67-11,085

JENNINGS, Bettye Lea, 1931-

A COMPARISON OF CREATIVE AND NON-CREATIVE PRE-SERVICE TEACHERS ON SCHOLASTIC APTITUDE, ACADEMIC ACHIEVEMENT, PERSONALITY, AND ITEM SORTS ON BEHAVIORIAL CLASSROOM SITUATION VARIABLES.

The University of Oklahoma, Ed.D., 1967
Education, teacher training

University Microfilms, Inc., Ann Arbor, Michigan

THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

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A DISSERTATION

SUBMITTED TO THE GRADUATE COLLEGE

in partial fulfillment of the requirements for the

degree of

Doctor of Education

BY

BETTYE LEA JENNINGS

Norman, Oklahoma

1967

A COMPARISON OF CREATIVE AND NON-CREATIVE PRE-SERVICE TEACHERS ON SCHOLASTIC APTITUDE, ACADEMIC ACHIEVEMENT, PERSONALITY AND ITEM SORTS ON BEHAVIORIAL CLASSROOM SITUATION VARIABLES

APPROVED BY

DISSERTATION COMMITTEE

ACKNOWLEDGMENT

I wish to express my deepest appreciation and indebtedness to Dr. Omer Rupiper, my committee co-chairman, for his help in directing, editing, and evaluating the manuscript for this study, and for the many hours spent in checking the statistical procedures. His support and assistance were invaluable to me. To Dr. W. B. Ragan, I wish to extend special thanks for his encouragement and help when it was needed. I wish to express my gratitude to Dr. Lloyd Williams to Dr. Robert L. Curry for their aid and helpful suggestions. Many other members of the faculty have been kind and thoughtful during the preparation of this manuscript and I would like for them to know that I am appreciative. My family has been patient and not too critical and, of course, they have made the endeavor possible.

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CHAPTER I

INTRODUCTION

The past decade has brought about a burgeoning of interest and research on creativity and the creative person. In earlier eras, creativity had been accepted as a spontaneous act with no consciously planned program for its development. Investigations and writings on the subject have revealed only little and inadequate information. After the time of William James, and during the first half of this century, creativity had been generally avoided as "unscientific, mysterious, and disturbing" (Anderson, 1959). The awakened interest which has occurred has been characterized by a broad interdisciplinary search for methods of identifying, developing, and using creative talent in a rapidly changing society.

Undoubtedly in this country, and possibly in others, there is a need for continuous scientific study of creative performance and a desire to know more about the nature of creativity itself. J. P. Guilford (1959b), one of the leading investigators of creativity, has attributed the most urgent reason for studying the phenomenon:

> We encounter challenges on all intellectual fronts, scientific and cultural as well as economic and political....Adjustments in the political and personal-relations areas call increasingly for imaginative solutions. From any aspect from which we may view the scene, the needs for creativity are enormous (pp. 142-143).

Concurrent with the discoveries emanating from many research centers has been the growth in general agreement among educators as to the importance of creativity, and the challenge of education to move into a creative phase. Responding to this challenge, the schools have added to their accepted functions--to transmit the cultural heritage and to develop the rational powers--the responsibility for developing the ability to think creatively, which may involve challenging past knowledge.

Pertinent questions have been raised by investigators: If a teacher has more than the average number of creative characteristics, will his students have or develop more creative characteristics and more creative performances? Will students with higher creative potential be attracted to the more creative teacher? Does the teacher with creative characteristics teach creatively? Taylor (1963), Torrance (1964), Bruner (1965), Lasswell (1959), Maltzman (1960), and many others, think that answers to these questions should be in the affirmative.

> We have thought of classifying teachers into one of three categories: first, those who are creative leaders in the sense of creating enough new ideas of their own to keep

> students busy as they lead the way themselves in blazing new trails; second, those who are leaders for creativity in the sense that they set the stage and encourage and perhaps even catalyze and spark creative production in their students; and third, non-creative teachers to whom neither of the above applies (Taylor, 1963, p. 112).

Torrance (1964a) described creative teaching as follows:

> Every teacher's way of teaching is his own unique creation. The truly creative teacher provides a fully alert and sensitive kind of guidance and direction for children. It requires a receptive type of listening, sensing and feeling. It takes skill in relieving fears, frightening off disparagement and criticism, and keeping alive the excitement of learning and thinking. The teacher does not permit his own creativity to deprive children of opportunities for creative behavior. Such a way of teaching can be created only by a person who is fully alive, curious and excited about learning, and free from hostility, and pathological needs to control and punish (p. 37).

Carl Rogers (1953) noted three conditions that certainly have direct implications for the creative orientation of teaching...

> (1) openness to experience or lack of rigidity;
> (2) the ability to toy with possibilities--to play with or be spontaneous with ideas, materials, or relationships from which the new arises;
> (3) an internal locus of evaluation (p. 42).

Research findings suggest that pupils of more creative teachers show greater growth in creative abilities than the pupils of less creative colleagues (Bruner, 1959). According to Getzels (1964) there is no question that certain teachers do regularly and predictably produce in children learning phenomena along creative lines, and that the

"creative teacher" is a desirable addition to the teaching force. To explore a person's dimensions that would point to identification of creativeness prior to entrance into the teaching profession especially during the college years, would seem feasible.

The criteria for acceptance of candidates into the teaching field have been traditionally determined by the various training institutions that prepared these candidates to teach, and recommended them for teaching certificates. Some of the indices which were purported to measure effectiveness in teaching have been: (1) the student's performance on achievement tests, (2) satisfactory completion of a given program, (3) dimensions of personality as assessed by scores on various personality instruments, and (4) a favorable recommendation by a responsible faculty member, usually the advisor. With the mass accumulation of research findings on teaching effectiveness, it was considered important to ascertain the relevance of creativity as a criterion for teacher selection.

This study represents an attempt to determine some of the scholastic and personality differences which underlie the creative and non-creative pre-service teachers. A secondary objective will be an attempt to relate more conventional ability and personality measures to the results obtained from a standardized instrument designed to assess creative ability.

CHAPTER II

THEORETICAL APPROACHES TO CREATIVITY

Psychoanalytic:

Freud's early writings initiated a continuing psychoanalytic interest in artistic creativity. Freud studied poets, artists, and writers, and from these studies he developed the concept of sublimation. He defined the capacity to sublimate as "the ability to exchange the original sexual aim for another aim that is no longer sexual" (Freud, 1908).

Freud felt that there were three ways to adapt to the hardships of life: powerful diversions of interest, which lead one to care little for misery; substitute gratifications, which lessen the misery; and intoxicating substances which make one insensitive to it (Freud, 1958). Creativity was seen as a substitute, a means of running away from hardships in order to achieve some degree of satisfaction, and he turns to fantasy, where he gives full play to his erotic and ambitious wishes. To be successful he must mold his fantasies into a new reality; the product is his creation, be it in art, music, science, or literature.

Perhaps the most notable recent reformulation of psychoanalysis has been the emphasis on ego processes as opposed to id forces. Kris (1952) discussed the place and importance of ego psychology in understanding the creative process as well as the significance of socio-historical factors as they affect the creative individual, his work, and his audience.

Kris' emphasis on the ego is seen clearly in his concept of ego regression.

> Central to artistic--or indeed any other--creativeness, is a relaxation (regression) of ego functions. The word fantasy conveys just this disregard of external stringencies in its reference to the process and product of creative imagination. In fantasy and dreams, in states of intoxication, and fatigue, such functional regression is especially prominent (Kris, 1952, p. 253).

Schafer (1958) elaborated on Kris' concept of "regression in the service of the ego."

> It is the process which increases the individuals' access to preconscious and unconscious contents, without a thoroughgoing sexualization or aggression of major ego functions, and therefore without descriptive anxiety and guilt (Schafer, 1958, p. 122).

Schafer outlined how Kris' concept of regression has been applied not only to creativity but to wit, humor, problem solving, sleeping, dreaming, capacity for orgastic experience, ego-building identification, therapy, motherliness, empathy, intimacy, and love. Also described by Schafer were the major psychological determinants favoring and hampering creative regression. Favoring conditions

include: a well developed set of affect signals; a secure sense of self; a relative mastery of early traumata; relative flexibility rather than rigidity or fluidity of defenses and controls; a history of adequate trust and mutuality in interpersonal relations; and a self-awareness that encompasses personal and effective communication with others. The hampering condition appears to be the reduction of the ego's autonomy from the id which does not permit the ego to relax. Super-ego condemnation of fantasy and reverie also dampens regression in the service of the ego.

Kubie (1958) shifted further from the psychoanalytic position than did Kris and Schafer. Kubie feels that the preconscious system is the basis of creativity and that unless the preconsciousness can bloom freely there can be no creativity. Preconscious processes are influenced by conscious processes, or reality, and the unconscious processes. Both of these processes are rigid and do not allow for fantasy or imaginative thinking. Kubie dismissed sublimation on the grounds that this concept was misleading and based on inaccurate assumptions; he also observed that sublimation as a concept was formulated before the workings of the preconscious system were understood.

Associationistic:

Ribot (1900) was the forerunner of the modern associationist dealing with creativity. For him, association is the process by which mental states become joined together

so that one tends to evoke the other. Association by contiguity merely reproduces the environment and often makes for stereotypy rather than creativity. Association by resemblance, either direct or by way of a mediating idea or effort, is the basis, on the other hand, for analogical thinking which is so important in the creative process. Association theory deals with the ability to think productively, utilizing the number of association bonds an individual has at hand. It is the recombination of these bonds that results in creativity.

Mednick (1962) presented an associative interpretation of the process of creative thinking. The traditional views from Locke to Bain, including Ribot, are represented in Mednick's definition.

> We may proceed to define the creative thinking process as the forming of associative elements into new combinations which either meet specified requirements or are in some way useful. The more mutually remote the elements of the new combination, the more creative the process or solution (Mednick, 1962, p. 221).

Mednick pointed out that any condition or state of the organism which brings the necessary associative elements into ideational contiguity will increase the probability and rapidity of a creative solution. The three types of creative association are: serendipity, similarity, and mediation. Individual differences are accounted for by the amount of ability of an individual to bring remote ideas into contiguity. Several points where individual differences

may occur are: need for associative elements, associative hierarchy, number of associations, cognitive or personality styles, and selection of the creative combination.

Mednick's concepts appear to be refined descriptions of trial and error learning. Campbell (1960) states the same position. For him creative thought includes two processes, blind variation and selective retention. Blind variation implies that the variation be uncorrelated with the solution, and, also, that variations are produced without prior knowledge of which one will produce the solution. Selective retention occurs after this internal variation of thought is in operation. When the selective process blindly stumbles into the thought trial that meets the selection criterion, creativity has occurred.

Gestalt:

Wertheimer (1945) suggested that there have been two approaches to the problem of creative or productive thinking: traditional logic, and association theory. He criticized both views as failing to do justice in describing the phenomena; both views seemed constricted and limited. In their place, he offered Gestalt theory to enhance an understanding, requestioning, and investigation of thinking processes.

The Gestalt theory defines creativity as an action that produces a new idea or "insight" full-formed; it comes

to the individual as a flash. Novelty arises from the imagination, not from reason and logic.

Arnheim (1947) and Mooney (1958) added a few frills to Wertheimer's original formulations. Arnheim (1947) discussed how perceptual "preferences for balance and symmetry" as well as "dynamic richness" are expressed in an art form: "the organism makes a creative contribution by simplification, preference of balance, regular symmetrical patterns and enrichment of the structure" (p. 69).

Mooney (1958) extended the Gestalt equilibrium model: "The person, process, environment, and the product involved in a creative performance are in a dynamic interplay of forces. The creative person essentially is an embodiment of these interacting forces, only in a heightened state" (p. 172).

Existential:

Existentialism as a theoretical position stands somewhat akin to Wertheimer. Both try to describe creative persons themselves in their creative moments. Existential theory offers only one concept, the encounter. Creativity is defined as the process of bringing something new into birth through the vehicle of the encounter.

> The first thing we notice in a creative act is that it is an encounter. The paint, the canvas, and other materials become secondary to this encounter; they are the language of it (May, 1959, p. 58).

May unraveled his view of creativity to include the encounter of man with the world, for the world is seen as inseparable from man. He concluded that creativity is "the encounter of the intensely dedicated, conscious human being with his world" (May, 1959, p. 56). May does not adequately define encounter; he assumes somewhat erroneously that the reader understands the concept.

Schachtel (1959) agreed with May. The concept of encounter was a cornerstone of his formulations. Openness in the encounter with the world means that one's senses are more freely receptive to new reflections of the environment. "The creative person's resistance in the face of opposition to his creation is not the resistance of an id drive, as Freud held, but of the opposition by shared autocentricity of conventional perception and thought" (Schachtel, 1959, p. 243).

Schachtel described creativity as the "art of seeing the familiar fully in its inexhaustible being, without using it autocentrically for purposes of remaining embedded in and reassured by it" (Schachtel, 1959, p. 184). This is, in effect, the ability to remain perceptually open to the world, to encounter it. Or as Schachtel put it, in "the existential struggle between the two tendencies in man; to remain open toward the world, capable of allocentric perception, or to seek the security of secondary embeddedness in a closed world and in the shared autocentricity of familiar perspective" (Schachtel, 1959, p. 188).

Wenkart (1960) concurs with May and Schachtel; however, her frame of reference is a therapeutic one. Therapy is a means of restoring the creative moment, the sites of creativity, these remaining vestiges of self where the person can restore some semblance of personal identity and worth. The therapist tries to restore those moments "for they are the existential pivot of the self; they contain the last spark of relatedness, the part of entry into the country of one's being. They are the point of beginning--can be the point of return" (Wenkart, 1960, p. 377).

