

THE RELATIONSHIP OF DEMOGRAPHIC VARIABLES AND  
CREATIVITY OF ELEMENTARY SCHOOL STUDENTS

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## CHAPTER I

### INTRODUCTION

Recent changes in the public's attitude toward education are reflected in the public's demand that educational institutions provide meaningful and beneficial programs for all students. This increasing demand has spurred an abundance of legislative provisions. Passage of the Education for All Handicapped Children Act of 1975 was considered by many to be significant enough to be called the Magna Carta of education. Goodman (1976) said:

By any standards, Public Law 94-142--enacted last November as the Education for All Handicapped Children Act and scheduled for full implementation in Fiscal Year 1978--is blockbuster legislation. Schools in every part of the nation are destined to feel its impact, and to be sturdier and more broadly American as a consequence. (p. 15)

According to Stewart (1978) in 1970, U. S. Commissioner of Education, S. P. Marland, was directed by public law 91-230 to define "gifted and talented" and to determine the extent to which special educational assistance programs were needed to meet the needs of gifted and talented children. The definition established by this directive reads as follows:

Gifted and talented children are those identified by

professionally qualified persons who by virtue of outstanding abilities, are capable of high performance. These are children who require differentiated education programs and/or services beyond those normally provided by the regular school programs in order to realize their contribution to self and society. (Stewart, 1978, p. 134)

It appears, that in our continued quest for the right to an education for all American children, another legislative provision may soon be needed--Public Law 00-000 the Creative Child. Educators will apparently then be responsible for both assessment of creative thinking abilities and for providing tasks, experiences, and process for creative development.

#### Statement of Problem

The need for this study was founded upon the continuing endeavor of educators to improve both curriculum and instruction through the assessment of groups of students; in this case, creativity as related to certain demographic variables. Educational institutions are likely to face enormous problems in making education meaningful for their diverse student bodies. Jones (1972) believes:

The aims of any school must be to secure the full potential of its pupil in both body and mind, to ensure that these are used to the good of the community, and to give adequate preparation for everyday life in the world of work and leisure. It will not succeed in any one of these aims unless it offers a place for all kinds of creative work. (p. 22)

Torrance (1964) feels that it is extremely important that educators and parents alike recognize the need for developing the creative talents of children and believes that we are beginning to experience one of the most revolutionary changes in our educational system--a creative challenge to educators. He feels schools of the future will be designed not only for learning but for thinking.

Paul H. Davis (1962) predicted there will be less emphasis on memory and more on creative thinking. He stated:

In the last one hundred years, the medical profession has changed from folklore to science, from opinions based on hunches to judgements based on controlled experiments. Now the teaching profession is starting a similar transition. (p. 143)

To assist students in their creative thinking, it appears that investigators must consider both the degree of creative development and the process of its development. The formation of self-concept and creativity concepts may develop somewhere between those personality variables which represent aspects of the past and those of the future. Studies of the relatedness of such variables may provide base-line data which will allow schools to launch creative, stimulating experiences.

I feel that the significant characteristics of pri-

vate elementary school students are often overlooked in the development of creativity curricula. This is unfortunate since the relatedness among demographic variables which describe the private elementary students and their current creativity level may be highly significant indicators for more meaningful ways of providing creativity experiences. The use of demographic inquiries or surveys may provide a better understanding of the population in attendance at private elementary schools.

I believe that if private elementary schools are going to respond to the creative needs of individuals, revisions of curricula seems essential. Thus, it appears that a more comprehensive approach to the measurement of creativity as related to demographic factors might provide important data. When specific factors are identified curriculum development and institutional management can enhance their students' creativity and their readiness for creative development. Certainly, a curriculum which includes an opportunity for individuals to investigate their behavior regarding creativity is one alternative to present conditions.

#### Statement of Purpose

The purpose of this study was to identify the relation-

ship between demographic characteristics and characteristics of creativity of students attending one private elementary school. The study investigated the statistically significant relationship between demographic variables and specific cognitive and attitudinal factors of creativity. The following inquiries were addressed:

1. What demographic variables characterize Episcopal Elementary School students grades four through six?

2. What is the relationship between demographic variables characteristic of Episcopal Elementary School students grades four through six and creativity characteristic as measured by a self-report inventory?

On the basis of expected differences and similarities between fourth, fifth, and sixth-grade students at Episcopal Elementary School, two null hypotheses were tested:

1. No statistically significant relationship exists between demographical, biographical, and attitudinal variables and creativity as measured by the Torrance Tests of Creative Thinking, Form A.

2. No set of demographic variables will predict creativity as measured by the Torrance Tests of Creative Thinking, Form A.

Fourth, fifth, and sixth-grade students were asked to



complete two inventories; one including demographical, biographical, and attitudinal variables; the other, a creativity assessment inventory. A Personal Data Form was developed for this study to obtain selected demographical, biographical, and attitudinal data. The Torrance Tests of Creative Thinking Form A was used to gather data pertaining to the creativity level of the 4th, 5th, and 6th-grade students.

#### Significance of the Study

Since Sir Francis Galton's 1869 study of individual differences there has been much interest in both creativity and the development of creativity. The notion of creativity is one that has been discussed and theorized in great detail by nearly every discipline yet it still remains a multifaceted concept (cited in Jones, 1972).

Definitions of creativity appear to be organized around two general themes which are those pertaining to traits and personality factors, and those pertaining to process. Taylor (1955) reported that two of the basic assumptions underlying one approach to the problems of identifying creativity are:

1. Creativity is the resultant process that occurs within the individual. In general one tends to judge the creativity of others in terms of "product" that they have produced, or stated differently, in terms of

the "distances" between what they have produced and the status of the field before they come on the scene. Such an orientation causes us to overlook the fact that creativity is a process. It is a process of hypothesis formation, hypothesis testing, and the communication of results.

2. Creativity is the resultant process of social transaction. Individuals affect and are affected by the environments in which they live. They do not interact with their environment without changes occurring in both directions.

Thus, creativity has been defined as a kind of person, product, or process and in terms of environmental conditions. Likewise, the production of something new can be found in almost all definitions of creativity. Rhodes (1961) labeled these definitions of creativity the "Four P's of Creativity" (p. 305). They are Person, Process, Product, and Press. He defined creativity as "a noun naming the phenomenon in which a person communicates a new concept (which is the product)" (p. 305). Rhodes believes that mental process is inherent in his definition and that since man does not operate alone, the term press is also inherent.

Theories about factors which produce creative individuals tend to cluster around four components of intellect, mental health, authoritarianism, and oedipal responses. Guilford (1967,a) believes that creativity consists of a number of closely related factors of intellect in the divergent thinking area of the structure of intellect which in-

cludes ideational fluency, spontaneous flexibility, associational fluency, and originality. Therefore, a child with high endowment in these factors would be creative whereas those without it would not be of particular importance to educators. The idea is that a developmental aspect exists.

The concept of sound mental health owes much to Maslow, according to Gowan, Demos, and Torrance, in terms of his fully-functioning self-actualization theories. Maslow viewed creativity as:

complete integration or lack of barriers between the conscious mind and its preconscious areas. The ability to regress in the service of the ego, retrieve material from the preconscious and return with it to the world of reality. (p. 70)

Gowan, Demos, and Torrance expounded the concept of creativity as the opposite of authoritarianism. They feel that "the degree to which we are tarnished with authoritarian practice diminishes our creative potential, and narrows the possible avenue of creative endeavor" (p. 1). Both this view and Maslow's concept of sound mental health, place emphasis on the individual preserving one's creativity by non-authoritarian attitudes and by having positive evaluations placed upon their initial creative efforts.

The theory of creativity based on the "function of the child's oedipal response to the affectional approach of the

opposite-sexed parent" (p. 15) originated with Gowan, Demos, and Torrance. Basically, this theory specifies that boys who were closest to their mothers, and girls who were closest to their fathers during the period from 4 to 7 years of age will be more creative than others.

Taylor (1959) attempted to incorporate the apparent differences in opinion concerning creativity by looking at creativity in terms of five levels. He suggested the following:

1. Expressive creativity. Independent expression where skills, originality, and the quality of the product are unimportant, as in the spontaneous drawings of children.

2. Productive creativity. Artistic or scientific products where there is a tendency to restrict and control free play and develop techniques for producing finished products.

3. Inventive creativity. Inventors, explorers, and discoverers, where ingenuity is displayed with materials, methods, and techniques.

