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THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

THE RELATIONSHIP OF INDIVIDUAL CREATIVITY AND THE ADEQUACY OF THE SENIOR HIGH SCHOOL CURRICULUM

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degree of

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BY

LOYCE JEAN WILLETT

Norman, Oklahoma

1965

THE RELATIONSHIP OF INDIVIDUAL CREATIVITY AND THE ADEQUACY OF THE SENIOR HIGH SCHOOL CURRICULUM

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THE RELATIONSHIP OF INDIVIDUAL CREATIVITY AND THE ADEQUACY OF THE SENIOR HIGH SCHOOL CURRICULUM

CHAPTER I

INTRODUCTION

Two of the major considerations of today's senior high schools are the pursuit of excellence and the increased emphasis upon creativity. These appear to be compatible, but are they? If the high school curriculum is expected to foster these two objectives, it logically follows that the high school course marks of students should be the outward evidences of the results of the evaluative procedures used to reflect progress in attaining these objectives. It is suspected, however, that the school marks received by students actually reflect little evidences of congruency of objectives, curriculum, and evaluation procedures. Is it possible that high school marks are little more than an indication of conforming behavior patterns such as ability to follow direction, submissiveness to authoritarian rule, and/or acceptance of authority without question? How, then, can school marks be justified if they do not properly evaluate or reflect any achievement with regards to one of the secondary school's major objectives, specifically the development of individual imagination or creativity? Possibly, those students with inquiring, imaginative behavior patterns have been penalized with lower

marks due to their non-conformistic behavior. Are there any specific curricular areas that appear to be more closely associated with developing creativity and imagination than others?

This investigation is concerned with indices of academic achievement and with selected aspects of behavior. The relationship of these two factors as well as their relationships to mental ability and to selected non-intellectual characteristics is also considered. A descriptive analysis of senior high school students should permit the evaluation of curricular objectives and practices in terms of these stated variables.

It is the purpose of this investigation, therefore, to isolate, if possible, some determiners of school course marks in order to determine relative curricular effectiveness in developing individual imagination and creativity.

Statement of the Problem

The problem of this study is to determine and to identify those indices that reflect or have relationship to imagination and creativity as measured by The Kinget Drawing-Completion Test.

In order to implement the investigation of the major problem under study, the necessary sub-problems are as follows:

(1) to determine if any relationship exists between imagination and chronological age,

(2) to determine if any relationship exists between imagination and mental ability,

(3) to determine if imagination may be related to selected personality characteristics,

(4) to determine if any relationship exists between imagination

and academic success as reflected by grade average in certain senior high school curricular areas, and

(5) to determine if any relationship exists between imagination and academic success as reflected by total senior high school grade point average.

The Hypotheses

In accordance with the problem and sub-problems set up for this study, the following hypotheses have been derived to direct the investigation:

(1) Imagination as ascertained by The Kinget Drawing-Completion Test is statistically independent of chronological age.

(2) Imagination as ascertained by The Kinget Drawing-Completion Test is statistically independent of mental ability as measured by The Otis Quick Scoring Mental Ability Test.

(3) Imagination as ascertained by The Kinget Drawing-Completion Test is statistically independent of personality characteristics as measured by The Guilford-Zimmerman Temperament Survey.

(4) Imagination as measured by The Kinget Drawing-Completion Test is statistically independent of academic achievement as reflected by grade average in selected curricular areas derived from the subjects' cumulative record files.

(5) Imagination as measured by The Kinget Drawing-Completion Test is statistically independent of total grade point average derived from the subjects' cumulative record files.

Treatment of Data

The statistical treatment of the data using the Chi-square test

was designed to determine independency of the variables under study. Where dependency occurred, the variables concerned were examined further in an attempt to determine if the dependency was due to differences in sex, in grade classification, or in interactions between sex and grade classification.

Limitations

Any investigation of imagination and creativity is necessarily limited by what is known about these aspects of behavior. Attempts to define creativity or imagination are arbitrary and thus open to dispute and debate. Lack of consensus concerning a definition of creativity or imagination is evident in the various attempts that have been made to measure these components of individual behavior according to various criteria. These complications, however, do not prevent an investigation to proceed from a working definition of creative imagination, a definition that is subject to modification as work and knowledge progresses.

A second limitation of this study concerns the use of school course marks in assessing students' achievements in fulfilling the objectives of the senior high school curriculum. With many teachers involved in assigning marks to students, it is inevitable to find variability in grading criteria. Grade point averages, therefore, are used in an attempt to minimize this variability factor.

Assumptions

There are several assumptions upon which the hypotheses derived to direct the investigation were based. The first assumption was that creative and imagination potential are possessed by everyone. This potential or ability, then, is present in all individuals, just as "...all

individuals possess to some degree all abilities, except for the occurrence of pathologies."[1] Objective measures of either imagination or creativity, however, will reveal differences in degree or level of individual imagination or creativity with those individuals recognized for their creative and imaginative behavior merely having more of this ability than do other individuals.

A second assumption was that the level of imagination can be isolated by means of assessing individual reaction to basic stimuli. The Kinget Drawing-Completion Test was considered to be a valid objective instrument in assessing this facet of personality structure.

In this investigation, imagination was considered to be a descriptive term of individual behavior. It is the extent to which one displays freedom in response to basic stimuli. Creative imagination, therefore, was used to describe that ability of an individual to react to a stimulus or situation in a new or novel manner that is original to the individual. The unusual or original aspects of an individual's responses were assumed to be indicative of the level of his creative imagination.

The fourth assumption was that the course marks received by students were indices of academic performances and that marking practices reflected the objectives of an institution's educational program. In other words, marking practices were considered as an integral part of the total educational situation, specifically reflecting the objectives, the curriculum, and the evaluation process.

A fifth assumption was that the subjects used in this investigation

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[1] J. P. Guilford, "Creativity," The American Psychologist, V (1950), p. 446.

have been drawn from a representative senior high school. The school population was heterogeneous, including both rural and urban youth, and a variety of courses were offered in the curriculum structure to meet the needs and interests of both continuing and terminal students. The curriculum was assumed to be that of the typical senior high school found in towns of similar size.

This investigation was limited to those individual traits defined by the respective instruments employed in the study. All instruments were assummed to be valid. Mental ability was ascertained by The Otis Quick Scoring Mental Ability Test; the level of imagination was isolated by The Kinget Drawing-Completion Test; and, personality traits were limited to those traits defined and measured by The Guilford-Zimmerman Temperament Survey.

Need for the Study

There are several reasons why this investigation of school marks and creative imagination is pertinent. With increased interest in excellence and the resulting movements to strengthen academic disciplines, curriculum innovators appear to feel the necessity for pupils to know essential academic background. While content is a major factor, these same innovators have also stressed individual creativity and development of thinking ability. Of primary importance is the need to focus attention on the senior high school's avowed purpose of teaching students to think critically and independently while, at the same time, rewarding the conforming students with high marks. This contradictory practice results in giving mere lip service to one of the school's major considerations.

The importance of creative imagination in today's society cannot be overlooked. The economic value of new ideas alone justifies an emphasis on creative imagination. In addition, attention is called to the satisfying element of individual productivity. The results of self-discovery and creative imagination are more than ends in themselves, rather they merely serve as means to stimulate one to further investigation and effort. These factors challenge the schools to focus more attention to the development of creative imagination in all students.

A third justification for this investigation concerns the dearth of studies of creative imagination. In an examination of abstracts for approximately the second quarter of this century, Guilford[2] cites that less than two-tenths of one per cent of the books and articles indexed bear directly on creativity and that few of these increase the understanding or control of creative activity very much.

The use of The Kinget Drawing-Completion Test as a device to measure creative imagination was a fourth reason for this investigation. This is a relatively new instrument and few studies have been attempted. In particular, no studies could be found in which the Kinget has been used as an evaluative procedure of the senior high school curriculum. It was the hope of this investigator to indicate the value of including an instrument of this type in the senior high school evaluation program.

Sources of Data

Sampling Procedure

The subjects chosen for this study were drawn from the total number of students in one senior high school. It was possible to control the

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[2] Ibid., p. 445.

composition of the sample by obtaining approximately an equal number of subjects from each grade level.

