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This study was developed in order to determine whether substantiation for Carl Rogers' theory of originality as related to an internal locus of control could be located among groups of elementary school children. The setting was in Portland, Oregon, in three types of city schools: suburban (upper/ upper-middle class); conventional (middle/lower middle-class); and common man (lower-middle/ lower class). Two hundred and sixty-one sixth grade students took part in the study. The sample would be considered quite indicative of Northwestern school children of this developmental level, with the exception that the population was predominantly Caucasian.

The two major purposes of the study were to investigate relationships between the psychological construct locus of control and creative originality as affected by intelligence differences, sex differences, and social class differences. Specific hypotheses were as follows:

- H₁: The degree of originality as measured by the Torrance Tests of Creative Thinking (TTCT) will correlate positively to the degree of internal locus of control as measured by the Bialer Locus of Control Questionnaire (BLCQ);
- H₂: Intelligence as measured by the SCAT will correlate positively with originality as measured by the TTCT and to an internal locus of control as measured by the BLCQ;
- H₃: There will be a significant difference shown between boys and girls in the degree of originality as measured by the TTCT and in the degree of internal locus of control as measured by the BLCQ; and
- H₄: There will be a significant difference in the degree of originality as measured by the TTCT and in the degree of internal locus of control as measured by the BLCQ between lower class and middle class children.

The 261 students were administered the TTCT, scored for originality only; the BLCQ, ranked by raw score from low to high; the SCAT, scored by Portland norms; and the Warner Index of Occupational Rank, Revised 1960, ranked 1-4 serving for middle-class designation and 5-7 serving as lower class designation.

A correlation matrix of the variables was developed using IQ categorized as 1, 2, 3. A second procedure used a correlation matrix with IQ placed on a continuum. Both matrices were based on

Pearsonian product-moment correlations. Multiple regressions with analysis of variance utilizing the F-test (F^2_{253}) sought to determine whether main effects contained the meaningful relationships or if there were significant interaction effects of the variables.

The first correlation matrix with IQ categorized supported all four hypotheses. The second correlation matrix with IQ on a continuum showed IQ to be the main factor in any relationship among the variables. Hypothesis 1 was not supported, although the data indicated a direction towards a significant, positive relationship between locus of control and originality. Hypothesis two was supported: IQ correlated significantly with both an internal locus of control and with originality. Hypothesis three, sex differences, was supported only in direction and was rejected. Hypothesis four, social class differences, was supported only in middle-class groupings in the suburban and the conventional types of schools. Analysis of variance with the F-test showed the main effects contained the meaningful relationships between any of the tested variables.

The IQ of the student was seen as the best predictor of any relationship among variables. Prediction was most consistent among upper-middle and middle-class subjects, which could be indicative of instrument bias. Verbal originality scores related more closely to SCAT and BLCQ than figural originality, perhaps due to the

dependence of all three tests on verbal rather than visual media.

The need for further refinement of tests seems indicated.

The Correlation of Children's Perception of Locus of
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THE CORRELATION OF CHILDREN'S PERCEPTION OF LOCUS
OF CONTROL TO ORIGINALITY IN SELECTED
GROUPS OF SIXTH GRADE CHILDREN

CHAPTER I

INTRODUCTION

Background of the Problem

As man has evolved along the broad continuum which we call civilization, his peaks of growth may be measured in large part by the creative contributions of various and varied individuals, his valleys in large part by the lack of the emergence and utilization of such persons. From his earliest beginnings man has had a constant need for such original "creators" and thinkers, for as Will and Ariel Durant have noted,

New situations do arise, requiring novel responses. Here the "great man," the "hero," or the "genius" plays his role in history. At times his eloquence, like Churchill's, may be worth a thousand regiments; his foresight in strategy and tactics, like Napoleon's may win battles and establish states. A Pasteur, a Morse, an Edison, a Ford, a Lenin are effects of numberless causes, and causes of endless effects (21:263).

Perhaps never has man needed creative, original thinkers and innovators more than in our own time when we approach in our country a post-industrial technocracy such as never before

envisioned as reality by man but which is countered in the scale of human development by backward, rudimentary societies with resultant ignorance and poverty. The arraignment of power both within and between groups of many spheres--economic, political, social and ethnic--seems at loggerheads with the power and basic rights of the individual. Creative, original thinking and action is surely called for if feasible, meaningful solutions to such problems as affluence versus poverty and group versus individual rights are to be found and utilized. It is in the quest for such problem-solvers, in part at least, that the concern with creative development and with the need for creative, original individuals has grown in recent years, especially since World War II. Thurstone has strongly stated that "the recognition of creative talent and of the need for its development is essential for the survival and improvement of our entire culture" (63:2) These words exemplify the deep concern toward recognition and development of original, creative talent today.

This same concern, for development of creative thinking, coupled with the concern for loss of such abilities, was stated by Anderson when he said:

In children, creativity is universal; among adults it is almost nonexistent. The great question is: what has happened to this enormous and universal human resource? This is the question and the quest for our age (2:xii).

There have been many problems encountered in seeking to

locate and to develop creative potential, although the last 15 years have seen the development of numerous tests of creativity and of research projects designed to refine such tests as have been developed. The works of J. P. Guilford and of E. P. Torrance are certainly the best known and have been published for use by researchers. Guilford's tests are applicable to high school age and upwards while Torrance's tests are applicable for use from Kindergarten upward through graduate school students.

Not the least of the problems faced in the search for creativity has been the attempts to arrive at some generally accepted definition of creativity, a problem not yet solved to the satisfaction of those concerned. Perhaps it may be asked whether such a single consensual agreement is possible or even desirable at this point in research since such prominent researchers as Guilford, Torrance, and Wallach and Kogan are in agreement that creativity is highly complex and, as far as is known, consists of "no single ability." However, factor-analytic studies of the nature of creativity--notably those of J. P. Guilford and his students, Lowenfield and Beittel, E. P. Torrance and his students, and Wallach and Kogan--have indicated that the creative aptitude is composed of such traits as elaboration ability, flexibility, fluency, and originality.

For the writer's purposes, the definition given by E. P. Torrance seems best suited for a general definition of creativity:

. . . a process of sensing difficulties, problems, gaps in information, missing elements; making guesses or formulating hypotheses about these deficiencies; testing these guesses and possibly revising and re-testing them; and finally communicating the results . . . (64:4).

Questions might well be raised as to the conditions which promote originality in the individual. Certainly many conditions might be stated, any one of which could affect a given individual somewhat differently. Nevertheless, a major tenet of this dissertation is that an internal locus of control is of foremost importance in the quality we know as originality, and the development of such is best assured by the conditions of psychological freedom and safety, as posited by Carl Rogers. To quote Rogers: "The most fundamental condition of creativity is that the source or locus of evaluative judgment and control is internal" (53:76).

Erich Fromm in his definition of the creative attitude states that "I experience myself as the true center of my world, as the true originator of my acts" (25:50).

These two men, prominent in the field of counseling and psychotherapy, state well the importance of an internal locus of control in the creative process. For the unfamiliar, the following definition of locus of control (and evaluation) is given: "The source or locus of evaluative judgment is internal. The product is for the creative person established not by praise or criticism of others, but by himself" (53:76).

David Riesman, Harvard sociologist, has called this same

condition that of being either "inner-directed" or "other-directed."

R. J. Havighurst, educator and sociologist, stressed the importance of the developmental tasks in middle childhood, which include developing a scale of values and personal independence. He would seem to be speaking of developing an internal locus of control (and evaluation).

Statement of the Problem

With the foregoing information as a background for clearer communication than might otherwise be achieved, a statement of the problems with which this dissertation is concerned may now be given. The two general problems are:

- (a) to determine whether children who have an internal locus of control are more original than children who have an external locus of control; and
- (b) to determine the effects, if any, of such variables as sex differences, intelligence differences, and social class differences as related to an internal or external locus of control and hence to originality.

Purposes of the Study

The purposes of the study will be to test these specific hypotheses:

- H₁: The degree of originality as measured by the Torrance Tests of Creative Thinking will correlate positively to the degree of internal locus of control as measured by the Bialer Locus of Control Questionnaire;
- H₂: Intelligence, as measured by the School and College Ability Test, will correlate positively with originality as measured by the Torrance Tests of Creative Thinking and to an internal locus of control as measured by the Bialer Locus of Control Questionnaire;
- H₃: There will be a significant difference between boys and girls in the degree of originality as measured by the Torrance Tests of Creative Thinking and the degree of internal locus of control as measured by the Bialer Locus of Control Questionnaire; and
- H₄: There will be a significant difference in the degree of originality as measured by the Torrance Tests of Creative Thinking and in the degree of internal locus of control as measured by the Bialer Locus of Control Questionnaire between lower class and middle class children.

Limitations of the Study

It is the viewpoint of the writer that the most important factor in the creative process is the ability to think in an original manner,

and it is, therefore, only with this quality of the creative aptitude with which this dissertation will be concerned. Originality will be defined and measured by the Torrance Tests of Creative Thinking, Form A, with the definition being:

. . . one facet of creativity, defined as uncommonness of response in a statistical sense, determined by a scale value: responses given by 5-12% are assigned a value of 1; from 2-5%, a value of 2; from 1-2%, a value of 3; and from less than 1%, a value of 4 (67:215).

The Torrance Tests of Creative Thinking are in the form of a research edition and have no normative data to date. Also, the Bialer Locus of Control Questionnaire is in Research Edition form. The School and College Ability Test is designed to test the subject's ability to do school-related tests rather than to test general intelligence. Finally, the Warner Index focuses upon the occupational level for the basis of class rank with the ranking of skill and/or knowledge level necessary for the occupation as well as the prestige level accorded the occupation as determined by national sampling.

The distribution of the tested variables was assumed to be approximately normal with the exception that the lower levels of intelligence would have been screened earlier and would not be found in regular classrooms. Otherwise, a random distribution is assumed.

The sample was selected from three kinds of schools to be found in a large urban setting in the Pacific Northwest. The subjects would tend to be representative of large city rather than small town

or rural educational settings. They would tend to be reflective of the cultural life of the Northwest rather than of large cities in general throughout the United States. The subjects were at the pre-adolescent to early adolescent stage of development and would tend to reflect this age-level rather than a younger or an older grouping of students. The sub-samples of boys and girls were almost equal in number. Sample size, $N = 261$, was of adequate size for this study but is somewhat small from which to make generalizations of any magnitude.

The next chapter will add a general research and related literature background upon which this study is based.

CHAPTER II

REVIEW OF RESEARCH AND RELATED LITERATURE

The format for the presentation of research and related literature will be from the general to the specific, each section reading from experts' judgments to research findings. Specified variables of importance in this dissertation will be reported. A chronological reporting of research will be followed within each sub-section of the chapter. Creativity research and literature will be discussed first, reading from the creative personality which focuses on adults, through adolescents, and culminating in research concerning children. Research and literature concerning locus of control will follow, discussing first this construct as a testable, intrapersonal variable, social-class comparisons, learning-achievement studies, and concluding with the relationship to originality.

As early as 1959, Carl Rogers spoke of the "creative process" and defined it as ". . . the 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" (53:71). This definition, Rogers pointed out, includes no comment as to the value of a product, nor does it make any distinction regarding the degree of creativity.

The global definition of Rogers is in direct contrast to Guilford's approach. His approach (30) is a factor analytical one; hence, creativity is viewed as an aptitude composed of a particular cluster from among primary traits which make up his theoretical structure of the intellect. The creative aptitude is defined as composed of such traits as fluency, spontaneous and adaptive flexibility, originality, ability to redefine, and elaboration. Originality is seen as ". . . an aptitude of unconventionality which predisposes an individual not to behave in the usual, popular manner" (30:150). Guilford further describes the original person as more confident, more tolerant of ambiguity than the non-original person.

Maltzman defined originality as ". . . behavior which occurs relatively infrequently, is uncommon under given conditions, and is relevant to those conditions" (48:229). He views creativity as ". . . the products of such behavior and the reaction of other members of the given society to those products. . ." (48:229). It is seen that both Rogers and Maltzman make some allowance for the social situation which leads to seeing an action or product as creative.

Originality, then, probably represents only a single factor in creativity, but it would seem that it is the single, most useful measure of creativity currently available. As given in Torrance's definition in Chapter I, it is easily definable in terms of a statistical infrequency and relevance to a given task, while it does not make the

error of confusing facility with the more basic issue of uniqueness of an idea nor require a "product" as such.