4. Innovative creativity. Improvement through modification involving conceptualizing skills.

5. Emergentive creativity. An entirely new principle or assumption around which new schools flourish. (p. 5-6)

The foregoing ideas concerning creativity and the development of creativity have important educational implications. Torrance (1962) believes educators and parents will agree that "schools have a right to be concerned about mental

health, full mental functioning, educational achievement, and vocational success. They ought to be concerned that coming generations contribute productively to society" (p. 7). Therefore, it appears that the whole concept of creativity had identified some legitimate reasons why educators should be concerned with both assessing and developing creative abilities.

### Limitations

Limitations of this study can be classified into three areas. The areas are the subjects involved in the investigation, the instruments used to collect the data, and the procedures followed.

The subjects were those students in grades four through six attending the Episcopal Elementary School, Wichita Falls, Texas, September, 1980. Another segment of the school's population, 4 and 5 year old kindergarten and grades one through three were not included.

The instrument used to collect data, the Personal Data Form, is non-standardized since it was personally developed for the purpose of this study. The Personal Data Form consists of those items defined as demographic variables and is included in the Appendix.

Procedural limitations include the methodology employed

for administering the Personal Data Form and the Torrance Tests of Creative Thinking, Form A. The tests were administered in a two day period of time during the Fall semester, 1980.

### Definitions

For the purpose of this study, the following definitions were used:

Creativity. The ability to bring into existence something new and unconventional, and the process of doing so.

Creative thinking. The form of thinking in which initiative manifested by a person who breaks away from the usual sequence of thought in a problem situation into a different but more productive sequence (Torrance, 1962).

Creative thinking abilities. Thinking abilities which include the factors of fluency, flexibility, and originality which came under the heading of divergent thinking plus the factor of elaboration.

Fluency. The ability to generate many similar ideas are known as fluency (Parnes, 1967).

Flexibility. The ability to generate ideas in many categories outside of the usual ones (Parnes, 1967).

Originality. The ability to generate statistically uncommon responses (Parnes, 1967).

Elaboration. The ability to implement or spell out ideas (Parnes, 1967).

Creative behavior. The ability to see problems where others do not see them, the ability to generate many ideas and hypotheses about solutions to problems, the ability to separate the context from the essence of a problem, the ability to redefine a problem in terms that make it soluble and the ability to produce unconventional or unusual responses.

Demographic variables. The following demographic variables were used in this study: (a) Grade level, (b) Sex, (c) Birth date, (d) Number of siblings, (e) Birth order, (f) Parent's age, (g) Parent's educational level, (h) Parent's occupational category, (i) Subjects liked best, (j) Subjects liked least, and (k) Positive and negative attitudes toward the curriculum.

### Summary

Apparent changes in the public's attitude toward education seem to be reflected in the public's demand that educational institutions provide meaningful and beneficial programs for all students. Presumably, the private elementary school, as well as other educational institutions have a paramount challenge to meet the needs of those learners. Many educators view developmental experiences for creativity

as playing a crucial role in meeting these needs.

If the staff or personnel of the private elementary school is to effectively plan what types of developmental experiences are needed for creativity, it is apparent that comparisons of creativity levels of their students are to be made. The demographic variables which this study introduced as data have been contrasted with creativity scores. The relatedness of demographic variables which describes the private elementary school student and creativity may be highly significant as indicators for meaningful ways of providing experiences for creative development of the students.



## CHAPTER II

### REVIEW OF THE LITERATURE

The review of literature and research pertinent to this study were divided into the areas of: creativity, creative development, and demographic variables. In reviewing each of the areas, related research tends to support the emphasis this study places on creativity and creative development. An abundant amount of literature which suggests how one might define creativity, measurement, creative development, and other important variables involved in this study was surveyed.

#### Creativity

Creativity, historically has been a nebulous concept, but in recent years those concerned with development of children have spurred educators to clarify the definition and nature of creativity. Torrance (1962) noted that although sporadic reports can be found on the topic as early as 1898, sustained efforts by numerous research workers are of recent origin.

Ghiselen and Lacklen (cited in Torrance, 1962) focused attention on the product result of creativity. Ghiselen

(cited in Torrance, 1962) proposed that "the measure of creativity of an idea is the extent to which it restructures our universe of understanding." (p. 39-40) Lacklen (cited in Torrance, 1962) suggested that "the creativity of a contribution may be measured in terms of the extent of the area of science which it covers." (p. 40)

Based on this product orientation the 1957 Committee formulated the following creativity issues:

1. The relation between level of creativity and amount of creative productivity.
2. The diversity of an individual's products and the level of his creativity.
3. The construction of a scale for evaluation of level of creativity of products following the Ghiselen and Lacklen formulations.
4. Abbreviated procedures for product evaluation.
5. The "validation" of a scale (such as in 3) against ratings of individuals who vary in their judged creativity.
6. The adequacy of official records for product evaluation. (Torrance, 1962, p. 40)

Einstein and Infeld (1938) feel that the formulation of a problem is more important than the solution; yet they viewed creativity in terms of product. Wason (1968) likewise viewed creativity, in terms of product, as a way of operating cognitively, aesthetically, and emotionally, which will find problems in a situation or material and

will try to solve them. Getzels and Csikyentmihalyi (1967) viewed creativity also as product oriented through the posing of a problem and the action of solving it.

There are a number of researchers who support the view that cognitive and environmental factors are of supreme importance to creativity. Attempts to identify the creative individuals by means of cognitive variables include divergent thinking, intellectual abilities, task uninvolvement, and a preference for complexity. For example, Guilford (1965) dealt with divergent thinking abilities as part of creativity. Wallach and Kogan (1965) stressed availability of remote associates and presented examples suggesting the importance of availability of cognitive associations. Shapiro (cited in Jones, 1972) attempted to study the relationship between divergent thinking and creativity criterion. Those scoring high on divergent thinking tests were scored high also on selected creativity criterion of fluency, flexibility, and originality.

Guilford (1967,b) supported 16 of 24 hypothesized intellectual abilities which were felt to be related to creativity. These abilities included fluency of thinking, including word, ideational, expressional, and associational fluency; flexibility of thinking, including spontaneous

and adaptive; sensitivity to problem; and figural and semantic elaboration. Lowenfeld and Beittel (1959) identified essentially the same factors, five of which were identical to those identified by Guilford. These five were fluency, flexibility, redefinition, sensitivity to problems, and originality,

Many researchers have sought to find a relationship between divergent thinking measures and creativity. Elliott (1964), Gough (1961), and MacKinnon (1961) established that the Guilford tests neither correlated highly nor predicted efficiently the degree of creativity demonstrated in their creative production. However, these studies investigated architects and scientists. Similar studies done with advertising personnel by Beittel (1964) and Elliott (1964) with college art students resulted in positive correlations. Dellas and Gaier (1970) stated that "despite the fact that the validity of Guilford like creativity measures is still incomplete and unclear, the available evidence does suggest a relationship between creative performance and the divergent thinking attributed to the creative" (p. 57).

Since the recognition of divergent production abilities, much research has centered around the relationship between creativity and intelligence. Barron (1962), Getzels and

Jackson (1962), McNeman (1964), Torrance (1962), and Vernon (1964) maintain that a valid distinction exists between the cognitive concept of general intelligence. Guilford and Hoepfner (1966) reported a mean correlation of .32 between the two variables, Getzels and Jackson (1962) reported a .30, and Torrance (1962) reported correlations which ranged from .16 to .32. The results of these seven studies led Dellas and Gaier (1970) to suggest that "until the personological context in which the cognitive variables are embedded is determined, real measures of this dimension of creativity remain elusive" (p. 59).

Although certain cognitive characteristics may be essential to creativity, Vinacke (cited in Jones, 1972) believes that they function not in isolation but in relationship to a total personality system. Guilford (1967) proposed that "what motivates individuals needs to be considered in terms of needs, interests, and attitudes that help the individuals to be productive creativity" (p. 12).

MacKinnon (1962) reported that on the California Psychological Inventory creative individuals emerged as self-confident, aggressive, flexible, self-accepting, little concerned with social restraints or other's opinions, and strongly motivated to achieve primarily in those situations

where independent thought and action, rather than conformity, were required. The findings of Barron (1963) and Gough (1961) were in essential agreement with those of MacKinnon (1962).

Much creativity research has been concerned with the similarity of personality traits between young creative persons and persons recognized as creative adults. Investigations of undergraduates (Drevdahl, 1956; Garwood, 1964; Rees & Goldman, 1961), high school adolescents (Cashdan & Welsh, 1966; Getzels and Jackson, 1962; Holland, 1961; Parloff & Datta, 1965; and elementary school children (Torrance, 1962; Weisberg & Springer, 1961) reported that highly creative students have personality structures that are congruent to those of the mature recognized creatives.

The research suggests that creativity or creativeness is not a single factor, but rather a collection of different abilities, each of which may be possessed in different degrees by individuals. It also seems to me that a person's effort is most creatively effective when emerging through some urge within curiosity, interest, and the urge to express, make, or do.