For the purposes of this study, therefore, a total of nine hundred and five (905) students enrolled in the tenth, eleventh, and twelfth grades at the Ardmore High School, Ardmore, Oklahoma, were given The Kinget Drawing-Completion Test and The Guilford-Zimmerman Temperament Survey. These tests were administered in seventy-five regular class sessions scheduled at various times of the day during the fall of the school year 1963-64. The Kinget Test, measuring creativity and imagination, was administered first. Not all of the 905 students were present for all sessions, resulting in the failure of some to complete the test battery. All students with an incomplete battery of tests were rejected. The selection of the sample was made on the basis of completion of the two tests and the presence of an intelligence score on The Otis Quick Scoring Mental Ability Test taken from the cumulative record file of each student. Random sample was then made to obtain the 260 subjects for the investigation.

The general results of the sampling procedure were a total of 138 males and 122 females; the grade classification and sex distribution for the subjects can be found in Table I.

Administration of Tests

In order to assure, as far as possible, the independency among the variables under investigation, it was necessary to select tests that provided measurements of relatively independent factors and that were readily available, reliable, and well standarized. The tests that best fulfilled these qualifications were: The Otis Quick Scoring Mental Ability Test, The Kinget Drawing-Completion Test, and The Guilford-

TABLE I

GRADE CLASSIFICATION AND DISTRIBUTION
BY SEX FOR ALL SUBJECTS
(n = 260)

Classification	Male	Female	Both Sexes
Sophomore	64	39	103
Junior	36	45	81
Senior	38	38	76
All Grades	138	122	260

Zimmerman Temperament Survey.

The Kinget Drawing-Completion Test was the first test administered. This test, a projective instrument, was readily adaptable for group administration, a factor of economy in both the time and effort involved in obtaining the necessary data concerning imagination and creativity. Adaptability was also enhanced by the simple construction and organization of the test material and of the instructions for administering the test. The group administration of a projective test, however, did necessitate certain controls. With such a projective instrument, it was necessary to discourage and to control such factors as the copying and imitating the drawings of others. For this reason a proctor assisted the administrator with the testing.

A questionnaire was used in order to determine the presence or absence of any significant differences in drawing abilities, interest, training, or experience. Each subject responded to the questions on the inquiry sheet, and the responses of the questionnaire were tabulated for all subjects.

The responses of the subjects to question one and to question two of the questionnaire can be found in Table II; the complete inquiry sheet can be found in Appendix A.

TABLE II

SUBJECTS' RESPONSE TO QUESTION ONE AND QUESTION TWO FROM QUESTIONNAIRE FOR EACH GRADE CLASSIFICATION AND FOR TOTAL SAMPLE (n = 260)

Grade Classification	Question one: Is drawing one of your hobbies?		Question two: Have you had any training in art?	
	yes	no	yes	no
Sophomore	31	72	62	25
Junior	22	59	53	28
Senior	23	53	45	31
Total Sample	76	184	176	84

The 176 subjects responding yes to question two indicated that the art training received was in the elementary school program or in the junior high school as a required one semester course; only fifty subjects of this same group indicated any art training beyond the junior high school level.

Administration of The Guilford-Zimmerman Temperament Survey followed the testing procedure set out in the test manual for this instrument. In all testing sessions, the subjects responded cooperatively and appeared interested in the test situation. A general atmosphere of permissiveness was present.

Materials

Each subject was provided with all materials necessary for the administration of the tests. These materials included the two printed test materials, an inquiry sheet, one IBM electrical scoring answer sheet, a drawing pencil, and a special pencil for recording responses on the IBM scoring sheet. Both pencils were equipped with erasers. In addition to the above materials, there was available for each student a scoring sheet and a profile sheet for The Kinget Drawing-Completion Test.

Additional Sources of Data

The cumulative record file of each subject was checked to obtain an intelligence score as determined by The Otis Quick Scoring Mental Ability Test. This test was taken by all students in the school at the beginning of the ninth grade and was administered by the local school system.

A further check of the cumulative record files was necessary to obtain the grades or marks received by each student in all school subjects. All marks received by the subjects in the senior high school, from the ninth grade to and including the marks received during the fall semester of 1963-64, when the tests used in this investigation were administered, were included for consideration. As a result of this procedure, the number of marks available varied with the classification of the subject. Three semesters of marks, therefore, were available for the sophomore students, five semesters of marks for the junior students, and seven semesters of marks for the senior students.

Description of Tests

The Otis Quick Scoring Mental Ability Test

The Otis Quick Scoring Mental Ability Test presents items which

are mainly verbal descriptions of word meaning, reasoning or classification, and numerical reasoning; it is designed to be used with senior high school and college students and with adults. The score on this test is expressed as an Intelligence Quotient (I. Q.), and was used as an index of the mental ability for each subject in the investigation.

The Guilford-Zimmerman Temperament Survey

The Guilford-Zimmerman Temperament Survey is designed to be used with senior high school students, college students, and adults. The results of administering this instrument was a series of scores for each subject, with each score representing a confirmed dimension of personality and dependable descriptive category. For purposes of analysis, the obtained raw scores were converted to T scores based on national norms available for high school students as found in the Profile Chart for the Guilford-Zimmerman Temperament Survey.[3]

The Kinget Drawing-Completion Test

The Kinget Drawing-Completion Test consists of eight graphic stimuli which the subject can develop in his own way. The principal aim of this test is to reveal the structure of personality through the use of almost unstructured material that allows possibilities for free-association and expression. The development of this instrument, as reported by Dr. Marian Kinget,[4] is based on the Wartegg test blank. The author traces extensive validation studies, as well as the origin and

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[3] Profile Chart for the Guilford-Zimmerman Temperament Survey (Beverly Hills, California: Sheridan Supply Company, 1955).

[4] G. Marian Kinget, The Drawing-Completion Test: A Projective Technique for the Investigation of Personality (New York: Grune & Stratton, Inc., 1952).

development of the test, administration and scoring procedures, and illustrations of quantitative and qualitative interpretative principles.

Kinget's test is a scoring and interpretative system of thirty-five variables. Each of the eight drawings are evaluated in terms of these variables. The scores on the variables are then combined into various groups to form a profile or personality schema composed of four basic functions: Emotion, Imagination, Intellect, and Activity. Each of these four is further divided into two parts or functions, resulting in a schema of personality with eight functions. The Imagination function, with which this investigation is concerned, is composed of Combinative Imagination and of Creative Imagination.

The description by Kinget of the two sub-variables of Imagination is that "The combining type of imagination draws its material directly from the surroundings, organizes it according to objective standards and produces forms which fit into the world of sensorial experience. This kind of imagination is thus essentially based on perception and oriented towards visible reality. It may also present a fairly emotional undercurrent, as manifested in its products which often show an esthetic tendency, though of a conventional variety. The creative kind of imagination is characterized by the looseness of its contact with visible reality and by its preference for abstract constructs or for symbols of an emotional, philosophical or mystical sort. A touch of creative imagination is likely to enhance the personality and may be highly valuable in certain spheres of activity; however, a marked predominance of this kind of imagination is likely to be an obstacle to adjustment to ordinary life."[5]

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[5] Ibid., p. 10.

The Kinget Drawing-Completion Test for each individual was scored, using an initial set of criteria based on an interpretation of Kinget's criteria. The criteria were developed by Laird[6] to facilitate objectivity of scoring. For purposes of this investigation, scoring was computed for the two sub-variables, Combinative Imagination and Creative Imagination; the obtained scores contributed to the total score of Imagination. The scoring and profile variables used in the personality schema of Imagination are found in Figure 1; the complete test and profile sheet for scoring can be found in Appendix A.