The Creative Personality

There is general agreement that adults seen as creative showed some signs recognizable as creativity when children. Due to the multiplicity of variables, it is difficult to say which variable(s) might have been predictors of creativity and which might have been extraneous.

There is some consensus that certain personality traits are associated with creativity and originality in adults. Upon reviewing the characteristics which have been listed in at least one research study as indications of the creative adult, Torrance make a list of 84 such characteristics (67).

The work of Adorno and his associates on the "authoritarian personality" found a combination of personality traits, a personality syndrome which indicated the authoritarian personality. These include: rigidity and inflexibility, concreteness of thinking, an inability to handle abstractions easily, and conforming, conventional behavior. Such characteristics are antithetical to the creative, original attitude (1).

Rokeach has reported his research for the past ten years. He suggests that closed-mindedness is a general personality trait

related to the inability to form new cognitive systems of various kinds--perceptual, conceptual, aesthetic. He found, in various reported studies since 1960, that open-minded groups were significantly superior to closed-minded groups in the amount of time required to solve problems requiring both analysis and synthesis. Open-mindedness appears to be one condition of the creative process (54).

In the same vein, Frenkel-Brunswik proposed that some persons find it difficult to tolerate or to manage ambiguities, inconsistencies, or surprise (1). Their cognitive palate contains only blacks and whites, and such individuals are conforming and non-creative.

Taylor has reported that there is some evidence that creative persons are more autonomous than others, more self-sufficient, more independent in judgment, more open to the irrational in themselves, more stable, more feminine in interests and characteristics (especially in awareness of their impulses), more dominant and self-assertive, more complex, more self-accepting, more resourceful and adventurous, more radical (Bohemian), more self-controlled, more emotionally sensitive, and more extroverted but bold (61).

Golann in a recent review of literature suggested that, in future research, subjects be selected on a conceptual basis with such criterion variables as self-actualization or expression, an internal frame of evaluation, and independence of judgment. He reported

that these modes are related to behavior which is judged to be creative, effective, original, and productive (28).

Berelson and Steiner state that

. . . with regard to the characteristics of creative people relative to others, the following factors are involved. Highly creative people are more likely than others to view authority as conventional rather than absolute; to make fewer black-and-white distinctions; to have a less dogmatic and more relativistic view of life; to show more independence of judgment and less conventionality and conformity, both intellectual and social; to be more willing to entertain and sometimes express their own "irrational impulses"; to place a greater value on humor and in fact to have a better sense of humor--in short to be somewhat freer and less rigidly controlled (8:230).

A summation of the general characteristics of the creative, original adult indicates general agreement that there are probably "traits" which distinguish the original thinker from the non-original and that these characteristics were noted as being present in childhood. However, there is less agreement as to what these characteristics might be in any given individual and no real agreement as to priority ranking of any given trait or personal characteristic.

Studies of Adolescents

Several studies of adolescent groups are pertinent to any discussion of the creative versus the non-creative personality. Hammer, in a study of the personalities of gifted adolescents considered artistic, contrasted the genuinely creative from the merely facile

personality. Studying 18 high school artists in workshop situations, five were identified as truly creative and five as merely facile. Studying the psychological differences, Hammer found that the truly creative exhibited deeper feelings, greater original responsiveness, preference for an observer--rather than a participant--role, stronger determination and ambition, integration of feminine and masculine components, greater independence, rebelliousness, self-awareness, stronger need for self-expression, greater tolerance for discomfort, and a fuller range of emotional expression (32).

Getzels and Jackson differentiated highly creative adolescents from highly intelligent ones, finding a measured IQ difference of 23 points. The high IQ student, however, was rated by both teachers and peers as a highly desirable student while the creative one was not so rated. In a comparison of fantasy productions of the two groups the more creative students made significantly greater use of stimulus-free themes, unexpected endings, humor, and playfulness than the high IQ only student. The researchers concluded that one essential difference between the two groups was the creative adolescent's ability to produce new forms and to risk joining together elements usually seen as independent and dissimilar. They also suggested that the creative adolescent seems to enjoy taking risks and the uncertainty of the unknown (26).

The Runners [as cited in Torrance, (68)] in a study of 812

creative versus non-creative adolescent groups found the creatives high in orientations toward freedom, achievement, and anxiety while this group was low in orientation toward control. The non-creatives were highest in orientation toward anxiety and toward control but lowest in achievement and freedom orientation.

Torrance and Dauw studied 115 highly creative high school seniors with results supportive of the contention that highly creative students frequently experience rather intense and prolonged stresses that reduce their creativity and that stresses of the highly original student differ from those experienced by those who excel in only the elaboration facet of creativity. Those students who were doubly gifted, that is, high on both originality and elaboration, shared many of the difficulties of the high originals but seemed to escape the discomforts and strains that result from the nonconformity so often indicative of the highly original student. It was found that the peer group often applies pressures on the highly original young adolescent to which he feels he cannot acquiesce with resultant stress. His deeper emotional sensitivity causes him to feel stress more strongly than others (69).

As with creative adults, the creative adolescent seems to view the world from his own inner frame of reference, expresses a need for independence and autonomy--feeling pressure from the peer and adult group as a result--and to tend to be inner-directed rather than

other-directed individuals.

Studies of Children

Creativity studies of children must make certain assumptions concerning the possibility of assessing creative potential. Although it is possible to study adults with some demonstrated creative production, such is not readily the case with children because of a lack of established criteria. Most studies of children must assume that creative thinking abilities are distributed normally and that it is possible to assess the creative potential of any individual, however young, even though such potential may not be realized.

The qualities found in adolescents and adults which seem to indicate what may be termed the "creative personality" have been replicated and substantiated, for the most part, in research studies of creative ability in young children.

In a study of 649 boys and 345 girls Holland found evidence to support the contention that creative children were more independent and autonomous than the less creative children (37).

Weisberg and Springer conducted a personality study in depth of 32 high-IQ fourth grade children. The personality characteristics of the highly creative children were compared with those of the less creative children. The highly creative children were rated significantly higher on strength of self-image, ease of early recall,

humor, availability of Oedipal anxiety, and uneven ego development. On Rorschach Ink Blots children ranking high on the criterion measures showed a tendency toward unconventional responses, unreal percepts, and fanciful or imaginative treatment of the blots. They gave more human movement and color responses than their less creative peers. They were adjudged as both more sensitive and more independent than their less creative but equally intelligent peers (72).

Torrance investigated some of the social interaction characteristics of highly creative children. For all groups there were recorded observations of evidence of pressure on the most creative member to reduce his production and/or originality. Although a majority (68 percent) of the highly creatives produced more ideas than any other member of the group, very few of them (24 percent) were given the credit by other group members as having made the most valuable contributions to the groups (67).

MacDonald and Raths found highly creative children in grades four through six were more productive even under conditions of frustration than were their less creative peers (45).

Long and Henderson [as cited in Torrance, (68)] tested whether highly creative children would be better able to withstand the uncertainty of an undecided state and to resist premature closure as measured on the Children's Opinion Scale (Ziller, Long). Findings

supported the hypothesis, as children in the upper half of the sample tended to be high on both factors.

Torrance made an analysis of the personality characteristics of the most creative boy and girl in each of 23 classes in grades one through six in three elementary schools. Both peer and teacher nominations were used in addition to creativity tasks. Three personality characteristics stood out as differentiators of the highly creative children: the reputation for producing wild or silly ideas (especially true for boys), drawings and other production characterized by a high degree of originality, and productions characterized by humor, playfulness, and relative relaxation (67).

Fleming and Weintraub examined the relationship between rigidity and creative thinking among a group of 68 gifted elementary school children. They found a correlation of $-.41$. The attitudinal rigidity scores also correlated $-.37$, $-.40$, and $-.32$ with the originality, fluency, and flexibility scores (23).

Yamamoto, using imaginative stories of 20 fifth and 20 sixth graders for correlation with rigidity and originality and flexibility found correlations of $-.49$ and $-.51$ (75).

Lieberman explored the hypothesis that there is a relationship between the quality of playfulness in young children's behavior and fluency, flexibility, and originality. Using 93 Kindergarten pupils, via oral testing and ratings of two teachers assigned to each of five

classes, she found a centroid factor analysis which revealed playfulness to be a unitary behavior dimension that correlates significantly with creative measures (43).

Long, Henderson, and Ziller [as cited in Torrance, (68)] hypothesized that the social rejection associated with non-conformity would affect negatively the self-concept of children high in originality. The 15 lowest boys and 15 lowest girls were compared with the 15 highest boys and 15 highest girls. The findings showed that to a significant degree the highly original children were more alienated from authority and from same-sex parents, lower in esteem and higher in dependency, and described themselves as "unhappy." These findings are contrary to the bulk of research cited.

Torrance et al. reported that teacher ratings on creativity in school children correlated positively with independent measures of the following variables: .81 with the need for sentience (pleasure); .65 with intraception (imaginative, subjective, human outlook); .65 with the need to produce, organize, and build things; .63 with the need for understanding by others; .60 with the need to explain, judge, or interpret; .50 with the need to re-strive after failure and to overcome weakness; .50 with the enjoyment of thought and emotion for its own sake and preoccupation with inner activities. Negative correlations were reported for the same teacher ratings as follows: -.79 with sameness or routine; -.57 with the need for acquisition;

and -.54 with the need to reject others (66).

From the survey of research and related literature undertaken by the writer, the literature would seem to indicate that there is a body of research to support the contention that creative individuals, adult or child, are more independent in their thinking, more autonomous, possess an internal sense of control and judgment, and rely on their own judgment to a significantly greater extent than do non-creative individuals. It is also probable that both adult and child experience some form of discomfort from social pressures and resultant inner stresses from their non-creative peers. They may tend to feel that they are less acceptable socially than are others about them. Despite such inner stresses, they tend to remain true to their own standards.

Creativity and Intelligence

In recent years there has grown an increasing awareness that possession of a high intelligence quotient, as we are able to measure it, does not imply the necessary presence of an equally high level of creative ability. Getzels and Jackson (26) and Torrance (66) have reported either no direct positive relationship between creativity and very high intelligence or generally low correlations between the two. Barron generalized from his research and from other studies that:

. . . over the total range of originality and intelligence, a low positive correlation, probably in the neighborhood of .40 is obtained; beyond an IQ of about 120, however, measured intelligence is a negligible factor in creativity, and the motivational and stylistic variables . . . are the major determinants of creativity (5:297).

Yamamoto, apparently acting upon Torrance's earlier findings, demonstrated successfully what is referred to as a "threshold of intelligence," a point at or about the 120 IQ score, beyond which higher scores on an intelligence test show no significant relationship with scores on creativity tests. Much earlier Guilford, one of the pioneers in the field, had predicted that this relationship would be low (73).

Clive, Richards, and Abe re-stated in 1962 that on the basis of their research combined intelligence and creativity scores were no more efficient predictors of academic achievement than either score used separately (14).

Taylor and Holland, in a 1962 review of the literature, concluded that the greater number of investigations which were reported showed a positive but low correlation between intelligence for the general population and almost no correlation at the higher levels of either variable (61).

Getzels and Jackson found a positive but low (.20) correlation between measures of divergent thinking and intelligence. These findings were replicated by Torrance and later by Hudson in England (26).

Hasan and Butcher found a correlation of .50 between creativity and intelligence among Scottish school children. English children scored quite similarly to American children (.20) (33).

Wade found that intelligence and creativity correlations ranged from .18 to .55. She reported that achievement prediction using either intelligence or creativity scores was of almost equal efficiency as was achievement prediction on the basis of the two scores combined (70).

The question arises as to whether these two types of test instruments measure the same or highly similar abilities. In 1962 Wade (70) correlated cumulative creativity total scores with the Lorge-Thorndike Verbal Intelligence Test and found a positive but low correlation. Thorndike, the same year, followed by Wallach and Kogan in 1965, pointed out that the Minnesota Tests of Creativity (predecessor of the TTCT) had not been analyzed to determine whether the separate scores intercorrelated more strongly with one another than separately with intelligence measures (62). Yamamoto reported a low relationship (.30) between these tests and the Lorge-Thorndike Group Intelligence Test, later concluding that these tests do not measure a wholly independent and exclusive factor from general intelligence (75). However, Madaus, using ninth and tenth graders, found that selected tests of the creativity battery were independent of intelligence as measured by the School and College

Ability Tests (SCAT) (47).

Final resolution of the measuring similarities and/or differences between creativity measures and intelligence measures awaits further research, including refinement of both types of measurement devices. It seems probable that there is some overlapping of the abilities which are tapped by both kinds of test instruments.

