, the elementary school form of the dogmatism scale, devised by Figert (1968) was also administered. This study found that the high arithmetic achievement group outperformed the low arithmetic achievement group on each measure of creativity, with each test significant at the .001 level. However, on the elementary school form of the dogmatism scale, there was no significant difference between the two groups.

Investigators in the field of creativity have long given attention to the role of manipulativeness in invention and scientific discovery. When Torrance (1964) investigated the manipulativeness of first, second, and third graders it was found that boys and girls are alike with respect to manipulativeness in grade one, but are significantly different in grade two, and greatly different in grade three, with boys being more manipulative.

Since authorities in the language arts field held a diversity of points of view regarding what should be rewarded in children's writing, Torrance (1964) decided to conduct a simply study to investigate the effects of differential rewards on the creative writing of sixth grade children. Each one of the two groups was told that a two dollar award would be given to the best story.

However, Group A was told that while their stories should be interesting and original, the main thing is to avoid making errors. Group B was told that they will want to write legibly and correctly, but the thing that really counts is interest and originality. The results showed that the primary reward for originality resulted in a higher level of originality and interest (both at the .01 level). The primary reward for correctness resulted in fewer errors and a high proficiency index of correctness (both at the .01 level). The study supported the contention that children tend to achieve along whatever lines they are rewarded.

Torrance (1964) also made a study to ascertain the extent to which preadolescent children perceive the existence of pressure against divergency in seven different cultures. The study showed that about one-half of the subjects do perceive the existence of pressure against divergent behavior. All of the New World groups (Twin Cities, International Falls, and Puerto Rico tended more frequently to perceive pressures against divergency than the Old World groups (England, France, Turkey, and Greece). The difference in proportion being significant at the .01 level. In comparing the sources of such pressures, Torrance found that pressures from self, peers, and society were each significant at the .001 level. Parents as a source of pressure were found to be not significant.

Doyle (1970) investigated the hypothesis that Negroes will display creative talent superior to that of their Caucasian classroom peers using a t test calculated on verbal fluency scores for the two groups. Although the hypothesis was not statistically supported, there was a tendency toward Negro superiority on the creative talent measure.

Torrance (1971) found that the Torrance Tests of Creative Thinking have demonstrated their ability to identify creativity among children from disadvantaged or culturally different groups. The stimulus items used for the tests were found to be objects and designs that are either common or uncommon for all children. Only slight differences were found between black and white groups and between middle- and low-income groups. It was also found that these differences disappeared in some experiments where rapport was established and the testing atmosphere relaxed. Furthermore, the results of several studies with the Torrance tests demonstrate that minority children have the ability to create, if they are given the opportunity at school and at home.

Irons (1968) conducted a study to determine if there were significant differences in the creative thinking abilities of students attending certain rural and urban elementary schools in Northeast Texas. Irons found that significantly higher overall scores were demonstrated by urban students. He concluded that within the scope of his study, creative thinking abilities are influenced by the urban-rural factor. This study further showed that urban students have a significantly greater facility for supplying a large number of ideas, whether the task required writing or sketching. It was also found that greater talent for verbal expression appears to be associated with urban students. Urban students demonstrated the ability to produce a greater number of ideas, a greater variation of ideas, and more original ideas than students in rural schools. Both the capability of expressing non-verbal ideas in variety, originality, or elaboration and the elaboration of ideas in detail appeared to be autonomous of the environment.

Singh (1968), using the Meffessel Individual Test of Creativity, found that there were significant differences between privileged and under privileged children in favor of underprivileged on redefinition (verbal), redefinition (performance), fluency (verbal), sensitivity to problems (performance), and elaboration (verbal). He further found significant differences in favor of privileged children on flexibility (performance), originality (verbal), and originality (performance). Singh also found that the overall findings did not reflect race.

Part of Mayhon's (1966) study was to test the null hypothesis that no significant differences in creativity exist among differing ethnic groups of ninth graders attending small public high schools in New Mexico. There were three ethnic groups--the Anglo group, the Indian group, and the Spanish group. The Minnesota Tests of Creative Thinking, abbreviated form VII were used. Mayhon found that the Anglo group differed significantly (.01 level) from both the Indian group and the Spanish group, with the higher creativity mean favoring the Anglo group. While there was a 12 point difference between the Indian group and the Spanish group, in favor of the Spanish group, the difference was not significant at the .01 level.

Burgess (1971) used 104 pupils randomly selected from regular fourth-, fifth-, and sixth-grade classrooms of 14 teachers who had been equally divided on a rank-order scale of high-to-low creativity. Teacher categories were determined by composite scores on the Omnibus Personality Inventory and the Torrance Tests of Creative Thinking. Pupils were pre- and post-tested with the Torrance Tests of Creative Thinking. Burgess found that: (1) The level of teacher creativity was not found to be statistically significant for pupil performance

on the tests of creative thinking. (2) Pupil age differences were found to be statistically significant at the .05 level on the verbal fluency scale and at the .01 level on the verbal originality scale of the tests of creative thinking. (3) Pupil sex differences were found to be statistically significant at the .05 level on the verbal fluency scale of the tests of creative thinking. (4) Pretest to posttest differences were found to be statistically significant at the .01 level on the verbal fluency, verbal originality, figural originality, and figural elaboration scales of the tests of creative thinking.

Summary

Creativity has been reviewed with respect to definitions and theories. Also reviewed were ways of fostering creativity in the classroom, a description of the New School, and research pertaining to creativity and the classroom. No single encompassing definition of creativity has yet emerged. There are many different theories of creativity. The teacher appears to be the most important factor in the fostering of creativity in the classroom. The New School encourages a classroom atmosphere that is relatively free from pressure, utilizes the individualized approach to learning, provides a rich assortment of materials to explore and use, and allows students freedom to interact with each other. Research indicates that creativity and intelligence are not synonymous and that there are many factors affecting creativity in the classroom.