### Creative Development

One presumably cannot write about creativity and the creative person without addressing the human process of development. The nature of development during childhood and adolescence has received considerable attention. The processes of development have been variously labeled as growth trends, developmental tasks, and stages of development. Piaget (cited in Labinowicz, 1980) labeled four stages of development and the levels of thinking that are generally characteristic of each. Piaget believes that the order in which children pass through the developmental stages does not vary, but the rate at which children pass through stages does vary from child to child.

Chickering (1969) believes that developmental tasks or stages of development during adolescence and early childhood have seven major areas in common: achieving, competence, managing emotions, becoming autonomous, establishing identity, freeing interpersonal relationships, clarifying purposes, and developing integrity. Chickering called these vectors of development, since each seems to have direction and magnitude.

From his exploration of vectors of development, Chickering (1969) contended that development occurs through sequences of differentiation and integration and that dif-

ferences affect the outcomes of experiences. Chickering stated:

The notion that learning and development occur as persons encounter new conditions and experiences that are important to them, in which they invest themselves and for which they must develop new courage, new competencies, and new attitudes. (pp. 282-283)

Turner (1979) used the idea of development to define the creative person. She stated that "a creative person is one who is actively emerging through stages of development that contribute to her growth, maturation, and fulfillment as a human being" (p. 101).

Gowan (1971) feels that for creative development to occur one must abstract the best in both the world and nature. He viewed biographical development as necessary and sufficient for an individual's creativity up to maturity, at which point further development requires environmental stimulation.

According to Gowan (1971) developmental creativity appears to act under the following principles:

1. Functions which emerge spasmodically or periodically at earlier stages may be performed more regularly or continuously at higher stages.

2. An accomplishment held tenuously only in conditions of peak experience or great mental health will, in later development, persevere and be present under conditions of more stress.



3. Performance reached first by a few superior individuals in a culture, will later be reached by more, and eventually be the representative members of the culture.

4. What first appears as a phenomenon, gradually becomes a norm. (pp. 239-240)

The task of the elementary school is to provide whatever is needed so that learning and development can occur. According to Chickering (1969), sound decisions about what is needed must be gathered from "knowledge of where a student is, where he wants to go, and what equipment he brings for the trip. With sound information at hand, intelligent planning can occur. When significant differences are ignored, some students will be missed entirely, and many barely touched" (p. 284).

Sanford (1960) believes that "one might say it is natural to grow, but it is also natural to stand still" (p. 28) and speculates on the conditions which facilitate change. He stated that "it seems that if growth is to occur something has to happen to make it occur. We have to introduce stimuli which challenge the individual to make new responses and thus to expand his personality" (p. 28). Sanford further described the process of change by reflecting the importance of stimuli for different developmental stages. He stated:

A person develops through being challenged: for change to occur, there must be internal or external stimuli which upset his existing equilibrium, which causes instability that existing modes of adaption do not suffice to correct, and which thus require the person to make new responses and so to expand his personality. If the stimuli are minor or routine, the child, instead of changing, will simply react as before. (p. 51)

Torrance (1964) has long been interested in the stimuli in both nature and society that affect creative growth or development and in the things that can be manipulated in the classroom. He identified several areas which seem not to provide the necessary conditions for creative growth. They are **success-orientation, peer-orientation, sanctions** against questioning and exploration, overemphasis or misplaced emphasis on sex roles, divergency equated with abnormality, and work-play dichotomy. Torrance believes that educators do not prepare students to cope with frustration and failure because of our success-orientated culture. Likewise, unusual or original ideas, outstanding performance, and any divergent behavior becomes the target of peer pressures to conformity or is an indication of the abnormal. Torrance also feels we tend to squelch the need for children to ask questions and inquire about their world, and, thus, we instill in our youth the notion of enjoying play and disliking work.

Gowan, Demos, and Torrance (1964) agreed that the

problem of rewarding creative thinking and behavior is a difficult one. They suggest five principles which educators and parents can apply:

1. Be respectful of unusual questions. Children need to learn how to sustain a question, to play with it, toss it back and forth, refine it, and accept the answers from the teacher or parent.
2. Be respectful of the unusual ideas of children. Children who are stimulated by the creative approach will express ideas which their teachers will not be able to evaluate, yet we should not elicit such thinking, if we do not respect it.
3. Show children that their ideas have value. Many teachers and other adults do not feel that children are capable of thinking of ideas that have value. Children can be shown that their ideas have value, if we communicate them, if we display them, if we give credit for them, and the like.
4. Provide opportunities for self-initiated learning and give credit for it. The strong curiosity of the child and his exploratory tendencies suggest that all or almost all children have self-starting ability. The problem of parents and teachers is keeping it alive. It is quite possible that too much reliance is placed upon prescribed curriculum and that we need to make more effort to appraise and credit growth resulting from the student's own initiative.
5. Provide for periods of non-evaluated practice of learning. There needs to be periods when the individual can learn without threats of being evaluated. External evaluation is always a threat and creates a need for defensiveness. This makes some portion of the individuals experiencing or sensing denied to awareness. Thus, there is lacking the openness which is so necessary to awareness. (pp. 140-142)

Therefore, it appears that creativity is a develop-

mental process as described by Chickering (1969) and Gowan (1971) and is also affected by stimuli which provides creative growth as described by Torrance (1964) and Gowan, Demos, and Torrance (1964).

### Demographic Variables

Several demographic variables were used during the course of this study. The studies cited reflect the relative general value of selected variables as was relevant to their use in this study.

Parental characteristics have often been the subject of creativity studies. Drevdahl (1964), MacKinnon (1962), and Weisberg and Springer (1961) determined that an unpossessive, but not unaffectionate parent-child relationship, encourages self-reliance and independence. Schaeffer, Skager, and Anastasi (1968) and Skager, Schultz, and Klein (1965) found a relationship between creative children and parents with diverse and relatively intellectual interests, while Datta and Parlof (1967), Getzels and Jackson (1962) and Nichols (1964) found a correlation between creativity and permissive childbearing attitudes.

Several studies have established the existence of a relationship between educational level and age of parents

and creativity. Dewing and Taft (1973) found that the mothers of both potentially creative children and the highly creative performers had more formal education than mothers of the comparison subjects. However, the educational level of fathers was not significantly related. Getzels and Jackson (1961) studied the impact of college graduates versus non-college graduates on a child's creativity level. They found a significant correlation at the .05 level for fathers' educational level. The data then was also examined in terms of parents having some graduate training versus those having none and found similar relationships.

Dewing and Taft (1973) found that the occupational status of the father was not related to creative potential, but was related to creative performance in children. These writers further determined that high creative potential in girls was positively correlated with mothers occupational status of employment.

Getzels and Jackson (1961) reported statistically significant correlations between fathers' occupational status, in the areas of university teaching, research, and editing and creativity. Also, it was determined that a negative correlation existed between highly creative individuals and mothers who were exclusively housewives.

Yet, Aldous (1973) found that a mother's employment status had no significant effects on the children's originality scores. She determined that when both parents work and the occupations of both are compared, creativity scores will decrease when mothers are employed at higher prestige levels than fathers and will increase when fathers' occupations are in higher prestige levels.

Terman (1926) found that the average age of fathers at the birth of their gifted children was 33.6 and the mothers average was 29 years. Hollingsworth (1942) reported fathers and mothers averaged 33.6 and 28.9 years of age respectively, at the birth of their gifted children. Parental age may be more related to giftedness of intelligence than creativity since neither Dewing and Taft (1973) nor Cicirelli (1967), Drevdahl (1964), or Wade (1971) found any significant relationship between parental age and creative children.

A large number of researchers have tested the hypothesis that sex, age, and birth order of children affect creativity levels. Torrance (1964) found few sex differences between male and female scores while developing the Torrance Tests of Creative Thinking. Similarly, Aldous (1973); Lichtenwalner and Maxwell (1969); and Schwartz (1976) reported no correla-

tion between the subjects gender and creativity among pre-school, first, second, and third graders. After the fourth grade, Torrance and Aliotti (1969) and Warren and Luria (1972) found that girls out-score boys on both the Verbal and Figural tests of the Torrance Tests of Creative Thinking.

Bruce (1974) and Burgess (1971) reported that in their respective studies of fourth through seventh graders, and fourth through sixth graders, girls surpassed boys only on the measured Verbal creativity.

Fairbanks (1975) found fifth grade boys scored higher than girls on originality, elaboration, and total creativity. Similarly, Bolen (1976) and Eisenman and Schussel (1970) report few creativity differences with respect to gender.