Seemingly, Berelson and Steiner's statement well expresses what we do know with some degree of certainty of the qualities known as creativity and intelligence as we are able to measure them and of their relationship(s) to each other:

. . . it now seems clear that creativity is not simply a matter of intelligence. A high IQ is necessary for creativity in some fields (e. g. , nuclear physics), is not necessary in others (e. g. , graphic arts), and is never sufficient. Highly intelligent subjects are to be found in low creativity groups in virtually every study to date, 1967 (8:227-228).

The correlations between creativity and intelligence scores have not been high, although a positive relationship does seem to exist. Either seems as good a predictor of academic success as the other or as the two scores used simultaneously.

Creativity and Cultural Factors

The role of cultural factors and their relationship to creativity deserves exploration. It is entirely possible that our labeling of both creativity facets and such cultural variables as social class and

psychosexual roles is either incomplete, inaccurate, and certainly culturally defined. Both of these mentioned variables are pertinent to this dissertation. In addition, discussion of research on family interaction patterns and value systems will be mentioned. Some pertinent studies will be cited.

Studies as early as 1931 (Rossman) disclosed the rarity of women in certain fields of endeavor, especially in the scientific fields, with sanctions for deviation from group norms being cited as the prime reason for the situation.

Anne Roe wrote of cultural influences which impeded the entrance of women into the fields of science. Such influences as were noted include norms against both marriage and a career, norms defining sex differences in work role(s), and frequent estrangement for defying generalized norms (52).

In 1959, Anne Roe summarily reported that one of the most persistent personal problems of creative scientists was the difficulty in sex-role identification in the highly creative person. On measures of masculinity-femininity, the highly creative person of either sex is likely to be higher on the scale of the opposite sex than the less creative peer of his own sex (52).

Torrance et al. in a study to determine what changes might be brought in the reactions of girls to the culturally male-dominated field of science used fourth, fifth, and sixth graders of a university

elementary school for two school years. As expected, in 1959 boys demonstrated more ideas and explained more scientific principles than girls. In 1960 the girls demonstrated as many ideas and explained as many principles as did the boys. In 1959 many girls expressed dislike for the science task and tended to withdraw from active participation. In 1960, none of this dislike was observed. Peer evaluations of the contributions of boys to the success of the groups' tasks, however, still evaluated the boys more highly than the girls. There was also a slight, almost significant trend for boys to rate their own contributions more highly than did the girls (65).

Torrance sought to confirm the contention that boys should be provided materials appropriate to sex roles in order to elicit creative or inventive acts. Only at first grade level was the hypothesis supported. A surprise finding was the increasing superiority of boys over girls in creative, inventive thinking, beginning at second grade level (65).

Hall (31), speaking of the social factors which limit the development of human potentialities, spoke of the "imposed identity" of one role (rather than many) which squelches many children. Caplow, in the same vein, spoke of the "stagnant identity" given women in the American culture, such imposed cultural identity making it very difficult for the creative woman to develop her potential (11).

The effects of social stratification have been the subject of

research. Early findings seemed to indicate that lower class was synonymous with lower intelligence as well as lower achievement. Knief and Stroud demonstrated that when the effects of intelligence were removed, the relation between social class and educational achievement, including creativity, dropped appreciably (60).

Stein reported a negative relationship between creativity and socio-economic status. He reported a negative relationship between creativity and the educational status of the children's parents (58).

Cohen studied two matched groups of boys from 50 working class families. The first group had decided to pursue an education beyond high school level; the second had not. Comparison of the two groups showed little difference in academic ability, achievement, creative ability, and related abilities (15).

Lavin stated that on the basis of research done there is strong evidence that the lower class child slips further behind in all performance behaviors including creative behaviors if he is an initial underachiever (41).

Often such variables as race and social class are interrelated and findings are not clear. Although we assume that creativity is randomly distributed throughout the population, as late as 1965 Barbe stated that we have ". . . so few data gathered to show the proportions of gifted, creative children in relation to race (that) we are ignorant of the facts . . . and the same can be said for lower

class children in general . . ." (4:204).

Ausubel in a review of literature on ego development, a seeming prerequisite for creativity, among segregated Negro children states that the self-image of the Negro is severely affected as a product of the class-caste system in America even to the rejection of himself and his identity (3).

In an extensive study by the U. S. Office of Education in 1966 lower class Negroes (followed by lower class Puerto Ricans, Mexican-Americans, American Indians, and other types of lower class ethnic groups including Caucasian) were found to be extremely low in ability to use language well. There is cited a triple interaction of social class, ethnicity, and value orientation which promotes inadequacy in achievement of all kinds, including creativity (16).

Parents of any stratum tend to stress for their children those values which they see as important for successful living. Getzels and Jackson interviewed the parents of two groups of subjects, high IQ and high creative. The parents of the high IQ students tended to recall difficulties in early life and stressed more concern for their child's behavior and academic success. They were more critical of the children and of the school than were the other group of parents. The high IQ parents focused their concern on immediately visible virtues such as cleanliness, good manner, studiousness, while parents of the high creatives focused on less visible virtues such as

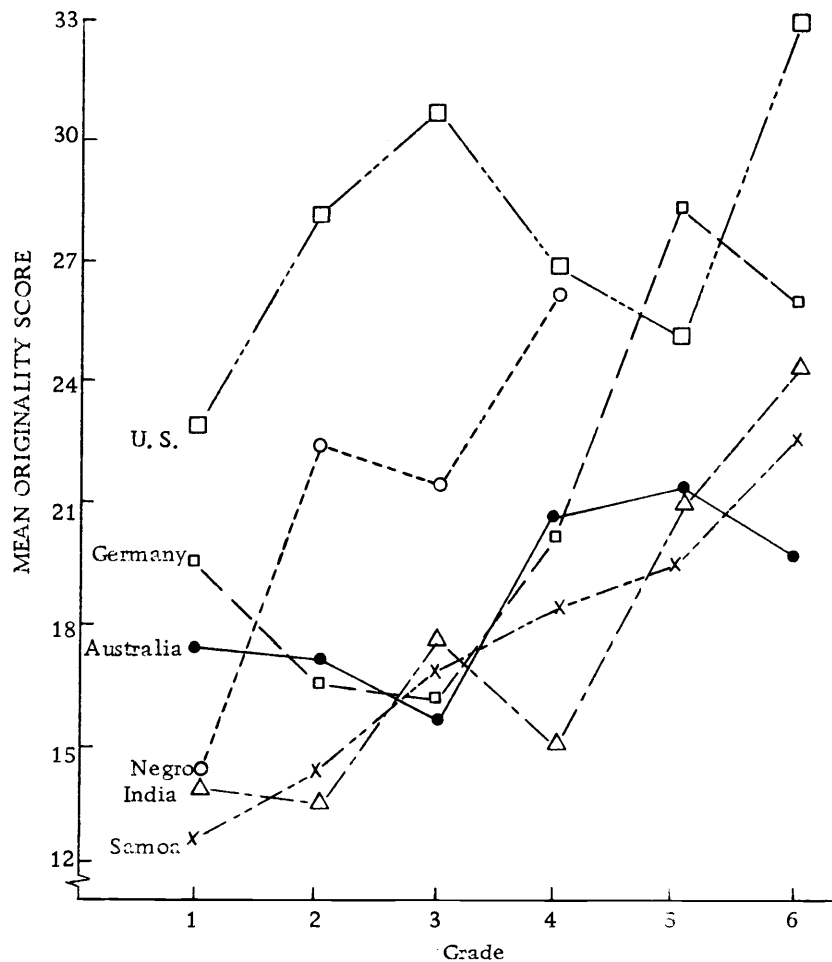
openness to experience, the child's values, his interests, and enthusiasm (26).

In a later study, Getzels was concerned with family environment effects. In part he found some common ground that creativity is fostered by a particular family environment which has little effect on intelligence, appearing to depend upon the feelings of psychological safety and freedom, whether one felt encouraged to present himself as an independent individual within the family context. The data were, however, not definitive (26).

Dreyer and Wells studied 24 children aged four and five and their parents. They reported the mothers of the more creative children engaged in more independence-granting and achievement-inducing behavior and less domestic value consensus but more role tension than parents of the low creative children (20).

One final important study of cultural differences is the cross-cultural study of six cultures undertaken by Torrance et al. Approximately 1,000 children in grades one through six in the countries of Australia, Germany, India, United States, Western Samoa, and a group of segregated Negro students from the state of Georgia were studied. Their developmental curves of originality were charted and compared. The results may be noted in Table 1.

Table 1. Developmental curve for originality on nonverbal tasks for six cultural groups.



Source: Education and The Creative Potential, E. Paul L. Torrance, p. 76.

As shown in the research and related literature, cultural factors seem to play an important role in the development of creativity. Such diverse variables as socio-economic status, value systems, sex-role emphases, and family interaction patterns undoubtedly affect creativity and its development. The next section of research and related literature will be concerned with one of the posited necessary

conditions for creative development: an internal locus of control.

The Psychological Construct Locus of Control and Evaluation

Rogers lists among the necessary conditions for creativity the need for an internal locus of control and evaluation of the events in the environment. He states that the value of a product is determined for the creative individual by his own personal reaction, that the basis for any meaningful evaluation lies within the creator, and that it is judged in terms of the personal satisfaction provided him. This is not to contend that he is not aware of others' judgments, rather that the product must give the individual a sense of actualizing his potentialities before it can be satisfying to him. Rogers goes on record as believing that an internal locus of control and evaluation is the most fundamental condition for creativity (53).

In the first expository paper dealing with this control dimension it is stated as a general principle that:

Internal control refers to the perception of positive and/or negative events as being a consequence of one's own actions and thereby under personal control; external control refers to the perception of positive and/or negative events as being unrelated to one's own behaviors . . . and therefore beyond personal control (42:207).

Although locus of control and evaluation are often considered together as parts of the same system, both Bialer and J. Miller have demonstrated the possibility of measuring these two constructs

separately. Their work has been followed by studies conducted by Rotter and Battle (7) which attested to the construct validity of locus of control and its independence.

In support of their studies, Anderson comments that it is not the presence of external evaluation so much as it is "the perception of the creating person that another has power over him which hinders creativity" (2:264). He further hypothesizes that ". . . given an internal locus of evaluation, one's creativity depends upon one's perception of the strength or absence of intentionality in others to use power over him" (2:264). A formal definition is taken from McConnell and Cromwell [as cited by Smith (57:14)] :

. . . a psychological construct describing the degree of predisposition within an individual toward the belief that he can control events as opposed to the belief that events in life are haphazard, the result of chance or luck, or controlled by other people.

This construct is seen as a continuum ranging from external at one extreme to internal at the other extreme. The individual who believes that he can exert control over events would be described as one who has an internal locus of control (ILC). The individual who has a predisposition to believe that he can exert few controls over events in life would be described as one who has an external locus of control (ELC).

Internal-External Control as an Intrapersonal Variable

The first attempt to measure internal-external control dimension as a personality variable was reported in 1955 by Phares (51). His scale was designed to measure a general attitude or personality characteristic of attributing the occurrence of reinforcements to chance rather than oneself. He reported that internals attributed significantly less responses due to chance.

James developed a more lengthy revision called the James-Phares Scale. He replicated Phares' earlier findings.

Bialer developed a Locus of Control Questionnaire for use with children. He found an increasing tendency among both normal and retarded children to display an internal locus of control as a function of increased mental age. He reported that the more mature child was more internally controlled and had a greater response to success and failure cues (9).

J. Miller developed a Children's Locus of Evaluation and Control (CLOE-C) by extending Bialer's work. He reported a developmental pattern most closely related to mental age of the normal or retarded child (50).

Battle and Rotter developed the Children's Picture Test of Internal-External Control, a projective technique. This has been correlated significantly with the BLCQ at $-.44$ (7).

Finally, the Intellectual Achievement Responsibility Questionnaire (IAR) was developed by Crandall, Katkovsky, and Crandall. It has been used to assess attribution of responsibility by children with respect to their school achievement. Results have been supportive of the researcher's intent (17).

Locus of Control and Learning-Achievement

Varied situations have been studied to find relationships of locus of control to learning situations under chance or risk-taking situations, serial learning situations, and achievement measures of various kinds. Some interesting findings have been reported.

James studied the effect of this variable on behavior in angle and line-matching tasks. He demonstrated that externals made more unusual shifts in their expectancy for success, that is, they were more likely to expect future success if they had just failed and more likely to expect failure after succeeding. He reported that internals had a greater increment in the expectation for success in a 75 percent reinforced sequence, substantiating the hypothesis that when one believes he is in control of the situation, positive reinforcement leads to an increasing certainty for future success (38).