CHAPTER III

METHODOLOGY AND PROCEDURES

The major purpose of this study was to determine what differences exist in creativity between Indian, rural, and urban fourth grade students who have been enrolled in New School classrooms for a minimum of six months and a reference group of Indian, rural, and urban fourth grade students who have not been enrolled in New School classrooms. The particular aspects of creativity considered in this study were verbal fluency, verbal flexibility, verbal originality, figural fluency, figural flexibility, figural originality, and figural elaboration. The relationships were investigated under the following hypotheses:

1. There are no significant differences in creative thinking ability on the verbal and figural sections of the test between Indian and non-Indian children.

2. There are no significant differences in creative thinking ability on the verbal and figural sections of the test between New School and non-New School Indian children.

3. There are no significant differences in creative thinking ability on the verbal and figural sections of the test between New School and non-New School rural children.

4. There are no significant differences in creative thinking ability on the verbal and figural sections of the test between New School and non-New School urban children.

5. There are no significant differences in creative thinking ability on the verbal and figural sections of the test between New School and non-New School children.

6. There are no significant differences in creative thinking ability on the Torrance Tests of Creative Thinking on the verbal and figural sections of the test between Indian, urban, and rural fourth grade children.

The Sample

The research population used in this study consisted of 237 fourth grade students. The sample included 120 girls and 117 boys. Table 1 gives a summary of the sample.

TABLE 1

SAMPLE LOCATION AND SIZE

	Experimental				Reference		
School	Girls	Boys	Total	School	Girls	Boys	Total
Urban				Urban			
McKinley	12	13	25	Washington	10	12	22
Madison	10	15	25	Wilson	15	9	24
Rural				Rural			
Lakota	11	8	19	McVille	8	9	17
Lakota	11	9	20	Tolna	8	8	16
Indian				Indian			
Belcourt	10	12	22	Belcourt	9	9	18
Cannon Ball	10	5	15	Fort Yates	6	8	14
Totals	64	62	126	Totals	56	55	111

The population for the urban group came from Fargo, North Dakota. Fargo, with a population of 53,365, is the largest city in the state. It is located in the southeastern part of North Dakota.

The sample for the experimental group was drawn from Madison School and McKinley School. Madison School is located in an area of small older homes that are mostly privately owned or rented. The school is near an area of grain elevators, warehouses, and other commercial buildings. The achievement scores for the Madison and Wilson Schools on the Iowa Tests of Basic Skills which were given in the fall of 1969 are among the lowest norms reported by the Fargo Public Schools. Using percentile scores, the Madison fourth graders scored 23 and the Wilson fourth graders scored 46 in reading, in the language skills Madison scored 13 and Wilson 26, and the composite test score was 18 for Madison and 38 for Wilson. McKinley School is located in the newer northern residential section of the city. It is in an area of medium-sized private homes and fairly new apartment buildings.

Woodrow Wilson and Washington Schools supplied the sample for the reference group of urban children. Woodrow Wilson School is located in the older part of the city. The school building itself is old. The homes near the school are also older. Some of the homes are privately owned and occupied by one family and others have apartments which are rented out. The school is near highway #81 in a commercial area. Washington School is in the northern residential section of Fargo. It is located in an area of medium-sized private homes. This area is much like that of McKinley School.

Lakota, with a population of 964, is located at the junctions of state highways #1 and #2. It is approximately 60 miles west of

Grand Forks. The town is situated in a good farming area. Most of the people appear to own their own farms. In the town itself there are some opportunities for employment in small businesses, farm implement stores, service stations, and grain elevators. The sample of the experimental group was taken from the fourth grade classrooms at Lakota.

One rural reference group was drawn from a fourth grade classroom at McVille, North Dakota. McVille is about 25 miles to the south and a little to the east of Lakota. It is a small community having a population of 583. This area also appears to be a good farming area.

The sample of the other rural reference group was drawn from a fourth grade classroom at Tolna, North Dakota. Tolna, with a population of 247, is approximately 20 miles to the south and just a little to the west of Lakota. It is located in the same kind of farming area as Lakota and McVille.

Part of the Indian sample (one experimental and one reference group) was drawn from the Turtle Mountain Community School at Belcourt, North Dakota. Belcourt, which is part of the Turtle Mountain Indian Reservation, has a population of 450. It is located in a somewhat forested area in the north central part of the state. Most of the Indians here belong to the Chippewa tribe. Many of the children have French names which attest to their Indian and French ancestry. Most of the children live in small homes in and near Belcourt. There are some economic opportunities, especially at Rolla, which is about eight miles from Belcourt and has a population of 1,458. The experimental sample was drawn from one fourth grade and the sample for the reference group was drawn from another fourth grade classroom from the Turtle Mountain Community School.

The second Indian experimental group was drawn from the Oak Grove School at Cannon Ball. Cannon Ball is located in a hilly area which appears to be suitable only for grazing. It is on the northern edge of the Standing Rock Indian Reservation which is in southern North Dakota and just west of the Missouri River. It is about 40 miles south of Bismarck. Cannon Ball has a population of 400. There is little economic opportunity for the people in this area. Most of the people live in small houses of one or two rooms scattered outside of Cannon Ball. The children in this area do not appear to have much opportunity to visit areas outside of the reservation. The Indians of this reservation belong to the Sioux tribe. The sample of the other Indian reference group was drawn from a fourth grade classroom of the Standing Rock Community School at Fort Yates. Fort Yates is about 30 miles south of Cannon Ball and has a population of 1,153. It is also part of the Standing Rock Indian Reservation. The area surrounding the town is rolling hill country with some areas suitable for farming. There did not appear to be much in the way of economic opportunities for people in this area, but the homes in Fort Yates were larger and the children seemed to have more contact with each other.