FIGURE 1

SCORING AND PROFILE VARIABLES USED IN THE KINGET PERSONALITY SCHEMA OF IMAGINATION

Combinative Imagination	Creative Imagination
Physiognomy	Expansion
Ornaments	Fantasy (Fancy, Phantasm, Symbolism)
Style	Orginality
Organization	Asymmetric Abstraction (Technical)
Symmetric Abstraction	Dark Shading

[6] A. W. Laird, "Differential Analysis of Creativity and Imagination Between Gifted and Non-Gifted High School Students as Ascertained by the Kinget Drawing-Completion Test" (unpublished Ph. D. dissertation, Graduate College, University of Oklahoma, 1964), pp. 103-117.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of the following presentation was to review theoretical and research approaches to the study of creativity and imagination that are pertinent to this investigation so as to highlight the issues and emphases reflected in the literature. The scope of this review was not intended as an exhaustive presentation of all theoretical statements and research reports concerned with creativity and imagination but rather as a limited review of the major theories, studies, and reports relevant to the purposes and variables of this investigation. Briefly, the following presentation explores theoretical considerations and approaches to the measurement of creativity and imagination with respect to chronological age, mental ability or I. Q., personality factors, and school marks or academic success.

Creativity and Chronological Age

The concept of continuity appears to be a crucial aspect of creative imagination and to have several implications for chronological age. The ability to think creatively has been regarded as a continuum, possessed in different degrees by all persons. Guilford[1] has indicated

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[1] J. P. Guilford, "Creativity," The American Psychologist, V (1950), p. 446.

this continuum to exist for all abilities while Wilson[2] proposed that originality, which he defined as the most essential element in creative thinking, should be regarded as a continuum that is measured by one's ability to produce ideas that are novel or statistically infrequent for the population of which the individual is a member. Applied to chronological age, this means that all children and adolescents are capable of some level of creative thinking. The degree to which one actually achieves creative thinking, however, will vary widely, depending somewhat upon other personal traits and acquired abilities.[3]

The research studies concerning the stages of creative development during the school years have yielded fairly consistent results even though a variety of measures have been used and a variety of samples studied. As early as 1900 Kirkpatrick[4], in studying elementary school years, reported that children in the first three grades were more imaginative than those in the fourth, fifth, and sixth grades and that an increase was evident again in the seventh and eight grades. This reported decrease in creativity and imagination noted at the fourth grade level has been supported by the work of Simpson[5] and by the

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[2] R. C. Wilson, "An Operational Definition of Originality," The American Psychologist, VI, No. 7 (1951), p. 297.

[3] David H. Russell, Children's Thinking (Boston: Ginn & Company, 1956), p. 307.

[4] E. A. Kirkpatrick, "Individual Tests of School Children," Psychological Review, V, No. 7 (1900), p. 274.

[5] R. M. Simpson, "Creative Imagination," American Journal of Psychology, XXXIII (1922), pp. 234-243.

investigations conducted by Torrance.[6]

As a result of his investigations in developing and using The Minnesota Tests of Creative Thinking, Torrance[7] reported that growth curves for creative development have been fairly well established for grades one through twelve. He found that the general pattern of the developmental growth curve was a steady increase from first through third grade, a sharp decrease between the third and fourth grades followed by some recovery during the fifth and sixth grades. Between the sixth and seventh grades another drop occurred followed by a steady increase in growth until near the end of the high school years when there was a leveling off or a slight decline.

Creativity and Mental Ability

Traditionally, creative acts have been tied to intelligence. The term "genius", which was developed to describe people who distinguished themselves because of creative productivity, has been adopted to describe an individual with exceptionally high I. Q. Current studies and literature emphasize the need for looking beyond the domain of intelligence for evidences of creativity.

In reviewing the literature, there has been more than one indication that creativity scores and I. Q. scores are essentially unrelated or at least are only lowly related. Some researchers have cited that the limitation of intelligence tests lies in their obvious emphasis on

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[6] E. Paul Torrance, Rewarding Creative Behavior (Englewood Cliffs, N. J. : Prentice-Hall, Inc., (1965), pp. 245-246.

[7] E. Paul Torrance, Guiding Creative Talent (Englewood Cliffs, N. J.: Prentice-Hall, Inc., (1962), pp. 93-98.

convergent, conforming thinking patterns, while others have based their criticisms upon the exclusive concern of intelligence tests on traditional academic value systems which have little to do with life; hence, the ability to memorize and to repeat arbitrary information is highly valued, and creativity, inventiveness, and originality are ignored.

As early as 1898, Dearborn[8] investigated the imaginative responses of Harvard students and faculty to a series of inkblots. Two of the poorest responders to the inkblots were students which he classified as the intellectual type. The investigator concluded with the suggestion that imagination and intelligence might not be as closely related as thought to be.

The concept that giftedness in intelligence and giftedness in creativity were not synonymous was supported in later years by such investigators as Chassell[9], Simpson[10], McCloy and Meier[11], and Barron.[12]

The impact of the conforming nature of traditional measures of intelligence were noted by Torrance[13] in studying children of West

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[8] G. V. Dearborn, "A Study of Imagination," American Journal of Psychology, V, No. 9 (1898), pp. 183-190.

[9] Laura M. Chassell, "Tests for Originality," Journal of Educational Psychology, VII (1916), pp. 317-328.

[10] R. M. Simpson, "Creative Imagination," American Journal of Psychology, XXXIII (1922), pp. 234-235.

[11] W. McCloy and N. C. Meier, "Re-Creative Imagination," Psychological Monograph, LI, No. 5 (1931), pp. 108-116.

[12] Frank Barron, "Originality in Relation to Personality and Intellect," Journal of Personality, XXV (1957), pp. 730-742.

[13] E. Paul Torrance, Guiding Creative Talent (Englewood Cliffs, N. J.: Prentice-Hall, Inc., (1962), p. 18.

Samoa through the Minnesota Tests of Creative Thinking. He found that children reared in this highly conforming culture rated high I. Q.'s as estimated by the Goodenough Draw-a-Person Test. Their drawings displayed high reproductive quality and outstanding technical skill. In discussing the results, the investigator concluded that the children's performance on the tests of creative thinking did not keep pace with the degree of intelligence exhibited in their drawings.

The relative independence of intelligence and creativity has been approached indirectly through some of the experimental science programs. Ornstein[14], in connection with an experimental physics program, noted that a substantial number of students who had scored only slightly better than average on the School and College Aptitude Test (SCAT) made gradually higher scores on the physics tests administered throughout the year. Some of these "average" students scored higher than many who were at the top of the SCAT and presumably were more gifted. Ornstein hypothesized that the students whose high SCAT scores did not correlate with their physics test scores were much better at memorizing facts and formulas than at the analytical, intuitive thinking the new approach required.

Using an I. Q. measure and five creativity measures, Getzels and Jackson [15] selected two experimental groups. One group was composed of children who placed in the top twenty per cent on the creativity

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[14] J. Ornstein, "New Recruits for Science," Parents' Magazine, XXXVI, No. 2 (February, 1961), pp. 42 ff.

[15] Jacob W. Getzels and Phillip W. Jackson, Creativity and Intelligence: Explorations with Gifted Students (New York: John Wiley and Sons, Inc., 1962), pp. 15-28.

measures when compared with the same-sexed age peers, but below the top twenty per cent in measured I. Q. The second group consisted of subjects who placed in the top twenty per cent in I. Q., but below the top twenty per cent on creativity measures. Despite having a mean I. Q. 23 points lower than the high I. Q. group, the achievement scores of the high creative group were equally as superior as the scores of the high I. Q. group to the achievement scores of the school population as a whole. Significantly, the mean I. Q. of the high creative group was lower than the mean I. Q. of the total school population.

Torrance[16] followed the same procedure of grouping in his eight partial replications as set up in the Getzels and Jackson study in that he selected groups who placed in the upper twenty per cent on either creativity or I. Q. measures, but not in the upper twenty per cent on the remaining measure. In six of the schools studied, he found that despite sizable differences in I. Q., the two groups were equally superior in achievement to the population from which they were drawn.

It has been suggested that restrictions in either intelligence or creativity in the samples studied, such as in the Getzels-Jackson study and in the Torrance investigations, have contributed to the inappropriate conclusions about the magnitude of the relationship between the two variables. MacKinnon, for one, has suggested that "...above a certain required minimum level of intelligence which ... in some instances may be surprisingly low, being more intelligent does not guarantee a corresponding increase in creativeness."[17] As

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[16] E. Paul Torrance, Guiding Creative Talent (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962), pp. 54-59.

[17] D. W. MacKinnon, "The Nurture of Creative Talent," The American Psychologist, XVII (1962), p. 488.