Interpersonal:

The interpersonal approach to creativity places emphasis on the creator as innovator and on another person who recognizes or acknowledges the creation. The four theoretical approaches previously de-emphasize this in their theory building; nevertheless, to varying degrees all four see it as a factor in creativity. The psychoanalytic school states that the creative person seeks worldly recognition. Associationism de-emphasizes milieu. To the Gestaltists, the creative person is open to the environment, influences it, belongs to it, extends his being into it. The existentialists extend their theory farther than the other four theories in expressing and recognizing that the creative person is always encountering a world; there is always some milieu that is met.

Although the four approaches describe some aspects of interpersonal influence in the respective theory of creativity, the advocates do not give an elaborate nor detailed scope to external forces. The theorists who do, such as Adler, Moreno, Fromm, Lasswell, and Tumin, give social factors prominence in their views of creativity.

Adler's concept of "the creative power of the individual" (Ansbacher & Ansbacher, 1956), gives meaning to life; it creates the goal as well as the means to the goal. This principle, the creative power of the individual, is subordinate to a social, cultural goal of social perfection. Creativity is defined as supreme usefulness, and those persons who are more creative are also more useful in terms of serving a social function. They are those creative persons who have taught others how to see, how to think, and how to feel. This is why it is so important to have these kinds of people in the classroom as teachers.

Moreno (1953) has always sought to describe the person in relation to others. For him, humans are seen to be endowed with spontaneity and creativity which are to be found in the interaction between "person and person, person and things, between society and society, between society and the whole of mankind" (p. 10).

> Creativity has four phases: creativity, spontaneity, warm-up process, and conserve. Creativity is the elementary X, recognized solely by acts. Spontaneity is the catalyzer of creativity, and the interaction of spontaneity is

> the warming-up process. The products of such interactions are called cultural conserves (Moreno, 1961, p. 12).

Fromm (1959), Rogers (1959), and Maslow (1959) in their formulations also stressed the importance of social interpersonal factors. Fromm describes the capacity to be puzzled as one condition for creativity. Children possess this quality.

Rogers defined creativity as an "emergence in action of a novel relational product, growing out of the uniqueness of the individual on the one hand, and the materials, events, people or circumstances of his life on the other" (Rogers, 1959, p. 71). As Rogers sees it, man's tendency to actualize himself is the mainspring of creativity.

> The inner conditions of constructive creativity allowing for this creative actualization include: openness to experience, or extensionality; an internal locus of evaluation, an ability to toy with elements and concepts. The external social conditions that facilitate creativity include: accepting the individual as of unconditional worth; providing a climate in which critical evaluation is absent; and psychological freedom. These three conditions allow psychological safety to occur, and in that context when persons such as teachers, parents, peers provide the individual complete freedom of symbolic expression, to feel self-worth, and to feel that he is not being critically evaluated, creativity is fostered (Rogers, 1957, p. 42).

Maslow (1959) in his concept of the "self actualizing 'individual,'" stresses the "fully functioning person" as one who is relatively unfrightened by the unknown, the mysterious, the puzzling. The self-actualizing person is trying to realize and complete himself through

an integration within himself and the world. In these states of being, the person becomes unified; for the moment, his life is seen as one. "In such a state, the person becomes more open to experience and far more spontaneous and fully functioning, essential characteristics of self-actualizing creativeness" (Maslow, 1959, p. 89).

Tumin (1954) elaborated and expanded on...the social forces that act as obstacles to creativity. For Tumin, man is a social being who is oriented toward the judgment of others regarding his personal and social worth. He forms an opinion of himself commensurate with what others think of him; he cannot develop an opinion arbitrarily or independently of these repeated evaluations.

This emphasis on status, and competition for status, makes it difficult to be both creative, hence different, and to be socially approved as well. For what is socially approved is usually what is done well and not what is novel. Conformity is the means by which social acceptance is obtained. Tumin suggests that we need social reform to create a society where status emphases are kept to a minimum and thereby encourage the possibility for creativity to occur.

Murphy (1958) speaking from a different vantage point, offers ideas similar to Tumin. He discussed "creative eras," times in which society encouraged individuality and de-emphasized status obtained through conformity. The creative periods include the Athenian Empire, ancient India, and the Renaissance.

Mead (1959) presented a contemporary, cross-cultural approach to creativity. She described the Samoan, Manus, Araphesh and Bali cultures and how these cultures affect creativity differently.

Lasswell (1959) abstracted the differences in values of cultures and social groups in his definition of creativity. For him, creativity is the disposition to make and to recognize valuable innovations. Different societies recognize and value different innovations. Lasswell's theory seems to encompass the views of Mead, Murphy and Tumin.

Lasswell (1959) stressed both the individual or innovator and the recognizer or social milieu. The interaction of the two determine what will be innovated and what will be recognized as innovation.

Anderson (1959) stressed the interpersonal situation and environmental factors in his writings. He started with the proposition that there are two kinds of creativity, creativity with objects and creativity with persons. Creativity in human relations requires intelligence, sharp perceptions, subtle sensitivities, respect for the other, ability to work with others, and a personal integrity that gives the person the possibility to express freely his feelings, thoughts and convictions. Anderson presented historical examples of creativity emerging from person-to-person interactions, such as the Magna Carta and the Bill of Rights.

He also presented examples of social creativity more akin to our daily living. For Anderson, personality development is one's ability to develop social creativity. Man is not only a product of his environment, but also a victim of it.

Stein (1953) discussed the cultural factors that influence creativity and his discussion seems to duplicate what has been said. He adds one thing: "The dominant philosophy of the culture may not only give direction to creative strivings, but may actually stimulate or impede the production of creative works" (p. 320).

Trait Theory:

Trait theory is a marked divergence from psychoanalytic, association, Gestalt, existential, and interpersonal theory. Traits are characteristics of individuals and can best be investigated by an approach that emphasizes individual differences. A trait is any distinguishable, relatively enduring way in which one individual differs from another.

Guilford (1950) described the primary traits related to creativity. They were: a generalized sensitivity to problems; fluency of thinking, that breaks down to four factors, word fluency, associational fluency, expressional fluency, and ideational fluency; flexibility of thinking, composed of spontaneous flexibility, both figural and semantic, and figural adaptive flexibility; originality, and

redefinition, which has figural, symbolic, and sematic factors; and semantic elaboration. These aptitude traits were found by factor analysis. Guilford also includes non-aptitude traits, and these were motivation and temperament. Guilford also described how creativity fits into his structure of intellect model (1959a) and how creativity is distinct from intelligence.

From the intellect model, Guilford and Merrifield (1960) hypothesized that the thinking abilities involved in creativity are divergent productions, transformations, convergent productions, and evaluation. Only the redefinition abilities of the convergent production category are seen as creative thinking, for not all convergent productions nor all evaluations are creative.

CHAPTER III

REVIEW OF RELATED LITERATURE

Psychonalytic theory bearing on creativity, as exemplified in Kris' (1952) work, has been tested by means of the Rorschach. Holt and Hovel's (1960) method assessed primary and secondary processes in the Rorschach. This test is used to measure an individual's ability to utilize primary process productivity or to regress "in service of the ego." The scoring system consists of three groups of scoring categories: content, formal variables (or deviations in form structure), and control and defence variables. This is a research tool and not a clinical tool.

The same method for scoring the Rorschach has been utilized by Pine and Holt (1960), Goldberger and Holt (1961), and Cohen (1961). In all three studies the Rorschach was the major technizue for assessing creativity with validation as one of the goals. The relationship between expression and control of primary process material, and the quality of production on a variety of tests of imagination was also studied. Besides the Rorschach, these tests included TAT, Science Tests, Humor Test, Animal Drawing, and Guilford's

Brick Uses and Consequences Test. The results indicated that the Rorschach test can be used as a measure of primary process. Also, the Rorschach test performance was related to the quality of imaginative production as evidenced on the other tests.

The theory dictates the measurement device, and psychoanalytically oriented investigators utilize projective techniques, especially the Rorschach, to measure creativity. Association theorists use words, and Maltzman (1960), Maltzman, Simon, Raskin, and Licht (1960) use verbal methods in their investigations.

Maltzman and his colleagues (1960) employed Guilford's Unusual Uses Test. Mednick (1962), although using verbal materials, did not employ a free associational method. He utilized a series of three words drawn from remote associative clusters, for examples, "rat," "blue," and "cottage." The subject was required to find a fourth word which could serve as a specific kind of associative link between these words. The answer to the above example was "cheese." There were 30 items in the actual test called the Remote Associates Tests.

Gestalt theory and existential theory do not seem to be concerned with constructing or utilizing empirical measures to support their theorizing. Nothing appears in the literature presenting data supporting or refuting their ideas on creativity.

The pacemakers in the field are Torrance, Guilford, and Getzels and Jackson. Torrance, and Getzels and Jackson represent no theoretical school in particular, although they seem very concerned with interpersonal, familial, group, cultural, and social factors that affect creativity. Hence one could perhaps categorize them in the interpersonal group. Guilford is an avowed trait theoist and he sees creativity as a segment of his structure of intellect.

Torrance (1962b) has not tried to answer the question, "What are creative abilities?" but rather, "Who are the creative people, what are they like, and how do they think and behave?" The areas investigated include: development of creative abilities; academic achievement of the creative subjects; peer reactions to the highly creative members; factors in teacher and adult behavior which either facilitate or interfere with the development of creative thinking in children; personality correlates of creative abilities; cultivation of creative interest through various classroom activities; and cross-cultural comparisons of creative thinking abilities.

Torrance thinks it is premature to establish a discrete set of creative abilities as pure factors, and in his definition a variety of kinds of behavior are included. Although disagreeing, in part, with Guilford's factorial approach, Torrance at first utilized many of his tests. After experimenting on his own, Torrance developed

tasks on the basis of analyses of the reported experiences of eminent scientific discoverers, inventors, and creative writers. An attempt was made to construct tasks which would be models of the creative process, each requiring several types of thinking such as fluency, flexibility and originality. This approach represents a departure from Guilford (1959) who insists that predictor measures of creativity should represent single factors. Torrance (1962b) developed complex tasks presumed to involve the creative process and then examined the products for evidence of various types of thinking. The tasks were also designed to grip the interest of the subjects and to maintain the subject's involvement.

Three years of experimentation have resulted in the development and use of over 25 tasks varying greatly in the nature of the stimulus and the type of thinking involved. All of the tasks called for the production of divergent thinking, and there were multiple possibilities for solution. The tasks were verbal and non-verbal. All the tests including test administration, scoring procedures, and results for these tasks can be found in Torrance (1962b), Yamamoto (1962), and Torrance et. al. (1960).

Like Torrance, Getzels and Jackson studied creativity from a situational-experimental or interpersonal frame of reference. Getzels and Jackson (1962) have focused on three main points: identification of two groups of subjects differing in kind of cognitive ability, namely

creativity and intelligence; investigation of personal-social behavioral concomitants of the two kinds of cognitive abilities; and the nature of the family environments for both groups of subjects. Getzels and Jackson's tests were either taken or adapted from other tests specifically for the study. These tests tapped verbal, numerical-symbol, and object-space relations. Scoring of the tests paralleled Torrance's scheme in that the score did not depend on a single predetermined correct response, but on the number, novelty, and variety of adaptive responses to a given stimulus task.

> The results indicated significant differences with respect to teacher perception, fantasy production, career aspiration, and family environment. The teachers rated the highly intelligent above the median in terms of the students they wanted in class; the highly creative were rated below the median. The highly creative in their writings exhibited unexpected endings, humor, and playfulness, significantly more often than the highly intelligent. With respect to career aspirations, the highly creative chose unconventional careers as compared to the highly intelligent whose career choices were conventional. Families of the highly intelligent allowed for less divergence, risks were minimized, while the overall impression of the highly creative family was one in which individual divergence was permitted and risks were accepted" (Getzels and Jackson, 1962, p. 16).

Although the effort did not start with Getsels and Jackson (1962), their book has stimulated a number of investigations, especially of the two hypotheses: (a) that teachers prefer "high IQ" to "high creative" students; and (b) that the two groups have essentially equal achievement.

When one considered the shortcomings of the study, as did de Mille and Merrifield (1962), it was not surprising that the findings were challenged, especially since the early resolution of issues dealing with the accomodating of both creative and intelligent children was of paramount importance.

In a replication of Getzels and Jackson's study of the comparative effects of creativity on intelligence on high school achievement, Yamamoto (1964a) found no significant difference between groups. In a comparative study of convergent and divergent thinking, Klausmeier and Wiersma (1964) reported that girls scored lower than boys on convergent, but higher on divergent, thinking tests. Children in grade seven did better than those in grade five in both kinds of tests. Children in a large city did as well as their small town counterparts on convergent thinking, but less well on divergent thinking.

In his study of National Merit Scholarship recipients, Holland (1961) used a measure of risk-taking tendencies. He reported that creative performance among high school students occurred more frequently among those who were independent, expressive, asocial, consciously original, and inclined to have high aspirations for future achievement than among those who exhibited qualities essentially opposite to those mentioned.

From the work of Barron (1962), the most significant inclination seemed to be that subjects with IQs above

120 appeared to be but a negligible factor in creativity. Barron found distinguished writers to be particularly high on the scales of the MMPI associated with schizoid, depressive, hysterical, psychopathic and femininity predispositions. From a rapprochement of earlier studies, Torrance (1964) established some primary determinants of creativity. In accordance with the determinants of Torrance were the findings of Burkhart (1962) that creative students in art scored high on measures of four deminsions of personality: (a) spontaneous abstract orientation, (b) divergent power, (c) ideational and perceptual openness, and (d) social-determination. Seyle (1964) limited 16 personality types among scientists, such as fact collector, gadgeteer, bookworm, and classifier.