Instrument

The Torrance Tests of Creative Thinking, Verbal Test Booklet A and Figural Test Booklet A were used to obtain the verbal fluency, verbal flexibility, verbal originality, and the figural fluency, figural flexibility, figural originality, and figural elaboration scores.

The purposes of the Torrance Tests of Creative Thinking (Research Edition) are fivefold, namely, for use in basic studies

that will yield a more complete understanding of the human mind and its functioning and development; for studies designed to discover effective bases for individualizing instruction; to be a source of clues for remedial and psycho-therapeutic programs; to assess the differential effects of various kinds of experimental programs, new curricular arrangements or materials, organizational arrangements, teaching procedures and the like; and last as a means of becoming aware of potentialities that might otherwise go unnoticed (Torrance, 1966). The use of the Torrance Tests of Creative Thinking was for the purpose of assessing the differential effect of the experimental New School program as compared with non-New School programs in regard to creative thinking.

The Ask-and Guess part of the verbal part of the test has three activities that are all based on a drawing. The first activity asks the students to write out all the questions that they can think of about the picture that they would need to ask to know for sure what is happening. The students are not to ask questions which can be answered just by looking at the drawing. The second activity asks the students to list as many possible causes as they can of the action shown in the drawing. The third activity asks the students to list as many possibilities as they can of what might happen as a result of what is taking place in the picture. These three activities test for verbal fluency, verbal flexibility, and verbal originality of thought.

Product Improvement, the fourth activity, asks the students to list the cleverest, most interesting, and unusual ways that they can think of for changing the toy elephant so that children will have more fun playing with it. This activity also tests for verbal fluency, verbal flexibility, and verbal originality of thought.

Unusual Uses of Cardboard Boxes, the fifth activity, asks the students to list as many of the interesting and unusual uses of cardboard boxes as they can think of. Verbal fluency, verbal flexibility, and verbal originality are tested in this activity.

The sixth activity, Unusual Questions About Cardboard Boxes, asks the students to think of as many questions as they can about cardboard boxes. They are told that their questions should lead to a variety of different answers which might arouse interest and curiosity in others concerning boxes. The children are told to try to think of questions about aspects of cardboard boxes which people do not usually think about. This activity gives a score for verbal fluency.

Just Suppose, the seventh activity, gives the students an improbable situation--one that will probably never happen. The children have to suppose that it has happened and as a consequence of this they are to think of all of the other things that would happen as a result of it. Then they are to list their ideas and guesses. This activity gives a score for verbal fluency, verbal flexibility, and verbal originality.

The first activity of the figural test is Picture Construction. The children are given a piece of colored paper in the form of a curved shape. They are to think of a picture or an object which they can draw with this piece of paper as a part. They are to stick the colored shape wherever they want to make the picture they have in mind. Then they are asked to add lines with their pencil or crayon to make their picture. This activity gives a score for originality and elaboration.

Picture Completion, the second figural activity, asks the children to add lines to the incomplete figures, thereby sketching some

interesting objects of pictures. They are asked to try to think of some picture or object that no one else will think of and to make it tell as complete and as interesting a story as they can think of. They are also to make up an interesting title for each drawing and to write it at the bottom of each block. This task will be scored for originality, elaboration, fluency, and flexibility.

The third activity, Lines, is a task that asks the children to make as many objects or pictures as they can from the pairs of straight lines. The pairs of straight lines should be the main part of whatever is made. With pencil or crayon the children can add lines to the pairs of lines to complete their picture. This task will also be scored for originality, elaboration, fluency, and flexibility.

Treatment of the Data

The experimental group (students who had been enrolled in New School classrooms for a minimum of six months) was compared to the reference group (students who had not been enrolled in New School classrooms) on the basis of performance on the Torrance Tests of Creative Thinking.

The first step in the analysis of the data from this study was to separate the data into three sets. The three different sets of data were: urban, rural, and Indian. Then, for a given set (e.g., urban), the group membership was binary coded (New School=1, Non-New School=0). Then, using the binary coded variable as the criterion and the creativity scores as predictors, a multiple linear regression was performed on the data. This process is isomorphic to Hotelling's T^2 test, a multivariate analog to the univariate t test. Also, residuals were found in

the multiple linear regression procedure. This would allow the classification procedure for a discriminant analysis. Testing for significance in the multivariate T^2 situation beyond the overall test is in some dispute. Following Hummel and Sligo's (1971) suggestion, the procedure described by Cramer and Bock (1966) was followed. That is, after the rejection of the overall multivariate null hypothesis, each univariate t test was run to find which variables contributed to the significance.

CHAPTER IV

ANALYSIS AND RESULTS

The analysis and results of this study are presented in the order of the null hypotheses proposed in Chapter I. The results used in answering each of the null hypotheses are followed by a summary of the findings.

Null Hypothesis Number One

There are no significant differences in creative thinking ability on the verbal and figural sections of the Torrance Tests of Creative Thinking between Indian and non-Indian fourth grade children.

Tables 2 through 17 present an analysis of the data for each aspect of creativity considered--verbal fluency, verbal flexibility, verbal originality, figural fluency, figural flexibility, figural originality, figural elaboration, total verbal creativity, total figural creativity, and total overall creativity for each group. Table 2 shows the means and standard deviations for Indian students and Table 3 shows the same summary information for non-Indian students. Table 4 includes a summary of the R's and F's for the comparison of fourth grade Indian and non-Indian students tested.

The comparison of means shows that the non-Indian group scored higher on all variables measuring verbal creativity, the greatest difference being apparent in the scores of verbal flexibility. The non-Indian group had a mean of 49.018 and the Indian group had a mean of

44.638. In the measurement of figural creativity, the comparison of means shows that the non-Indian group scored higher on every variable except figural fluency. While the combined figural creativity is significantly different on the T^2 test, no individual figural subtest shows a significant difference.