Studies would indicate a relationship between locus of control and perception of risk and willingness to take risks. Phares; James and Rotter; Rotter, Liverant, and Crowne; Holden and Rotter have

shown that the growth and extinction of expectancies for reward vary predictably under different experimental conditions if the tasks are perceived by subjects as chance, luck, or externally controlled rather than as a matter of person skill (55).

Liverant and Scodel found that locus of control had a low but significantly positive relationship with need achievement among both normal and mentally retarded children in a risk-taking situation (44).

Various studies would indicate a relationship between locus of control and achievement. Cellura found a positive relationship between boys' SRA arithmetic achievement test scores and internality. No relationship was significant for the girls in the study (12).

Crandall et al. found that internal boys had higher reading achievement test scores but did not find this true for the girls in the study (17).

Chance, using third through seventh graders, found internality positively related to reading, arithmetic, and spelling achievement for both sexes (13).

Franklin found a positive relation among high school students between internality and the amount of time spent doing homework (24).

James found that internals were more persistent at a highly complex logical puzzle than were the externals in the groups of high school students (38).

Crandall, Katkovsky, and Crandall, using 923 elementary and

high school students, studied children's beliefs in their own control of reinforcements in intellectual-academic achievement situations. Girls were found to be both more internal and to achieve better than boys. First-born were superior to others in differing ordinal positions within the family. All differences were in the direction of high-internal subjects of both sexes having higher achievement scores than did the low-internal subjects on all the achievement subtest scores and total achievement test scores. The relationship was consistently significant for the females tested (17).

McGhee and Crandall studied the beliefs in internal-external control of reinforcements and academic performance, using students in grades three, seven, and ten. An internal reference was correlated positively to academic performance, enhancing the predictive value of this variable (46).

M. Miller [as cited in Smith, (57)] found that retarded subjects who had an external locus of control were more sensitive to extra-task cues such as rewards and punishments than were subjects with an internal locus of control, who were more sensitive to intra-task cues such as success and failure.

McConnell and Cromwell [as cited in Smith, (57)] commented that internally controlled individuals seem not to need information feedback other than that which is obtainable within the content of the learning task, while externally controlled persons are dependent

upon (some) outside information.

Effran has tentatively produced an indirect but interesting indication between striving for achievement and an internal locus of control. Confirmation is still being sought with varied groups of subjects. This same relationship is being sought by Rotter and Mulry on the assumption of a stronger motivation of internals in achievement situations (22).

The teacher was the subject of two studies for possible effects upon learners with value systems different from that of the instructors. Butterfield and Butterfield found that cultural familial retardates who were external showed significantly greater achievement with a middle-class teacher than did an equivalent group which was internal in orientation. Butterfield found a close relationship between achievement and external locus of control using college freshmen later the same year (10).

In summary, there seems to be a predictable relationship between the tendency to perceive what happens to a person as dependent upon one's own actions and greater achievement and, probably, motivation. The relationship is generally supported in all the research, although prediction is not always consistent for both boys and girls. Internals tend to find rewards within the learning task itself while externals tend to seek approval and are sensitive to rewards and punishment to a considerably higher degree than are internal subjects.

Locus of Control and Originality

In their review of research dealing with locus of control, McConnell and Cromwell [as quoted by Smith, (57:16)] have described the individual with an internal locus of control as "one who tends to be rather inner-directed, perhaps somewhat independent of the influence of other people and things outside himself, and, speculating, perhaps creative."

This study hypothesizes that the original individual will be one who relies upon his own judgments but has a realistic perception of his relationships with others and with the world about him as being subject to his own control. In 1960, Hobbs suggested this when he commented that not only would the gifted, productive individual have internal rewards but also internal controls (35).

Subjects with an external orientation have been found to be more conforming in several studies. Odell [as cited in Lefcourt, (42)] reported a significant relationship between Internal-External Control Scale (adult) and Barron's Independence of Judgment Scale, with subjects exhibiting the greater externality showing the highest degree of conformity.

Crowne and Liverant, in an Asch-type conformity experiment, confirmed Odell's findings (19).

Crandall, Katkovsky, and Crandall have stated on the basis of

their research with elementary school children that the more conforming will be less original, and if an external locus of control appears to indicate a conformity, then an internal locus of control indicates at least a higher probability of originality (17).

Simmons, Lefcourt, and Ladwig found that subjects with an external locus of control tried to avoid possible failure situations and that these failure-avoidant groups conformed more than subjects with an internal locus of control and tended to be less confident, although the difference failed to reach statistical significance (42).

Stein reported that creative subjects saw themselves as assertive, even authoritative, and controlling, while less creative individuals viewed themselves as submissive (58).

J. Miller reported both locus of control and locus of evaluation as related to withdrawal and aggression, with an external locus of control relating positively to withdrawal and an internal locus of control relating positively to aggression (50).

In a study of the relationship of locus of control to originality, Smith, using a sample of gifted children only (IQ at 120 or higher) reported that students with a higher internal score performed better throughout than did students with high external scores. Also, older students tended to show a stronger relationship between these two variables than did younger students (57).

Research and literature surveyed would seem to indicate a

probable relationship between locus of control and originality.

Social Class Comparisons of Internal vs. External Control

Studies relating to social class with the control dimension have typically yielded clouded findings, mainly an interaction effect of two or more variables. Battle and Rotter found an interaction between social class and race on the control variable. The lower-class white was significantly lower than the middle-class white, the middle-class Negro was not significantly above the lower-class white, with the lower-class Negro significantly more external than all the other groups (7).

Strodtbeck studied the attitude of personal "mastery" as affected by religious, national, and social class orientations as fostered within the family. He reported that Jewish middle-class and upper-class subjects were significantly differentiated from lower-class mixed Caucasians on the basis of this variable. He attributed the variance to "social class factors" as stressed within the confines of the Jewish family (59).

Graves and Jessor adapted the I-E Scale for use with high school students and studied an isolated tri-ethnic community. Findings were consistent with their predictions that the higher the social class, the more internal one's sense of control, although ethnicity played an interacting part in their study (39).

Strong prediction for the variability of internality-externality when comparing Negroes and whites is indicated in the Coleman report from the U. S. Office of Education. Among a random sample of white and non-white children in grades six, nine, and twelve more of the variance of the non-white's achievement scores was accounted for by this variable than by any of the 14 other attitudinal, school, teacher, familial, or social class variables which were studied. Furthermore, it was the second most predictive variable for white students (16).

In the reported studies there is general agreement that groups whose social power is minimal due to class, race, or to an interaction of these two factors will tend to score higher in the external control direction. Those with the double handicap of lower class and race other than white seem to exhibit the highest expectancy of external control (Orientals excluded).

Atypical Subjects on Internal vs. External Control

Among the more atypical groups which have been studied on the internal-external dimension are included mental retardates, blind children, prison inmates, schizophrenics, tuberculosis patients, and psychopaths.

Belief in external responsibility was reported to be positively related with high California F-Scale scores by Holden (36).

Cromwell, Rosenthal, Shakow, and Kahn reported that belief in external responsibility was significantly more prevalent among schizophrenics than among groups with more contact with reality although still mentally ill (18).

Land and Vineberg found that blind children were more external in belief than non-blind children but no significant difference was found between institutionalized and non-institutionalized blind (40).

Cromwell et al. found that the greater degree to which abnormal subjects attributed protective attitudes to their parents, the greater the degree of externality. Also, the data they accumulated indicated that attitudes of hostility were related to external control attitudes (18).

Seeman and Evans studied the behavior of patients in a tuberculosis sanitarium, reporting support for their hypotheses that patients scored as "internals" would know more about their condition, would be better informed about their disease, and would be considered better patients by ward workers (56).

Bialer demonstrated with retardate children and adolescents that with increasing age there is an increasing tendency among all subjects to: (1) perceive internal locus of control, (2) choose a failed rather than a succeeded task on repetition choice, and (3) to choose a delay gratification to attain a greater reward. Mental age was found to be the most relevant variable related to such measures of

development of success-failure conceptualization (9).

Summary

The research and literature surveyed indicate that among adults, adolescents, and children there are recognizable "traits" which seem indicative of creativity/originality. Among these traits are a sense of personal effectiveness, a trust in one's own ability to control events in the environment, a trust in one's judgment, a sense of humor, and a deeper sensitivity than others about them. Also the creative individual often expresses feelings of discomfort as others about him attempt to bring about changes toward conformity.

There are "traits" which an internal locus of control and originality mutually share. Among these are trust in one's own judgment, risk-taking, aggressive action if the goal is seen as important to the individual, a sense of power--even dominance, and a feeling of personal effectiveness. Neither originality nor an internal locus of control is consistently predictable on the basis of IQ alone. In fact, there seems to be a point (about 120) above which the relationship of IQ to creativity seems to dissipate.

Social class comparisons often show an interaction of variables, especially between race (ethnic group) and lower class. Black children of the lower socio-economic stratum are most external in orientation.

Locus of control has been related significantly and predictably with both children and adolescents to learning and/or achievement situations. The relationships were especially consistent for boys, but were not always consistent for girls. The relationship between an internal orientation and motivation to succeed is also significant.

Studies with atypical groups of various kinds indicate a strong relationship between an external locus of control and poor mental health. Various institutionalized groups such as psychopaths, schizophrenics, mental retardates, and blind children were studied and research reported.

The diversity of groups studied and the age range add strength to the validity and importance of the construct locus of control and its perceived relationships to factors in the psychological environment as given.

Chapter III will outline the procedures implemented in this study of the relationship of locus of control to originality and the effects of such variables as sex, intelligence, and social class.

CHAPTER III

PROCEDURES

Chapter III consists of the procedures undertaken to find the correlation between the degree of originality and the degree of an internal locus of control; further, the effects of these variables: sex differences, intelligence differences, and social class differences in selected groups of sixth grade youngsters.

School Selection

It was determined through discussion with the psychological testing department, Portland Public Schools, Portland, Oregon, that the schools selected for testing should be representative of urban school settings, with the restriction that the heavily racially imbalanced schools should not be selected due to the stringent demands of their own testing programs. The age-group for sixth grade was selected as being representative of two possible developmental groups: childhood and adolescence. Three schools were selected as representative of three rather distinct types of school settings and quite prototypical of three of the four categories of schools in an urban setting as identified by R. J. Havighurst:

School A: a high-status school--generally found toward the edges of the city, in high income areas, and in upper-middle class dormitory suburbs;

School B: a conventional school--generally found in areas of middle to lower-middle class dominance and in cross-sectional or industrial suburbs; may be found in most working-class areas;

School C: a common man school--generally found in areas of stable working class residence, in the central city, and in working-class residential suburbs; has a low income, high transiency, and many welfare and related cases (34:92-93).

Three classes of sixth graders were in each of two schools, while three and one-half were in the third school. A total of 261 students was located for testing. The total of boys and girls was almost equal in number. These schools would give to the study a grouping in the upper-middle class stratum, the middle and lower-middle class, and the lower class social stratum, thus lending the truest picture of the proposed differences to be researched.

After selection of schools, briefing sessions in the use of the testing materials were held with the classroom teachers. Entire classes were tested at one time. Tests were administered by each teacher to his class, with the exception of the SCAT test, which was

administered as an adjunct to the district testing program by school psychometrists. Sex identification was gained from the cover sheet on the tests, while social class ranking was gained from school records and/or teacher conferences.

A brief but pertinent description of test materials follows, before the analytical procedures are introduced.

Materials

Torrance Tests of Creative Thinking

As the index for creativity/originality both the verbal and figural batteries of the TTCT, Form A, were given to all subjects.

The creativity tasks which were administered are as follows:

"Thinking Creatively with Words" (Verbal)

1. Ask-and-Guess (activities 1-3)
2. Product Improvement (activity 4)
3. Unusual Uses (activity 5)
4. Unusual Questions (activity 6)
5. Just Suppose (activity 7)

"Thinking Creatively with Pictures" (Figural)

1. Picture Construction (activity 1)
2. Picture Completion (activity 2)
3. Lines (activity 3)

All subjects were given these tests in two separate sessions of approximately 50 minutes in length, including readiness time. In each session it was stressed that there were no "right" or "wrong" answers and the student should feel free to write or draw any idea he might conceive. The responses of the students were scored only for the originality weighting as given in the manual.