McClelland[18] has emphasized, the conclusion that intelligence is a threshold variable with respect to creative performance cannot be established by research on a group at one extreme of the distribution of intelligence or creativity.

In several investigations when sampling conditions have not been imposed, i.e., when there was a broad range of scores on both measures of intelligence and creativity, the two variables have appeared to be substantially related through by no means identical. The study by Richards, Cline, and Needham[19], for example, yielded a median correlation of 0.40 between five of Guilford's creativity tests and the California Test of Mental Maturity. In studying the same tests, Ripple and May [20] reported correlations ranging between 0.55 and 0.75 on a heterogeneous sample of high school students.

Meer and Stein[21], in their investigation of research chemists, reported a positive correlation between their measures of creativity and intelligence, but the correlation disappeared when education was held constant. They concluded that when education was controlled and

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[18] D. C. McClelland, "Issues in the Identification of Talent," Talent and Society, eds. D. C. McClelland, A. L. Baldwin, U. Bronfenfrenner, and F. L. Strodtbeck (Princeton, N. J.: D. Van Nostrand, 1958), p. 13.

[19] J. M. Richards, V. B. Cline, and W. E. Needham, "Creativity Tests and Teacher and Self Judgements of Originality," Journal of Experimental Education, XXXII (1964), pp. 281-285.

[20] R. E. Ripple and F. May, "Caution in Comparing Creativity and I.Q," Psychological Reports, X (1962), pp. 229-230.

[21] Bernard Meer and Morris I. Stein, "Measures of Intelligence and Creativity," The Journal of Psychology, XXXIX (1955), pp. 117-126.

opportunity held constant, I. Q. beyond the ninety-fifth percentile was not significant for creative work.

Creativity and Personality Factors

In an attempt to understand the creative processes, many investigators have studied the personality attributes of creative individuals while others have contrasted the personality attributes of those who scored high with those who scored low on one or more measures of creativity.

Barron[22] investigated the style of personality of a group of military officers consistently performing in an original way with that of less original officers. He reported a positive relationship between originality and scope-and-complexity as a person. Relationships also existed between originality and (1) impulsivity, (2) skepticism, (3) daring, and (4) expressive as opposed to suppressive dispositions in the personality.

In a later investigation with the same sample, Barron[23] utilized a staff of observers to rate the subjects on originality on the basis of their social interaction within the group. The subjects were also given a battery of eight tests designed to measure originality. The general results indicated originality to be related to (1) independence of judgment, (2) personal complexity, (3) preference for complexity

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[22] Frank Barron, "Some Relationships between Originality and Style of Personality," The American Psychologist, IX (1954), p. 326.

[23] Frank Barron, "The Disposition towards Originality," Journal of Abnormal and Social Psychology, LI (1955), pp. 478-485.

in phenomena, (4) self-assertion and dominance, and (5) rejection of suppression as a mechanism for the control of impulse.

Studying the relationship between aptitude and nonaptitude, Guilford[24] stated that the correlations were generally low. Subjects who scored higher on ideational fluency were found to be more impulsive, self-confident, ascendent, and more appreciative of originality. Subjects who scored higher on originality were more interested in esthetic expression, reflective and divergent thinking, more tolerant of ambiguity, and felt less need for orderliness.

Drevdahl[25] explored the relationships between ratings of creativity and certain objectively measured personality factors using a group of university advanced undergraduate and graduate students. The investigation revealed the creative persons to be superior to non-creative individuals in their verbal facility, fluency, flexibility, and in their originality. The creative individuals also appeared to be considerably more withdrawn and quiescent than non-creative persons. The author concluded that individuality and non-conformity appear to be desirable for creativity.

In an investigation of the finalists of the National Merit Scholarship Corporation program, Holland [26] reported some descriptive

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[24] J. P. Guilford, "Creative Abilities in the Arts," Psychological Review, LXIV (1957), pp. 110-118.

[25] John E. Drevdahl, "Factors of Importance for Creativity," Journal of Clinical Psychology, XII, No. 1 (1956), pp. 21-26.

[26] John L. Holland, "Creative and Academic Performance Among Talented Adolescents," Journal of Educational Psychology, LII, No. 3 (1961), pp. 136-147.

characteristics of the more creative individuals in this talented group of high school students. The creative individual was found to be independent, intellectual, expressive, asocial, consciously original, and open to experience.

In a study of adolescents in grades seven through twelve, Getzels and Jackson[27] reported that the highly creative group made significantly greater use of stimulus-free themes, unexpected endings, humor, and playfulness than did the high I. Q. group. On the basis of these findings, the investigators suggested that an 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 appeared to enjoy the risk and uncertainty of the unknown whereas the adolescent with the high I. Q. preferred the anxieties and delights of safety to the anxieties and delights of growth.

Creativity and Academic Success

Educational literature has consistently indicated that an individual tends to learn and develop along whatever lines he finds rewarding. If an environment is hostile or unfriendly to creative behavior, i.e., not rewarding, creative behavior patterns would not be

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[26] John L. Holland, "Creative and Academic Performance Among Talented Adolescents," Journal of Educational Psychology, LII, No. 3 (1961), pp. 136-147.

[27] Jacob W. Getzels and Phillip W. Jackson, Creativity and Intelligence: Explorations with Gifted Students (New York: John Wiley & Sons, Inc., 1962), pp. 22-33.

expected to flourish. The rewards in an educational environment are often the school marks that apparently indicate some degree or level of academic success.

The premium currently being placed upon good grades as the index of success or of potential ability has been attacked by many investigators. Mednick[28], for example, contended that current selection techniques for college admittance has resulted in the evolution of a race of "grade getters." This has resulted in some extremely desirable characteristics such as originality and independent thinking being bred out of the college population.

As a result of his research with the National Merit Scholarship finalists, Holland[29] reported that creative performance was generally unrelated to scholastic achievement and scholastic aptitude. The results of various correlational findings implied that academic achievement involved somewhat different motives than creative performance with the result that good grades in high school appeared to be a function of socialization, both citizenship and popularity, and of perseverance, whereas creative performance was a function of conscious concern with high accomplishment, independence, and originality. The investigator concluded with the observation that it was not surprising that the creative students appeared to come into conflict with

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[28] S. A. Mednick, "Development of Admission Criteria for College and Universities That Will Not Eliminate Such Applicants as the Bright and Non-conformist, the Under-challenged, and the Individual with Highly Specialized Ability," Current Issues in High Education (Washington, D. C.: National Education Association, 1961), pp. 86-88.

[29] John L. Holland, "Creative and Academic Performance Among Talented Adolescents," Journal of Educational Psychology, LII, No. 3 (1961), pp. 136-147.

teachers who demand conforming, controlled, nonexploratory behavior.

In an examination concerning the failure of educational institutions to find ways of rewarding divergent kinds of achievement, Drews[30] identified three types of gifted high school students: the studious, the social leaders, and the creative individuals. The poorest marks of the three types of students were made by the creative intellectuals, but in competitive examinations sampling a wide range of information, these same students performed better than the other two groups.

Getzels and Jackson[31] reported the equal achievement of the highly creative and highly intelligent high school students despite a twenty-three point difference in I. Q. For a clearer understanding of the behavior patterns of the two groups, the investigators asked each classroom teacher to rate all students in the school on the degree to which they enjoyed having them in class. The results on the ratings indicated that the high I. Q. group was more desirable as perceived by the teachers than the average student group; the highly creative group was not considered more desirable as pupils than the average student group. The authors summarized the results of the investigation by suggesting that it appears that ". . .teachers distinguish among high achievers, favoring one group of achievers over the population of

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[30] Elizabeth M. Drews, "A Critical Evaluation of Approaches to the Identification of Gifted Students, "Measurement and Evaluation in Today's Schools, ed. A. Traxler (Washington, D. C.: American Council of Education, 1961), pp. 47-51.

[31] Jacob W. Getzels and Phillip W. Jackson, Creativity and Intelligence: Explorations with Gifted Students (New York: John Wiley & Sons, Inc., 1962), pp. 30-33.

students but not another group. They favor high achievers who are high I. Q.'s, but not high achievers who are high creatives."[32]

Holland[33] investigated the limitations of teachers' ratings in predicting creativity. The general results of this study indicated the teachers give lower ratings to students with more potential for creativity than to students with less potential. The author suggested that this is another indication that school personnel value the good "grade-getter" more than the creative student.