Table 4 shows that the overall test is significant at the .05 level. Contributing to this difference is the verbal flexibility score of the non-Indian group. The difference for verbal flexibility is significant at the .05 level. Also contributing to the significant overall test total is the figural total which is significant at the .05 level. Making the greatest contribution to the figural total is the higher figural originality score of the non-Indian group. However, this difference is not significant. Null hypothesis number one was rejected.

TABLE 2

MEANS AND STANDARD DEVIATIONS ON ALL VARIABLES FOR GRADE FOUR INDIAN STUDENTS (N=69)

	Mean	SD
Age	9.812	.625
Sex (Male=1, Female=0)	.493	-
T score--Verbal fluency	37.464	8.429
T score--Verbal flexibility	44.638	13.888
T score--Verbal originality	42.391	6.998
T score--Figural fluency	41.449	8.874
T score--Figural flexibility	45.797	8.896
T score--Figural originality	43.551	10.541
T score--Figural elaboration	51.666	11.268

TABLE 3

MEANS AND STANDARD DEVIATIONS ON ALL VARIABLES FOR GRADE FOUR NON-INDIAN STUDENTS (N=168)

	Mean	SD
Age	9.702	.501
Sex (Male=1, Female=0)	.494	-
T score--Verbal fluency	39.226	7.796
T score--Verbal flexibility	49.018	12.859
T score--Verbal originality	43.660	6.369
T score--Figural fluency	40.357	7.514
T score--Figural flexibility	46.190	8.212
T score--Figural originality	44.732	10.414
T score--Figural elaboration	52.548	12.631

TABLE 4

MULTIVARIATE T^2 TESTS (REPORTED AS R'S AND F'S) FOR OVERALL CREATIVITY, OVERALL VERBAL CREATIVITY, AND OVERALL FIGURAL CREATIVITY FOR INDIAN AND NON-INDIAN STUDENTS

Variable	R	R^2	F
Overall (Total)	.266	.07093	2.497*
Verbal (Total)	.165	.02736	2.185
Verbal fluency	.100	.01004	2.383
Verbal flexibility	.150	.02252	5.415*
Verbal originality	.088	.00774	1.833
Figural (Total)	.217	.04729	2.879*
Figural fluency	.063	.00393	0.927
Figural flexibility	.021	.00045	0.107
Figural originality	.052	.00265	0.625
Figural elaboration	.033	.00107	0.253

*Significant at .05 level
**Significant at .01 level

TABLE 5

MEANS AND STANDARD DEVIATIONS ON ALL VARIABLES FOR GRADE FOUR INDIAN STUDENTS ENROLLED IN NEW SCHOOL CLASSROOMS (N=37)

	Mean	SD
Age	9.676	0.580
Sex (Male=1, Female=0)	0.459	-
T score--Verbal fluency	36.757	8.183
T score--Verbal flexibility	43.108	15.200
T score--Verbal originality	41.622	6.567
T score--Figural fluency	39.324	8.512
T score--Figural flexibility	45.000	8.660
T score--Figural originality	41.892	9.380
T score--Figural elaboration	48.784	11.511

TABLE 6

MEANS AND STANDARD DEVIATIONS ON ALL VARIABLES FOR GRADE FOUR INDIAN STUDENTS ENROLLED IN NON-NEW SCHOOL CLASSROOMS (N=32)

	Mean	SD
Age	9.969	0.647
Sex (Male=1, Female=0)	0.531	-
T score--Verbal fluency	38.281	8.763
T score--Verbal flexibility	46.406	12.197
T score--Verbal originality	43.281	7.471
T score--Figural fluency	43.906	8.774
T score--Figural flexibility	46.719	9.212
T score--Figural originality	45.468	11.595
T score--Figural elaboration	55.000	10.160

TABLE 7

MULTIVARIATE T^2 TESTS (REPORTED AS R'S AND F'S) FOR OVERALL CREATIVITY, OVERALL VERBAL CREATIVITY, AND OVERALL FIGURAL CREATIVITY FOR INDIAN STUDENTS (NEW SCHOOL=1, NON-NEW SCHOOL=0)

Variable	R	R^2	F
Overall (Total)	.451	.20316	2.222*
Verbal (Total)	.144	.02062	.456
Verbal fluency	.087	.00763	.515
Verbal flexibility	.119	.01416	.967
Verbal originality	.119	.01416	.965
Figural (Total)	.426	.18116	3.540*
Figural fluency	.259	.06708	4.832*
Figural flexibility	.097	.00941	.637
Figural originality	.170	.02890	2.005
Figural elaboration	.277	.07680	5.574*

*Significant at .05 level

TABLE 8

MEANS AND STANDARD DEVIATIONS ON ALL VARIABLES FOR GRADE FOUR RURAL STUDENTS ENROLLED IN NEW SCHOOL CLASSROOMS (N=39)

	Mean	SD
Age	9.590	0.677
Sex (Male=1, Female=0)	0.436	0.502
T score--Verbal fluency	40.513	7.677
T score--Verbal flexibility	50.513	12.128
T score--Verbal originality	43.974	6.089
T score--Figural fluency	38.205	6.929
T score--Figural flexibility	44.231	7.825
T score--Figural originality	42.821	8.491
T score--Figural elaboration	49.359	9.609

TABLE 9

MEANS AND STANDARD DEVIATIONS ON ALL VARIABLES FOR GRADE FOUR RURAL STUDENTS ENROLLED IN NON-NEW SCHOOL CLASSROOMS (N=33)

	Mean	SD
Age	9.636	0.549
Sex (Male=1, Female=0)	0.515	0.508
T score--Verbal fluency	40.909	5.653
T score--Verbal flexibility	53.182	9.587
T score--Verbal originality	45.000	4.507
T score--Figural fluency	40.152	7.653
T score--Figural flexibility	45.303	9.265
T score--Figural originality	46.970	13.107
T score--Figural elaboration	55.727	12.647