Some of the most provocative data associated with new types of measures and approaches emerged from reports made at the University of Utah conferences on the identification of creative scientific talent (Taylor and Barron, 1963). In using a methodology similar to that in Barron's study, MacKinnon (1961) compared 40 architects, 45 research scientists, and 40 student engineers on measures of art preferences, personality scales, and intelligence tests. The subjects who were rated highly creative exhibited a greater tendency to show independence of judgment, to take little on faith, to be more aesthetically sensitive (except in the instance of engineers), to give more expression to

the feminine side of their nature, and to be open-minded. Occasionally these persons as students were difficult to work with, since they sought to find their own solutions to problems.

In studying 100 Air Force captains and their relative dispositions toward originality, Barron (1963) found that, although various measures of originality yielded only low degrees of relationship to one another, these relationships were positive and usually statistically significant. He found that originality was associated with traits of independence of judgment, need for personal mastery, rebelliousness, disorderliness, exhibitionism, and self-centeredness.

Torrance (1962b) has replicated Getzels and Jackson's work and attained similar results for elementary school children. He noted that among the upper 20 percent of the creative group, 70 percent of these children would have been eliminated if a "gifted" group was selected on the basis of an intelligence test.

Yamamoto (1961) reviewed the literature with respect to the relationship of creativity and intelligence and reported that the range is .20 to .40 in the general population and practically zero in selected populations. Torrance (1962b) in his resume of the literature in 1962 pointed out that it was only in the past decade that there existed a "look" beyond intelligence tests in an assessment

of "giftedness." Intelligence tests emphasized convergent, conforming thinking, and traditional academic values of achievement and precision. Guilford (1959) concured with Torrance and concluded that different tests needed to be developed to tap creativity as opposed to that which was measured by intelligence tests.

Earlier, Guilford's trait theory was described. For each of the traits, Guilford and Merrifield (1960) have developed at least two, and usually three tests. At present, they have 39 tests developed, and all are operational. The tests covered verbal and non-verbal areas; stimuli and responses were both verbal and non-verbal depending upon the factor being measured. Scoring, unlike Torrance and Getzels and Jackson, allowed for perhaps two but usually only one score per test. The score obtained is a flexibility score. Torrance, and Getzels and Jackson would obtain a fluency, flexibility, originality, and an elaboration score for a given test whereas Guilford would obtain these scores through the use of four different tests.

The Minnesota Test for Creative Thinking:

In the past six years, various measures of creative thinking were developed and tried out in the Minnesota Studies of Creative Thinking. These included both verbal tasks with verbal stimuli, and non-verbal tasks with non-verbal stimuli. Several test forms were constructed by choosing different tasks from the total core of tasks.

Scoring schemes for the tasks were first devised by Torrance and Michie (1959), Torrance and Radig (1959), Torrance, Palm, Palamula, and Radig (1959), and Yamamoto (1960). When the experimental schemes were evaluated in 1960 (Torrance, et. al.) it was apparent that preceeding efforts had not led to practical and theoretical improvement because of the lack of a systematic approach and a growing complexity. Yamamoto (1964) attempted to regain the simplicity and systematic formulation in the approach to reliable and meaningful scoring schemes for creative thinking tests.

Validation for these tasks as predictors of creativity posed difficulties in obtaining suitable criteria. With that in mind, Torrance tried to avoid criteria that were obviously contaminated by intelligence, grade point average, and scholastic achievement tests. In developing the Minnesota Tests of Creative Thinking, Torrance and his associates made deliberate attempts to construct test tasks that would be models of the creative process, each contributing something unique to the batteries being constructed. Test tasks were fairly complex and had features that made use of what was known about the nature of the creative thinking processes, the qualities of creative products, and creative personalities.

The same test tasks, in most instances, have been administered at all educational levels from Kindergarten

through graduate school. "This has made it possible to determine whether or not children and young people identified as 'creative' behave in ways similar to the ways in which eminent creative people of the past behave when they were children and young people" (Torrance, 1965a, p. 672).

In observational studies Torrance and his associates (Torrance, 1965a) found that children scoring high on tests of creative thinking initiated a larger number of ideas, produced more original ideas, and gave more explanations of the workings of unfamiliar science than did their less creative peers when placed in five-person groups.

> When matched for intelligence, sex, race, and teacher, the most creative children in forty-six classrooms from grades one through six more frequently than their controls had reputations for having wild and fantastic ideas, produced drawings and other products judged to be original, and produced work characterized by humor, playfulness, relative lack of rigidity and relaxation" (Torrance, 1961a, p. 66).

Weisberg and Springer (1961) studied a sample of gifted (high IQ) fourth grade students. Those students who made the higher scores were rated significantly higher on strength of self-image, ease of early recall of life experiences, humor, availability of Oedipal anxiety, and even ego development as compared to those who made the lower creativity test scores. On the Rorschach Ink Blots, they showed a tendency toward unconventional responses, unreal percepts, and fanciful and imaginative treatment of the blots. Among sixth grade children, Fleming and Weintraub (1962) found

significant negative relationships between measures of originality, fluency, and flexibility and measures of rigidity. Yamamoto (1963) found correlations of around .50 between creativity test scores and a composite measure of originality based on creative writings.

Studies with adults have also been positive in nature. Torrance (1962) had found that those who obtained high scores on the tests of creative thinking developed original ideas in the content areas and made more creative applications of knowledge than did their less creative peers. Blockhus (1961) found that the students of the more creative business education teachers showed more growth in originality during a semester than did the pupils of the less creative ones. Sommers (1963) found that students carefully identified by college industrial arts instructors as creative scored significantly higher on tests of creative thinking than did their less creative peers. Wallace (1961) found that measures of originality and fluency differentiated the several echelons of personnel in a large national sales organization. The measures of flexibility and elaboration failed to differentiate the highest echelon of sales executives from the lower groups, but differentiated within the various lower levels.

Bentley (1961) found the following set of correlation coefficients for four different measures of achievement in a graduate class of 110 students in educational

psychology, and a composite measure of creative thinking ability based on a battery of the Minnesota tests and the Miller's Analogies Test, an instrument used in graduate school admission procedures:

Achievement Measure	Creativity	Miller's
Recognition (multiple-choice test)	.03	.47
Memory (completion and short-answer test)	.11	.41
Productive Thinking (creative applications)	.53	.37
Evaluation & Judgment (decision making)	.38	.27

(Bentley, 1961, p. 34)

The studies point to an interesting supposition that when knowledge is obtained by authority, a mental age or intelligence is a better predictor of achievement than a measure of originality, fluency, and the like. When knowledge is obtained in creative ways, for example by discovery or experimentation, measures of originality, and fluency seem to be better predictors than scores on intelligence tests.

INFLUENCE OF TEACHER'S BEHAVIOR ON CLASSROOM BEHAVIOR

Laura Zirbes (1959) attempts to define classroom atmosphere that induce creativity and stifle creativity.

> A group of young children manifests spontaneity and individuality when it is not regimented or repressed by imposed restraints and required conformity. Provided with challenging opportunities to explore and discover the possibilities of a variety of play materials, these children have a chance to move about, to handle things, to act on impulse, to react to each other, and to the situation . . . . Warmly permissive adult guidance encourages and paces developmental activity and fosters a sense of satisfaction in

> whole-hearted involvement. The atmosphere is unhurried and free from anxiety.
>
> In sharp contrast, another group of children of the same age range is provided with uniform, stereotyped seatwork, and explicit oral directions to be followed in unvarying compliance. These children sit in rather passive, compliant preoccupation with this task, without noting much else, and without having anything to do with each other. The situation is clearly one in which one efficient type of mass management has everhthing in control to an extent which discourages deviations from directions. Any thought of individual initiative would seem to be too precarious to occur to children. This accounts for anxiously submissive, adaptive behavior, and also for the lack of zest. The room is very quiet and there is nothing dynamic or challenging to spur children to go beyond what they are required to do (p. 21 & 22).

Spaulding (1963) attempted to relate attributes of teachers and classroom-climate dimensions to a number of variables, including flexibility and originality. He studied 21 classrooms in 10 different schools from fourth to sixth grade level in a west coast urban center. In each classroom, he recorded teacher-pupil transactions over one full morning and placed descriptions of activities underlying these transactions into 113 categories. The categories were reduced by factor analysis to 17 components, which Spaulding then intercorrelated with school achievement and with pupil performance on a variety of tests. Spaulding found two teacher styles to be negatively related to flexibility and originality. In one style, the teacher responded primarily to the social emotional qualities displayed by their pupils rather than to their cognitive performance. In the second style, the teacher created

a formal group-instruction situation in which teacher control was maintained by shame, ridicule, or admonition.

Sears (1963) contributed an important study in differentiating children of high and average intellectual ability on school-associated variables. The subjects were 100 girls and 95 boys in seven fifth- and sixth-grade classrooms in an upper middle class suburban community. The purpose of the study was to relate certain significant outcomes of elementary behavior, achievement test scores, attitudes toward school activities, and creativity test scores, to various classroom conditions. These classroom conditions consisted of teachers' classroom behavior, their attitudes toward school activities, and their perceptions of the child along numerous dimensions. The total group was divided by sex and by mental ability with the group mean IQ of 115 being the dividing line. Correlations were run between the six classes of child target variables and the predictor variables for the four ability groups. Several significant differences were obtained between the superior and average ability groups. The self-concept of children of average ability was highly dependent on favorable opinions from significant pupils in the classroom. In the superior boys and girls, good performance on divergent thinking and creativity tests was related to good self-esteem and academic productivity; this was not true of boys with average ability. Significant differences were

obtained on the basis of sex. The data suggested that independence and task-oriented work were seen by the teachers and peers as legitimate means of striving for bright boys but as somehow inappropriate or undesirable for bright girls at this age. In general, there were more substantial correlations between teacher behavior and six target variables for children of average ability, suggesting that the superior pupils were more influenced by teacher variance than were the average pupils. Most provocative of the findings was the suggestion that different kinds of classroom environments might be differentially rewarding for bright and average pupils. The bright pupil seemed more independent of his school environment for self-esteem, gaining rewards from his superior performance instead; the average pupil, on the other hand, depended on opinions of teachers and peers for his self-esteem.

In his review of literature relating to personality and social development, Spaulding (1964) concluded that:

> Children who are dependent, aggressive, withdrawn, or independently productive can be expected to respond in a different way to teachers who are highly orderly and business-like than to those who are more permissive and less highly organized (p. 594).

Bellack (1963) presented a creative description of how teachers and students interact, characterising the rules of the "classroom game." A rule for pupils is "the pupil's primary task is to respond to the teache's solicitations" (Bellack, 1963, p. 98). Bellack and his associates

using their category system, found in their study of 15 high school social studies teachers that the two most common patterns of classroom discourse, making up nearly 50 per cent of the interaction, were (a) teacher solicitation--student response and (b) teacher solicitation--student response--teacher reaction.

Flanders (Amidon and Flanders, 1962) developed a system containing seven categories for teacher talk: accepts feelings, praises, accepts ideas, questions, lectures, gives directions, and criticizes. In addition, it contained two categories for pupil talk; student talk-responding and student talk-initiation. Another category noted silence or confusion. Giammatteo (1963), using Flander's system, studied 150 elementary school teachers during language arts periods. He found that teachers accounted for more than 50 per cent of the talk in the classroom, and that most student talk was in response to teacher's questions. Using supervisory ratings as a criterion of teaching excellence, Amidon and Giammatteo (1965) compared the interaction patterns of 30 "superior" teachers with 150 randomly selected teachers in 11 elementary school districts. Using Flander's categories, they found that superior teachers talked less, accepted more student ideas, encouraged more pupil-initiated participation, and gave fewer directions than did average teachers.

In a study of 12 intellectually superior classes,

Gallagher and Aschner (1963) attempted to relate the type of teacher questions to the production of divergent thinking on the part of pupils. In using her categories for classifying thinking, Aschner found, in general, that when the percentage of divergent questions from the teacher was high, the percentage of divergent thinking production from children was also high.

TEACHER CHARACTERISTICS AND PUPIL CREATIVITY

As a result of observations of teachers and counselors and study of ideal therapeutic relationships, Torrance proposed a creative relationship for the teacher and counselor. To establish creative relationships, he suggested that teachers change from the basic strategy of coercive influence to various strategies which would facilitate healthy creative processes.

A review of the literature revealed that there has been little or no empirical research to determine the characteristic of creative teachers or teachers who are effective in guiding creative growth. Excellent descriptions of creative teachers from current literature were cited by Torrance (1961). In spite of all the diversity described by Hobelman, Barkan, and Wessel, there was a core of commonality among the teachers they described. All of them were "highly sensitive, resourceful, flexible and willing to get off the beaten track" (Torrance, 1961, p. 193).

Numerous accounts of successful and unsuccessful teaching procedures were described by people who have been in educational and socio-psychological fields for a number of years and have attempted to formalize their observations. Bartky (1953) found that teachers must be personally interested in educational goals if they were to be achieved. Kubie (1958) has pointed out that individuals burdened with anxiety were unable to perform up to their creative capacities. Lowenfield (1957) saw education as responsible for transforming every individual's potential creativity into functional creativity. Sharp (1951), a specialist in teacher education, described the teacher as frequently involved in processes designed to release anxiety and reduce tension with their students. These accounts and the findings of related research in creativity tend to form a somewhat loosely organized body of knowledge, full of implications for further research into teacher role and development of creativity in the classroom.

Any professional educator or lay participant is aware of the variety of management and behavior problems in public school classrooms. Each classroom has a unique personality of its own, and no two are exactly the same. But the classrooms with creative atmospheres have generally been described as having:

> . . . a feeling tone which each person receives by direct empathy. If he is to release his inner meanings he must emotionally believe

> that he is wanted as a member, that he has qualities which others recognize, believe in, and accept, that he is and can be different from others yet work with them mutually and cooperatively, that he has a right to grow up as a unique self, that every person is helping him to develop all of his emergent possibilities as he is helping others do the same . . . At the outset and in the process that this atmosphere is affected more by the teacher than the children since she knows how to develop it while they have to learn. She never knowingly injects conditions that destroy it, she helps children verify their contributions to it (Hopkins, 1956, p. 20).