Studies by Holland[34] and by Gough[35] have suggested that the student who gets good grades in high school can be described as bright, persistent, conforming, self-controlled, responsible, serious, and rated high by teachers. In addition, reports by Holland[36] and MacKinnon[37] have implied that good grades in high school and college may be either unrelated to, or negatively correlated with, potential for creative performance.

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[32] Ibid., p. 31.

[33] John L. Holland, "Some Limitations of Teacher Ratings as Predictors of Creativity," Journal of Educational Psychology, L (1959), pp. 219-223.

[34] Ibid., pp. 219-223.

[35] H. G. Gough, "What Determines the Academic Achievement of High School Students?" Journal of Educational Psychology, XLVI (1953), pp. 321-331.

[36] John L. Holland, "The Prediction of College Grades from Personality and Aptitude Variables," Journal of Educational Psychology, LI (1960), pp. 245-254.

[37] D. W. MacKinnon, "What Do We Mean by Talent and How Do We Test for It?" The Search for Talent (New York: College Entrance Examination Board, 1960), pp. 20-29.

With a traditional value system apparently rewarding conforming behavior patterns, Patrick theorized that " . . . the chief defect of much of our educational system today is that more emphasis is placed on the establishment of behavior norms than on the production of original work. In fact, many teachers confess that their chief aim is to have the pupils return the information which they give. Teachers may even be annoyed when a pupil presents an original answer which differs from what is expected, because it does not fit in with the rest of their scoring scheme for grades."[38]

Studies concerned with the results of rewarding creative performances have been attempted by several investigators. The following research study is an example of the work beginning in this field of endeavor focused on creativity and its manifestations.

In a research project with sixth grade children, Torrance[39] hypothesized that rewarding creative thinking would improve the quality of creative thinking. With a random sample of children, the investigator discovered that the primary reward for originality apparently resulted in a high level of originality and interest and that the primary reward for correctness, identified as more conforming behavior, resulted in fewer errors and a higher proficiencey index of errors. In another sampling of sixth grade children, the author considered the influence of differential rewards on the originality of gifted or high achieving

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[38] Catherine Patrick, What is Creative Thinking? (New York: Philosophical Library, Inc., 1955), p. 185.

[39] E. Paul Torrance, Rewarding Creative Behavior (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1965), pp. 131-140.

children. The results indicated that differential instructions with the accompanying differential rewards influenced significantly the originality of the thinking of the gifted children with relatively little difference in fluency and no difference in flexibility. The subjects rewarded for originality of thinking produced about twice as many original responses as did their peers who were rewarded for sheer number of responses. On the basis of these data, the investigator concluded that giving instructions in terms of rewards for correctness or for quantity with secondary attention to originality appeared to work against the production of original ideas.

CHAPTER III

PRESENTATION OF DATA AND DISCUSSION OF RESULTS

Treatment of Data

The major purpose of this investigation was to isolate some determiners of school course marks in an effort to evaluate relative curricular effectiveness in developing individual imagination and creativity. Null hypotheses were formulated for the variables under consideration. For sample description, the means and standard deviations were computed for all variables included in this study.

Raw scores were used for all computations with the exception of the ten personality variables as measured by The Guilford-Zimmerman Temperament Survey. For these ten variables the obtained raw scores were converted to T scores based upon national norms as reported in Chapter I. Computations of the means, standard deviations, Chi-square tests of independence, and coefficients of correlation were done using IBM 1410 Data Processing Systems.

The administration of The Kinget Drawing-Completion Test produced three imagination scores for each subject, the Total Imagination score derived from the sum of the individual's scores on Creative Imagination and on Combinative Imagination. For each of these three imagination variables, Chi-square tests of independence were employed in order to

determine independency with each of the sixteen variables under investigation. Briefly, the sixteen variables were chronological age, mental ability, ten personality scores, and four grade point averages.

Having hypothesized that imagination was statistically independent of each of the test variables, the Chi-square statistic was used for the treatment of the data. The Chi-square test represents a useful method for comparing experimentally obtained results with those predicted expected theoretically by the hypothesis. Significance occurs when the discrepancy between an obtained frequency and an expected frequency is greater than chance expectation. The formula used was

$$\chi^2 = \sum \left[\frac{(f_o - f_e)^2}{f_e} \right]$$

where f_o = observed frequency of occurrence,

f_e = expected frequency of occurrence.

The expected frequency was computed using marginal probabilities.

It was necessary to interpret the obtained Chi-square value in each instance. Generally, the smaller the Chi-square value, the more closely the observed results approximated the expected thus allowing the acceptance of the null hypothesis of independency or to retain it with some doubt. If the Chi-square value was sufficiently large the null hypothesis was rejected with moderate or with positive assurance. This interpretive procedure was conducted by comparing the obtained Chi-square values with a table of percentile values of the Chi-square distribution for the appropriate degrees of freedom. Where dependency was found, the variables were examined further in an attempt to determine if the dependency was due to differences in sex, in grade classification, or in interactions between sex and grade classification.

When a null hypothesis of independence between two variables was rejected, the Pearson product-moment coefficient of correlation was used to reveal the magnitude and vector of the relationship between the variables concerned. The formula used for the computation of each coefficient of correlation was

$$r_{xy} = \frac{n\Sigma XY - \left[(\Sigma X) \cdot (\Sigma Y)\right]}{\sqrt{\left[n\Sigma X^2 - (\Sigma X)^2\right]\left[n\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

The level of significance of each obtained coefficient of correlation was determined by use of the Student's t statistic:

$$t = r_{xy}^2 \cdot \sqrt{\frac{(n - 2)}{(1 - r_{xy}^2)}}$$

with d. f. = n - 2.

Discussion of Results

The following presentation is a discussion of the results of the statistical treatment of the data concerning the evaluation of the hypotheses regarding the statistical independence between each of the imagination variables and the factors (1) chronological age, (2) mental ability, (3) personality characteristics, (4) grade average in each of the three selected curricular areas, and (5) total grade point average. To reject a null hypothesis the resulting Chi-square test had to be significant at the 0.05 level of significance for all variables under study. If the obtained Chi-square test was not significant at the 0.05 level of significance, the hypothesis under test was accepted.

Imagination Variables

All subjects in the sample responded to the eight graphic stimuli of The Kinget Drawing-Completion Test in order to assess the personality schema of imagination. The scoring of the responses to these stimuli resulted in three imagination scores, Total Imagination, Combinative Imagination, and Creative Imagination, for each subject. The means and standard deviations were computed for each of the imagination variables by sex distribution for each grade classification and for the total sample. The results of these computations for Total Imagination are found in Table III; the same information for Combinative Imagination is reported in Table IV. The means and standard deviations for the various groupings for Creative Imagination are presented in Table V.

TABLE III

MEANS AND STANDARD DEVIATIONS FOR TOTAL IMAGINATION BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Total Imagination					
	Mean			S.D.		
	M	F	Both Sexes	M	F	Both Sexes
Sophomore	40.30	39.92	40.16	22.65	21.09	21.97
Junior	57.31	63.04	60.49	44.73	37.25	40.58
Senior	46.58	60.76	53.67	23.79	33.19	29.56
All Grades	46.46	54.94	50.44	30.80	33.00	32.07

TABLE IV

MEANS AND STANDARD DEVIATIONS FOR COMBINATIVE IMAGINATION BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	Combinative Imagination					
	Mean			S.D.		
	M	F	Both Sexes	M	F	Both Sexes
Sophomore	21.84	23.80	22.58	12.62	13.56	12.95
Junior	30.33	36.60	33.82	20.23	21.21	20.89
Senior	26.24	25.13	30.68	13.02	18.48	16.50
All Grades	25.27	32.05	28.45	15.37	18.93	17.43

TABLE V

MEANS AND STANDARD DEVIATIONS FOR CREATIVE IMAGINATION BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	Creative Imagination					
	Mean			S.D.		
	M	F	Both Sexes	M	F	Both Sexes
Sophomore	18.45	16.13	17.57	11.06	9.07	10.37
Junior	26.97	26.44	26.68	25.42	17.19	21.10
Senior	20.60	25.63	23.12	11.90	15.89	14.17
All Grades	21.27	22.89	22.03	16.49	15.24	15.91

The sample mean on the variable, Total Imagination, was 50.44 with a standard deviation of 32.07. The mean sample for Combinative Imagination was

28.45, with a standard deviation of 17.43. The data on Creative Imagination yielded a mean of 22.03 for the total sample with a standard deviation of 15.91. The ranges in scores for each of the imagination variables were 10 to 251 for Total Imagination, 6 to 104 for Combinative Imagination, and 0 to 147 for Creative Imagination.