TABLE 10

MULTIVARIATE T^2 TESTS (REPORTED AS R'S AND F'S) FOR OVERALL CREATIVITY, OVERALL VERBAL CREATIVITY, AND OVERALL FIGURAL CREATIVITY FOR RURAL STUDENTS (NEW SCHOOL=1, NON-NEW SCHOOL=0)

	R	R^2	SD
Overall (Total)	.339	.11480	1.186
Verbal (Total)	.178	.03168	.740
Verbal fluency	.029	.00084	.060
Verbal flexibility	.121	.01464	1.045
Verbal originality	.095	.00902	.639
Figural (Total)	.311	.09655	1.790
Figural fluency	.134	.01795	1.282
Figural flexibility	.064	.00409	.284
Figural originality	.190	.03610	2.615
Figural elaboration	.278	.07751	5.881*

*Significant at .05 level

TABLE 11

MEANS AND STANDARD DEVIATIONS ON ALL VARIABLES FOR GRADE FOUR URBAN STUDENTS ENROLLED IN NEW SCHOOL CLASSROOMS (N=50)

	Mean	SD
Age	9.660	0.593
Sex (Male=1, Female=0)	0.560	-
T score--Verbal fluency	36.800	8.315
T score--Verbal flexibility	44.700	14.478
T score--Verbal originality	42.500	7.089
T score--Figural fluency	41.500	8.345
T score--Figural flexibility	47.100	8.577
T score--Figural originality	42.800	10.840
T score--Figural elaboration	54.080	13.457

TABLE 12

MEANS AND STANDARD DEVIATIONS ON ALL VARIABLES FOR GRADE FOUR URBAN STUDENTS ENROLLED IN NON-NEW SCHOOL CLASSROOMS (N=46)

	Mean	SD
Age	9.891	0.674
Sex (Male=1, Female=0)	0.457	0
T score--Verbal fluency	39.565	8.221
T score--Verbal flexibility	49.457	12.659
T score--Verbal originality	43.696	6.867
T score--Figural fluency	41.087	6.742
T score--Figural flexibility	47.500	7.130
T score--Figural originality	46.848	8.715
T score--Figural elaboration	51.304	13.517

TABLE 13

MULTIVARIATE T^2 TESTS (REPORTED AS R'S AND F'S) FOR OVERALL CREATIVITY, OVERALL VERBAL CREATIVITY, AND OVERALL FIGURAL CREATIVITY FOR URBAN STUDENTS (NEW SCHOOL=1, NON-NEW SCHOOL=0)

Variable	R	R^2	SD
Overall (Total)	.439	.19271	3.001**
Verbal (Total)	.208	.04326	1.388
Verbal fluency	.166	.02756	2.678
Verbal flexibility	.173	.02993	2.915
Verbal originality	.086	.00740	.702
Figural (Total)	.418	.17486	4.821**
Figural fluency	.027	.00073	.070
Figural flexibility	.026	.00068	.061
Figural originality	.203	.04121	4.021*
Figural elaboration	.103	.01068	1.015

*Significant at .05 level
**Significant at .01 level

TABLE 14

MEANS AND STANDARD DEVIATIONS ON ALL VARIABLES FOR GRADE FOUR STUDENTS ENROLLED IN NEW SCHOOL CLASSROOMS (N=126)

	Mean	SD
Age	9.643	0.613
Sex (Male=1, Female=0)	.492	-
T score--Verbal fluency	37.936	8.204
T score--Verbal flexibility	46.032	14.245
T score--Verbal originality	42.698	6.653
T score--Figural fluency	39.841	8.048
T score--Figural flexibility	45.595	8.405
T score--Figural originality	42.540	9.669
T score--Figural elaboration	51.063	11.971

TABLE 15

MEANS AND STANDARD DEVIATIONS ON ALL VARIABLES FOR GRADE FOUR STUDENTS ENROLLED IN NON-NEW SCHOOL CLASSROOMS (N=111)

	Mean	SD
Age	9.838	.640
Sex (Male=1, Female=0)	.495	-
T score--Verbal fluency	39.594	7.721
T score--Verbal flexibility	49.685	11.876
T score--Verbal originality	43.964	6.436
T score--Figural fluency	41.622	7.721
T score--Figural flexibility	46.622	8.398
T score--Figural originality	46.486	10.925
T score--Figural elaboration	53.685	12.429

TABLE 16

MULTIVARIATE T^2 TESTS (REPORTED AS R'S AND F'S) FOR OVERALL CREATIVITY, OVERALL VERBAL CREATIVITY, AND OVERALL FIGURAL CREATIVITY FOR NEW SCHOOL AND NON-NEW SCHOOL STUDENTS (N=237)

	R	R^2	SD
Overall (Total)	.238	.05668	1.967
Verbal (Total)	.142	.02018	1.600
Verbal fluency	.104	.01072	2.547
Verbal flexibility	.137	.01890	4.527*
Verbal originality	.096	.00928	2.202
Figural (Total)	.221	.04874	2.972*
Figural fluency	.112	.01260	3.000
Figural flexibility	.061	.00373	0.881
Figural originality	.189	.03572	8.705**
Figural elaboration	.107	.01148	2.730

*Significant at .05 level
**Significant at .01 level

TABLE 17

COMPARISON OF INDIAN, RURAL, AND URBAN STUDENTS ON CERTAIN ASPECTS OF CREATIVITY

Variable	Means			MSW	F
	Indians	Urban	Rural		
Verbal fluency	37.464	38.125	40.694	62.857	3.369*
Verbal flexibility	44.638	46.979	51.736	170.075	5.496**
Verbal originality	42.391	43.073	44.444	42.849	1.823
Figural fluency	41.449	41.302	39.097	62.322	2.073
Figural flexibility	45.797	47.292	44.722	69.962	1.995
Figural originality	43.551	44.740	44.722	109.691	.311
Figural elaboration	51.667	52.750	52.278	150.708	.156

*Significant at .05 level
**Significant at .01 level

Null Hypothesis Number Two

There are no significant differences in creative thinking ability on the verbal and figural sections of the Torrance Test of Creative Thinking between New School and non-New School Indian fourth grade children.