Altus (1966) believes the effect of birth order relates to "the differential parental treatment accorded children of different ordinal position" (p. 48). Lichtenwalner and Maxwell (1969) reported a positive correlation between birth order and creativity finding first-born includes anxiety, overprotectiveness, and restrictiveness and whether these characteristics hindered a child's creative development. Eisenman and Schussel (1970); Helson (1968); and Weisberg

and Springer (1961) found the eldest child to be more creative than later-born children with Eisenman and Schussel (1970) having found first-born males more creative than later-born males.

Conversely, Staffieri (1970) found first-borns to be less creative than later-borns. Eisenman (1964) studied first-born art students and found they were less creative than later-borns. Bliss (1970) reported the same findings among eminent scientists.

Several researchers reported no significant relationship between birth order and creativity of children. The researchers reporting such findings were : Cicirelli (1967), Datta (1968), Dewing and Taft (1973), Joesting (1975), and Sellwood (1975).

Cicirelli (1967) reported that studies concerning the relationship between sibling and creativity levels have seemed to fail in delineating clearly the relationships which are presumed to exist. Helson (1968) reported that creative children tended to have an older brother or younger sister while Cicirelli (1967) reported the highest creative scores were obtained by boys with a brother close in age and by girls with a sister close in age. Datta (1968) found a significant correlation between low creativity ratings and



younger brothers distant in age.

Metcalf (1978) reported a number of significant relationships between both achievement and IQ scores, and fluency and originality measures among elementary school pupils. Eight separate studies supported Metcalf's findings, in addition to finding that under low evaluation stress, creativity measures, especially measures of ideational fluency and uniqueness, correlate highly and tend to be statistically independent of IQ (Boersma & O' Bryan, 1968; Clark, Veldman, & Thorpe, 1965; Feldhusen, Treffinger, Van Modfrans, & Ferris, 1971; Liebert, Poulos, & Strauss, 1974; McGuire, Hindsman, King, & Jennings, 1961; Van Modfrans, Feldhusen, Treffinger, & Ferris, 1971; Wallach & Wing, 1969; Williams & Fleming, 1973).

Bish (cited in Torrance, 1974) used the California Achievement Tests of Creative Thinking to measure creativity, and found the Verbal measures of creativity and achievement were positively correlated at the .001 level of significance. Correlations between the non-verbal measures and achievement were not statistically significant. Cicirelli (1974) obtained results similar to those of Bish (cited in Torrance).

Torrance (1964) found coefficients of correlation between a composite creativity score and measures of achieve-

ment somewhat higher than Bish (cited in Torrance, 1974).

All of the relationships found by Torrance were significant at the better than .05 level of significance.

Torrance feels that:

When knowledge is obtained by authority (i.e., receptive reading, listening, etc.), traditional measures of intelligence, scholastic aptitude, and the like are better predictors of achievement than measures of originality, fluency, elaboration, and the like. When knowledge is obtained in creative ways (discovery, experimentation and the like), the measures of originality, fluency, elaboration, and the like appear to be better predictors than the intelligence and scholastic aptitude tests. (p. 40)

There have been numerous research studies of demographic variables and their relatedness to creativity. Most of those studies included one or more of the general factors suggested by Miller and Gerald (1979). These included: Social Class, Family Size, Parental Age and Absence, Birth Order of Child, Sibling Constallations, and Gender of Child.

### Summary

Research by Einstein and Infeld (1938); Getzels and Csikyentmikalyi (1967); Ghiselin and Lacklen (cited in Torrance, 1962); and Wason (1968) reported creativity in terms of product or contribution, while others, including Dellas and Gaier (1970); Elliott (1964); Gough (1961); Guilford (1963); MacKinnon (1961); and Wallach and Kogan

(1965) investigated the relationship between cognitive measures and creativity.

Of particular importance to this study was the research seeking to establish significant relationships between selected demographic variables and creativity. Parental characteristics of age, educational level, and occupational categories have been the subject of creativity studies done by Alsous (1973); Dewing and Taft (1973); Getzels and Jackson (1961); Hollingsworth (1942); and Terman (1926). Student gender as related to creativity has been investigated by Aldous (1973); Lichtenwalner and Maxwell (1969); Schwartz (1976); and Torrance (1964) where no significant correlations were reported while Bruce (1964); Burgess (1971); Torrance and Aliotti (1969); and Warren and Luria (1972) reported females scoring higher than males on creativity measures. Birth order has been researched by Altus (1966); Eisenman and Schussel (1970); Helson (1968); Lichtenwalner and Maxwell (1969); and Weisberg and Springer (1961) and all reported a positive correlation between birth order and creativity regarding particularly the first-born.

The investigation of creativity, creative development, and related demographic variables are particularly pertinent to this study. The investigation of significant variables

which may serve as indicators for more meaningful ways of providing developmental experiences for creativity for a specific school population should prove valuable for those working with children.

## CHAPTER III

### RESEARCH DESIGN

The purpose of this study was to identify the relationship among selected demographic characteristics and characteristics of creativity of private elementary school students. These findings were compared with selected demographic, biographical, and attitudinal data to determine what inter-relationships exist and which variables are predictors of creativity.

#### Setting

The setting in which this study was conducted was the Episcopal Elementary School, Wichita Falls, Texas. The Episcopal Elementary School is small, private, and church-supported and is one of over 1,000 Episcopal schools in the United States and foreign countries. The total enrollment is 190 full and part-time students. Within the school there are three divisions arranged by pods: 4, 5, and 6 year old kindergarten; the lower pod of first, second, and third-graders; and the upper pod of fourth, fifth, and sixth-graders. There are 11 faculty members teaching both lower and upper pod curricula. Five of those faculty members teach

upper pod; three teaching upper pod only, two teaching specialized classes such as Spanish, Art, Music, and Physical Education for both lower and upper pod.

The Episcopal Elementary School is governed by a 19 member Board of Directors. The board members are selected from the community-at-large, the Episcopal Churches, and parents. School policy is set by the Board while administrative authority is delegated to the Headmaster and the Principal. The Board sets an admissions policy geared toward children who may be expected to perform in the average to superior levels of achievement. The Principal screens all admissions and educational recommendations are made.

The following is an educational profile of the Episcopal Elementary School:

1. Class Size. Admissions are limited to 18 students per class.
2. Grading. Consists of two areas of effort and progress with a choice of minimal, adequate, and superior.
3. Testing. Students are given a battery of educational assessment measures to determine placement.
4. Parental Involvement. Used to promote general functioning of the school by working in the library, the office, the classroom, on the playground, and to help keep

the school and the home environment consistent in attitudes and responses to the children. The Episcopal Elementary School is a charter member of the Texas Association of Non-Public Schools, a member of the Southwestern Association of Episcopal Schools, and the National Association of Episcopal Schools.

### Population

During the Fall semester of 1980, 190 students were enrolled at Episcopal Elementary School, in Wichita Falls, Texas. Of these, 98 were females and 92 were males. Thirty-seven were fourth, fifth, and sixth-grade students. Of these, 17 were fourth-graders, 9 were female and 8 were male; 16 were fifth-graders, 7 were female and 9 were male; and 4 were sixth-graders, 3 were female and 1 was male. The total sample age range was from 8 to 12 years of age.

### Instruments

Two instruments for gathering data were used in this study: a Personal Data Form and the Torrance Tests of Creative Thinking, Form A.

#### Personal Data Form

The Personal Data Form (see Appendix) was developed by

the investigator specifically for this study in order to obtain demographical, biographical, and attitudinal data about the student. Some of the data were not collected from the students but from student records housed at the Episcopal Elementary School.

#### Torrance Tests of Creative Thinking

The Torrance Tests of Creative Thinking, Form A (Torrance, 1964) is a self-report inventory measuring creativity and was made available for use in research after 15 years of development by E. Paul Torrance at both the University of Minnesota and the University of Georgia. The inventory consisted of two inventories, Figural and Verbal, with a total of 10 activities; three Figural and seven Verbal. Each of the seven activities on the Verbal inventory yields three separate scores on fluency, flexibility, and originality plus a total score on all seven activities on fluency, flexibility, and originality. Likewise, each of the three activities on the Figural inventory yields separate scores on four areas: fluency, flexibility, originality, and elaboration plus a total score on all three activities on fluency, flexibility, originality, and elaboration.

Torrance chose types of activities for the test which



he felt sampled different facets of creative thinking ability. Each task was felt to require different mental processes while requiring the subject to think in divergent directions.