Many observers have noted that young children come to school with an insatiable curiosity and an enthusiasm for learning, both of which diminish as they proceed through school. Sanders (1961) questioned whether the validity of such observations had been established. He pointed out that even if the desire-to-know diminished, it was still not known whether it was a natural phenomenon in child development or whether the school actually dulled enthusiasm for learning. Sanders had viewed the intellectual curiosity of the teacher as the possible determining factor. In an experiment conducted by Torrance (1959) it was found that the pupils of teachers scoring in the upper half of the sample on a measure of creative motivation or intellectual curiosity showed significant growth in creative writing during a three-month period. Pupils of the teachers scoring in the lower half failed to show any gain in creative writing during that period.

In Creativity: Progress and Potential, Taylor

(1964) presents a variety of problems faced by teachers in nurturing creativity. These have been identified by various researchers, including Sanders (1961), Hohn (1961), and Bruner (1960). These included the following:

1. When allowed to do so, children propose unexpected solutions which may disconcert teachers who anticipate more prosaic responses.
2. There is a strong temptation to tell the child what is "best" in order to "save time."
3. When the creative approach is used, children see relationships and significances that the teacher and even professionals in the subject matter field might miss.
4. Children ask questions the teacher cannot answer.
5. Teachers may feel guilty about permitting children to guess.
6. Time pressures and scheduling problems at times make it difficult to permit and consider the many questions children want to ask.
7. Quite realistically, teachers have to help children to conform in many ways "just to get along" (Taylor, 1964, p. 92).

Researchers agree that teachers must provide facilitating forces which counteract inhibiting forces that cut down any creative production in the classroom. Taylor (1964) listed the facilitating procedures that he felt were most important.

1. Rewarding varied kinds of talents and creative achievements.
2. Helping children recognize the value of their creative talent.
3. Teaching children to use creative problem-solving processes.
4. Developing creative acceptance of realistic limitations in a problem situation.
5. Avoiding the equation of divergency with mental illness and delinquency.
6. Modifying the misplaced emphasis on sex roles.
7. Helping creative children become less objectionable.

8. Developing school pride in creative achievement.
9. Reducing the isolation of highly creative children.
10. Providing sponsors or patrons for certain highly creative children.
11. Developing values and purposes.
12. Helping highly creative children learn to cope with anxieties and fears.
13. Helping high creative children to develop courage to tolerate the anxieties of being in the small minority, or exploring the uncertain, etc.
14. Reducing the discontinuities that seem to be associated with entrance into kindergarten, the fourth grade, and the seventh grade (p. 103).

In a paper delivered to the Minneapolis Teacher's League on May 20, 1959, Torrance (1962a) informed teachers what they can and should do to develop creative thinking in children. Twenty ideas were listed that should be considered as guideposts. Several assumptions underlay the formulations of these principles. First, it was assumed that creative thinking was important from the standpoint of mental health, the acquisition of knowledge for successful living and professional performance, and the progress of civilization. It was also assumed that all individuals possessed creative abilities to some degree and that those abilities could be improved by education and that providing this training is fundamental to the school's program.

The principles outlined were as follows:

1. Value creative thinking
2. Make children more sensitive to environmental stimuli
3. Encourage manipulation of objects and ideas
4. Teach how to systematically test each idea
5. Develop tolerance of new ideas

6. Beware of forcing a pattern
7. Develop a creative classroom atmosphere
8. Teach skills for avoiding peer sanctions
9. Teach the child to value his creative thinking
10. Give information about the creative process
11. Dispell the sense of awe of masterpieces
12. Encourage and evaluate self-initiated learning
13. Create "thorns in the flesh"
14. Create necessities for creative thinking
15. Provide for active and quiet periods
16. Make available resources for working out ideas
17. Encourage the habit of working out the full implication of ideas
18. Develop constructive criticism--not just criticism
19. Encourage acquisition of knowledge in a variety of fields
20. Develop adventurous-spirited teachers

(Torrance, 1962, p. 46).

This survey has concentrated on those studies and tests which seemed most related to the way in which creativity was determined or assessed, with particular reference to the teacher and classroom. The foregoing studies indicated a variety of topics for investigation, one of which was the present study. This study was designed to determine: (1) the manner in which pre-service teachers, who have been adjudged "more" and "less" creative, viewed the classroom atmosphere; (2) the relative importance they thought they would give to various commonly accepted practices involving the teaching-learning process; and (3) the kinds of activities which they thought would absorb their time and energies.

CHAPTER IV

The Problem

The generalizations of research studies on creativity suggested that creative persons were different from non-creative persons in their perceptions, value systems, goals, and behavior. The present investigation therefore sought to amplify the research on creativity with a sampling of creative and non-creative pre-service teachers in order to ascertain their differences in scholastic aptitude, academic achievement, and personality characteristics.

The Hypotheses

The purpose of this study was to determine the relationship and differences in performance of the creative and non-creative groups with respect to sorting creative and non-creative prepared items, scholastic aptitude as measured by the School and College Ability Test (hereafter referred to as SCAT), grade point average (hereafter referred to as GPA) in college, and personality variables as measured by the Guilford-Zimmerman Temperament Survey (hereafter referred to as G-Z). In accordance with the problem of this study the following hypotheses were formulated:

H_{o1}: There is no statistically significant difference in obtained converted score distributions between creative and non-creative groups for the Q and V variable on the SCAT, respectively.

H_{o2}: There is no statistically significant difference in obtained raw score distributions between creative and non-creative groups for each G-Z variable, respectively.

H_{o3}: There is no statistically significant difference in GPA distributions between the creative and non-creative groups.

H_{o4}: There is no statistically significant correlation between scores obtained on the Minnesota Test of Creative Thinking and obtained Q and V converted scores on the SCAT for the creative group, respectively.

H_{o5}: There is no statistically significant correlation between scores obtained on the Minnesota Test of Creative Thinking and obtained Q and V converted scores on the SCAT for the non-creative group, respectively.

H_{o6}: There is no statistically significant correlation between scores obtained on the Minnesota Test of Creative Thinking and obtained raw scores on the G-Z variable for the creative group, respectively.

H_{o7}: There is no statistically significant correlation

of the scores obtained on the Minnesota Test of Creative Thinking and obtained raw scores on the G-Z by variable for the non-creative group, respectively.

H_{o8}: There is no statistically significant correlation between scores obtained on the Minnesota Test of Creative Thinking and GPA for the creative group.

H_{o9}: There is no statistically significant correlation between scores obtained on the Minnesota Test of Creative Thinking and GPA for the non-creative group.

H_{o10}: There is no statistically significant correlation between scores obtained on the Minnesota Test of Creative Thinking and number of correct creative choices on a sort of creative and non-creative items by creative subjects.

H_{o11}: There is no statistically significant correlation between scores obtained on the Minnesota Test of Creative Thinking and number of correct creative choices on a sort of creative and non-creative items by non-creative subjects.

H_{o12}: There is no statistically significant correlation between scores obtained on the Minnesota Test of Creative Thinking and number of correct non-creative choices on a sort of creative and non-creative items by creative subjects.

H_{o13}: There is no statistically significant correlation between scores obtained on the Minnesota Test of Creative Thinking and number of correct non-creative choices on a sort of creative and non-creative items by the non-creative subjects.

H_{o14}: There is no statistically significant difference between creative and non-creative subjects in making proportion of correct creative choices on a sort of creative and non-creative items by item.

H_{o15}: There is no statistically significant difference between creative and non-creative subjects in making proportion of correct non-creative choices on a sort of creative and non-creative items by item.

H_{o16}: There is no statistically significant difference between the proportion of correct creative and correct non-creative choices on a sort of creative and non-creative items by item for the creative group.

H_{o17}: There is no statistically significant difference between the proportion of correct creative and correct non-creative choices on a sort of creative and non-creative items by item for the non-creative group.

H_{o18}: There is no statistically significant correlation between the number of correct creative and

non-creative choices on a sort of creative and non-creative items by the creative subjects.

H_{o19}: There is no statistically significant correlation between the number of correct creative and correct non-creative choices on a sort of creative and non-creative items by non-creative subjects.

Description of Tests

Minnesota Test of Creative Thinking

The verbal form of this test is appropriate for use in fourth grade through graduate school. For each test there is a manual designated as the Directions Manual and Scoring Guide (Torrance, 1966a) which contains all information necessary to administer and score the test. A single norms-technical manual (Torrance, 1966b) covering all forms of the test, includes the theoretical and statistical background material underlying testing of creative thinking. It also includes normative information.

The test contains seven activities. The subject is given a situation and asked to elaborate as much as he can in a given period of time. The test is timed and a total of 45 minutes is allowed for the test. The activities are:

1. Asking--asking questions about a particular picture.
2. Guessing causes--asking why the particular thing is happening in the picture.
3. Guessing consequences--what will happen because of what is happening in the picture.

4. Product improvement--how can a toy be made better to play with?

5. Unusual uses--what unusual things can be done with a common article?

6. Unusual questions--questions about seldom thought of aspects of an article.

7. Just suppose--what would happen if an improbable situation occurred?

Findings by the designer of the tests (Torrance, 1961b) suggests that it is not necessary to have special training in scoring the tests to assure reliable results. The manual provides a basis for judgment when scoring the test.

Each activity is scored for fluency and originality, and all but one, unusual questions, are scored for flexibility. In addition, there is an elaboration score possible that is optional with the examiner.

Item Sort

Torrance compiled a list of 20 suggestions to teachers for nurturing creativity in the elementary school (Torrance, 1962b). In using these suggestions as a basis, an item sort was constructed by the author of this study. For each of the suggestions, five statements were written about a common classroom practice, procedure, attitude or plan reflecting the suggestion. These five statements ranged from one believed to be conducive to creative behavior in the classroom to a statement believed to be antithetical to creative behavior in the classroom (see Appendix

A). It was assumed that the more creative the individual, the greater the empathy with creative atmosphere.

The Guilford-Zimmerman Temperament Survey

The Guilford-Zimmerman Temperament Survey is designed to be used with senior high school students, college students, and adults. The GZ was constructed with five objectives in mind: (1) single booklet of items; (2) a single answer sheet; (3) an efficient scoring method; (4) a coverage of the traits proven to have greatest utility and uniqueness; and (5) condensations and omissions of trait scores where intercorrelations were sufficiently high.

The 10 traits included in the survey are: G--general activity; R--restraint; A--ascendence; S--sociability; E--emotional stability; O--objectivity; F--friendliness; T--thoughtfulness; P--personal relations; and, M--masculinity. The traits are measured by 300 objective questions. The choice of items to be scored for each trait was determined by the results of factor-analysis and item-analyses.

The internal validity of the scores is fairly well assured by the foundation of factor-analysis studies plus successive item-analyses directed toward consistency and uniqueness. It is believed that what each score measures is fairly well defined and that the score represents a confirmed dimension of personality and a dependable descriptive category.

School and College Ability Tests

The School and College Ability Tests (SCAT) aid in estimating the capacity of a student to undertake the academic work of the next higher level of schooling. SCAT purports to measure verbal and quantitative abilities.

Each test booklet in the SCAT contains four parts. Two of these subtests, Part I and III measure developed verbal ability, where Parts II and IV measure developed ability in basic quantitative areas. The items in all four parts are multiple-choice and the student chooses the best answer from among the five choices.

Definitions

To define what is meant by creative power or creativity has been a complicated problem area. Over the centuries there have been many opportunities to observe the results of the creative process--in art, science, literature, architecture, mathematics, and many other fields. But the process of creativity is relatively still unknown. Creativity has been the subject of many research programs in the past ten years, but the interest and speculation about this fascinating secret of the mind is not new. Aristotle in 334 B. C. said, "The passive mind is potentially all things; but the creative mind converts the potential things into actual things, as light turns potential color into actual color" (Ulich, 1950).

The following definitions are used for the purpose of this study:

Creative Group: The phrase "creative group" refers to those subjects that scored above the first standard deviation on the MTCT. No implication concerning their creative power beyond this is attempted.

Non-creative Group: The phrase "non-creative group" refers to those subjects that scored below the first standard deviation on the MTCT. No implication concerning their creative power beyond this is attempted.

Creative Classroom Atmosphere: A "creative classroom" is identified by an atmosphere of "released control" (Torrance, 1962), permissiveness, a sense of security, an absence of fear, flexible ways of working together, and accepted roles of responsibility. There should be sharing of ideas, materials, and talents. An acceptance of everyone's capabilities and limitations, coupled with mutual respect, is important.

Limitations

This investigation is limited to elementary school pre-service teachers. All subjects are elementary school majors enrolled in the final semester of their elementary school teaching preparation program. No men are included in the sample since none are enrolled at this level. No attempt was made to control age or expected teaching level.

This investigation is also limited to those individual traits defined by the respective instruments employed in the study. Mental ability was ascertained by the SCAT, the level of creativity was isolated by the MTCT, and personality traits were limited to those traits defined and measured by the GZ.

Subjects

The population was comprised of 187 seniors enrolled at the University of Oklahoma during the spring semester of 1966. All were female, elementary education majors, planning to teach in elementary schools the following year. None had any teaching experience, but all had spent eight weeks doing practice teaching under the guidance of a supervising teacher. The subjects freely and willingly participated in the study.