The means and standard deviations for the New School and the non-New School Indian groups are shown in Tables 5 and 6. The comparison of means show that the non-New School Indian group scored higher on all variables measuring verbal creativity. However, as indicated on Table 7, none of these differences are significant. In the measurement of figural creativity, the comparison of means shows that the non-New School Indian group again scored higher on all variables. The mean for

figural fluency was 43.906 for the non-New School Indian group and 39.324 for the New School Indian group. For figural elaboration, the non-New School Indian group had a mean of 55.000 and the New School Indian group had a mean of 48.784. Table 7 showed that the score for the total figural test for non-New School Indian students was significantly higher at the .05 level. The greatest contributions to this total figural test score were the higher scores for figural fluency and figural elaboration made by the non-New School Indian group. These subtests showed significance at the .05 level. Thus, null hypothesis number two was also rejected.

Null Hypothesis Number Three

There are no significant differences in creative thinking ability on the verbal and figural sections of the test between New School and non-New School rural children.

There is only one significant difference in creative thinking ability on the verbal and figural sections of the Torrance Test of Creative Thinking between New School and non-New School rural fourth grade children; the non-New School group had a significantly higher ($p < .05$) mean on figural elaboration.

Table 8 shows the means and standard deviations for the New School rural group and Table 9 shows the same summary information for the non-New School rural group. The comparison of means indicated that the non-New School rural group scored higher on all variables than the New School rural group. The means of figural elaboration were 55.727 for the non-New School group and 49.559 for the New School group. This one significant difference was not considered sufficient to reject the overall hypothesis, thus null hypothesis number three was not rejected.

Null Hypothesis Number Four

There are no significant differences in creative thinking ability on the verbal and figural sections of the Torrance Test of Creative Thinking between New School and non-New School urban fourth grade children.

Tables 11 and 12 show the means and standard deviations for the New School and non-New School urban groups. The comparison of means showed that for the verbal section of the test, the non-New School group ranked higher on every variable. In the figural part of the test the non-New School students scored higher on figural flexibility and figural originality, while the New School urban group ranked higher on figural fluency and figural elaboration.

Table 13 showed that the overall (total) test score was significant at the .01 level. Contributing to this significant score was the total figural test score which was significant at the .01 level. Contributing to the significance of the total figural test was the higher score for figural originality made by the non-New School urban group; on the figural elaboration subtest the New School urban group tended to score higher. The difference for figural originality was significant at the .05 level. Thus, null hypothesis number four was rejected.

Null Hypothesis Number Five

There are no significant differences in creative thinking ability on the Torrance Tests of Creative Thinking on the verbal and figural sections of the test between New School and non-New School children.

Table 14 shows the means and standard deviations for the New School group and Table 15 shows the same summary information for the non-New School group. The comparison of means shows that the non-New

School group scored higher on all variables measuring verbal creativity, the greatest difference being apparent in the scores of verbal flexibility. The non-New School group had a mean of 49.685 and the New School group a mean of 46.032. In the measurement of figural creativity, the comparison of means showed that the non-New School group scored higher on every figural variable. The non-New School group mean for figural originality was 46.486 as compared to 42.540 for the New School group.

Table 16 shows that the overall test score is not significant. While there is no overall significance, there is a tendency for higher verbal flexibility scores with the non-New School group. There is significant difference in the figural total which is significant at the .05 level. Making the greatest contribution to the figural total is the higher figural originality score of the non-New School group. The figural originality score was significant at the .01 level. Null hypothesis number five was rejected.

Null Hypothesis Number Six

There are no significant differences in creative thinking ability on the Torrance Tests of Creative Thinking on the verbal and figural sections of the test among Indian, urban, and rural fourth grade children.

Table 17 presents the mean scores for each aspect of creativity measured for each of the three groups--Indian, urban, and rural; also included are the MSW and the F scores for each variable. As shown on Table 17 the verbal fluency score is significant at the .05 level. It can be seen that this significance is due to the mean score of the rural group which was 40.694 as compared to a score of 38.125 for the urban group and a low score of 37.464 for the Indian group. Greater

significance is indicated for the verbal flexibility score, which is significant at the .01 level. Again, the comparison of means for the three groups shows that the highest score for verbal flexibility was obtained by the rural group whose mean score was 51.736 as compared to the lower score of 46.979 made by the urban group and the lowest score of 44.638 made by the Indian group. While none of the other scores on the variables measured were significant, it can be noted from the comparison of means that the highest mean for verbal originality was also made by the rural group. Thus, the rural group had the highest mean scores on all the verbal variables. The comparison of means on the figural variables shows that the rural group scored lowest on figural fluency and figural flexibility, while the urban group scored highest on figural flexibility, originality, and figural elaboration and the Indian group scored highest on figural fluency. Thus null hypothesis number six was rejected.

No specific hypotheses were made in regard to Tables 18, 19, and 20. However, the writer felt it useful to follow this information. Table 19, Comparison of Individual Indian Classrooms, shows that the greatest difference in the mean scores for verbal flexibility was the score made by the classroom at Cannon Ball. Their mean score of 32.333 (significant at the .01 level) was the lowest score of all the Indian fourth grade classrooms. This score is 13.024 points lower than the next higher mean score. It appears then, that the low verbal flexibility score made by the Cannon Ball students was the greatest contributing factor in giving the non-Indian group a significantly higher mean score for verbal flexibility than the Indian group.