Torrance suggests the following uses for the Torrance Tests of Creative Thinking, Figural and Verbal, Form A:

1. Basic studies that will yield a more complete understanding of the human mind and its functioning and development.
2. Studies designed to discover effective bases for individualizing instruction.
3. Sources of clues for remedial and psychotherapeutic programs.
4. Assessing the differential effects of various kinds of experimental programs, new curricular arrangements or materials, organizational arrangements, teaching procedures, and the like.
5. As a means of becoming aware of potentialities that might otherwise go unnoticed. (Torrance, 1974, p. 5-6)

The Torrance Tests of Creative Thinking, Form A Verbal inventory activities include: Asking, Guessing Causes, Guessing Consequences, Product Improvement, Unusual Uses, Unusual Questions, and Just Suppose. Torrance feels the Asking activity gets at the subjects ability to become sensitive to what is unknown, while the Guess Causes and Guess Consequences activities deal with causal conditions and the results or consequences of these conditions. These

three activities combine to address the notion of curiosity as being an important element in creative thought.

The Norms-Technical Manual for the Torrance Tests of Creative Thinking (1974) defines both the activities and separate scale scores of fluency, flexibility, and originality as follows:

The Ask Activity is designed to reveal the individual's ability to sense what one cannot find out from looking at the picture and to ask questions that will enable one to fill in the gaps in one's knowledge. The Guess Causes and Guess Consequences Activities are designed to reveal the subject's ability to formulate hypotheses concerning cause and effect. The number of relevant responses produced by a subject yields one measure of ideational fluency. The number of shifts in thinking or number of different categories of questions, causes, or consequences or the extent to which the response represents a mental leap or departure from the obvious and commonplace gives one measure of originality. (p. 12)

The Product Improvement Activity allows the subject to play with ideas without the restriction of correct responses, or as Torrance (1974) said "to regress in the service of the ego" (p. 12). The three scores of fluency, flexibility, and originality reflect the number of relevant responses produced; the number of different approaches used in producing ideas for improvement, and the statistical infrequencies and appropriateness of the ideas produced.

The Unusual Uses Activities are modifications of Guilford's Brick Uses Test, since Torrance felt that the

subjects would respond more creatively and be more familiar with objects other than bricks. Torrance decided to use tin cans and cardboard boxes even though there was a tendency to think of all the different things that can be put into tin cans or cardboard boxes, making it difficult to produce other types of responses. The Unusual Uses Activity yields scores for fluency, flexibility, originality, and elaboration determined in the manner described for the Ask Activity.

The sixth activity on the Torrance Tests of Creative Thinking, Form A is the Unusual Questions Activity. It was adapted from a technique originated by Robert C. Burkhart and measured divergent thinking power. The scoring procedure is the same as the Product Improvement Activity and yields scores for fluency, flexibility, originality, and elaboration.

The Just Suppose Activity is the final activity on the Torrance Tests of Creative Thinking, Verbal Form A, and is an adaptation of the consequence type test in Guilford's battery. The subject is asked to predict possible outcomes in an improbable situation and is asked to look at all the possibilities and imagine all of the things that would happen as a consequence. Scoring is similar to the procedure de-

scribed for the Ask Activity.

The Torrance Tests of Creative Thinking, **Form A**  
Figural inventory activities include: Picture Construction, Picture Completion, and Lines. The Picture Construction Activity is an original one of the authors and requires the subject to think of a picture in which the given shape is an integral part. The results are scored in terms of number of responses, elaboration, and originality.

The second, Picture Completion Activity, is an adaptation of the Drawing Completion Test devised by Kate Franch, but the figures used in Figural Form A were created by the author. The Picture Completion Activity was developed to create tension in a subject to complete it in the easiest way. Thus, to produce an original response, the subject would have to control the tension and delay the completion. Each completed figure is scored for flexibility, originality, and elaboration.

The final activity of Lines (Repeated Figures) is similar to the second, the Picture Completion Activity, and consists of 30 sets of parallel lines. The parallel lines provoke the creative tendency to bring structure and completeness to whatever is incomplete. The author explains the deliberate attempt to **simulate** four types of divergent

thinking:

Fluency is stimulated by the instructions, "see how many object or pictures you can make"; flexibility, by "make as many different pictures and objects as you can" originality, by "try to think of things that no one else will think of"; and elaboration, by "put as many ideas as you can into each one and make them tell as complete and interesting a story as you can." (Torrance, 1974, p. 14-15)

A number of test-retest reliability studies have been conducted. Two studies using alternate forms involved fourth, fifth, and sixth-grade students in St. Croux, Wisconsin, and the second involved fifth-graders in White Bear, Minnesota. The test-retest reliability coefficients range from .50 to .93 with higher coefficients for the Figural tests and for fluency and flexibility than for originality and elaboration (Torrance, 1974, p. 20). Goralski (1964) tested student teachers and fifth-graders respectively, obtained co-efficients similar to the results reported above. However, in a study by Dalbec (cited in Torrance, 1974) testing college students, test-retest reliability coefficients of .59 for fluency, .35 for flexibility, and .73 for originality were obtained.

Several studies seeking test-retest reliabilities on battery totals have also been conducted. Sommer (1962) tested and retested college students with a ten week time lapse and reported reliabilities of .97 and .80. Wodtke

(1964) tested 100 to 150 children in each grade from two through five and reported co-efficients ranging from .34 to .79. Grover (1964) and Yamamoto (1963) tested subjects on a single activity and all obtained reliability co-efficients ranging from .47 to .89.

Construct validity studies have involved both personality characteristics of persons achieving high scores and low scores and creativity test scores as well as other measures. Weisburg and Springer (1961) compared personality characteristics of the highly creative children with those of the less creative ones through psychiatric interviews. They reported that highly creative children rated significantly higher on strength of self-image, ease of early recall, humor, availability of Opedipal anxiety, and uneven ego development.

Torrance (1962) made an analysis of the personality characteristics of the most creative boy and most creative girl in three elementary school grades one through six. Three personality characteristics were apparent; highly creative children have a reputation for producing wild and silly ideas; their drawing had a high degree of originality; and their productions were characterized by humor, playfulness, and relative relaxation.

Lieberman (1965) examined the relationship between quality of playfulness and fluency, flexibility, and originality. She found significant coefficients of correlation ranging from .21 to .36. Clark (1965) examined the relationship of creative thinking ability and open-structure learning experiences. He obtained an overall coefficient of correlation of .32 between these variables while Hamburg (cited in Torrance, 1974) reported a coefficient of correlation of .24. Fleming and Weintraub (1962) examined the relationship between rigidity and measures derived from the Torrance Tests of Creative Thinking. They found a significant correlation between the composite Torrance Tests of Creative Thinking and attitudinal rigidity as measured by the Frenkel-Brunswic Revised California Inventory. Originality, fluency, and flexibility scores also correlated with the attitudinal rigidity scores. Alston (1971) conducted a construct validity study regarding motor creativity using the Wyrick Test of Motor Creativity and the Torrance Tests of Creative Thinking. The measures of motor creativity were significantly correlated for the total group and for boys and girls separately.

#### Procedures

Fourth, fifth, and sixth-grade students in attendance

at Episcopal Elementary School, Fall semester 1980, were asked to complete the Torrance Tests of Creative Thinking, Form A, and the Personal Data Form. Since the completion of the Torrance Tests of Creative Thinking, Form A, and the Personal Data Form takes the average student the better part of five hours, two days were chosen for administration of the inventories.

Students were provided with booklets for the Torrance Tests of Creative Thinking, Form A, and were given oral and written instructions concerning the identification sought. A student number was assigned on the Personal Data Form and this number was transferred by the investigator onto the Torrance Tests of Creative Thinking, Form A Booklets.

As a part of the introduction to the tests, the students were made aware of the research purposes and possible inherent curricula changes based upon the results obtained from the inventories. Of the 39 enrolled fourth, fifth, and sixth-grade students, 2 students did not participate, due to absenteeism.

### Hypotheses

The purpose of this study was to investigate the statistical relationships among demographic variables and characteristics of creativity of elementary school students



the following specific questions were addressed:

1. What demographic variables characterize Episcopal Elementary School students grades four through six?
2. What is the relationship between demographic variables characteristic of Episcopal Elementary School students grades four through six and creativity characteristics as measured by a self-report inventory?
3. What demographic variables as measured by a self-report inventory are predictors of high creativity group membership?

On the basis of expected differences and similarities between fourth, fifth, and sixth-grade students at Episcopal Elementary School, two null hypotheses were tested:

1. No statistically significant relationship exists between demographical, biographical, and attitudinal variables and levels of creativity as measured by the Torrance Tests of Creative Thinking, Form A.
2. No set of demographic variables will predict creativity as measured by the Torrance Tests of Creating Thinking, Form A.