Procedure

The Minnesota Test of Creative Thinking, Verbal Section (hereafter referred to as MTCT), was administered to all 187 subjects. A composite total verbal score was compiled for each subject. This score included fluency, flexibility, originality, and elaboration for each of the seven tasks with the exception of Unusual Questions. It was scored for fluency, originality and elaboration. The subjects who scored above the first standard deviation were placed in one sample and designated, "creative;" those

subjects scoring below the first standard deviation were placed in another sample and designated, "non-creative." Nineteen subjects automatically fell in each sample. The remaining 149 subjects falling within the range of $\pm$ 1 standard deviation from the mean were not used since only the extreme cases would detect greater differences if they existed.

The creative and non-creative groups were administered a sort containing 100 items, 20 creative, 20 non-creative, and 60 neutral items. These items were constructed by the author using criteria obtained from published articles by Paul Torrance (1964a) and Calvin Taylor (1963) dealing with 20 areas of classroom procedure that can implement or deter the release of creative potential. The 20 groups of items were sorted by the subjects and placed into envelopes marked: "most like my classroom," and "least like my classroom." These categories were labeled "creative" and "non-creative," respectively.

SCAT, Q and V converted scores, GPA, and the GZ raw scores were obtained from the student's records. These data and item sorts were tallied and recorded for each subject comprising the creative and non-creative groups.

CHAPTER V

RESULTS OF THE STUDY

The obtained test scores, GPA, and results of the item sort were tabulated for each subject in the creative and non-creative groups (Appendix B). Since the two groups were isolated in terms of high and low performance on the MTCT, it was obvious that there was little point in analyzing the difference in group means. However, a comparison of the groups by test variable and GPA was made to determine if statistically significant differences existed in scholastic aptitude, personality characteristics, and academic achievement. Since some of the variables appeared to have rather skewed distributions and the samples were relatively small, non-parametric statistics were used in analyzing the data.

The Mann-Whitney U test is a powerful and most useful alternative to the parametric t test. For this reason it is employed to determine whether the two groups have the same distribution on the SCAT, and GZ variables, and GPA variable, respectively. The sums of ranks for the creative and non-creative groups, U values, z values, and

probabilities are given for each of the 13 variables in Table I. There is only one statistically significant difference between the two groups which occurs on the G (general activity) variable of the GZ where U = 270 with a probability of occurrence under the null hypothesis of p = .009. Since the probability is less than .01, the null hypothesis (H_{o2}) of no statistically significant difference in obtained raw score distributions on the G variable of the GZ between creative and non-creative groups is rejected. This indicates that the creative group is higher in general activity than the non-creative group. On all other variables the data give evidence which justify the acceptance of the null hypotheses, H_{o2} (except G variable - general activity), H_{o1} and H_{o3} and the conclusion is that the two groups are similar with respect to scholastic aptitude, personality characteristics, and academic achievement.

The next analysis was to determine the degree of relationship between the MTCT and the respective test variables of SCAT and GZ as well as GPA. To test the hypotheses, H_{o4} through H_{o9}, that no statistically significant correlations exist between obtained scores on the MTCT and the respective variables, Kendall's rank correlation was used (Seigel, p. 203ff). The Tau coefficients were corrected for ties and the z values and the associated probability values were computed. Table II shows the results of this analysis for both the creative and non-creative group.

The Mann-Whitney U, z Values, and Probabilities of Differences Between the Creative and Non-Creative Groups by Variable

Test Variables		Creative Ranks (n = 19)	Non-Creative Ranks (n = 19)	U	z	p[a]
SCAT	Q	360.0	356.5	194.5	.409	.3409
	V	340.0	401.5	211.5	.892	.1867
GZ	G	450.0	281.0	270.0	2.622	.0045
	R	344.0	397.5	207.0	.777	.2177
	A	463.5	278.5	272.5	1.146	.1251
	S	428.5	313.0	238.0	1.685	.0465
	E	399.0	341.5	209.5	.848	.1976
	O	384.5	356.5	194.5	.410	.3409
	F	397.0	344.0	207.0	.776	.2177
	T	308.0	433.0	243.0	1.830	.0336
	P	418.5	322.5	228.5	1.407	.0703
	M	377.5	353.5	197.5	.498	.3085
GPA		354.5	361.0	196.5	.497	.3192

[a]In testing the differences between the two groups, a prediction in direction of differences is not stated. Therefore, the probability of U occurring under the null hypothesis is a two-tailed test. The probabilities given are for a one-tailed test or alternate hypothesis and the value of probability should be doubled for testing the null hypothesis.

TABLE II

Rank Correlation Coefficients (Tau) Between MTCT and Test Variables and GPA, z Values and Probabilities for the Creative and Non-Creative Groups by Variable

	Creative Group			Non-Creative Group		
	Tau	z	p	Tau	z	p
SCAT Q	-.182	-1.089	.1400	-.006	- .036	.4840
V	-.032	- .080	.2118	.280	1.677	.0465
GZ G	.031	.183	.4286	-.299	-1.790	.0368
R	-.240	-1.439	.0749	.132	.790	.2155
A	-.006	- .036	.4840	-.006	- .036	.4840
S	-.036	- .216	.4129	-.042	- .251	.4013
E	-.225	-1.347	.0885	.024	.147	.4404
O	-.042	- .251	.4013	.203	1.216	.1112
F	.078	.467	.3192	.456	2.731	.0032
T	-.006	- .036	.4840	.109	.653	.2578
P	-.102	- .611	.2709	.266	1.593	.0559
M	-.036	- .215	.4168	-.163	- .976	.1635
GPA	-.199	-1.191	.1170	.368	2.204	.0139

The results in Table II show no statistically significant correlation for any variable in the creative group, consequently, hypotheses H_{o4} through H_{o9} are accepted and no association obtains between creativity as measured by the MTCT, and scholastic aptitude as measured by SCAT, personality characteristics as assessed by GZ, and GPA.

However, four statistically significant Tau coefficients are evident for the non-creative group. For the relation between MTCT scores and verbal ability, Tau = .28 and z = 1.677 with a probability = .0465. Although the Tau value just reached the level of significance = .05, the hypothesis of no correlation is rejected and it is concluded that the two variables are associated in the population. The relation between MTCT and grade point average, Tau = .368 and z = 2.204 with probability = .0139, indicates association between the two variables, therefore, the hypothesis or no correlation is rejected. This is meaningful, perhaps, in that it could account for the rejection of the aforementioned hypothesis. Two personality characteristics seem to be related to MTCT scores, G (general activity) and F (friendliness) with Tau = -.299, z = 2.731 with a probability = .0032, respectively. The negative relationship between MTCT scores and general activity trait suggests that the non-creators exhibit a less rapid pace, they are not particularly fond of action, and they do not display an excess of energy. The relatively high association

between MTCT scores and friendliness for the non-creative group implies that a quality of agreeableness and compliance is related to non-creativity.

To explore the degree of relationship between MTCT obtained scores and number of correct creative and non-creative item sorts for the creative and non-creative groups four rank correlation coefficients were computed. These Tau coefficients were used to test the null hypotheses 10 through 13 with the results presented in Table III.

TABLE III

Rank Correlation Coefficients (Tau) Between MTCT and Number of Correct Creative and Non-Creative Item Sorts, z Values and Probabilities for the Creative and Non-Creative Groups

	Creative Group			Non-Creative Group		
	Tau	z	p	Tau	z	p
No. of Correct Creative Item Sorts	.0135	.078	.4721	.412	2.467	.0068
No. of Correct Non-Creative Item Sorts	.0595	.353	.3632	.379	2.269	.0036

The Tau values for the creative group failed to reach the .05 level of significance, hence H_{o10} and H_{o12} are accepted. In other words, there is no association between creativity as determined by the MTCT and number of

correct creative and correct non-creative item sorts. For the non-creative group, MTCT obtained scores correlated better than the .01 level of significance with correct item sorts. For the number of correct creative item choices Tau equals .412 with a z equal to 2.467, and for the number of correct non-creative item choices Tau equals .379 with a z equal to 2.269. H_{o11} and H_{o12} are rejected, which indicates that there is association between the MTCT scores and correct selection of creative and non-creative items by the non-creative group.

The previous analyses of item sorts were made in terms of total number of correct choices for all items. It seemed appropriate, therefore, to compare the proportions of creative and non-creative groups with respect to their correct choices by item. The results are shown in Tables IV and V. The differences in proportions are relatively large for all items for both groups with the exception of item 10. For this item, no statistically significant difference in proportion of subjects making correct creative and correct non-creative choices is evident. For all other items there is a statistically significant difference in proportion of subjects making the correct choice of items in favor of the creative group beyond the .05 level of significance. Hence, hypotheses H_{o14} and H_{o15} are rejected.

TABLE IV

Proportion (p) of Creative and Non-Creative Subjects Making Correct Choices of Creative Items by Item

Item No.	Creative Group (n = 19) p_1	Non-Creative Group (n = 19) p_2	p_1-p_2	z
1	52.63	15.79	36.84	2.392*
2	89.47	26.32	63.24	3.952**
3	73.68	21.05	52.63	3.249**
4	100.00	52.63	47.37	2.715**
5	63.16	15.79	47.37	2.998**
6	84.21	31.58	52.63	3.289**
7	84.21	26.32	57.89	3.596**
8	78.95	26.32	52.63	3.249**
9	100.00	21.32	73.68	4.723**
10	36.84	15.79	21.05	1.472
11	94.74	15.79	78.95	4.904**
12	73.68	31.58	42.10	2.599**
13	73.68	21.05	52.63	3.248**
14	78.95	21.05	57.90	3.574**
15	100.00	31.58	68.42	4.443**
16	94.74	26.32	68.42	4.298**
17	78.95	26.32	52.63	3.249**
18	68.42	15.79	52.63	3.289**
19	100.00	15.79	84.21	5.263**
20	84.21	10.05	73.71	4.559**

* Significant beyond the .05 level
** Significant beyond the .01 level

TABLE V

Proportion (p) of Creative and Non-Creative Subjects Making Correct Choices of Non-Creative Items by Item

Item No.	Creative Group (n = 19) p_1	Non-Creative Group (n = 19) p_2	p_1-p_2	z
1	78.95	31.58	47.37	2.942**
2	100.00	31.58	68.42	4.443**
3	100.00	42.11	57.90	3.938**
4	100.00	31.58	68.42	3.443**
5	94.74	42.11	52.63	3.485**
6	89.47	36.84	50.63	3.245**
7	100.00	21.05	78.95	4.965**
8	68.42	10.53	57.89	3.641**
9	89.47	31.58	57.89	3.641**
10	68.42	36.34	31.58	1.949
11	89.47	31.58	57.94	3.644**
12	94.74	26.32	68.42	4.303**
13	100.00	26.32	73.68	4.723**
14	100.00	36.84	63.16	4.183**
15	100.00	42.11	57.89	3.938**
16	100.00	36.84	63.16	4.183**
17	100.00	47.37	52.63	3.680**
18	100.00	36.84	52.63	3.680**
19	94.74	36.84	57.90	3.760**
20	89.47	36.84	52.63	3.249**

** Significant beyond the .01 level

Further analyses were made where the proportions of correct creative and correct non-creative items were chosen by the creative and non-creative groups, respectively, by item. The results of these analyses are presented in Tables VI and VII. The differences in proportions are relatively small, and not consistent in direction. More statistically significant differences occur with the creative group than with the non-creative. Only one significant difference exists for the non-creative group, i.e., with item 18. Where these differences occur, they are in the direction of correct non-creative choices. In view of the existing differences, H_{o16} and H_{o17} are accepted for all items except 3, 10, 14, 17, and 18 for the creative group and item 18 for the non-creative group. With the exceptions indicated, the findings suggest that the creative and non-creative items are chosen with a reasonable amount of accuracy. However, the least amount of differences occur with the non-creative group.

In the last analysis, the data were combined to determine if there was an association between correct creative and correct non-creative choices in sorting creative and non-creative items by creative and non-creative groups. The data presented in Table VIII reveal that no statistically significant correlation exists for the creative group. The hypothesis H_{o18} is accepted. However, for the non-creative group there is a relationship between the number of correct creative and non-creative choices. Tau equals

TABLE VI

Proportion (p) of Correct Creative and Correct Non-Creative Choice of Items for the Creative Group by Item

Item No.	Correct Creative Choice p_1	Correct Non-Creative Choice p_2	p_1-p_2	z
1	52.63	78.95	-26.32	-1.709
2	89.47	100.00	-10.53	-1.462
3	73.68	100.00	-26.32	-2.415*
4	100.00	100.00	.00	.000
5	63.16	94.74	-31.58	-2.392
6	84.21	89.47	- 5.25	- .483
7	84.21	100.00	-15.79	-1.794
8	78.91	68.42	10.53	.736
9	100.00	89.47	10.53	1.462
10	36.84	68.42	-31.58	-1.949
11	94.74	89.47	5.27	.599
12	73.68	94.74	-21.06	-1.785
13	73.68	100.00	-26.32	-2.415
14	78.95	100.00	-21.05	-2.126*
15	100.00	100.00	.00	.000
16	94.74	100.00	- 5.26	-1.011
17	78.95	100.00	-21.05	-2.126*
18	68.42	100.00	-31.58	-2.676**
19	100.00	94.74	5.26	1.011
20	84.21	89.47	1.09	- .483

* Significant beyond the .05 level
** Significant beyond the .01 level

TABLE VII

Proportion (p) of Correct Creative and Correct Non-Creative Choice of Items for the Non-Creative Group by Item

Item No.	Correct Creative Choice p_1	Correct Non-Creative Choice p_2	p_1-p_2	z
1	15.79	31.58	-15.79	-1.144
2	26.32	31.58	- 5.26	- .358
3	21.05	42.11	-21.06	-1.395
4	52.63	31.58	21.05	1.316
5	15.79	42.11	-26.32	-1.790
6	31.58	36.84	- 5.26	- .341
7	26.32	21.05	5.27	.418
8	26.32	10.53	15.79	1.253
9	26.32	31.58	- 5.26	- .358
10	15.79	36.84	-21.05	-1.472
11	15.79	31.58	-15.79	-1.144
12	31.58	26.32	5.26	.356
13	21.05	26.32	- 5.27	- .382
14	21.05	36.84	-15.79	-1.074
15	31.58	42.11	-10.53	- .675
16	26.32	36.84	-10.52	- .697
17	26.32	47.37	-21.05	-1.349
18	15.79	47.37	-31.58	-2.091*
19	15.79	36.84	-21.05	-1.472
20	10.53	36.84	-26.31	-1.906

* Significant beyond the .05 level

.474 and a z = 2.840 with a probability = .0023. Since the value exceeds the level of significance = .01, the hypothesis of no correlation is rejected and it is concluded that the two variables are associated in the population.