Imagination and Chronological Age

The chronological age for each subject at the time of the administration of the tests was obtained by checking the cumulative record files in order to ascertain the date of birth. For all computations, chronological age was expressed in months. Means and standard deviations for chronological age by sex distribution for each grade classification and for the total sample can be found in Table VI.

TABLE VI

MEANS AND STANDARD DEVIATIONS FOR CHRONOLOGICAL AGE IN MONTHS BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Age in Months					
	Mean			S.D.		
	M	F	Both Sexes	M	F	Both Sexes
Sophomore	192.14	189.51	191.15	7.96	5.99	7.36
Junior	203.92	201.84	202.76	9.71	6.95	8.30
Senior	212.47	211.00	211.74	5.93	5.68	5.82
All Grades	200.81	200.75	200.78	11.75	10.62	11.22

The mean chronological age of the total sample was sixteen years, eight months with a range in chronological age from fourteen years, seven months to

nineteen years, zero months. Observed differences were noted in the means and standard deviations for the two sexes for the separate grade classifications, thus leading to the question of possible dependence between imagination and chronological age.

Chi-square tests were used to test the independency of each of the three imagination variables with respect to chronological age. The obtained Chi-square values for the three imagination variables and chronological age are reported in Table VII.

TABLE VII

CHI-SQUARE VALUES FOR IMAGINATION AND CHRONOLOGICAL AGE FOR THE TOTAL SAMPLE
(n = 260)

Imagination Variables	χ^2 Values		
	d.f.	χ^2	p
Total Imagination	42	38.493	>0.05
Combinative Imagination	72	63.287	>0.05
Creative Imagination	42	28.177	>0.05

The treatment of the data regarding the null hypothesis of independency between imagination and chronological age yielded no Chi-square values significant at the 0.05 level. On the basis of this data, the chronological age of a senior high school student did not appear to be relevant to scoring level on the imagination variables as measured by The Kinget Drawing-Completion Test.

Imagination and Mental Ability

The assessment of mental ability by The Otis Quick Scoring Mental Ability Test yielded an I. Q. score for each subject. The means and standard deviations for I. Q. scores by sex distribution for each grade classification and for the total sample are presented in Table VIII.

TABLE VIII

MEANS AND STANDARD DEVIATIONS ON I. Q. SCORES BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR TOTAL SAMPLE
(n = 260)

Grade Classification	I. Q. Scores					
	Mean			S.D.		
	M	F	Both Sexes	M	F	Both Sexes
Sophomore	109.09	105.00	107.54	26.30	23.65	25.29
Junior	107.69	113.58	110.96	23.94	20.68	22.24
Senior	111.63	116.00	113.82	20.56	16.06	18.48
All Grades	109.43	111.59	110.44	24.10	20.78	22.58

For all subjects in the sample, the mean I. Q. score was 110.44, with a range in I. Q. scores from 61 to 147, the standard deviation was 22.58. Observed differences were noted in the means and standard deviations on I. Q. scores for the two sexes for the separate grade classifications, thus questioning the possibility of dependency between imagination and mental ability.

Chi-square tests were used to test the independency of each of the imagination variables and mental ability. The obtained Chi-square values

for the three imagination variables with respect to mental ability are reported in Table IX.

TABLE IX

CHI-SQUARE VALUES FOR IMAGINATION AND MENTAL ABILITY FOR THE TOTAL SAMPLE
(n = 260)

Imagination Variables	χ^2 Values		
	d.f.	χ^2	p
Total Imagination	48	100.501	0.0005
Combinative Imagination	72	119.273	0.0005
Creative Imagination	48	67.673	0.05

The treatment of the data regarding the null hypothesis of independency between imagination and mental ability yielded Chi-square values which were significant at the 0.05 level of significance.

Since dependency occurred between each of the three imagination variables and mental ability, the data were examined further in an attempt to determine if the dependency was due to differences in sex, in grade classification, or in interactions between sex and grade classification. Chi-square tests were used to test the independency of imagination and mental ability for each of the groupings by sex and by grade classification. The obtained Chi-square values for Total Imagination and mental ability can be found in Table X; the same information for Combinative Imagination and mental ability are reported in Table XI. Chi-square values for Creative Imagination and mental ability are presented in Table XII.

TABLE X

CHI-SQUARE VALUES FOR TOTAL IMAGINATION AND MENTAL ABILITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	32	24.557	15	16.654	32	35.818
Junior	28	24.364	30	51.314*	48	58.879
Senior	15	9.932	25	19.855	30	30.623
All Grades	56	42.931	48	83.637**	48	100.501***

* Significant at 0.01 level
** Significant at 0.005 level
*** Significant at 0.0005 level

On examination of Tables X, XI, and XII, hypotheses of independency between each of the three imagination variables and mental ability were rejected for the total number of females in the sample. In addition, the data on females classified as juniors indicated rejection of the hypotheses of independency between Creative Imagination and mental ability at the 0.01 level of significance.

Coefficients of correlation were computed to obtain the magnitude and vector of the relationship between each of the three imagination variables and mental ability. The obtained coefficients of correlation are reported in Table XIII. In each case the results of these computations yielded significant positive relationships between mental ability and the three imagination variables at the 0.005 level of significance.

TABLE XI

CHI-SQUARE VALUES FOR COMBINATIVE IMAGINATION AND MENTAL ABILITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	40	34.437	25	21.132	40	42.862
Junior	42	34.071	42	49.259	56	70.652
Senior	25	33.695	40	38.294	40	53.944
All Grades	56	60.625	64	91.335*	72	119.273**

* Significant at 0.025 level
** Significant at 0.0005 level

TABLE XII

CHI-SQUARE VALUES FOR CREATIVE IMAGINATION AND MENTAL ABILITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	24	17.527	10	13.041	24	26.388
Junior	24	11.045	28	49.178**	40	51.360
Senior	15	12.306	35	15.042	42	20.548
All Grades	24	24.997	40	70.870***	48	67.673*

* Significant at 0.05 level
** Significant at 0.01 level
*** Significant at 0.005 level

TABLE XIII

COEFFICIENTS OF CORRELATION BETWEEN THE THREE IMAGINATION VARIABLES AND MENTAL ABILITY FOR THE TOTAL SAMPLE (n = 260)

Imagination Variables	Coefficients of Correlation		
	d.f.	r	p
Total Imagination	258	0.3426	0.005
Combinative Imagination	258	0.3526	0.005
Creative Imagination	258	0.3053	0.005

Imagination and Personality

Personality characteristics, assessed by The Guilford-Zimmerman Temperament Survey, yielded ten personality scores for each subject: G (General Activity), R (Restraint), A (Ascendance), S (Social Interest), E (Emotional Stability), O (Objectivity), F (Friendliness), T (Thoughtfulness), P (Personal Relations), and M (Masculinity). The raw scores for each of the personality variables were converted to T scores based upon national norms for treatment of the data. The means for the personality variables are presented in Table XIV. Standard deviations for the same data are reported in Table XV.

Chi-square tests were used to test the independence of each of the imagination variables with respect to each of the personality characteristics. The obtained Chi-square values for the three imagination variables and the personality variables are reported in Table XVI.