TABLE 18

COMPARISON OF INDIVIDUAL URBAN CLASSROOMS

Variable	Means: Non-New School Washington	Wilson	New School McKinley	Madison	MSW	F
Verbal fluency	41.136	38.125	37.800	35.800	68.208	1.648
Verbal flexibility	51.591	47.500	47.800	41.600	182.709	2.216
Verbal originality	44.318	43.125	44.400	40.600	47.689	1.615
Figural fluency	42.045	40.208	42.400	40.600	58.466	0.475
Figural flexibility	47.955	47.083	47.600	46.600	63.812	0.131
Figural originality	48.182	45.625	45.600	40.000	94.661	3.027
Figural elaboration	52.727	50.000	56.800	51.360	180.870	1.180

TABLE 19

COMPARISON OF INDIVIDUAL INDIAN CLASSROOMS

Variable	Means: Non-New School Fort Yates	Belcourt	New School Cannon Ball	Belcourt	MSW	F
Verbal fluency	38.214	38.333	32.467	39.773	66.953	2.555
Verbal flexibility	45.357	47.222	32.333	50.455	153.431	6.828**
Verbal originality	42.500	43.889	37.000	44.773	41.987	4.774**
Figural fluency	40.714	46.389	40.000	38.864	72.764	2.865*
Figural flexibility	42.500	50.000	45.333	44.773	75.149	2.202
Figural originality	40.714	49.167	42.333	41.591	104.122	2.520
Figural elaboration	54.286	55.556	49.333	48.409	122.306	1.862

*Significant at .05 level
**Significant at .01 level

TABLE 20

COMPARISON OF INDIVIDUAL RURAL CLASSROOMS

Variable	Means				MSW	F
	Non-New School		New School			
	McVille	Tolna	Lakota	Lakota		
Verbal fluency	38.824	43.125	41.000	40.000	45.591	1.207
Verbal flexibility	50.882	55.625	49.250	51.842	121.761	1.035
Verbal originality	43.824	46.250	44.000	43.947	29.565	.759
Figural fluency	41.765	38.437	37.250	39.211	52.498	1.247
Figural flexibility	47.647	42.811	43.000	45.526	70.868	1.295
Figural originality	47.059	46.875	43.000	42.632	121.104	.851
Figural elaboration	54.118	57.437	48.750	50.000	125.315	2.210

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Problem

The purpose of this study was to determine the relationship that exists between New School urban, rural, and Indian fourth grade children and non-New School urban, rural, and Indian fourth grade children and a measure of creativity; the relationship that exists between New School fourth grade children and non-New School fourth grade children and a measure of creativity; the relationship that exists between Indian fourth grade children and non-Indian fourth grade children and a measure of creativity; and also the differences that exist among the three groups on a measure of creativity. The particular aspects of creativity considered in this study were verbal fluency, verbal flexibility, verbal originality, figural fluency, figural flexibility, figural originality, and figural elaboration.

Six null hypotheses were established and tested in this study.

1. There are no significant differences in creative thinking ability on the verbal and figural sections of the Torrance Tests of Creative Thinking between Indian and non-Indian fourth grade children.

2. There are no significant differences in creative thinking ability on the verbal and figural sections of the Torrance Tests of Creative Thinking between New School and non-New School Indian children.

3. There are no significant differences in creative thinking ability on the verbal and figural sections of the Torrance Test of Creative Thinking between New School and non-New School rural fourth grade children.

4. There are no significant differences in creative thinking ability on the verbal and figural sections of the Torrance Test of Creative Thinking between New School and non-New School urban fourth grade children.

5. There are no significant differences in creative thinking ability on the Torrance Tests of Creative Thinking on the verbal and figural sections of the test between New School and non-New School children.

6. There are no significant differences in creative thinking ability on the Torrance Tests of Creative Thinking ability on the verbal and figural sections of the test among Indian, urban, and rural fourth grade children.

Summary of the Methodology and Procedures

The research population for this study included 237 fourth grade students from urban, rural, and Indian communities in North Dakota. The experimental group of 126 students with 62 boys and 64 girls included the fourth grade urban, rural, and Indian students who had been enrolled in New School classrooms for a minimum period of six months. The reference group of 111 students with 55 boys and 56 girls included the fourth grade urban, rural, and Indian students who had not been enrolled in New School classrooms. The reference group was drawn from the same or comparable elementary schools in the same or similar geographical area of North Dakota.

The creativity scores (verbal fluency, verbal flexibility, verbal originality, figural fluency, figural flexibility, figural originality, and figural elaboration) were obtained from the Torrance Tests of Creative Thinking Ability administered to each of the students. Other data required, ethnic background (where applicable) were obtained from the Torrance Tests of Creative Thinking Ability test booklets and from school personnel.

In order to analyze the data from this study, the first step was to separate the data into three sets--urban, rural, and Indian. Then, for a given set (e.g., urban), the group membership was binary coded (New School=1, non-New School=0). Then, using the binary coded variable as the criterion and the creativity scores as predictors, a multiple linear regression was performed on the data. This process is isomorphic to Hotelling's T^2 test, a multivariate analog to the univariate t test. Also, residuals were found in the multiple linear regression procedure. This would allow the classification procedure for a discriminant analysis. Testing for significance in the multivariate T^2 situation beyond the overall test is in some dispute. Following Hummel and Sligo's (1971) suggestion, the procedure described by Cramer and Bock (1966) was followed. That is, after the rejection of the overall multivariate null hypothesis, each univariate t test was run to find which variables contributed to the significance.

Summary of the Findings

The following results were derived from statistical analysis of the data. Chapter IV gives a comprehensive report of the findings.