#### Analysis of Data

All data for this study were gathered through two

instruments, the Torrance Tests of Creative Thinking, Form A and the Personal Data Form, and from the student records housed at the Episcopal Elementary School. The Torrance Tests of Creative Thinking, Form A booklets were hand-scored. Raw scores on all scales were transformed to standard scores to facilitate comparisons within groups and between groups. Data from both the Torrance Tests of Creative Thinking, Form A and the Personal Data Form were coded by hand and then keypunched onto IBM cards.

The data for Question One were analyzed using the Statistical Package for the Social Sciences (SPSS) computer program. The program provides means, medians, standard deviations, ranges, and other descriptive statistical data necessary to present a profile of the characteristics of students who scored low, average, and high on the Torrance Tests of Creative Thinking, Form A. From raw scores standard scores were derived; low, average, and high scoring groups were designated. On Verbal Fluency low was any score less than or equal to 15; average ranged from 16 to 70; and high was any score greater than or equal to 116. Verbal Flexibility reflects a low of 0 to 10; average 12 to 33; and high was above 34. Originality on the Verbal scores ranged from a low grouping of 0 to 11; average 14 to 59; and high 89 to 166. Low, average, and high scoring

groups on Figural Fluency reflects a low of 0 to 18; average were those scores 19 to 22; and high was any score above 23. On Flexibility low was any score less or equal to 12; average ranged from 13 to 21; and high was any score greater than or equal to 22. Originality resulted in low scores of 0 to 22; average included those scores ranging from 25 to 46; and high was any score above 47. Elaboration scoring groups were: low, 0 to 58; average, 59 through 113; and high was 130 and above.

Data for Hypothesis 1 were subjected to chi-square analysis. Through the use of chi-square analysis it is possible to measure the degree of association which exists between variables for which only categorical information is available with the obtained results showing statistically significant departures from chance expectations (Mendenhall & Reinmuth, 1974). Significance, for the purpose of this study, was established at the .05 level of significance.

Data for testing Hypothesis 2 were subjected to multiple regression analysis. Through the use of multiple regression analysis it is possible to determine what set of variables account for the variance in a criterion variable (Mendenhall & Reinmuth, 1974). That is, knowledge of performance on particular variables can be used to predict performance on the

criterion variable which for this research was seven measures of creativity.

## CHAPTER IV

### PRESENTATION AND ANALYSIS OF DATA

The purposes of this study were to investigate the relationships among specific demographic variables and creativity characteristics of private elementary school students at Episcopal Elementary School and to investigate variables which may serve as predictors of creativity and creativity development. Fourth, fifth, and sixth-grade students in attendance at Episcopal Elementary School, Fall semester, 1980 were asked to complete the Torrance Tests of Creative Thinking, Form A and the Personal Data Form. Data from both the Torrance Tests of Creative Thinking, Form A and the Personal Data Form were coded by hand, key-punched onto IBM cards and were then analyzed using the Statistical Package for the Social Sciences (SPSS) computer program. Data were then subjected to chi-square and multiple regression analysis.

On the basis of expected differences and similarities between fourth, fifth, and sixth-grade students at Episcopal Elementary School, two null hypotheses were tested; that no statistically significant relationship exists between demographical, biographical, and attitudinal variables and

levels of creativity as measured by the Torrance Tests of Creative Thinking, Form A; and that no set of demographic variables will predict creativity as measured by the Torrance Tests of Creative Thinking, Form A.

In order to examine the null hypotheses the following three questions were addressed:

1. What demographic variables characterize Episcopal Elementary School students grades four through six?

2. What is the relationship between demographic variables characteristic of Episcopal Elementary School students grades four through six and creativity characteristics as measured by a self-report inventory?

3. What demographic variables as measured by a self-report inventory are predictors of high creativity group measurement?

This chapter presents a general data description of the sample and a profile illustrating the relationship between selected demographic variables and creativity scores. The data is reported in a table and discussed in the text.

#### Question One

What demographic variables characterize Episcopal Elementary School students grades four through six?

The enrollment at Episcopal Elementary School during Fall semester 1980, was 190. Of these, 39 enrolled in the fourth through sixth grades. Of the 39 students, 37 completed the Personal Data Form and the Torrance Tests of Creative Thinking, Form A. Two students were absent the two days during which the inventories were administered.

Of the 37 students, 14 were males and 23 were females, 38% and 62% respectively. The students ranged in age from 8 to 12; 5% were 8, 36% were 9, 38% were 10, 16% were 11, and 5% were 12. The birth order of students were first-born (70%), second-born (24%), third-born (3%), and fourth-born (3%). Among the students 46% were fourth-graders, while 43% were fifth-graders, and 11% were sixth-graders. It was found that 16% of the students' mothers were between 26 to 30 years of age, 32% were 31 to 35, 27% were 36 to 40, 9% were 41 to 45, and 16% were between 46 to 51 years of age. Of the fathers, 33% were between the age of 26 to 35 years, 51% were 36 to 45, and 16% were between 46 to 63 years of age.

Furthermore, 87% of the students' mothers were college graduates while 97% of the students' fathers were college graduates. Of the fathers, 56% completed a Bachelor's Degree and 41% held an advanced degree. Also, 73% of the

mothers held a Bachelor's degree and 10% had earned advanced degrees.

The largest percentage, (73%), of students' mothers were found to be Homemakers. The next largest percentage were Educator (Specialist) and Educator (Secondary) with 5% each. The largest percentage of students' fathers were Business (27%). The next largest were Doctor/Health (20%), Military (11%), and Skilled Worker (5%).

Of the best liked subjects of the students, the largest percentages were Art (27%), Math (22%), Science (22%), Social Studies (13%), and Reading (11%). The largest percentages least liked were Spanish (60%), English (24%), and Physical Education (5%).

Table 1 presents a profile of the students who were able to complete the two inventories.

Table 1

Percentages of Sample Representing Demographic Variables

Age	8	9	10	11	12	Total
Number	2	13	14	6	2	37
Percentage	5%	36%	38%	16%	5%	100%



Table 1 Continued

Grade	4	5	6	Total
Number	17	16	4	37
Percentage	46%	43%	11%	100%

Sex	Male	Female	Total
Number	14	23	37
Percentage	38%	62%	100%

Birth Order	1st-born	2nd-born	3rd-born	4th-born	Total
Number	14	9	1	1	37
Percentage	70%	24%	3%	3%	100%

Number of Siblings	None	1	2	3	4	Total
Number	10	13	12	0	2	37
Percentage	27%	36%	32%	0%	5%	100%

Best Liked Subject	Art	Science	Social Studies	Reading	Language	Math	Total
Number	10	8	5	4	2	8	37
Percentage	27%	22%	13%	11%	5%	22%	100%

Least Liked Subject	Reading	Spanish	Math	English	Study	P.E.	Total
Number	1	22	1	9	2	2	37
Percentage	3%	60%	3%	24%	5%	5%	100%

Table 1 Continued

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Father's Age	26-30	31-35	36-40	41-45	46-50	51-63	Total
Number	4	8	10	9	4	2	37
Percentage	11%	22%	27%	24%	11%	5%	100%

---

Father's Educational Level	Grade 4	Bachelor's	Master's	PhD	MD	Total
Number	1	21	10	1	4	37
Percentage	3%	56%	27%	3%	11%	100%

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Father's Occupational Category	Business	Military	Health	Skilled	Clergy
Number	10	4	7	6	2
Percentage	27%	11%	20%	16%	5%

---

Father's Occupational Category-con't	Unemployed	Rancher	Other	Total
Number	2	2	4	37
Percentage	5%	5%	11%	100%

---

Mother's Age	25-30	31-35	36-40	41-45	46-51	Total
Number	6	12	10	3	6	37
Percentage	16%	32%	27%	9%	16%	100%

---

Table 1 Continued

Mother's Educational Level	High School	Bachelor's	Master's	PhD	Total
Number	5	27	3	2	37
Percentage	13%	73%	9%	5%	100%

  

Mother's Occupational Category	Homemaker	Semi-Skilled	Educator Specialist	Educator Secondary
Number	27	1	2	2
Percentage	73%	4%	5%	5%

  

Mother's Occupational Category con't	Health	Business	Total
Number	2	3	37
Percentage	5%	9%	100%

Question Two

What is the relationship between demographic variables characteristic of Episcopal Elementary School students grades four through six and creativity characteristics as measured by a self-report inventory?

Hypothesis 1. No statistically significant relation-

ship exists between demographical, biographical, and attitudinal variables and levels of creativity as measured by the Torrance Tests of Creative Thinking, Form A.

Data for testing Hypothesis 1 were subjected to chi-square analysis. Through the use of chi-square analysis it is possible to measure the degree of association which exists between variables for which only categorical information is available with the obtained results showing statistically significant departures from chance expectations. Significance for the purpose of this study was established at the .05 level of significance. Table 2 presents the results of these analysis.