Bialer Locus of Control Questionnaire

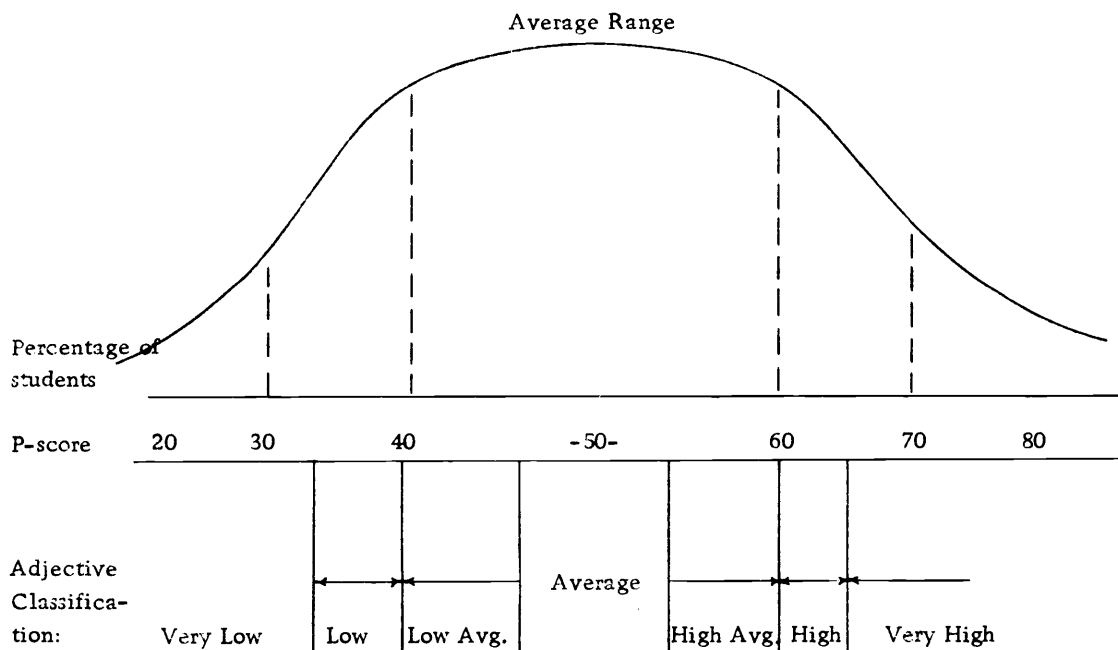
The BLCQ, used as the index for perception of locus of control, consists of 22 items in questionnaire form designed to tap this basic construct. The test was given in one 25-minute session. To avoid possible reading difficulty, the test directions and the test questions were read aloud by the teacher. The students were instructed to circle a "yes" or a "no" answer, whichever seemed closest to his feelings about the question asked. Again, it was stressed that there were no "right" or "wrong" answers but whatever the student thought was the best answer should be marked.

The raw scores constitute the sum of the student's sense of locus of control. The raw score is used in ranking the student as internal or external, presumably the higher the raw score the higher the sense of personal control of events in his environment. The questionnaire was scored as a 1 for an answer indicating an internal sense or as 0 for an answer indicating an external sense of control.

School and College Ability Tests

The SCAT scores were used as the index for student ability or intelligence. The SCAT was given in one 80-minute session with a short break given between subtests. The test has two subtests, Verbal and Quantitative, and a total score. SCAT scores are reported as P-Scores (Portland-Standard Scores). The P-Score is arranged in intervals of 10 around a mean of 50 as illustrated in Table 2.

Table 2. P-score scale for SCAT



The IQ range is treated in two ways. One is to take the total scores and to treat IQ as a random variable ranging generally from

30 to 70 plus. The second is to categorize students as "low" if their score is one Standard Deviation or more below the mean of 50, as within the "average" range those who score within one Standard Deviation above or below the mean, and as "high" those who score above the mean by at least one Standard Deviation. Both methods are used in this study, with categorization and score being based on the total score of this test. Categorization is used first; randomization is used in a second analysis.

Social Class Rating

The index for social class was obtained by using the Revised Scale for Rating Occupations developed by Warner, Meeker, and Eels in 1949 and revised in 1960. The occupation of the working parent(s) was gathered from school records and through teacher consultation as needed. If both parents were working, the occupational level which had the highest rating was used. The primary criteria for rating were the level of skill that the job required and the prestige level attached to the job based on random samples of American citizens. The rating is assigned on the basis of seven levels beneath seven overall categories. The categories are as follows: (Ranking from 1 through 7)

1. Professionals
2. Proprietors and Managers

3. Businessmen
4. Clerks, Kindred Workers, etc.
5. Manual Workers
6. Protective and Service Workers
7. Farmers

Sex Identification

The information for sex identification was gained from the test cover sheets, completed by each student.

With the gathering of the basic test information, the analytical procedures were in order.

Analytical Procedures

Three procedures were selected to answer the questions with which this factorial experimental model is concerned. In Analysis I a correlation matrix was developed by use of an IBM computer utilizing Pearson product-moment correlations. In this analysis IQ was categorized as 1, 2, 3. In Analysis II the standard product-moment correlations were performed utilizing factorial analysis of variance for regressions via the F-test. IQ was placed on a continuum. In Analysis III the following regression equation for interaction versus main effects was implemented, utilizing the F-test:

$$Y_1, Y_2, Y_3 = B_0 + B_1 + X_1 + B_2 + X_2 + B_3 + X_3 + B_4 + \\ X_4 + B_5 + X_5 + B_6 + X_6 + \Sigma$$

Raw data for the correlation matrix consisted of IQ, sex, social class, school, BLCQ score, and originality scores on both verbal and figural subtests plus the combined originality scores. It is expected that the data will reveal a significant correlation between an internal locus of control and originality; that a high intelligence will be significantly correlated to an internal locus of control and to originality; that girls will score significantly higher on both measures than boys; and that a higher social class will be significantly correlated to both. Significant differences between the three types of schools should also be noted. It is anticipated that the findings discussed in the following chapter will support the four hypotheses given in Chapter I. Chapter IV will analyze the findings of this investigation.

CHAPTER IV

FINDINGS

Analysis I. IQ Categorized

The findings from this study will be discussed according to the order in which each analytical procedure was performed. Table 3 gives the correlation matrix for the eight variables, using IQ categorized as 1, 2, 3.

Table 3. Correlation of all variables using total N

	BLCQ	<u>Originality</u>			School	Sex	Social Class
		Combined	Figural	Verbal			
IQ ^a	.16*	.22**	.24**	.15*	.30**	.28**	.39**
Social class	.73**	.25**	.25**	.18**	.55**	.18**	
Sex	.28**	.27**	.22**	.28**	.16*		
School	.15*	.32**	.28**	.27**			
Originality verbal	.51**	.86**	.59**				
Originality figural	.36**	.88**					
Originality combined	.40**						

^aIQ categorized as 1, 2, 3.

*Significant at .05 level of confidence

**Significant at .01 level of confidence

The relationship between BLCQ and verbal originality was .51 ($p = .01$). The relationship between BLCQ and figural originality was .36 ($p = .01$). The relationship between combined originality scores and BLCQ was .41 ($p = .01$). These findings support Hypothesis 1 that there is a significant correlation between locus of control and originality.

The relationship between IQ and BLCQ was .16 ($p = .05$). The relationship between IQ and verbal originality was .15 ($p = .05$). The relationship between figural originality and IQ was .24 ($p = .01$). The relationship between combined originality scores and IQ was .22 ($p = .01$). These findings would support Hypothesis 2 that there is a significant relationship between IQ and locus of control (sig. .05) and a significant relationship between IQ and originality (sig. .01, .01, .05).

The relationship between BLCQ and sex was .28 ($p = .01$). The relationships between sex and originality scores were as follows: sex-verbal, .28 ($p = .01$); sex-figural, .22 ($p = .01$); sex-combined originality, .27 ($p = .01$). These findings support Hypothesis 3 that there is a significant difference between boys and girls in the degree of originality and in the degree of internal locus of control.

The relationship between BLCQ and social class was .73 ($p = .01$). The relationship between social class and verbal originality was .18 ($p = .01$); between social class and figural originality

was .25 ($p = .01$); and between social class and the combined originality scores was .25 ($p = .01$). These findings support Hypothesis 4 that there is a significant relationship between social class and locus of control and between social class and originality scores.

Other findings of interest indicate a high correlation between school and social class (sig. .01) and between school and IQ (sig. .01). School was correlated significantly to the three originality scores (sig. .01) and to BLCQ (sig. .01).

Analysis II. IQ Continuum

Table 4 shows a second set of correlations between IQ on a continuum, originality scores, and the BLCQ scores.

Table 4. Correlation of IQ, BLCQ, originality scores, with IQ treated as a continuum, using analysis of variance for the regressions, total N

	BLCQ	Originality Verbal	Originality Figural	Originality Combined
IQ	.41**	.35**	.08	.19**
Originality combined	.07	---	---	---
Originality figural	.02	---	---	---
Originality verbal	.11	---	---	---

**Significant at .01 level of confidence

In this procedure the findings indicate a relationship between BLCQ and verbal originality of .11; between BLCQ and figural originality of .02; and between BLCQ and combined originality of .07, none of which is significant. These findings would reject Hypothesis 1.

The correlation between IQ and BLCQ was .41 ($p = .01$). The correlations between IQ and originality scores were as follows: IQ-Verbal, .35 ($p = .01$); IQ-Figural, .08; and IQ-Combined scores, .19 ($p = .01$). These findings support Hypothesis 2. Tables of Means and Standard Deviations on IQ scores, originality scores, and BLCQ scores for boys and girls in each of the three schools may be found in Appendix II.

Table 5 illustrates the differences in BLCQ correlations with the major variables by each of the three schools, comparing girls with boys in each instance.

The correlation between BLCQ and figural originality for the boys in School A was .33 ($p = .05$). The correlation between BLCQ and the combined/ originality scores was .47 ($p = .01$). These were the only significant correlations between BLCQ and originality in any of the groupings. Total findings would reject Hypothesis 1 and Hypothesis 3.

Table 5. Sex differences in correlations of BLCQ and originality scores, IQ, and social class in three schools

	Originality			IQ	Social Class
	Verbal	Figural	Combined		
<u>BLCQ, School A</u>					
Girls	.02	.22	.14	.54**	.07
Boys	.08	.33*	.47**	.34*	.21
<u>BLCQ, School B</u>					
Girls	.29	.17	.25	.59**	.26
Boys	.27	.17	.24	.54**	.37**
<u>BLCQ, School C</u>					
Girls	.02	.15	.09	.38**	.01
Boys	.07	.05	.05	.20	.27

* Significant at .05 level of confidence

** Significant at .01 level of confidence

The correlations between IQ and BLCQ were significant for girls in all three schools ($p = .01$). Correlations for boys between IQ and BLCQ were as follows: School A, .34 ($p = .05$); School B, .54 ($p = .01$); and School C, .20. These findings would support Hypothesis 2.

The following tables 6, 7, and 8 show the differences between the two social classes found in each school context wherein each social class was compared on the basis of the other variables.

Table 6. Class comparisons within schools on major variables

	Originality Verbal	Originality Figural	Originality Combined	BLCQ
School A. Middle Class				
Sex	.01	-.15	.07	.06
IQ	.27*	.20	.20	.38**
BLCQ	.06	.17	.26*	
School A. Lower Class				
Sex	-.90**	.58**	.17	.07
IQ	.67**	.12	.51**	.30
BLCQ	-.43*	.48*	.32	

* Significant at .05 level of confidence

** Significant at .01 level of confidence

Table 7. Class comparisons within schools on major variables

	Originality Verbal	Originality Figural	Originality Combined	BLCQ
School B. Middle Class				
Sex	-.22	-.20	-.23	.53**
IQ	.56**	.15	.32*	.52**
BLCQ	.17	.27	.27	
School B. Lower Class				
Sex	-.35*	-.29	-.38*	.03
IQ	.56**	.22	.44**	.60**
BLCQ	-.38*	.01	.21	

* Significant at .05 level of confidence

** Significant at .01 level of confidence

Table 8. Class comparisons within schools on major variables

	Originality Verbal	Originality Figural	Originality Combined	BLCQ
School C. Middle Class				
Sex	.16	.03	-.08	.27
IQ	.15	.15	.20	.27
BLCQ	.02	.06	.06	
School C. Lower Class				
Sex	-.13	.09	.01	-.28*
IQ	.18	.14	.01	.31*
BLCQ	.18	.02	.04	

* Significant at .05 level of confidence

The middle-class students in School A showed a significant correlation between BLCQ and combined originality ($p = .05$). No other correlation was significant for this group. Lower-class students in School A showed significant correlations between BLCQ and verbal originality ($p = .05$) and BLCQ and figural originality ($p = .05$). Hypothesis 4, that there will be a significant difference between social classes, is supported by these data.