The .05 and the .01 levels of significance were used throughout for identification of significant differences.

Null Hypothesis Number One

There was a significant difference in verbal flexibility at the .05 level in favor of the non-Indian group. While the total figural test was significant at the .05 level none of the figural subtests was found to be significant.

Null Hypothesis Number Two

Significant differences were found in figural fluency and figural elaboration in favor of the non-New School Indian group. These subtests were significant at the .05 level. The comparison of means also showed that the non-New School Indian group scored higher on every other variable. However, none of these other scores were found to be significant.

Null Hypothesis Number Three

Null hypothesis number three was not rejected. While the non-New School rural group scored higher on all creativity variables than the New School rural group, the only significant difference between the two groups was on the figural elaboration subtest.

Null Hypothesis Number Four

The non-New School urban group scored significantly higher (.05 level) on figural originality. The non-New School also scored higher on every verbal variable, but not significantly so.

Null Hypothesis Number Five

This null hypothesis was rejected as the non-New School group scored significantly higher (.01 level) on figural originality.

Null Hypothesis Number Six

The rural group differed significantly on verbal fluency (.05 level) and verbal flexibility (.01 level) from the urban and Indian groups. Thus, null hypothesis number six was also rejected.

Discussion and Conclusions

The present study found that the non-Indian group exhibited greater creativity than the Indian group. This finding for a minority group agrees with the findings of Mayhon (1966) who found that the Anglo group differed significantly from both the Indian group and the Spanish group. On the other hand, Singh (1968) found no difference between Negroes and Caucasians in creativity. Much of the difference was due to the low scores from the Indian sample at Cannon Ball, a reservation area that might be considered to be in the lower socio-economic area, even by reservation standards.

The finding concerning creativity in New School and non-New School classrooms was to some degree unexpected as greater creativity was exhibited by the non-New School group. The New School by allowing children to initiate activities, direct themselves, and take responsibility for their learning is following Torrance's (1963b) suggestion for providing the necessary conditions for creative work--making assignments calling for original work, independent learning, and self

initiated projects and experimentation. Further, the New School (1970) is desirous of fostering classrooms where an atmosphere of mutual trust and respect exists between teachers and pupils. Thus, the New School would appear to be providing the psychological safety necessary in order that creative behavior might occur as both Rogers (1959) and Torrance (1963a) suggested.

The following factors may account for the results that showed significantly greater creativity exhibited by the non-New School children:

1. The experimental group of students (those who had been enrolled in New School classrooms for a minimum period of six months) may not have been enrolled in a New School classroom long enough to make the necessary adjustments to this type of classroom.

2. The training period for some of the teachers in the New School classrooms was limited to one summer session (at the time of the testing--spring of 1970).

3. The duration of one summer session for some of the New School classroom teachers may not have been long enough to affect the types of cognitive and personality changes that are necessary for creative teaching.

4. Supervision by clinical professors may not have been adequate enough to effect significant changes in the teacher interns.

5. Difference in the attitudes of the students in taking the tests of creativity may account for the generally lower scores. More non-New School students appeared to enjoy taking the tests of creativity than New School students.

6. Instrumentation used in this study may not adequately measure the variables of creativity.

7. Because the Cannon Ball children were also in a New School classroom, it might be conjectured that their inclusion in the study did, to some degree, reduce the creativity scores for the New School group.

Regarding creativity among the Indian, urban, and rural students, this study found the rural group to differ significantly on two variables of creative thinking--verbal fluency (.05 level) and verbal flexibility (.01 level). These findings differ from those of Irons (1968) who found in a comparison of urban and rural students that the urban students exhibited significantly greater verbal and figural fluency. Irons also found the urban students to show greater ability in verbal flexibility and verbal originality, but not significantly so. The reasons for the difference in results may be due to the differences in the two rural groups. While the writer has no acquaintance with the rural area of Northeast Texas in which Irons did his study, she is acquainted with a rural area similar to the one in which the present study was taken. In the rural area of North Dakota where these tests were administered the farm family is generally able to afford modern conveniences in the home, TV, an automobile or two, a snowmobile, and the like. Thus the children are exposed to a variety of experiences. Furthermore, many North Dakota farm parents that the writer has met are highly desirous of giving their children every advantage--both educationally and socially and will make every effort to provide their children with such experiences. This parental attitude appears to help give many rural children a good self-concept which is conducive to creative thinking.

The major conclusions which emerged from this study are as follows:

1. Non-Indian children had a significantly higher mean score in verbal flexibility than the Indian children as measured by the Torrance Tests of Creative Thinking.

2. Non-New School Indian children had significantly higher mean scores in figural fluency and figural elaboration than the New School Indian children as measured by the Torrance Tests of Creative Thinking.

3. There was a significant difference between the New School and non-New School rural children on figural elaboration as measured by the Torrance Tests of Creative Thinking. However, this one significant subtest was not considered sufficient to reject the overall hypothesis.

4. The non-New School urban group scored significantly higher on figural originality as measured by the Torrance Tests of Creative Thinking than the New School urban group.

5. The non-New School group scored significantly higher in figural originality, as measured by the Torrance Tests of Creative Thinking, than the New School group.

6. Among the rural, urban, and Indian groups, the rural group was found to have significantly higher mean scores in verbal fluency and verbal flexibility as measured by the Torrance Tests of Creative Thinking.

The following recommendations are suggested as a result of this study:

1. Further research is needed to determine the influence of more than six months of New School treatment on the variables of creativity of elementary fourth grade students.

2. More attention should be given to the teacher variable. An almost unlimited range of avenues could be explored. For example, an instrument could be developed to rate teachers on how well they are fostering creativity in the classroom.

3. Efforts should be made to develop additional instruments to measure creativity.

4. In developing additional measures of creativity, attention must be focused on the criterion problem, particularly as it relates to the validity of these statements.

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