Table 2  
Chi-Square Values For Verbal and Figural Creativity  
Tests and Demographic Variables

Test and Variable	$\chi^2$	Significance
Verbal Creativity		
Fluency and Grade	1.66	NS
Fluency and Sex	6.08	NS
Fluency and Age	5.03	NS
Fluency and Number of Siblings	2.16	NS
Fluency and Older Siblings	.82	NS
Fluency and Father's Age	30.21	NS
Fluency and Mother's Age	35.97	NS
Fluency and Father's Occupation	18.14	NS

Table 2 Continued

Test and Variable	$\chi^2$	Significance
Fluency and Mother's Occupation	3.55	NS
Fluency and Father's Education	14.72	NS
Fluency and Mother's Education	2.31	NS
Fluency and Best Liked Subject	19.62	NS
Fluency and Least Liked Subject	17.12	NS
Flexibility and Grade	2.13	NS
Flexibility and Sex	5.42	NS
Flexibility and Age	4.97	NS
Flexibility and Number of Siblings	2.32	NS
Flexibility and Older Siblings	1.91	NS
Flexibility and Father's Age	35.42	NS
Flexibility and Mother's Age	34.69	NS
Flexibility and Father's Occupation	18.69	NS
Flexibility and Mother's Occupation	4.18	NS
Flexibility and Father's Education	9.69	NS
Flexibility and Mother's Education	6.65	NS
Flexibility and Best Liked Subject	8.64	NS
Flexibility and Least Liked Subject	14.27	NS
Originality and Grade	1.96	NS
Originality and Sex	5.52	NS
Originality and Age	3.89	NS
Originality and Number of Siblings	1.20	NS
Originality and Older Siblings	1.05	NS
Originality and Father's Age	30.2	NS
Originality and Mother's Age	37.2	NS
Originality and Father's Occupation	16.75	NS
Originality and Mother's Occupation	2.98	NS
Originality and Father's Education	10.80	NS

Table 2 Continued

Test and Variables	$\chi^2$	Significance
Originality and Mother's Education	2.58	NS
Originality and Best Liked Subject	16.54	NS
Originality and Least Liked Subject	16.59	NS

## Figural Creativity

Test and Variable	$\chi^2$	Significance
Fluency and Grade	1.19	NS
Fluency and Sex	2.06	NS
Fluency and Age	8.27	NS
Fluency and Number of Siblings	4.34	NS
Fluency and Older Siblings	2.49	NS
Fluency and Father's Age	28.85	NS
Fluency and Mother's Age	31.25	NS
Fluency and Father's Occupation	27.45	NS
Fluency and Mother's Occupation	10.29	NS
Fluency and Father's Education	5.65	NS
Fluency and Mother's Education	4.28	NS
Fluency and Best Liked Subject	5.12	NS
Fluency and Least Liked Subject	15.47	NS
Flexibility and Grade	8.92	NS
Flexibility and Sex	.12	NS
Flexibility and Age	15.58	NS
Flexibility and Number of Siblings	9.99	NS
Flexibility and Older Siblings	6.99	NS
Flexibility and Father's Age	36.61	NS
Flexibility and Mother's Age	42.00	NS
Flexibility and Father's Occupation	20.48	NS
Flexibility and Mother's Occupation	15.92	NS

Table 2 Continued

Test and Variable	$\chi^2$	Significance
Flexibility and Best Liked Subject	12.61	NS
Flexibility and Least Liked Subject	20.18	NS
Originality and Grade	8.66	NS
Originality and Sex	.65	NS
Originality and Age	21.02	NS
Originality and Number of Siblings	2.94	NS
Originality and Older Siblings	6.79	NS
Originality and Father's Age	37.58	NS
Originality and Mother's Age	33.14	NS
Originality and Father's Occupation	15.51	NS
Originality and Mother's Occupation	13.91	NS
Originality and Father's Education	10.03	NS
Originality and Mother's Education	5.22	NS
Originality and Best Liked Subject	10.89	NS
Originality and Least Liked Subject	16.45	NS
Elaboration and Grade	2.16	NS
Elaboration and Sex	.35	NS
Elaboration and Age	3.44	NS
Elaboration and Number of Siblings	11.01	NS
Elaboration and Older Siblings	9.51	NS
Elaboration and Father's Age	33.71	NS
Elaboration and Mother's Age	36.39	NS
Elaboration and Father's Occupation	20.80	NS
Elaboration and Mother's Occupation	11.49	NS
Elaboration and Father's Education	9.48	NS
Elaboration and Mother's Education	5.18	NS
Elaboration and Best Liked Subjects	7.11	NS
Elaboration and Least Liked Subjects	15.58	NS

Examination of the results presented in Table 2 indicated that there were no significant differences between selected demographical, biographical, and attitudinal variables and

groups of students scoring low, average, and high on the Torrance Tests of Creative Thinking, Form A. Therefore, the null hypothesis is retained.

### Question Three

What demographic variables as measured by a self-report inventory are predictors of high creativity group measurement?

Hypothesis 2. No set of demographic variables will predict creativity as measured by the Torrance Tests of Creative Thinking, Form A.

The variables which were considered for this part of the analysis were: Grade, Sex, Age, Number of Siblings, Older Siblings, Father's Age, Mother's Age, Father's Occupation, Mother's Occupation, Father's Education, Mother's Education, Best Liked Subject, and Least Liked Subject. Data for testing Hypothesis 2 were subjected to multiple regression analysis. Through the use of multiple regression analysis it is possible to determine what set of variables account for the variance in a criterion variable. That is, knowledge of performance on particular variables can be used to predict performance on the criterion variable which for this research was seven measures of creativity. Again,



as in Hypothesis 1, significance was established at the .05 level of significance. Due to the small sample size of this study, caution would be advised in generalizing these results to other dissimilar populations.

Tables 3 through 5 present variables which are significant predictors of Verbal fluency, flexibility, and originality, respectively, while Table 6 presents variables which are significant predictors of Figural fluency. F tests for the selected demographical, biographical, and attitudinal variables in relationship to the creativity Figural subscales of flexibility, originality, and elaboration yielded no variables significant at the .05 level of significance.

F tests, which were significant at the .05 level of significance, confirmed the contribution of that variable to the variance of the creativity variable. On each of the Tables 3 through 6, the square of the multiple correlation coefficient ( $R^2$ ) is equal to the proportion of variance in the criterion variable which is explained by the predictors.  $R^2$  change on each of these tables reflects the increment in explained variance by the additional predictor in the equation. Beta (B) represents the weight of the contribution of each variable in the predictor equation while the F values presented are the result of testing the hypothesis

that the Beta weight is equal to zero.

Table 3 presents significant  $F$  values for Verbal fluency by variable.

Table 3  
Significant Predictor of Verbal Fluency

Variable	<u>df</u>	<u>R</u> <sup>2</sup>	<u>R</u> <sup>2</sup> change	B	<u>F</u>
Sex	1 and 25	.499	.499	-.276	7.89

Only one of the selected demographical, biographical, or attitudinal variables was significantly related at the .05 level for fluency. The sex of the student indicates that females score higher than males on the Verbal fluency subscale of creativity.

Table 4 presents significant  $F$  values for Verbal flexibility by variable.

Table 4  
Significant Predictor of Verbal Flexibility

Variables	<u>df</u>	<u>R</u> <sup>2</sup>	<u>R</u> <sup>2</sup> change	B	<u>F</u>
Sex	1 and 25	.359	.359	-.139	23.4
Other Siblings	1 and 25	.550	.191	-.879	9.2

F tests showed sex again to be a significant predictor at the .05 level of significance indicating that females scored higher than males on Verbal flexibility.

The Personal Data Form asked students to indicate the number of siblings in their family. F test results showed the relationship between only child status and high scores on the Verbal flexibility subscale of creativity. This value (9.2) was significant at the .05 level of significance.

Table 5 presents significant F values for Verbal originality by variable. The contribution of sex (as indicated by a F value of 5.8) to the Verbal originality subscale of creativity was significant at the .05 level of significance. Analysis of students' responses showed that females scored higher than males on this Verbal subscale.

Table 5  
Significant Predictor of Verbal Originality

Variable	<u>df</u>	<u>R</u> <sup>2</sup>	<u>R</u> <sup>2</sup> change	B	<u>F</u>
Sex	1 and 25	.324	.324	-.276	5.8

Table 6 presents significant F values for Figural fluency.