TABLE XIV

MEANS FOR THE TEN PERSONALITY VARIABLES OF THE GUILFORD-ZIMMERMAN TEMPERAMENT SURVEY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Personality Variables	Sophomore		Junior		Senior		All Grades		
	M	F	M	F	M	F	M	F	Both Sexes
G	46.92	50.69	45.67	46.13	47.00	47.13	46.62	47.90	47.22
R	43.61	44.74	41.86	44.80	43.90	46.37	43.23	45.27	44.19
A	47.86	45.92	45.06	47.89	46.05	44.95	46.63	46.34	46.50
S	46.50	49.95	45.47	48.36	43.90	47.45	45.51	48.58	46.95
E	45.00	41.67	44.92	41.36	45.79	42.95	45.20	41.95	43.67
O	43.92	41.33	42.06	42.11	42.84	41.95	43.14	41.81	42.52
F	45.39	43.59	44.64	43.40	45.71	47.42	45.28	44.71	45.02
T	48.67	52.92	47.33	48.56	48.29	47.84	48.22	49.73	48.93
P	43.28	43.74	40.97	43.09	42.13	44.97	42.36	43.88	43.08
M	48.03	56.08	46.14	50.31	47.13	52.87	47.29	52.95	49.95

TABLE XV

STANDARD DEVIATIONS FOR THE TEN PERSONALITY VARIABLES OF THE GUILFORD-ZIMMERMAN TEMPERAMENT SURVEY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Personality Variables	Sophomore		Junior		Senior		All Grades		
	M	F	M	F	M	F	M	F	Both Sexes
G	10.25	9.43	10.83	10.26	9.97	11.45	10.27	10.49	10.38
R	9.26	7.26	9.13	9.64	8.31	9.42	8.95	8.83	8.94
A	9.07	7.99	9.05	9.41	8.46	8.91	8.92	8.84	8.87
S	8.76	7.46	9.47	9.63	7.87	9.83	8.72	9.04	8.99
E	7.60	6.19	8.45	8.19	6.48	8.89	7.50	7.82	7.81
O	9.08	6.72	9.99	8.91	7.44	9.04	8.89	8.25	8.60
F	7.62	6.99	8.31	9.45	9.98	9.79	8.45	8.97	8.69
T	8.89	12.25	10.52	9.91	9.05	11.92	9.33	11.45	10.39
P	8.93	7.62	9.24	10.37	9.16	11.15	9.06	9.80	9.42
M	9.08	10.93	9.06	12.39	9.20	11.76	9.07	11.89	10.84

TABLE XVI

CHI-SQUARE VALUES FOR IMAGINATION AND PERSONALITY CHARACTERISTICS FOR THE TOTAL SAMPLE (n = 260)

Personality Variables	χ^2								
	Total Imagination			Combinative Imagination			Creative Imagination		
	d.f.	χ^2	p	d.f.	χ^2	p	d.f.	χ^2	p
G	35	27.882	>0.05	45	29.004	>0.05	30	19.309	>0.05
R	35	27.968	>0.05	45	40.844	>0.05	30	30.113	>0.05
A	35	145.206	0.0005	45	61.833	0.05	30	88.914	0.0005
S	28	60.630	0.0005	36	52.216	0.05	24	48.153	0.0005
E	30	280.703	0.0005	45	243.594	0.0005	30	269.078	0.0005
O	30	93.815	0.0005	45	119.139	0.0005	30	88.169	0.0005
F	35	26.085	>0.05	45	33.158	>0.05	30	19.091	>0.05
T	35	26.834	>0.05	45	42.295	>0.05	30	25.805	>0.05
P	35	101.630	0.0005	45	153.927	0.0005	30	93.543	0.0005
M	35	22.706	>0.05	45	32.505	>0.05	30	17.214	>0.05

The treatment of the data regarding the null hypothesis of independency between imagination and personality characteristics yielded Chi-square values which were significant at the 0.05 level of significance for the following five personality variables: A (Ascendance), S (Social Interest), E (Emotional Stability), O (Objectivity), and P (Personal Relations). The null hypothesis of statistical independence between imagination and personality characteristics was rejected for each of these five personality variables. The personality characteristics of G (General Activity), R (Restraint), F (Friendliness), T (Thoughtfulness), and M (Masculinity), however, were not found to yield Chi-square values of significance with respect to independency of imagination. The null hypothesis, therefore, of statistical independence between imagination and personality characteristics was not rejected for these latter five personality variables.

An examination of Table XVI indicates that dependency occurred between each of the three imagination variables as ascertained by The Kinget Drawing-Completion Test and the five personality variables of Ascendance, Social Interest, Emotional Stability, Objectivity, and Personal Relations as measured by The Guilford-Zimmerman Temperament Survey. These data, therefore, were examined further in an attempt to determine if the dependency was due to differences in sex, in grade classification, or in interactions between sex and grade classification. Chi-square tests were used to test the independency of imagination and these five personality variables for each of the groupings by sex and by grade classification. The obtained Chi-square values for Total Imagination and Ascendance are reported in Table XVII.

The obtained Chi-square values for testing the independency of

TABLE XVII

CHI-SQUARE VALUES FOR TOTAL IMAGINATION AND ASCENDANCE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	12	15.120	9	12.719	12	8.351
Junior	15	16.768	20	39.754*	28	61.511**
Senior	9	12.663	20	9.853	20	16.090
All Grades	28	19.364	30	85.476**	35	145.206**

* Significant at 0.01 level
** Significant at 0.0005 level

Total Imagination and Ascendance for the various groupings by sex distribution and by grade classification indicated that a factor in the dependency found between these two variables was the performances of the female students classified as juniors. For this group of subjects, the obtained Chi-square value was significant at the 0.01 level of significance. This statistically significant value appears to have contributed to the 0.0005 level of significance obtained for the junior subjects of both sexes, to the 0.0005 level of significance found for all female subjects, and to the 0.0005 level of significance obtained for the total sample.

In order to determine if this same pattern occurred in the sub-component variables of Combinative Imagination and Creative Imagination, Chi-square tests of independence were employed to test the independency of Combinative Imagination and Ascendance and the independency of Creative Imagination and

TABLE XVIII

CHI-SQUARE VALUES FOR COMBINATIVE IMAGINATION AND ASCENDANCE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	15	8.656	15	16.195	15	13.160
Junior	18	25.555	28	31.927	32	38.994
Senior	15	19.442	32	20.266	32	23.508
All Grades	28	26.137	40	45.133	45	61.833*

* Significant at 0.05 level

Ascendance for each of the groupings by sex and by grade classification. The Chi-square values for Combinative Imagination and Ascendance are presented in Table XVIII; Table XIX reports the obtained Chi-square values for Creative Imagination and Ascendance.

The obtained Chi-square values, as reported in Table XVIII for ascertaining independence of Combinative Imagination and the personality trait of Ascendance, revealed no significant values for the various groupings by grade levels or by sex distribution. The data for the total sample, however, produced a significant Chi-square value at the 0.05 level of significance. These data indicated that there was statistical dependence between Combinative Imagination and Ascendance but that none of the groupings by grade classification and/or by sex distribution were statistically significant contributors.

The obtained Chi-square values in testing the independency of

TABLE XIX

CHI-SQUARE VALUES FOR CREATIVE IMAGINATION AND ASCENDANCE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	9	7.009	6	9.102	9	10.820
Junior	18	18.018	16	32.288*	24	52.802**
Senior	9	10.146	20	12.457	20	16.779
All Grades	18	15.178	25	59.903***	30	88.914***

* Significant at 0.01 level
** Significant at 0.001 level
*** Significant at 0.0005 level

Creative Imagination and Ascendance (see Table XIX) revealed significant values for the subjects classified as juniors at the 0.001 level of significance, for the female subjects at the 0.0005 level of significance, and for the total sample at the 0.0005 level of significance. An additional Chi-square value of significance was obtained for the female subjects classified as juniors at the 0.01 level of significance. The statistical dependency found between Creative Imagination and Ascendance, therefore, appears to have occurred again mainly in the junior female subjects. This particular group appeared to be contributing to the significant Chi-square values obtained for the junior subjects of both sexes, for the female subjects in the sample, and for the total sample grouping.

From the results of these Chi-square tests of independence between each of the three imagination variables and the personality variable of

Ascendance, it was possible to conclude that the dependence that occurred was due to differences in sex and in grade classification. The dependdency appeared to have arisen from the performances of the female subjects classified as juniors. It was not possible on the basis of the available data to account for these differences occurring in sex and grade classification.