The middle-class students in School B showed no significant correlations between BLCQ and any of the three originality scores. Lower-class students' data revealed a significant correlation only between BLCQ and verbal originality score ($p = .05$). These data would reject Hypothesis 4.

The middle-class students of School C revealed no significant correlations between BLCQ and any of the three originality scores. No significant correlations were revealed between BLCQ and any of the originality scores for lower-class students from School C. These findings would reject Hypothesis 4.

The most significant correlation revealed is the high correlation between IQ and BLCQ in each of the three school groupings. IQ reveals an inconsistent (not throughout each grouping) but definitely significant correlation to verbal originality and to combined originality. IQ thus seems the most significant factor and best predictor from these data.

Analysis III. Multiple Regressions

Table 9 gives the data from the multiple regressions utilizing the F-test (F^2_{253} df) to locate possible interaction effects as opposed to main effects. (Table 10 in Appendix II gives summary information of analysis of variance procedures.)

It was found that the main effects contained the meaningful relationships with no significant interaction effects noted. Again, the significant relationships to BLCQ and originality scores was to the IQ of the student.

Table 9. Summary of statistical computations ANOVA

SS_1	SS_2	df	M^2	F
2051.93	2250.95	5	178.17	.22
2316.19	2250.95	2	178.17	.40
1093.04	2089.65	5	172.61	1.19
2243.90	4369.84	2	172.61	6.00
6289.27	6435.58	5	198.33	.15

In summary, there is a positive relationship between the originality scores as measured by the TTCT and the degree of an internal locus of control as measured by the BLCQ, but the relationship is too low to be of real significance based upon the total data from this study. Hypothesis 1 is thus rejected. The intelligence as measured by the SCAT correlated significantly and positively with both originality scores and locus of control score. Hypothesis 2 is supported. There were differences found between boys and girls in the degree of originality and the degree of internal locus of control but the relationships were inconsistent and were not significant. Hypothesis 3 is rejected. The data revealed positive and significant correlations ($p = .05$) for the middle-class students only when social class was explored as a causal link between locus of control and originality. Hypothesis 4 is thus rejected for the bulk of the data, accepted only for the middle-class student in a predominantly middle-class, suburban type of city school. The acceptance from the data of

Hypothesis 2 reveals the IQ, as measured by the SCAT, as the main affector and best predictor of both originality, as measured by the TTCT, and an internal locus of control, as measured by the BLCQ.

Chapter V will discuss and analyze these findings, summarize, and make recommendations based upon the findings for additional research.

CHAPTER V

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The major purpose of this study was to investigate relationships between the psychological construct locus of control to originality as affected by intelligence, sex, and social class. The specific hypotheses which were tested were:

- H₁: The degree of originality as measured by the Torrance Tests of Creative Thinking will correlate positively to the degree of internal locus of control as measured by the Bialer Locus of Control Questionnaire;
- H₂: Intelligence as measured by the School and College Ability Tests will correlate positively with originality as measured by the TTCT and to an internal locus of control as measured by the BLCQ;
- H₃: There will be a significant difference shown between boys and girls in the degree of originality as measured by the TTCT and the degree of internal locus of control as measured by the BLCQ; and
- H₄: There will be a significant difference in the degree of originality as measured by the TTCT and in the degree of internal locus of control as measured by the BLCQ

between lower class and middle class children.

Hypothesis 1

The first statistical procedure, a correlation matrix of the variables with the IQ categorized as 1, 2, 3, supported all of the four hypotheses. The second statistical procedure, a correlation matrix with IQ placed on a continuum, supported only Hypothesis 2. The third statistical procedure, multiple regressions with analysis of variance via the F-test, revealed that the main effects contained the meaningful relationships and that interaction effects of the variables were minimal.

Three kinds of originality scores were correlated to the locus of control score: verbal, figural, and combined originality score. It is of interest to note that the order of correlation from high to low remained the same in the analyses, the relationship of locus of control to verbal originality highest, to combined originality score, second, and to figural originality, the lowest.

More differences among the subjects tended to be found in the verbal originality scores than in the figural scores; thus, the combined originality score tended to reflect the differences found there. Since both the BLCQ and the verbal battery of the TTCT depend upon verbal media, perhaps the dependence of each affected its relationship to the other test. As figural tests in the TTCT do not rely upon

verbal media, the probability of significant correlation to a verbal media test might be diminished. It is surely possible that artifacts of either TTCT or BLCQ might exert an unmeasured effect or that the relationship varies according to some unknown or untested variable. Each of these tests, still in the research stage of development, may need to undergo further refinement, including establishment of basic norms for measurement. With such refinement we may be able to measure with equal certitude both figural and verbal originality and measure one's sense of locus of control with any relationships among these constructs.

In summation, there is a low, positive relationship between originality and locus of control as determined by the TTCT and the BLCQ but significance for the relationship cannot be claimed. Hypothesis 1 is not supported, although the data indicate a direction toward a positive, significant relationship between locus of control and verbal originality.

Hypothesis 2

In the first set of product-moment correlations the relationship between IQ and originality and between IQ and locus of control was significant ($p = .05$). In these data the figural originality score correlated most highly with the IQ. When the IQ was placed on a continuum, the relationship of IQ to locus of control and to verbal

originality emerged as very significant ($p = .01$).

It would seem to be very possible that the IQ index (SCAT), the locus of control index (BLCQ), and verbal originality of the TTCT are measuring an ability much more similar than are the IQ index and figural originality. The difference between the basic media of expression, verbal as opposed to visual, could be one important factor affecting the relationship of IQ to figural originality.

Placing the IQ on a continuum best allows for the differences in ability to be shown, for in a categorized IQ it is possible for a difference of one point above or below the Mean or Standard Deviation to place one in a different category even though the difference itself has little or no meaning. Therefore, the relationships shown in data gathered by the second product-moment correlations would contain the greater probability of expressing the true relationship between IQ and either locus of control or originality scores. It has been noted that such relationships increased appreciably in this second set of data. More of the variance of both BLCQ and verbal originality may be accounted for on the basis of IQ than on the basis of any other variable.

It would seem that on these instruments for measuring the IQ, locus of control, and originality that the best predictor of an internal locus of control and of verbal originality is the IQ of the subject. These relationships are, however, subject to the built-in limitations

of the instruments used, their reliance on same (or similar) media of expression, or some other untested, extraneous variable(s). The SCAT test limits the intelligence measurement to school-related abilities, for example, rather than a general, more global ability or abilities. It is certainly probable that another instrument might express the relationship(s) of IQ to locus of control and to originality differently due to a different base of emphasis than that of the SCAT.

The very lower limits of the IQ range were not contained within the subjects, for screening procedures for placement in special education classes for mentally retarded has taken place before the sixth grade. Had such been included in the range of intelligence measured, some differences might have been brought forth from the basic data.

The findings that the IQ is the best predictor of the locus of control and of verbal originality would be in line with Rotter's theory of social learning in which he concludes that there are many more perceived rewards for the more intelligent than for the less intelligent; hence his feelings of personal control would increase at a proportionately greater rate than that of the less intelligent subject. In a culture where the ability to use verbal media for expression is valued, this relationship between IQ and locus of control and verbal originality might be fostered more readily and apparently than a relationship of IQ and locus of control to figural originality.

Hypothesis 2 that the relationship of IQ to both locus of control

and to originality is supported with the qualification that the figural originality sub-score does not reflect such a relationship.

Hypothesis 3

In the data from the first correlation matrix with IQ on a continuum the correlations of locus of control scores and all three originality scores were significant ($p = .01$). In the second set of data such relationships were only found among the boys in School A. With School A as the exception girls showed higher correlations between locus of control and originality than did boys.

Sex differences in the correlations of IQ to BLCQ show that girls demonstrated a higher correlation than did boys. This is so in each of the three school settings. It is very possible that this could be due to girls' developmental stages being from one to two years in advance of boys' in general growth, verbal abilities, and general school readiness in contrast to boys of sixth grade age.

It is also possible that the social pressures are such that girls in our culture are "expected" to perform in school to a greater degree than are boys with a possible greater loss of status for the "slow learning" girl than for the "slow learning" boy at this educational level. There may be fewer alternatives for increased status open to girls who are less capable than for boys, e. g. , the athletic programs in our schools stress boys' teams rather than girls' teams,

even though athletics is an ability imbued with high status in many school settings. For girls, such could increase the pressures for striving for academic success and ability and tend to increase the feelings of personal worth as one succeeds or to decrease them as one does not succeed.

It seems noteworthy that the highest correlations between IQ and BLCQ for both girls and boys are found in School B, the conventional, middle-class school. One possible conclusion is that in keeping with McClelland's research on achievement motivation there is greater striving for academic success as a means to upward social mobility in middle-class communities than in either of the more extreme kinds of communities. The suburban, upper-middle class community ranked second with the lower-class school community third. Each of these facts could be considered as supportive of the achievement motivation ethic.

Supplementary tables (Appendix II) show that the Mean IQ for girls in all three schools was higher than for boys, but the difference was not significant. BLCQ Means were also higher, except in School A. In the latter case the upper-middle class boys scored slightly higher than the girls. A close study of the data reveals the highest Standard Deviation of all tests which is accounted for by the high scores on the BLCQ from those boys who rank at the top of the IQ range. Again this is expressive of the relationship of IQ to locus

of control. High scores in figural originality by these same boys help to account for the fact that boys in this school setting showed a higher correlation of originality scores, figural and combined, to BLCQ.

There does appear to be a trend for sex differences to occur in IQ, locus of control, and originality as measured by the instruments used in this study, but the significant relationship would seem to be the IQ. Based on data from analysis three for interaction effects, IQ and its effects were the most significant of any relationship among these variables. Hypothesis 3 was given directional support only and is rejected.

Hypothesis 4

The fourth hypothesis was that there would be a significant difference between lower and middle social classes in locus of control and originality. The first data gave strong support ($p = .01$). The high correlation (.55) between school and social class supports the thesis that our youngsters are living in neighborhoods restricted on the basis of socio-economic levels in this particular urban setting.

A comparison of girls and boys in each of the three schools reveals lower correlations between social class and locus of control for the girls in each school. No relationship is significant, although School B approaches significance at the .05 level. Since this is the

conventional, middle-class school, directional support for the achievement motivation ethic might be a contributing factor.

A comparison of boys in the three schools would lead one to conclude that the social class ranking used seems to have more meaning in the upper strata. It is possible that such class distinctions as have been made are more discernible among those of the middle and upper-middle classes, due in part to a basic value system which promotes mobility as a desirable end and self-sufficiency as a means to such social mobility. The upper-middle class youngster as a member of the professional-managerial social grouping might feel an intense need to succeed. The youngster from either of these groupings who finds success in school might well experience a sense of worth and personal power, while one who encounters difficulties might feel low in worth and ability to control. The lower-class boy, not being bound to the same values, could easily be less affected by such reasoning even if the school should promote it. Also, such alternatives are open to the lower-class boy as athletic prowess, physical strength, daring, etc., upon which his sense of personal worth could perhaps more readily depend.

A comparison of classes within School A shows more distinct differences than either of the other schools. Lower-class students scored lower in IQ, verbal originality, but not on locus of control as might be anticipated. The sample is small ($N = 15$), and it may be

that in such a high-achievement-oriented setting that the differences as measured by verbal means tend to persist between the classes, while this minority may compensate for such differences by strong convictions of personal worth and control. If one were not comfortable in such an environment, he might well exhibit a need to intensify his sense of personal control to maintain a positive identity. It is just as possible that this minority has readily adopted the attitudes toward self which the majority group exhibits and sees no real discrepancies due to personal (in)abilities. Where a minority is quite small, this could be very possible.

School B data reveal correlations significant at .01 levels between sex and BLCQ, IQ and verbal originality, BLCQ and IQ for middle-class subjects and a correlation significant at .05 between IQ and combined originality. The lower class shows correlations significant at .01 between IQ and verbal originality, IQ and combined originality, and IQ and BLCQ. There are also correlations significant at .05 between sex and both verbal and combined originality scores, all in a negative direction. It would seem that neither sex nor locus of control related significantly among the lower-class grouping in this conventional school, while IQ was strongly related to both verbal and combined originality scores for this grouping. A study of the table(s) show a similar picture for each class, differences being for the most part one of mere degree. The classes may

be considered as quite assimilated with their differences less distinct than in School A, which would be the expected picture of the "melting pot" concept in the American culture.