Table 6

## Significant Predictor of Figural Fluency

Variable	<u>df</u>	<u>R</u> <sup>2</sup>	<u>R</u> <sup>2</sup> change	b	<u>F</u>
Older Siblings	1 and 25	.309	.309	.484	4.28

Only one of the selected demographical, biographical, or attitudinal variables was significant at the .05 level on Figural fluency. Students were asked to indicate the number of siblings in their family and F test results indicated a significant relationship between students of a multiple child family and high scores on the creativity subscale of Figural fluency. Therefore, the hypothesis that no demographic variables will predict creativity is rejected.

Summary

The enrollment at Episcopal Elementary School during the Fall semester 1980, was 190. Of these 39 were enrolled in the fourth, fifth, and sixth-grades. Of the 39 students 37 completed the Personal Data Form and the Torrance Tests of Creative Thinking, Form A. Data from these instruments were used to describe characteristics of the research sample and to examine the relationship among student charac-

teristics and creativity characteristics. Of the sample 74% were 9 or 10 years old and 70% were first born. The largest percentages of students were fourth and fifth-graders, 46% and 43%, respectively. Approximately 73% of the students' mothers were Homemakers and 87% were college graduates. The father's educational level of the largest percentages of students was college graduate with the largest occupational categories being Business (27%), Doctor/Health (20%), and Military (11%). The best liked subject of most students was Art (27%), Math (22%), Science (22%), and Social Studies (13%). More students indicated Spanish (60%) and English (24%) as least liked subjects.

Data were then subjected to chi-square analysis to statistically determine relationships between demographical, biographical, and attitudinal variables and creativity. Examination of the results indicated no significant chi-square values at the .05 level of significance.

Data were also subjected to multiple regression analysis to determine whether any demographical, biographical, and attitudinal variables would statistically predict creativity scores as measured by the Torrance Tests of Creative Thinking, Form A. F tests showed two variables (sex and number of siblings) to be predictors of creativity at the

.05 level of significance. No other demographical, biographical, or attitudinal variables on Verbal and **Figural** subscales were significant predictors at the .05 level of significance.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

Several researchers (Aldous, 1973; Dewing and Taft, 1973; Getzels & Jackson, 1961; Hollingsworth, 1942; Terman, 1926) have investigated the relationship between parental characteristics and creativity. Many others (Aldous, 1973; Lichtenwalner & Maxwell, 1969; Schwartz, 1976; Torrance 1963) have investigated the relationship between creativity and gender; while others (Altus, 1966; Eisenman & Schussel, 1970; Helson, 1968; Lichtenwalner & Maxwell, 1969; Weisberg & Springer, 1961) examined the relationships between creativity and birth order.

Recent changes in the public's attitude toward education are reflected in the public's demand that educational institutions provide meaningful and beneficial programs for all students. This study was initiated due to the continuing endeavors of educators to improve both curriculum and instruction through the assessment of groups of students, in this case, creativity.

The purposes of this study were to examine the relationship among demographic characteristics and creativity characteristics of private elementary school students and

to investigate the existence of variables which may serve as predictors of creativity. The Torrance Tests of Creative Thinking, Form A, a self-report inventory consisting of two inventories, Figural and Verbal, was used to measure creativity. The Figural inventory yields four scores: fluency, flexibility, originality, and elaboration. The Verbal inventory yields three scale scores: fluency, flexibility, and originality. Descriptive data were presented in a table in order to present a profile of the participants. Creativity scores (ranked low, average, and high) were tested for association with selected biographical, demographical, and attitudinal data to determine what interrelationships existed. Scores from results on the Torrance Tests of Creative Thinking, Form A were examined in relation to biographical, demographical, and attitudinal data by the application of the Statistical Package for the Social Sciences (SPSS) chi-square and multiple regression analyses.

On the basis of expected differences and similarities between fourth, fifth, and sixth-grade students at Episcopal Elementary School, two null hypotheses were tested:

1. No statistically significant relationship exists between demographical, biographical, and attitudinal



variables and levels of creativity as measured by the Torrance Tests of Creative Thinking, Form A.

2. No set of demographic variables will predict creativity as measured by the Torrance Tests of Creative Thinking, Form A.

The sample consisted of 37 students at the Episcopal Elementary School, Wichita Falls, Texas, Fall semester, 1980. Of the 37 students, 14 were males and 23 were females; 17 were fourth-graders, 16 were fifth-graders, and 4 were sixth-graders. The subjects ranged from 8 to 12 years of age. Hypothesis 1 was that no statistically significant relationship exists between demographical, biographical, and attitudinal variables and levels of creativity as measured by the Torrance Tests of Creative Thinking, Form A. The results of the chi-square analyses revealed that there were no significant relationships between demographical, biographical, and attitudinal variables and creativity measures. The Hypothesis 1 was therefore retained.

Hypothesis 2 was tested by subjecting the data to multiple regression analysis. Significance for the purpose of this study was established at the .05 level of significance. The results indicated there were statistically significant demographic variables which may serve as pre-

dictors of creativity. F tests showed two variables (sex and the number of siblings) to be predictors of creativity at the .05 level of significance. Therefore, the hypothesis that no demographic variables will predict creativity was rejected.

### Conclusion

The sex of the student seems to be related to certain aspects of creativity as measured by the Torrance Tests of Creative Thinking, Form A. These results indicated that females score higher than males on all Verbal creativity subscales of fluency, flexibility, and originality. These results are consistent with the notion that females are more highly developed in the verbal area than males during the elementary school years. These results also confirm previous research (Bruce, 1974; Burgess, 1971; Torrance & Aliotti, 1969; Warren & Luria, 1972) which found that females at this age score higher than males on Verbal creativity tests.

Analyses of student responses resulted in a significant negative relationship between number of older siblings and scores on Verbal flexibility. A sharp contrast was shown in that **students** who are in a multiple child family may

be expected to score higher than others on Figural fluency. While these results concerning the relationship between number of siblings and creativity are not conclusive they do tend to disavow the notion, reported by Cicirelli (1967) that such studies fail to delineate clearly the relation which are presumed to exist.

The reported result on only children as a demographic variable which will predict creativity is in contrast to the results reported by Helson (1968). He found that creative children tended to have an older brother or younger sister. Likewise, Cicirelli (1967) reported the highest creativity scores were obtained by boys with a brother close in age and by girls with a sister close in age. However, since their measures of creativity did not separate Verbal from Figural, further research is necessary to provide the basis for a final conclusion on these relationships.

#### Recommendations

The results showed that only 12% of this study sample scored at the exceptional level of the Verbal creativity test and 29% scored at the exceptional level on the Figural creativity test. Thus it would appear that the student population at Episcopal Elementary School would benefit

from additional creativity development experiences. The following types of activities could be implemented:

1. Exercises such as the comic-strip technique of story-telling where prepared strips have the climax left to the students' imagination (Foster, 1971).

2. A math exercise where students are given seven symbols, three of which are numbers and four are arithmetical signs. Students are asked to see how many problems they can make up using as many or as few of the symbols as they like (Foster, 1971).

3. Ask students to find a space in the hall without any equipment, show as many different ways of moving your body as you can (Foster, 1971).

4. Write the most interesting and exciting story you can think of about one of the topics listed below: The woman who can but won't talk; The horse that won't run; The cat who could only run backwards; The 'fridge that ate the food (Foster, 1971).

5. Make a model with any or all of the materials you see here: assorted buttons, assorted feathers, wire, wooden cocktail sticks, cup-hooks, glue, paste, assorted corks, fruit and vegetables in season, samples of cloth, variety of nails, card, paints, cellotape, and/or pebbles (Foster, 1971).

6. Listen to this music that I am going to play for you. Listen very carefully and see if the music suggests different things to you. Paint the one that interests you most. Try to paint the picture you think no one else will paint, a picture with lots of ideas, using the paper and paints really well, a painting which shows what you want to say. When you have finished, give the picture a name. (Foster, 1971).

While these suggestions may help in the development of specific creative products, there are many questions as yet unanswered about creativity instruction in the elementary school as well as questions about the nature of creativity development. Future research might focus on the role of self-concept in creativity development. The findings of this study should also be tested in a larger, more diverse population to insure the generalizability of these results.

## APPENDIX

I. D. Number \_\_\_\_\_

PERSONAL DATA FORM  
(For Research Only)

1. Grade \_\_\_\_\_
2. Male \_\_\_\_\_ Female \_\_\_\_\_
3. Birthdate \_\_\_\_\_
4. Number of brothers and sisters \_\_\_\_\_
5. How many are older than you \_\_\_\_\_
6. Father's age \_\_\_\_\_
7. Mother's age \_\_\_\_\_
8. Father's occupation \_\_\_\_\_
9. Mother's occupation \_\_\_\_\_
10. Father's education \_\_\_\_\_
11. Mother's education \_\_\_\_\_
12. Subject best liked \_\_\_\_\_
13. Subject least liked \_\_\_\_\_

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