TABLE VIII

Rank Correlation Coefficients (Tau) Between the Number of Correct Creative and Non-Creative Item Sorts, z Values and Probabilities for the Creative and Non-Creative Groups

	Tau	z	p
Creative Group	.003	.078	.4721
Non-Creative Group	.474	2.840	.0023

CHAPTER VI

SUMMARY, FINDINGS, AND DISCUSSION

Summary

The problem of this study was to obtain an index of creativity for a population of pre-service teachers and to isolate a creative and non-creative sample. It was extended to obtain indices of scholastic aptitude, academic achievement, personality characteristics, and response styles to item sorts of classroom situations in order to compare samples and to investigate the relationships among the indices.

The Minnesota Test of Creative Thinking was administered to all senior pre-service teachers enrolled in elementary education at the University of Oklahoma during the spring semester of 1966. The 19 subjects who obtained scores above one standard deviation from the mean were designated the creative group and the 19 subjects who obtained scores below one standard deviation from the mean were designated the non-creative group. Scores on the School and College Ability Test, Guilford-Zimmerman Temperament Survey, and cumulative grade point averages were

already available for the 38 subjects. A set of 100 items designed to nurture creativity and to reflect one's perception of common classroom behavior, attitude, and planning was developed by the writer. The item sort was accomplished by the subjects and the number of correct responses were used as the index for comparison.

Findings

The basic experimental paradigm was to contrast performance on the SCAT, GZ, and GPA of a group of creative and non-creative pre-service teachers. With but one statistically significant difference in distribution of scores found among the 13 significance tests, there was little evidence in the results of this analysis to suggest that creative and non-creative pre-service teachers were different in terms of scholastic ability, personality characteristics, and cumulative grade point average. The only difference found was on the G (general activity) variable of the GZ, which indicated that the creative group was generally more active and energetic than the non-creative group.

When the degree of relationship was determined between performance on the MTCT and each test variable of the SCAT and GZ and GPA, no statistically significant associations were found for the creative group. These findings suggested that the index of creativity was not indicative of measuring the same thing as the indices of scholastic

aptitude, personality characteristics, and cumulative grade point average. With the exception of verbal ability (SCAT), of personality characteristics G (general activity) and F (friendliness), and cumulative grade point average, the relationships between the MTCT and remaining variables for the non-creative group were similar to the results obtained for the creative group. The negative relationship between MTCT and G variable indicated that the non-creative group was more concerned with less activity while the positive relationship with F variable suggested that the non-creative group was more friendly. The low scores on the creative index and GPA were associated.

The relationship between MTCT obtained scores and number of correct creative and non-creative item sorts for the creative and non-creative groups showed no association for the creative group. For the non-creative group the Tau coefficients were highly significant indicating an association between MTCT scores and correct selection of creative and non-creative items. Seemingly, the group who scored high on the MTCT failed in selecting correct creative and non-creative items on the item sort, while the group who scored low on the MTCT succeeded in selecting correct creative and non-creative items.

The proportions of creative and non-creative subjects were compared with respect to their correct choices by item. There were statistically significant differences in proportion of subjects making the correct choices of

items in favor of the creative group for all items except for one item. No differences of proportion was indicated for item 10. In general, more subjects in the creative group chose correct creative items than those in the non-creative group.

The proportions of correct creative and correct non-creative items chosen by the creative and non-creative groups, respectively, were compared by item. More statistically significant differences occurred for the creative group than for the non-creative group. Statistically significant differences existed for items 3, 10, 14, 17, and 18 for the creative group, and for item 18 for the non-creative group. All these differences occurred in direction of correct non-creative choices.

In the final analysis, the item data were combined to determine if there was an association between correct creative and correct non-creative choices as sorted by the creative and non-creative groups. Although no statistically significant correlation existed for the creative group, the correlation obtained for the non-creative group was significant. It was concluded that, although the non-creative group made fewer correct creative choices, there was an association between this inability to select items which indicated creative and non-creative classroom situations.

Discussion

The evidence found in this study indicated an importance of the G variable of the GZ as a guide to assessing creative behavior in pre-service teachers. The data indicated that the creative group was higher in general activity than the non-creative group. When checking the distributions of the two groups, there was a statistically significant difference in obtained raw score distribution on the G variable between the creative and non-creative group. Also, there was a negative relationship between MTCT scores and the G variable for the non-creative group. This finding suggested that the members of the non-creative group did not move at as rapid a pace nor were as energetic as the creative group members. This seemed feasible in light of the related research.

> It has been suggested that the creative person is curious, enterprising in his ideas, intellectually persistent, . . . he shows initiative in his area of work; he likes to think and manipulate ideas; . . . he needs variety . . . he wants to improve upon currently accepted orders and systems. The use of passional sources of energy . . . may be important. High energy with vast work output through disciplined work habits is usually found (Taylor, 1964, p. 24).

A positive relationship was found on the F (friendliness) variable of the GZ for the non-creative group. This indicated a degree of compliance or conformity that was more consistent with non-creative behavior than was usually the case with creative individuals. There was some

evidence that creative persons were more autonomous than others, more independent in judgment. "They go against group opinion if they feel it is incorrect" (Taylor, 1964, p. 27). One of the dimensions of the F variable was agreeableness or getting along with people. Creative persons, striving for autonomy and solutions, may be sensed as a threat and may be sanctioned by others, but will continue to seek comprehensive answers and to be intellectually thorough in spite of what their peers or elders might say or do. On the other hand, non-creative persons tend to compromise in order to lessen tension.

There was a statistically significant relationship between verbal ability and the MTCT for the non-creative group, but none for the creative group. If performance on the MTCT were a true measure of creativity, this finding was not completely in line with previous findings. However, if this significant correlation were taken in conjunction with the significant correlation found between the MTCT and GPA for the non-creative group, it could perhaps serve as a basis of explanation for the higher verbal ability scores achieved by the non-creative group. Higher verbal ability could reasonably be expected to influence GPA.

High correlation between low creative scores and high GPA was not unusual. As a result of his research with the National Merit Scholarship finalists, Holland (1961) reported that creative performance was generally unrelated

to scholastic achievement and scholastic aptitude. The results of correlational studies implied that academic achievement involved somewhat different motives than creative performance with the result that good grades appeared to be a function of socialization, both citizenship and popularity, and of perseverence; whereas creative performance was a function of conscious concern with high accomplishment, independence and originality. Creative students appeared to come into conflict with teachers who demanded controlled and nonexploratory behavior, which influenced their GPA.

The item sorts and their relationship to the creative measure yielded some unforeseen results. The null hypotheses of no relationship between obtained creative scores and number of correct creative and non-creative item sorts for the creative groups were accepted because the Tau values for this group failed to reach the .05 level of significance. For the non-creative group, MTCT obtained scores correlated better than the .01 level of significance with item sorts. The null hypotheses in these latter cases were rejected. This indicated that there was a relationship between low creativity scores and the subject's perceptions of practices in the classroom. This seemed to suggest that non-creative subjects did prefer the procedures that were traditional and more conformity inducing but that the creative subjects did not necessarily prefer the opposite.

The null hypotheses of no significant differences in proportions of creative and non-creative groups with respect to their correct choices by item were rejected. These differences in proportion were relatively large for both groups for all items except item 10. This showed that the two groups did choose different items with the exception of one case and indicated that the creative group was more perceptive of creative and non-creative classroom situations than the non-creative group.

Both the creative and non-creative groups chose correct creative items more consistently than the non-creative items. There were several differences in the direction of non-creative items for the creative group and one for the non-creative group. In this instance as in the others, the non-creative group was more consistent in choosing the correct item.

There was a high association between the number of correct creative and correct non-creative items sorted by the non-creative group, but not for the creative group. These findings coincide with the other findings concerning the behavior of the two groups with respect to the item sort. This led to the conclusion that, with this group of subjects, the non-creative group was inclined to be more consistent in their behavior while the creative group displayed greater variety with respect to their card sorting performance.

Some ambiguity still exists in so far as interpretation is concerned. This is probably a result of the particular sampling of variables used as well as the method for obtaining the creative and non-creative groups. Also, since the items for the item sorts were constructed and restricted in part to the theoretical framework upon which the MTCT was developed, it was not surprising that the obtained correlations were generally not significant for the creative group and significant for the non-creative group.

From among the 13 variables, and with two relatively small groups, only one difference, the personality trait of general activity existed. With this finding only the most tenuous of speculations can be forwarded. The tentative conclusion is that the creative and non-creative groups are similar in terms of scholastic aptitude, academic achievement, personality characteristics, and cumulative grade point average. General activity (more energy) seemed to be the most characteristic trait in the creative group. At the same time, it was interesting to note that the findings related to the two personality characteristics of general activity and friendliness corroborate findings cited in the review of literature.

REFERENCES

Amidon, E. J., Flanders, N. A., The Role of the Teacher in the Classroom: A Manual for Understanding and Improving Teachers' Classroom Behavior, Minneapolis, Minnesota: Paul S. Amidon and Associates, 1963.

Amidon, E. J., Giamatteo, M. M., "The Verbal Behavior of Superior Teachers," Elementary School Journal, February, 1965, 65, 283-285.

Anderson, H. H. (Ed.), Creativity and Its Cultivation, New York: Harper, 1959.

Ansbacher, H. L., Ansbacher, Rowena R. (Eds.), The Individual Psychology of Alfred Adler, New York: Basic Books, 1959.

Arnheim, R., "Perceptual Abstraction and Art," Psychological Review, 1947, 54, No. 1, 66-82.

Association for Supervision and Curriculum Development, "Creativity and Openness to Experience," Perceiving, Behaving, Becoming: A New Focus, Washington, D. C.: National Education Association, 1962.

Barron, Frank, Creativity and Psychological Health, Princeton, N. J.: D. Van Nostrand Co., 1963.

Barron, Frank, "The Creative Writer," California Monthly, February, 1962, 72, 11-14, 38-39.

Bartky, John A., Supervision as Human Relations, Boston: D. C. Heath & Co., 1953.

Bartlett, Sir F., Thinking, New York: Basic Books, 1958.

Bellack, Arno A., The Language of the Classroom: Meanings Communicated in High School Teaching, U. S. Department of Health, Education and Welfare, Office of Education Cooperative Research Project No. 1497, New York: Institute of Psychological Research, Columbia University, 1963.

Bentley, J. C., "The Creative Thinking Abilities and Different Kinds of Achievement," Master's thesis, University of Minnesota, 1961.

Bills, Robert, "Believing and Behaving: Perception and Learning," Learning More About Learning, Association for Supervision and Curriculum Development, Washington, D. C.: National Education Association, 1959.

Blockhus, Wanda A., "Creativity and Money Management Understandings," Doctoral Dissertation, University of Minnesota, 1961.

Bruner, J. S., "Individual and Collective Problems of the Psychology of Thinking," in Harms (Ed.), Fundamentals of Psychology: The Psychology of Thinking, New York: New York Academy of Science, 1960.

Bruner, J. S., "Learning and Thinking," Harvard Educational Review, Summer, 1959, 29, 184-192.

Burkhart, Robert C., Spontaneous and Deliberate Ways of Learning, Scranton, Pa.: International Book Co., 1962.

Campbell, D. T., "Blind Variation and Selective Retention in Creative Thought as in other Knowledge Processes," Psychological Review, 1960, 67, 380-400.

Cohen, I., "Adaptive Regression and Creativity," Paper read at Midwest Psychological Association, Chicago, May, 1961.

de Mille, Richard, Merrifield, Phillip R. (Reviewers), "Creativity and Intelligence: Exploration with Gifted Students by Jacob W. Getzels and Phillip W. Jackson," Educational and Psychological Measurement, Winter, 1962, 22, 803-808.

Dinkmeyer, Don C., Child Development: The Emerging Self, Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1965.

Edgar, Thomas, "The Invaluable By-Product, Creativity," Phi Delta Kappan, February, 1965, 46, 275.

Ferren J., "The Problem of Creative Thinking in Painting," In The Nature of Creative Thinking, New York: Industrial Relations Institute, 1953.

Fleming, E. S., Weintraub, S., "Attitudinal Rigidity as a Measure of Creativity in Gifted Children," Journal of Educational Psychology, 1962, 53, 81-85.

Fletcher, F. M., "Manpower for Tomorrow--A Challenge," Personnel and Guidance Journal, 1958, 37, 32-39.

Freud, Sigmund, Civilization and Its Discontents, Garden City, N. Y.: Doubleday, 1958.

Freud, Sigmund, "Civilized Sexual Morality and Nervousness," In Collected Papers, Vol. II, London: Hogarth, 1924, Originally published in 1908.

Fromm, Eric, "The Creative Attitude," In H. H. Anderson (Ed.), Creativity and Its Cultivation, New York: Harper, 1959.

Gallagher, J. J., Aschner, M. J. M., "A Preliminary Report: Analysis of Classroom Interaction," Merrill-Palmer Quarterly of Behavior and Development, July, 1963, 9, 183-194.