School C data show less significant correlations than either of the other two schools. The middle class shows no significant correlations. The lower class shows a correlation at .05 level between IQ and BLCQ and a negative correlation significant at .05 between sex and BLCQ. As in each of the two other schools the relationships of the IQ to BLCQ and to verbal originality scores were the most significant. The differences between the classes seem to be less pronounced in this common man school than in the other two schools. The correlations between the variable-pairs were generally lower than in the other schools. Perhaps some dependence upon the verbal media of expression affected the correlations, as the school has a preponderance of lower-class subjects who do not rely as heavily on verbal means of communication and are not so affected by it. The instruments used could contain some measurement bias in favor of the more middle-class students and hence may be less able to determine locus of control and originality among lower-class children. Future normative data on the two research editions of BLCQ and TTCT may well eradicate such a possibility at a later date.

Schools B and C show more similarity between the classes than does School A, but School C shows less significance in any

relationship of variables other than the overall effect of IQ on other variables. Hypothesis 4 that there are positive, significant differences between classes can be accepted only for the upper-middle and middle-class strata based upon this study. The lower-class school revealed no significant differences between classes in originality scores or in locus of control. IQ was again the best predictor and greatest affecter of any other variable.

Recommendations Based on Findings

One of the values of the present study would seem to be the fact that a simple, easily administered test called the BLCQ has some usefulness in assessing youngsters' sense of personal effectiveness. However, the IQ as measured by the SCAT test dominated all correlations among variables. The use of an IQ test which may tap a more global intelligence than school-related abilities could well yield different results.

1. It is recommended that the use of other group or individual IQ tests be correlated in place of the SCAT to test for effect upon the locus of control-originality relationships.
2. Use of all sub-tests other than originality scores to be correlated to locus of control or in conjunction with originality scores to see if differences appear in such findings could well be recommended for clarification of relationships

from these findings.

3. Other bases such as a study of life-style or another scale for establishing socio-economic status or social class might be used in a study basically like this one in order to establish what, if any, differences occur in basic correlations among variables.
4. Use of Miller's CLOE-C test for locus of evaluation and control might be recommended to substitute for the BLCQ in assessing children's perception of locus of control.
5. A sample which would include sufficient numbers of ethnic groups other than white youngsters could be recommended as fruitful for more comparative understanding of a locus of control to originality relationship.

Recommendations for Further Research

With further research development it is possible that the BLCQ might well be used as a tool for counselors to aid in gaining insight into children's sense of personal effectiveness. Those who are at either extreme of the raw score continuum might be considered for guidance/counseling if other data for locating potential counselees seem supportive.

1. Test-Retest editions of the BLCQ are recommended as possible indices of growth of sense of ability to control his environment for use by school counselors of elementary

school children.

2. SRA materials for assessment of classroom environment as perceived by pupils could well be recommended for correlation with children's perception of locus of control.
3. It is recommended that those students whom peers and/or teachers identify as "leaders" or "followers" be compared on the basis of both locus of control and originality or on the basis of either of these constructs using the BLCQ and the TTCT as bases.
4. A comparison of the effect of teaching strategies which utilize either a teacher-centered or student-centered base could be recommended for study in relationship to student's perception of locus of control.
5. A longitudinal study to indicate growth curves for locus of control along such lines as sex differences, ethnic differences, and socio-economic status differences could be recommended for study. A comparison of American children with children of a distinct sub-culture (American Indian, lower-class Negro) could be recommended for further study.

Any of the recommendations given could extend, clarify, or support all or part of the findings from this study. It would be of interest to see whether such findings as were reached in this study

would be supported in further research of the same type using the same or similar instruments for measurement of locus of control and originality. A different sampling could confirm or deny any such findings.

If we may assume that even a qualified relationship between locus of control and originality will be further substantiated, there are some implications for education. If an internal sense of control is important for original thinking, then we must seek opportunities for its development. We are charged with the tremendous task of aiding the child to develop his potential. Certainly within our conception of potential we include both originality and the sense of personal effectiveness. Perhaps it is time to look at and to refine such strategies and climates which promote these two facets of human growth. We have not only our children but also our culture to enrich by such efforts.

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APPENDIX

APPENDIX I

Formula for Pearsonian Product-Moment Correlation

$$r_{xy} = \frac{\Sigma xy}{N \sigma_x \sigma_y}$$

Formula for F-test used with ANOVA

$$F = \frac{MST}{MSE}$$

Formula for Confidence Interval

$$B \pm \frac{T \cdot S. E.}{\sqrt{\frac{N \cdot \Sigma(x^2) - (\Sigma x)^2}{N}}}$$

Formula for Standard Error of Estimate

$$S. E. = \sqrt{\frac{\Sigma(y^2) - A(\Sigma y) - B[\Sigma(xy)]}{N - 2}}$$

Formula for Computation of F

$$F = \frac{\frac{SS_2 - SS_1}{df}}{M^2}$$

APPENDIX II

Table 10. Means and sigmas of boys and girls on IQ scores, originality scores, and BLCQ scores for School A

	Girls			Boys		
	Mean	Sigma	N	Mean	Sigma	N
IQ*	55.16	8.22	48	53.95	9.26	47
Originality Verbal	44.48	9.01	--	44.36	6.64	--
Originality Figural	41.66	9.07	--	39.53	9.34	--
Originality Combined	85.10	17.30	--	83.12	16.24	--
BLCQ	15.33	2.66	--	15.91	5.97	--

*IQ on a continuum

Table 11. Means and sigmas of boys and girls on IQ scores, originality scores, and BLCQ scores for School B

	Girls			Boys		
	Mean	Sigma	N	Mean	Sigma	N
IQ*	50.05	9.80	38	45.62	9.49	39
Originality Verbal	42.23	5.54	--	38.71	6.66	--
Originality Figural	46.18	11.71	--	41.41	9.66	--
Originality Combined	88.42	14.24	--	80.38	13.97	--
BLCQ	14.66	3.16	--	14.41	3.17	--

*IQ on a continuum

Table 12. Means and sigmas of boys and girls on IQ scores, originality scores, and BLCQ scores for School C

	Girls			Boys		
	Mean	Sigma	N	Mean	Sigma	N
IQ*	50.37	8.17	48	49.59	9.86	42
Originality Verbal	44.90	5.99	--	43.29	4.95	--
Originality Figural	41.63	9.09	--	42.20	8.66	--
Originality Combined	86.63	12.76	--	85.24	111.29	--
BLCQ	14.86	2.24	--	14.36	2.37	--

*IQ on a continuum

Table 13. Summary for ANOVA for three originality scores

Source of Variation	d. f.	S. S.	M. S.	F	r
VERBAL ORIGINALITY					
1. Main Effects					
Regression	6	2051.93	341.99	8.37*	.41
Deviation from Regression	255	10418.68	40.86		
2. 1st Order					
Regression	11	2250.96	204.63	5.01	.42
Deviation--Reg.	250	10219.66	40.88		
3. 2nd Order					
Regression	13	2316.19	178.17	4.35	.43
Deviation--Reg.	248	10154.42	40.95		
FIGURAL ORIGINALITY					
1. Main Effects					
Regression	6	1093.04	182.17	1.99	.21
Deviation--Reg.	255	23356.82	91.60		
2. 1st Order					
Regression	11	2089.66	189.97	2.12	.29
Deviation--Reg.	250	22360.21	89.44		
3. 2nd Order					
Regression	13	2243.90	172.61	1.93	.30
Deviation--Reg.	248	22205.96	89.54		

Table 13. Continued

Source of Variation	d. f.	S. S.	M. S.	F	r
COMBINED ORIGINALITY					
1. Main Effects					
Regression	6	4369.84	728.31	3.62	.28
Deviation--Reg.	255	51251.55	200.98		
2. 1st Order					
Regression	11	6289.27	571.75	2.90	.34
Deviation--Reg.	250	49332.13	197.32		
3. 2nd Order					
Regression	13	6435.58	495.04	2.50	.34
Deviation--Reg.	248	49185.81	198.33		

*Significant at .05 level of confidence

APPENDIX III

BIALER MODIFIED LC SCALE

Name _____
 Grade _____
 School _____

Please read carefully:

This is not a test. We are just trying to find out how people your age think about certain things. Here are some questions to see how you feel about these things. There are no right answers or wrong answers to these questions. Some people say "yes" and some say "no." After reading each question, if you think your answer should be yes, or mostly yes, circle the word yes. If you think the answer should be no, or mostly no, circle the word no. Remember, different people give different answers, depending on how they feel about the question, and there is no right or wrong answer. Just circle "yes" or "no" depending on how you think the question should be answered.

- | | | |
|-----|----|---|
| Yes | No | 1. When somebody gets mad at you, do you usually feel there is nothing you can do about it? |
| Yes | No | 2. Do you really believe a student can be whatever he wants to be? |
| Yes | No | 3. When people are mean to you, could it be because you did something to make them be mean? |
| Yes | No | 4. Do you usually make up your mind about something without asking someone first? |
| Yes | No | 5. Can you do anything about what is going to happen tomorrow? |
| Yes | No | 6. When people are good to you, is it usually because you did something to make them be good? |
| Yes | No | 7. Can you ever make other people do things you want them to do? |

- Yes No 8. Do you ever think that people your age can change things that are happening in the world?
- Yes No 9. If another student was going to hit you, could you do anything about it?
- Yes No 10. Can a person your age ever have his own way?
- Yes No 11. When someone is nice to you, is it because you did the right things?
- Yes No 12. Can you ever try to be friends with another person even if he doesn't want to?
- Yes No 13. Does it ever help any to think about what you will be when you grow up?
- Yes No 14. When someone gets mad at you, can you usually do something to make him your friend again?
- Yes No 15. Can people your age ever have anything to say about where they are going to live?
- Yes No 16. When you get in an argument, is it sometimes your fault?
- Yes No 17. When nice things happen to you, is it only because of good luck?
- Yes No 18. Do you often feel you get punished when you don't deserve it?
- Yes No 19. Will people usually do things for you if you ask them to?
- Yes No 20. Do you believe a kid can usually be whatever he wants to be when he grows up?
- Yes No 21. When bad things happen to you, is it usually someone else's fault?
- Yes No 22. Can you ever know for sure why some people do certain things?

ID	IQ	Social		School	Creativity			Locus
		Class	Sex		Verbal	Figural	Combined	
134	1	1	2	1	50	40	90	16
135	1	2	1	1	40	35	75	19
136	1	2	2	1	40	35	75	17
137	2	3	1	1	55	50	105	18
138	1	2	2	1	50	30	80	15
139	1	1	1	1	50	30	80	15
140	2	1	2	1	45	40	85	16
201	3	6	2	1	45	55	100	11
202	2	1	1	1	50	50	100	15
203	2	2	1	1	45	40	85	19
204	2	4	1	1	40	40	80	16
205	1	2	2	1	40	35	75	17
206	2	2	1	1	50	30	80	12
207	2	5	1	1	50	55	105	17
208	2	1	2	1	50	40	90	15
209	2	3	1	1	50	45	95	13
210	3	1	2	1	40	30	70	12
211	1	2	1	1	45	45	90	14
212	2	2	1	1	45	35	80	13
213	2	2	2	1	40	35	75	15
214	2	1	2	1	45	40	85	18
215	2	3	2	1	45	40	85	17
216	2	2	2	1	40	20	60	17
217	1	2	1	1	40	20	60	17
218	2	2	2	1	35	30	65	12
219	2	2	2	1	45	40	85	11
220	2	2	2	1	40	40	80	15
221	1	1	1	1	40	40	80	17
222	3	3	2	1	30	30	60	12
223	3	3	2	1	45	35	80	17
224	2	3	1	1	40	45	85	12
225	3	3	2	1	40	40	80	18
226	0	0	0	0	0	0	0	0
227	1	2	2	1	40	40	80	16
228	3	5	2	1	40	55	95	19
229	1	2	2	1	40	35	75	16
230	2	4	2	1	45	50	95	12
231	3	6	1	1	50	35	85	12
232	2	2	1	1	50	40	90	16
233	1	2	1	1	45	50	95	14