Getzels, J. W., "Creative Thinking, Problem-Solving, and Instruction," National Society for the Study of Education Yearbook, 1964, 63, Part I, 240-269.

Getzels, J. M., Jackson, P. W., Creativity and Intelligence: Explorations with Gifted Students, New York: Wiley, 1962.

Giammatteo, Michael C., "Interaction Patterns of Elementary Teachers Using the Minnesota Categories of Interaction Analysis," Doctor's Dissertation, University of Pittsburg, 1963.

Goldberger, L. E., Holt, R. R., "Experimental Interference With Reality Contact: Individual Differences," In P. Solomon, P. E. Kubxansky, P. H. Liederman, J. H. Mendelson, R. Trumbull, D. Wexler (Eds.), Sensory Deprivation, Cambridge, Mass.: Harvard University Press, 1961, 130-152.

Guilford, J. P., "The Three Faces of Intellect," American Psychologist, 1959, 14, 469-479. (a)

Guilford, J. P., "Traits of Creativity," In H. H. Anderson (Ed.), Creativity and Its Cultivation, New York: Harper, 1959, 142-161. (b)

Guilford, J. P., Merrifield, P. R., "The Structure of Intellect Model: Its Uses and Implications," Psychological Research Lab, No. 24, Los Angeles: University of Southern California, 1960.

Hohn, F. E., "Teaching Creativity in Mathematics," Arithmetic Teacher, 1961, 8, 102-111.

Holland, John L., "Creative and Academic Performance Among Talented Adolescents," Journal of Educational Psychology, June, 1961, 52, 136-147.

Holt, R. R., Hanel, Joan, "A Method for Assessing Primary and Secondary Process in the Rorschach," In Maria A. Rickers-Ovsiankina (Ed.), Rorschach Psychology, New York: Wiley, 1960, 263-314.

Hopkins, L. Thomas, "Classroom Climate Can Promote Creativeness," Educational Leadership, 1956, XIII, 281-283.

Klausmeier, Herbert J., Wiersma, William, "Relationship of Sex, Grade Level, and Local to Performance of High IQ Students on Divergent Thinking Tests," Journal of Educational Psychology, April, 1965,

Kris, E., Psychoanalytic Explorations in Art, New York: International University Press, 1952.

Kubie, Lawrence, Neurotic Distortion of the Creative Process, Lawrence, Kansas: University of Kansas Press, 1958.

Lasswell, H. D., "The Social Setting of Creativity," In H. H. Anderson (Ed.), Creativity and Its Cultivation, New York: Harper, 1959.

Lowenfield, Vicktor, Creative and Mental Growth, New York: The Macmillian Co., 1957.

McClelland, D. C., "The Calculated Risk: An Aspect of Scientific Performance," In The 1955 University of Utah Conference on the Identification of Creative Scientic Talent, C. W. Taylor (Ed.), 1956, 96-110.

MacKinnon, Donald W. "Fostering Creativity in Students of Engineering," Journal of Engineering Education, December, 1961, 52, 129-42.

Maltsman, I., "On the Training of Originality," Psychological Review, 1960, 67, 229-242. (a)

Maltsman, I., Simon, S., Raskin, D., Licht, L., "Experimental Studies in the Training of Originality," Psychological Monographs, 1960, 74, No. 6. (b)

Maslow, A. H., "Creativity in Self-Actualizing People," In H. H. Anderson (Ed.), Creativity and Its Cultivation, New York: Harper, 1959, 83-95.

May, R., "The Nature of Creativity," In H. H. Anderson (Ed.), Creativity and Its Cultivation, New York: Harper, 1958, 55-58.

Mead, Margaret, "Creativity in Cross-Cultural Perspective," In H. H. Anderson (Ed.), Creativity and Its Cultivation, New York: Harper, 1959, 222-235.

Mednick, S. A., "The Associative Basis of the Creative Process," Psychological Review, 1962, 69, 220-232.

Mooney, R. L., "A Conceptual Model for Integrating Four Approaches to the Identification of Creative Talent," In C. W. Taylor (Ed.), The Second Conference on the Identification of Creative Scientific Talent, Salt Lake City: University of Utah Press, 1958, 170-180.

Moreno, J. L., "Creativity--Spontaneity--Cultural Conserves," In J. L. Moreno (Ed.), The Sociometry Reader, Glencoe, Ill.: Free Press, 1960, 8-14. (a)

Moreno, J. L., Who Shall Survive?, Beacon, New York: Beacon House, 1963. (b)

Murphy, Gardner, Human Potentialities, New York: Basic Books, 1958.

Newell, A., Shaw, J. C., Simon, H. A., "The Processes of Creative Thinking," In H. E. Gruber, G. Terrell, M. Wertheimer, (Eds.), Contemporary Approaches to Creative Thinking, New York: Charles Scribner's Sons, 1962, 55-66.

Pine, G., Holt, R. R., "Creativity and Primary Process: A Study of Adaptive Regression," Journal of Abnormal and Social Psychology, 1960, 61, 370-379.

Ribot, T., The Nature of Creative Imagination, Chicago: Open Court Publishing Co., 1906.

Rogers, Carl, "Toward a Theory of Creativity," In H. H. Anderson (Ed.), Creativity and Its Cultivation, New York: Harper, 1959, 69-82. (a)

Rogers, Carl, The Conference on Creativity, A report to the Rockefeller Foundation, Columbus: Ohio State University, 1953, 42. (b)

Sanders, D. C., Elementary Education and the Academically Talented Pupil, Washington, D. C.: National Education Association, 1961.

Schachtel, E. G., Metamorphosis, New York: Basic Books, 1959.

Schafer, Richard, "Regression in the Service of the Ego," In G. Lindzey (Ed.), Assessment of Human Motives, New York: Rinehart, 1958, 119-148.

Sears, Pauline, The Effect of Classroom Conditions on the Strength of Achievement Motive and Work Output of Elementary School Children, U. S. Department of Education, Cooperative Project No. 873, Stanford, California: Stanford University, 1963.

Selye, Hans, From Dreams to Discovery: On Being a Scientist, New York: McGraw-Hill Book Co., 1964.

Sharp, George, Curriculum Development as Re-education for the Teacher, New York: Bureau of Publications, Teachers College, Columbia University, 1951.

Sommers, W. S., "The Influence of Selected Teaching Methods on the Development of Creative Thinking," Doctoral Dissertation, University of Minnesota, 1963.

Spaulding, Robert L., "Personality and Social Development: Peer and School Influence," Review of Educational Research, December, 1964, 34, No. 5, 589-595.

Spaulding, Robert L., "What Teacher Attributes Bring Out the Best in Gifted Children," Gifted Child Quarterly, Winter, 1963, 7, 150-156.

Stein, M. I., "Creativity and Culture," Journal of Psychology, 1953, 36, 311-322.

Taylor, Calvin W., Personal Communication. February 28, 1966.

Taylor, Calvin W., Creativity: Progress and Potential, New York: McGraw-Hill, Ind., 1964.

Taylor, Calvin W., "Clues to Creative Teaching," Instructor, 1963, 73, 5+.

Taylor, Calvin W., "Some Variables Functioning In Productivity and Creativity," The Second University of Utah Conference on the Identification of Scientific Talent, Salt Lake City: University of Utah, 1958, 3-19.

Taylor, Calvin W., Barron, Frank, Scientific Creativity: Its Recognition and Development, New York: John Wiley and Sons, 1963.

Torrance, E. Paul, Personal Communication, February 22, 1966. (a)

Torrance, E. Paul, Personal Communication, February 17, 1966. (b)

Torrance, E. Paul, Torrance Tests of Creative Thinking: Directions Manual and Scoring Guide, Princeton, N. J.: Personnel Press, Inc., 1966 (c)

Torrance, E. Paul, Torrance Tests of Creative Thinking: Norms-Technical Manual, Princeton, N. J.: Personnel Press, Inc., 1966. (d)

Torrance, E. Paul, Rewarding Creative Behavior: Experiments in Classroom Creativity, Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1965. (a)

Torrance, E. Paul, "Scientific Views of Creativity," Daedalus, Journal of the American Academy of Arts and Sciences, Summer, 1965, 94, No. 3, 663-681. (b)

Torrance, E. Paul, "Creativity in the Classroom," Instructor, September, 1964, 74, 37. (a)

Torrance, E. Paul, "Education and Creativity," In Calvin Taylor (Ed.), Creativity: Progress and Potential, New York: McGraw-Hill Book Co., 1964, Chapter 3. (b)

Torrance, E. Paul, "Developing Creative Thinking Through School Experiences," In Sidney Parnes (Ed.), A Source Book for Creative Thinking, New York: Charles Scribners' Sons, 1962. (a)

Torrance, E. Paul, Guiding Creative Talent, Englewood Cliffs, N. J.: Prentice-Hall, 1962 (b)

Torrance, E. Paul, Creativity: Second Minnesota Conference on Gifted Children, Minneapolis: Center for Continuation Study, University of Minnesota, 1961. (a)

Torrance, E. Paul, New Educational Ideas: Third Minnesota Conference on Gifted Children, Minneapolis: Center for Continuation Study, University of Minnesota, 1961, (b)

Torrance, E. Paul, Rewarding Creative Thinking: A Manual for Elementary Teachers, Minneapolis: University of Minnesota, Bureau of Educational Research, 1959, Mimeographed, Out of Print.

Torrance, E. Paul, Michie, H. W., Explorations in Creative Thinking in the Early School Years: Scoring Manual for "How Good Is Your Imagination?" Form C, Minneapolis: Bureau of Educational Research, University of Minnesota, 1959.

Torrance, E. Paul, Palm, H. H., Palamula, H., Radig, H. J., Scoring Manual for a Measure of Inventive Level, Minneapolis: Bureau of Educational Research, University of Minnesota, 1959.

Torrance, E. Paul, Radig, H. J., The Ask and Guess Test: Scoring Manual and Rationale, Minneapolis: Bureau of Educational Research, University of Minnesota, 1959.

Torrance, E. Paul, Yamamoto, K., Schenetzke, D., Palamutlu, Necla, Luther, B., Assessing the Creative Thinking Abilities of Children, 1960.

Tumin, M., "Obstacles to Creativity," Educational Policies Commission, 1954, 11, 261-271.

Wallace, H. R., "Creative Thinking: A Factor in Sales Productivity," Vocational Guidance Quarterly, 1961, 9, 223-226.

Weisberg, P. S., Springer, Kayla J., "Environmental Factors in Creative Function," Archives in General Psychiatry, 1961, 5, 554-564.

Wenkart, Antonia, "Creativity in the Light of Existentialism," Journal of Existential Psychiatry, 1960, 3, 367-378.

Wertheimer, M., Productive Thinking, New York: Harper, 1945.

Yamamoto, K., Experimental Scoring Manuals for Minnesota Tests of Creative Thinking and Writing, Minneapolis: Bureau of Educational Research, University of Minnesota, 1964. (a)

Yamamoto, K., "Role of Creative Thinking and Intelligence in High School Achievement," Psychological Reports, June, 1964, 14, 783-789. (b)

Yamamoto, K., "Creative Writing and School Achievement," School and Society, October, 1963, 91, 307-308.

Yamamoto, K., Revised Scoring Manual for Tests of Creative Thinking, Minneapolis: Bureau of Educational Research, University of Minnesota, 1962.

Yamamoto, K., Creativity and Intellect: A Review of Current Research and Projection, Paper read at Minnesota Psychological Association, Minneapolis, Minnesota, April, 1961.

Yamamoto, K., Scoring Manual for the Non-Verbal Tasks of Creative Thinking, First Draft, Minneapolis: Bureau of Educational Research, University of Minnesota, 1960, Xeroxed.

Zirbes, Laura, Spurs to Creative Teaching, New York: G. P. Putnam's Sons, 1959.

APPENDIX A

ITEM SORT OF CREATIVE AND NON-CREATIVE ITEMS

1 a. The teacher encourages originality whenever possible and is alert to new and possibly latent talents in children.
   b. To convey their thinking to others, individuals are encouraged to use a variety of media.
   c. Children should always use correct spelling and punctuation when writing.
   d. The teacher is frequently concerned with the fact that students must complete certain units of work, build various understandings, and acquire particular skills if they are to be prepared for the next grade.
   e. Pupils who vary considerably in abilities may be grouped together for purposes of exploring mutual interests.

2 a. To increase the chance of intellectual accomplishment and creative contribution, the pupil is allowed some time to play around with contrary and sometimes unworkable ideas, even to dawdle and mull things over in his mind.
   b. Many classroom activities develop from interests which boys and girls generate in the home and other out-of-school situations.
   c. The teacher encourages students to see their own ideas as valuable--the child does not need to quote others or accept the solutions of others at every turn.
   d. Students are encouraged always to support their opinions with valid evidence.
   e. Criticism by the teacher is made in a constructive manner by pointing out to the child how the problem should be solved.

3 a. The processes involved in or used by the student are considered to be as important as his final product.
   b. Students and teacher set goals, plan experiences, and evaluate progress cooperatively.
   c. Students are encouraged to speculate about the consequences of their actions.
   d. The teacher frequently points out what an experience or a group of experiences really mean.
   e. The student learns to make judgments by first following accepted patterns and mastering knowledge already organized by scholars.

4 a. Students report on topics assigned to them by the teacher or the group.
   b. The teacher directs and plans topics for discussions, dramatizations, and socialized learning situations.

c. Individual students are allowed to use different means for arriving at the same learning objectives.
d. Children are stimulated to create problems and consider alternative solutions or endings.
e. Authorities are consulted when differences of opinion arise for an individual or group.

5 a. Curiosity and a sense of wonder are continually encouraged in the classroom.
b. Time is spent exploring unusual, contrary or "silly" ideas that are of interest to the students, and their creative contributions are rewarded.
c. The teacher commends effort and gives generous praise for work that comes up to standard.
d. The students are encouraged to follow the teacher's example.
e. A child's speculative glance or expression of "I wonder--" is noticed and considered as an opportunity for learning.

6 a. The teacher builds readiness for every activity undertaken in the classroom.
b. Students are encouraged to question and evaluate what they read, give personal reactions, check other sources.
c. The teacher encourages students to see their own ideas as valuable--the child is free to pursue new and different ideas.
d. The teacher encourages originality whenever possible--but is ever aware of the skills her students must learn.
e. Classes are conducted according to preconcieved, prepared plans.

7 a. Children are encouraged to keep their desks and papers neat and orderly. These conditions help boys and girls to do their best work.
b. Work space and a variety of art materials are used frequently by each child.
c. Children often experience large blocks of time in a relaxed, permissive atmosphere for projects of their own choosing.
d. Bulletin boards communicate interests, concerns, and achievements of pupils.
e. At times a child may, and can, appear to be doing nothing at all. Time to one's self is important.

8 a. Pupil interactions and social adjustments are studied through sociograms, student interviews, and parent conferences.
b. Role playing, puppetry, and dramatizations are used to help children understand themselves and others.

c. As students evaluate the work of their classmates, they are encouraged to avoid criticism that may be blighting to individual effort.
d. Students are encouraged to be courteous and well-mannered.
e. Children are encouraged to speculate about the consequences of their actions.

9 a. Students are encouraged to think of ways to improve writings, inventions, and customs; and the consequences of such improvements are discussed.
b. Students spend time in studying the work of great men and women; students learn from the lives of others.
c. The teacher draws illustrations from the lives of great men and women and shows how the students can be better citizens.
d. Students are encouraged to speculate on events of history and how certain changes could have altered the progress of the world.
e. Only those writings, drawings and discoveries which have the mark of originality and sensitive perception are selected for special recognition.

10 a. The teacher sets the tone for the classroom atmosphere by his acceptance or rejection of behavior.
b. The teacher continually appraises the results of his efforts; seeks improvement in accordance with his educational philosophy.
c. The teacher spends time in reading, course work, and other in-service activities to improve his teaching.
d. The teacher explains school policy so it will have meaning to students.
e. The teacher utilizes her own initiative and creativity to keep the class interesting.

11 a. Students participate in selecting and previewing activities for the class and participate in continuous evaluation of their own efforts.
b. Every activity undertaken in the classroom is carefully planned and prepared by the teacher.
c. Students wholeheartedly absorbed in an activity are often allowed to continue for awhile undisturbed though other classroom activities may commence.
d. The teacher frequently talks with each child for purposes of evaluation.
e. The teacher is careful to set standards for each activity and to be sure each student understands these standards.

12 a. Students are encouraged to use all of their senses in solving problems.
   b. Students take responsibility for the care of the classroom and its contents and arrangements.
   c. Classroom routines and arrangements are used by the teacher and students for a variety of learning activities.
   d. The teacher is primarily responsible for the classroom environment.
   e. Students are asked to work quietly at their own desks so as not to disturb others in the classroom.

13 a. Students are encouraged to question and analyze segments that disturb them, and to follow the problem to an answer, no matter how controversial.
   b. In most classroom activities pupils ask questions and express themselves freely about the work they are doing.
   c. Personal concerns of pupils are used as a basis for developing broader understandings of universal problems.
   d. Students are expected always to be courteous and well-behaved.
   e. The teacher is responsible for directing learning and must be constantly aware of the goals she has set for the children.

14 a. Assignments evolve from joint planning between students and teacher.
   b. Work is planned in such a way that students may discover principles and generalizations for themselves.
   c. All children are given an opportunity to participate in class planning by providing many kinds of media for them to choose from.
   d. A student is frequently helped in his attempts to perform a task.
   e. Students make oral or written reports on books, stories, films and television programs.

15 a. A change of pace in the kinds of activities occuring during the day is employed to promote physical, emotional and intellectual growth.
   b. The classroom has areas for large group activities and individual work.
   c. The teacher practices patience and understanding with the realization that learning takes time, and different settings for different children.
   d. Children are encouraged to work quietly alone to give all students the best learning environment.
   e. Most learning situations center around groups because children learn from each other.

16 a. Work space and a variety of materials are provided in the classroom.
   b. Students are encouraged to use unusual materials in new and different ways.
   c. Audio-visual materials, tape recordings, radio and television are used as teaching and learning aids.
   d. Parents and other resource people in the community visit the classroom to contribute to learning experiences.
   e. Students are encouraged to be neat in their work habits so that the classroom will be presentable.

17 a. To help students understand the implications of problems, they are encouraged to develop models and drawings, or to perform experiments.
   b. Students are permitted to spend time on projects of their own choosing.
   c. Students are encouraged to explore the meaning and feeling relating to an idea or skill by experimenting with non-verbal forms of communication such as art, music, and mechanics.
   d. The teacher talks frequently to the class for purposes of planning activities for the group.
   e. The teacher frequently gives explanations about experiences or groups of experiences.

18 a. The teacher talks frequently with each child for purposes of evaluation and understanding.
   b. The teacher and the students continually appraise the results of their efforts and seek improvement in accordance with their goals.
   c. An evaluation of classroom activities occurs before the planning of future activities.
   d. The class engages in periods of unevaluated discussion and activities.
   e. Each piece of work done by the student is evaluated by the teacher.

19 a. Students are encouraged to participate in many types of activities.
   b. Opportunities are provided for all students to learn a variety of skills through practice.
   c. To learn more effectively, students are usually grouped by ability and/or interest within the classroom.
   d. Upgrading the knowledge and skills of each student is partially accomplished through an individual exchange of ideas, information, and techniques resulting from different activities in which each has been involved.
   e. Students select the areas of their learning activities solely on the basis of their interests.

20 a. The teacher leads the way in posing unusual problems and strange ideas and encourages the students to do likewise.
b. School facilities and grounds are used by the teacher and students for a variety of learning activities.
c. The teacher accepts student reaction to his teaching as a source of professional growth.
d. The teacher commends effort and work well done.
e. Classes are conducted according to lesson plans.

APPENDIX B

RAW DATA ON ALL VARIABLES

FOR EACH SUBJECT

APPENDIX B

Creative Students	SCAT[a]		Guilford - Zimmerman											Torrance's Test[b]
	Q	V	G	R	A	S	E	O	F	T	P	M	G.P.A.	
BAL	289	300	15	10	18	25	12	14	13	24	17	11	2.68	503
BEK	326	315	15	19	15	18	16	14	24	29	20	9	2.86	464
SAE	298	310	11	18	10	8	13	11	12	12	12	6	2.46	446
LCT	279	294	15	21	19	23	27	22	18	20	17	8	2.30	436
JLE	293	311	11	19	16	25	24	27	22	12	28	17	3.39	424
LOP	296	296	28	7	29	28	10	21	27	20	25	13	2.54	411
BCM	295	307	17	15	16	22	12	18	13	20	19	15	3.02	401
ECC	318	299	24	5	25	25	11	15	17	8	6	12	3.47	395
EAD	312	311	26	5	21	14	17	12	17	11	18	19	2.82	381
BCH	307	298	24	22	21	28	14	15	20	12	15	4	2.36	375
LEA	251	250	24	23	11	28	19	24	26	18	21	16	2.99	369
LEC	314	323	23	13	11	20	19	23	20	13	25	8	3.62	346
BOF	312	312	16	22	15	18	22	18	23	25	24	20	2.86	345
JEP	291	292	19	21	19	16	20	19	14	20	19	11	2.61	342
JURL	304	293	20	25	19	28	23	20	24	16	27	15	3.45	339
BAJ	323	312	21	21	21	27	16	18	18	16	20	11	3.88	336
LEE	337	319	15	23	13	14	17	24	13	20	19	12	2.91	322
LEG	251	287	14	13	16	22	14	12	12	15	20	14	2.35	303
JEA	318	319	15	15	18	26	21	12	16	21	17	3	3.10	300

APPENDIX B (CONTD)

N-Creative Students	SCAT[a]		Guilford - Zimmerman										G.P.A.	Torrance's Test[b]
	Q	V	G	R	A	S	E	O	F	T	P	M		
LAB	307	310	12	21	14	24	13	14	21	23	19	4	3.44	145
LAE	295	319	14	18	16	26	22	22	19	17	23	15	3.68	144
LAA	305	307	14	20	16	15	18	23	17	19	20	8	2.77	143
BAM	293	330	12	18	3	6	9	20	25	24	27	7	3.39	142
JLE	295	315	8	25	16	22	16	22	21	25	15	5	3.09	141
LAR	323	307	8	22	11	18	12	16	24	24	25	17	3.27	139
BRC	296	310	10	12	13	17	15	23	15	21	14	17	2.85	139
BCH	289	291	22	21	13	19	15	17	17	18	15	17	2.36	137
LAK	316	300	12	17	15	25	22	20	16	15	14	10	3.07	134
BIW	298	307	11	24	15	20	23	24	19	24	26	13	2.41	133
JAP	312	316	14	21	2	10	19	17	17	26	17	7	2.48	130
JIW	312	321	9	14	13	19	12	10	8	15	7	11	2.46	130
BIN	283	312	9	17	13	23	10	6	15	19	14	14	2.39	123
SAN	297	311	14	19	11	14	11	8	10	23	15	7	3.17	110
BOR	291	299	24	22	16	22	20	10	16	25	19	5	3.01	109
SAB	333	305	22	23	10	19	20	20	16	17	16	14	2.75	107
JVE	279	295	26	15	11	22	4	7	14	21	14	21	2.35	105
SAM	309	304	22	15	17	18	11	13	7	23	12	25	3.14	92
SAC	305	305	20	18	20	24	27	28	20	10	23	14	2.52	86

[a]Corrected Scores

[b]Raw Scores

APPENDIX B (CONTD.)

Categories - Creative Choices:

Creative Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	T
BAL		1		1		1	1	1	1		1		1	1	1	1		1	1	1	14
BEK				1		1	1		1		1			1	1	1		1	1	1	11
SAE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
LCT	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1	1	1	18
JLE	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1	1	1	18
LOP	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1	1	1	18
BCM		1	1	1			1		1	1	1	1	1		1	1			1	1	13
ECC	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	19
EAO	1	1	1	1	1	1		1	1		1	1	1		1	1	1	1	1	1	17
BCH				1	1	1		1	1	1		1	1	1	1		1	1	1		13
LEA		1		1		1	1	1	1		1	1	1	1	1	1	1		1	1	15
LEC	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
BOF	1	1		1			1	1	1	1	1	1		1	1	1	1		1		14
JEP	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	19
JURL	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	19
BAJ		1	1	1		1			1		1	1			1	1	1		1	1	12
LEE		1	1	1			1		1	1	1	1			1	1	1		1		12
LEG		1	1	1	1	1	1	1	1	1	1	1		1	1	1			1	1	16
JEA		1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	18
Total	10	17	14	19	12	16	16	15	19	7	18	14	14	15	19	18	15	13	19	16	306

APPENDIX B (CONTD.)

Categories - Creative Choices: (CONTD.)

N-Creative Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	T
LAB		1	1	1		1	1	1			1	1	1	1	1	1	1	1			14
LAE		1		1		1	1	1	1	1	1	1	1	1	1		1	1			14
LAA		1		1		1		1	1			1	1		1	1	1			1	11
BAM																					0
JLE	1			1	1	1	1					1									6
LAR		1		1		1			1	1	1			1	1	1	1				10
BRC								1							1						2
BCH																					0
LAK			1	1	1		1	1	1			1	1	1	1	1			1	1	14
BIW				1																	1
JAP				1															1		2
JIW																					0
BIN					1		1														2
SAN	1						1											1			3
BOR			1	1		1			1			1				1			1		7
SAB	1	1	1	1																	4
JVE																					0
SAM																					0
SAG																					0
Total	3	5	4	10	3	6	5	5	5	3	3	6	4	4	6	5	5	3	3	2	90

APPENDIX B (CONTD.)

Categories - Non-Creative Choices

Creative Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	T
BAL	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	19
BEK	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
SAP	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			18
LCT	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	19
JLE	1	1	1	1	1		1	1	1		1	1	1	1	1	1	1	1	1	1	18
LOP	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	19
BCM	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	19
ECC	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
EAO	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	19
BCH		1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	18
LEA		1	1	1		1	1		1		1	1	1	1	1	1	1	1	1	1	16
LEC	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	19
BOF		1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	18
JEP	1	1	1	1	1		1	1	1	1		1	1	1	1	1	1	1	1	1	18
JURL		1	1	1	1	1	1			1		1	1	1	1	1	1	1	1	1	16
BAJ	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
LEE	1	1	1	1	1	1	1	1			1	1	1	1	1	1	1	1	1		17
LEG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
JEA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
Total	15	19	19	19	18	17	19	13	17	13	17	18	19	19	19	19	19	19	18	17	353

APPENDIX B (CONTD.)

Categories - Non-Creative Choices (CONTD.)

N-Creative Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	T
LAB		1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	18
LAE	1	1	1	1	1	1			1	1	1			1	1		1	1	1	1	15
LAA	1	1	1	1	1	1			1	1				1	1	1	1	1	1		12
BAM													1								1
JLE	1		1	1	1	1	1	1	1	1								1			10
LAR	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	18
BRC			1								1			1	1	1	1		1	1	8
BCH	1					1															2
LAK		1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1		1	17
BIW																	1	1	1		3
JAP																					0
JIW										1		1				1				1	4
BIN																		1		1	1
SAN													1								1
BOR	1	1	1		1	1			1	1	1			1	1		1	1	1		13
SAB				1																	1
JVE														1							1
SAM																	1		1		2
SAG												1				1			1		3
Total	6	6	8	6	8	7	4	2	6	7	6	5	5	7	8	7	9	9	7	7	130