ID	IQ	Social			Creativity			Locus
		Class	Sex	School	Verbal	Figural	Combined	
234	1	1	2	1	50	50	100	15
235	2	2	1	1	35	40	75	15
236	3	3	1	1	40	35	75	14
237	1	2	1	1	45	35	80	15
238	2	2	1	1	40	55	95	19
239	2	3	1	1	45	40	85	16
240	1	1	1	1	50	40	90	15
301	2	2	1	1	40	55	95	18
302	1	1	2	1	45	8	12	51
303	2	2	1	1	35	55	90	16
304	2	3	2	1	50	45	95	15
305	3	3	1	1	30	40	70	13
306	1	2	2	1	45	50	95	18
307	2	1	1	1	40	45	85	17
308	1	2	2	1	40	55	95	20
309	1	4	1	1	45	45	90	21
310	3	3	1	1	45	55	100	8
311	2	1	1	1	45	40	85	15
312	2	2	2	1	35	40	75	16
313	2	4	2	1	40	50	90	14
314	1	1	1	1	45	35	80	15
315	1	1	1	1	55	55	110	18
316	2	3	2	1	40	40	80	15
317	1	3	2	1	40	35	75	15
318	0	0	0	0	0	0	0	0
319	3	3	2	2	30	40	70	14
320	2	4	1	2	40	40	80	12
321	1	3	2	2	40	50	90	16
322	2	3	2	2	40	45	85	16
323	2	6	2	2	45	40	85	16
324	2	7	1	2	50	55	105	17
325	2	3	1	2	45	60	105	18
326	1	3	1	2	50	40	90	14
327	3	3	2	2	40	45	95	14
328	2	7	1	2	45	40	85	13
329	1	6	2	2	45	50	95	19
330	3	7	2	2	35	40	75	9
331	3	3	1	2	40	75	115	14
332	2	3	1	2	40	65	105	17
333	2	4	1	2	35	40	75	16

ID	IQ	Social			Creativity			Locus
		Class	Sex	School	Verbal	Figural	Combined	
334	2	3	2	2	35	35	70	15
335	1	4	1	2	45	35	80	18
336	2	5	2	2	40	45	85	13
337	2	3	1	2	45	60	105	14
338	3	5	1	2	40	55	95	8
339	2	3	2	2	35	35	70	15
340	3	7	2	2	30	30	60	6
401	3	2	2	2	40	45	85	9
402	1	5	2	2	40	35	75	17
403	3	5	1	2	40	45	85	9
404	0	0	0	0	0	0	0	0
405	2	6	2	2	35	45	80	17
406	2	3	1	2	40	30	70	16
407	3	3	2	2	30	35	65	13
408	3	5	1	2	30	35	65	13
409	3	4	1	2	35	30	65	11
410	1	6	2	2	40	40	80	15
411	1	3	1	2	45	45	90	16
412	2	5	1	2	40	65	105	12
413	1	4	1	2	45	50	95	21
414	2	3	2	2	30	30	60	14
415	2	4	2	2	40	35	75	12
416	1	4	2	2	45	60	105	14
417	2	6	1	2	40	35	75	15
418	3	6	2	2	30	35	65	16
419	3	3	2	2	30	25	55	13
420	2	1	2	2	40	30	70	15
421	1	6	2	2	40	45	85	17
422	3	3	2	2	45	60	105	16
423	2	3	1	2	40	45	85	14
424	3	7	2	2	40	35	75	10
425	3	5	2	2	45	40	85	19
426	2	6	1	2	45	45	90	13
427	1	5	1	2	40	40	80	16
428	2	7	2	2	40	25	65	13
429	2	3	1	2	45	35	80	12
430	1	6	1	2	50	45	95	14
431	0	0	0	0	0	0	0	0
432	1	5	1	2	55	45	100	16
433	3	5	1	2	30	35	65	9

ID	IQ	Social		School	Creativity			Locus
		Class	Sex		Verbal	Figural	Combined	
434	2	3	2	2	55	40	95	18
435	3	3	2	2	25	55	80	18
436	2	4	2	2	50	55	105	20
437	2	1	2	2	45	40	85	16
438	3	6	2	2	30	50	80	12
439	2	6	2	2	40	40	80	15
440	2	4	1	2	40	45	85	15
501	3	3	2	2	35	25	60	13
502	3	4	1	2	40	40	80	11
503	2	3	1	2	40	40	80	17
504	3	5	1	2	40	45	85	9
505	3	3	2	2	50	65	115	9
506	1	5	1	2	50	60	110	15
507	1	3	1	2	50	65	115	18
508	2	7	2	2	30	40	70	15
509	1	3	1	2	50	60	110	15
510	2	3	2	2	45	50	95	16
511	2	6	2	2	40	45	85	9
512	2	3	1	2	35	65	100	20
513	2	5	1	2	40	40	80	17
514	2	3	2	2	40	35	75	18
515	2	3	1	2	40	30	70	14
516	2	5	1	2	45	35	80	19
517	2	7	1	2	40	40	80	19
518	0	0	0	0	0	0	0	0
519	1	6	2	3	40	20	60	15
521	1	3	2	3	45	45	90	16
522	2	4	2	3	40	40	80	17
523	2	3	1	3	40	45	85	14
524	1	3	2	3	50	45	95	11
525	1	3	1	3	40	35	75	17
526	2	3	1	3	45	40	95	13
527	0	0	0	0	0	0	0	0
528	2	5	2	3	45	50	95	12
529	3	4	2	3	45	50	95	12
530	2	5	2	3	40	30	70	12
531	2	3	2	3	45	50	95	13
532	3	5	2	3	55	50	105	13
533	2	5	2	3	55	50	105	13
534	3	6	2	3	35	35	70	17

ID	Social			School	Creativity			Locus
	IQ	Class	Sex		Verbal	Figural	Combined	
535	2	3	2	3	40	40	80	15
536	1	5	2	3	40	35	75	15
537	2	3	2	3	50	35	85	16
538	3	5	2	3	45	50	95	13
539	1	5	2	3	50	45	95	14
601	2	5	1	3	45	40	85	12
602	2	3	1	3	40	35	75	17
603	3	3	1	3	40	40	80	13
604	2	3	1	3	45	40	85	14
605	2	4	1	3	35	40	75	17
606	2	5	1	3	40	30	70	14
607	2	3	1	3	45	35	80	18
608	3	4	1	3	25	35	60	15
609	2	5	1	3	45	35	80	16
610	3	3	1	3	40	45	85	12
611	2	4	1	3	45	40	85	12
612	1	3	1	3	45	40	85	19
613	1	3	1	3	55	65	120	18
614	1	3	1	3	45	40	85	11
615	2	4	1	3	40	50	90	14
616	2	5	1	3	40	40	80	16
617	2	4	1	3	45	35	80	12
618	2	5	1	3	45	45	90	17
619	0	0	0	0	0	0	0	0
620	3	4	2	3	45	25	70	10
621	2	3	2	3	50	40	90	16
622	2	3	2	3	40	40	80	13
623	2	3	2	3	45	40	85	14
624	3	4	2	3	35	40	75	12
625	2	6	2	3	50	45	95	13
626	3	5	2	3	40	50	90	15
627	2	3	2	3	40	40	80	16
628	2	4	2	3	40	55	95	15
629	3	5	2	3	40	35	75	9
630	1	3	2	3	40	40	80	15
631	3	5	2	3	35	25	60	14
632	2	4	2	3	45	50	85	13
633	2	3	1	3	55	30	85	14
634	2	5	1	3	40	45	85	15
635	2	5	1	3	50	35	85	14

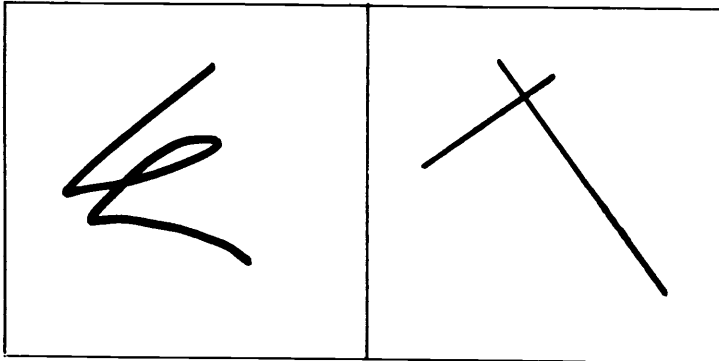
ID	IQ	Social			Creativity			Locus
		Class	Sex	School	Verbal	Figural	Combined	
636	2	4	1	3	50	40	90	13
637	2	5	1	3	50	50	100	11
638	2	4	1	3	50	35	85	14
639	3	3	1	3	40	45	85	14
640	3	3	1	3	50	60	110	10
701	2	7	1	3	40	25	65	15
702	2	3	1	3	45	35	80	15
703	1	3	1	3	40	55	95	19
704	2	6	1	3	40	25	65	13
705	1	4	1	3	45	50	95	16
706	1	4	1	3	50	55	105	17
707	0	0	0	0	0	0	0	0
708	2	4	2	3	45	60	105	14
709	2	2	2	3	45	35	80	20
710	2	3	2	3	40	55	95	13
711	1	1	2	3	40	40	80	18
712	2	4	2	3	50	40	90	19
713	1	3	2	3	45	55	100	16
714	3	7	2	3	40	40	80	11
715	1	3	2	3	40	40	80	15
716	2	5	2	3	45	50	95	15
717	2	5	2	3	40	45	85	18
718	2	4	2	3	40	35	75	14
719	2	3	2	3	40	40	80	17
720	2	3	1	3	45	35	75	14
721	3	3	1	3	50	35	85	13
722	2	3	1	3	55	60	115	16
723	2	5	1	3	50	35	85	16
724	2	4	1	3	45	50	95	18
725	2	4	1	3	45	50	95	13
726	3	4	1	3	50	40	90	18
727	2	3	1	3	50	40	90	15
728	2	3	1	3	50	50	100	18
729	2	7	1	3	55	55	110	16
730	1	7	1	3	55	50	105	16
731	2	3	1	3	45	40	85	12
732	2	3	1	3	40	25	65	15
733	2	5	1	3	35	40	75	17

	$\left(\sum_{i=1}^{261} x_i \right)$	$\left[\sum_{i=1}^{261} (x_i)^2 \right]$	Mean	S. D.
IQ	509	1107	1.878	0.748
Social Class	905	3765	3.339	1.659
Sex	389	643	1.435	0.560
School	519	1213	1.915	0.901
Creativity Verbal	11310	500700	41.734	10.307
Creativity Figural	10998	486114	40.583	12.138
Creativity Combined	22227	1941269	82.018	20.927
Locus	3920	61920	14.465	4.396

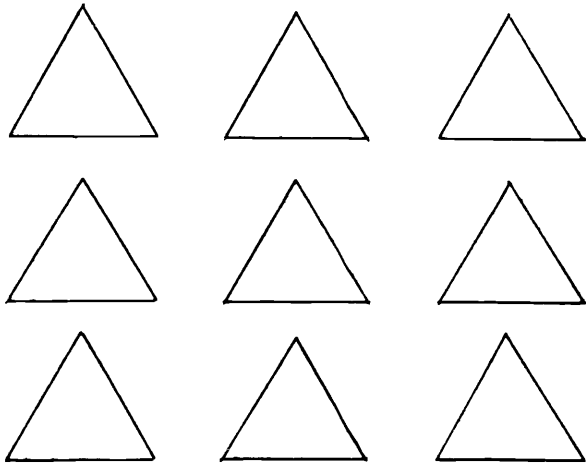
Number of Observations = 261

Part 4

Add lines to the incomplete figures to sketch some interesting objects.



See how many objects or pictures you can make from the triangles below.



12-6664-2.2M

ASSESSING CREATIVE THINKING
a demonstration based on
The Torrance Tests of Creative Thinking

Part 1

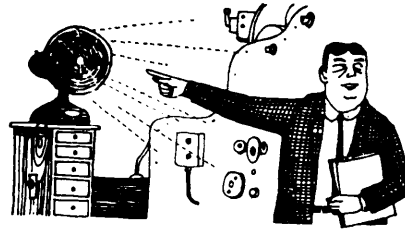
List all the ways you can think of to improve the toy.

- 1 _____
- _____
- 2 _____
- _____
- 3 _____
- _____
- 4 _____
- _____
- 5 _____
- _____
- 6 _____
- _____

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Part 2

List all the questions you can think of about this picture.



- 1 _____

- 2 _____

- 3 _____

- 4 _____

- 5 _____

- 6 _____

Part 3

List all the uses you can think of for junk autos

- 1 _____

- 2 _____

- 3 _____

- 4 _____

- 5 _____

- 6 _____

- 7 _____

- 8 _____