Since the hypothesis of statistical independence between Creative Imagination and Ascendance was rejected more postively than was the hypothesis of independence between Combinative Imagination and Ascendance, these variables were examined further in an attempt to understand the apparent differences.

The variable Ascendance, as measured by The Guilford-Zimmerman Temperament Survey, describes a personality trait of social boldness, the need for which varies according to personalities. Those individuals scoring low on this variable can be described as submissive. Assuming a submissive role is similar to a conforming type of behavior such as submissiveness to authoritarian rule or the acceptance of authority without question. Ascendance, then, may denote a certain amount of non-conformistic behavior and, as such, is consistent with what is known about creative behavior. One would expect, therefore, the level of creative and imaginative behavior to be closely associated with performance on the personality trait of Ascendance.

Coefficients of correlation were computed to obtain the strength and direction of the relationship between each of the three imagination variables and Ascendance. The obtained coefficients of correlation are reported in Table XX. The results of these computations did not yield any significant relationships between Ascendance and each of the

TABLE XX

COEFFICIENTS OF CORRELATION BETWEEN THE THREE IMAGINATION VARIABLES AND ASCENDANCE FOR THE TOTAL SAMPLE
(n = 260)

Imagination Variables	Coefficients of Correlation		
	d.f.	r	p
Total Imagination	258	0.0619	>0.05
Combinative Imagination	258	0.0660	>0.05
Creative Imagination	258	0.0521	>0.05

imagination variables. This lack of significant correlations indicates that a within-person relationship was non-existent. The significant Chi-square values denoted dependency when the scores were grouped by level categories.

The obtained Chi-square values for Total Imagination and the personality variable of Social Interest by sex distribution for each grade classification are reported in Table XXI; the values for Combinative Imagination and Social Interest are presented in Table XXII; the same information for Creative Imagination and Social Interest can be found in Table XXIII.

The null hypothesis of statistical independence between Total Imagination and Social Interest was rejected for male subjects classified as seniors, for the junior group of subjects of both sexes, and for the total sample. The data on Combinative Imagination and Social Interest yielded significant Chi-square values for all the male subjects

TABLE XXI

CHI-SQUARE VALUES FOR TOTAL IMAGINATION AND SOCIAL INTEREST BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomores	16	19.517	9	7.950	16	19.529
Junior	20	15.777	20	25.656	28	45.980*
Senior	9	14.031	15	15.496	15	22.151
All Grades	32	29.302	24	45.889**	28	60.630***

* Significant at 0.025 level
** Significant at 0.005 level
*** Significant at 0.0005 level

TABLE XXII

CHI-SQUARE VALUES FOR COMBINATIVE IMAGINATION AND SOCIABILITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	20	28.734	15	15.084	20	25.802
Junior	18	23.952	28	23.943	32	38.875
Senior	15	19.149	24	26.820	24	36.612*
All Grades	28	43.965*	32	37.088	36	52.216*

* Significant at 0.05 level

TABLE XXIII

CHI-SQUARE VALUES FOR CREATIVE IMAGINATION AND SOCIABILITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	12	11.224	6	8.716	12	14.332
Junior	16	12.886	16	15.589	24	30.773
Senior	9	18.978*	15	13.642	15	27.686**
All Grades	20	32.010	20	29.537	24	48.153***

* Significant at 0.05 level
** Significant at 0.025 level
*** Significant at 0.005 level

in the study, for the group of subjects classified as seniors, and for the total sample. The null hypothesis of statistical independence between Creative Imagination and Social Interest was rejected for the senior male subjects, for the group of subjects classified as seniors, and for the total sample. The results of these Chi-square tests of independence between each of the imagination variables and the personality variable of Social Interest indicated that the dependence occurring between these two variables was due to differences in sex and grade classification, but no one group was an obvious contributor throughout. This lack of pattern in discerning where the differences arose suggests that the statistical dependence between each of the imagination variables and Social Interest was present in the total sample regardless of grouping factors.

The rejection of statistical independence between Creative Imagination

and Social Interest was made with more positive assurance than was the rejection of Independence between Combinative Imagination and Social Interest. Any attempt to understand this difference in strength of rejection necessitates an examination of the Social Interest variable as measured by The Guilford-Zimmerman Temperament Survey.

The characteristic of Social Interest describes a trait of sociability or a gregarious personality. A low score on the Social Interest variable mainfests traits of shyness or seclusiveness. In this sample of high school students, creative behavior appeared to be associated with traits of an outgoing nature rather than with a withdrawn or reserved personality pattern. An outgoing personality suggests a certain degree of freedom from restraint and a self-confidence which appeared to be relevant to creative imagination.

Coefficients of correlation were computed to obtain the magnitude and direction of the relationship between each of the three imagination variables and the personality variable of Social Interest. The obtained coefficients of correlation are reported in Table XXIV. The results of these computations failed to produce any significant relationships between Social Interest and any of the imagination variables. The lack of significant correlations, however, merely denotes the absence of a within-person relationship. The statistical dependence between each of the imagination variables and Social Interest indicates dependency occurred when the scores were grouped by level categories.

Since the null hypothesis of statistical independence between imagination and Emotional Stability was rejected, these variables were examined in an attempt to determine any differences in sex distribution and grade classification. Accordingly, Chi-square tests were used to

TABLE XXIV

COEFFICIENTS OF CORRELATION BETWEEN THE THREE IMAGINATION VARIABLES AND SOCIAL INTEREST FOR THE TOTAL SAMPLE (n = 260)

Imagination Variable	Coefficients of Correlation		
	d.f.	r.	p
Total Imagination	258	0.0542	>0.05
Combinative Imagination	258	0.0750	>0.05
Creative Imagination	258	0.0246	>0.05

test the independence between each of the imagination variables and the personality variable of Emotional Stability. The obtained Chi-square values for Total Imagination and Emotional Stability for the various groupings are reported in Table XXV; the same information for Combinative Imagination and Emotional Stability is presented in Table XXVI. Table XXVII reports the obtained Chi-square values for Creative Imagination and Emotional Stability.

On examination of Tables XXV, XXVI, and XXVII, hypotheses of independence between each of the three imagination variables and Emotional Stability were rejected for the total number of males in the sample, for the total number of females in the sample, for the total group of subjects classified as seniors, for the total group of subjects classified as juniors, and for the female subjects classified as seniors. In addition, the data on male subjects classified as juniors indicated rejection of the hypotheses of independence between Total Imagination and

TABLE XXV

CHI-SQUARE VALUES FOR TOTAL IMAGINATION AND EMOTIONAL STABILITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	12	6.138	6	2.090	12	6.902
Junior	20	40.984*	15	17.495	35	98.551**
Senior	9	11.415	20	50.848**	25	86.918**
All Grades	24	146.446**	30	141.307**	30	280.703**

* Significant at 0.005 level
** Significant at 0.0005 level

TABLE XXVI

CHI-SQUARE VALUES FOR COMBINATIVE IMAGINATION AND EMOTIONAL STABILITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	15	15.496	10	14.558	15	11.640
Junior	24	29.810	21	33.600*	40	83.568***
Senior	15	22.433	32	63.776**	40	106.042***
All Grades	28	80.458***	40	161.081***	45	243.594***

* Significant at 0.05 level
** Significant at 0.001 level
*** Significant at 0.0005 level

TABLE XXV

CHI-SQUARE VALUES FOR TOTAL IMAGINATION AND EMOTIONAL STABILITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	12	6.138	6	2.090	12	6.902
Junior	20	40.984*	15	17.495	35	98.551**
Senior	9	11.415	20	50.848**	25	86.918**
All Grades	24	146.446**	30	141.307**	30	280.703**

* Significant at 0.005 level
** Significant at 0.0005 level

TABLE XXVI

CHI-SQUARE VALUES FOR COMBINATIVE IMAGINATION AND EMOTIONAL STABILITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	15	15.496	10	14.558	15	11.640
Junior	24	29.810	21	33.600*	40	83.568***
Senior	15	22.433	32	63.776**	40	106.042***
All Grades	28	80.458***	40	161.081***	45	243.594***

* Significant at 0.05 level
** Significant at 0.001 level
*** Significant at 0.0005 level

TABLE XXVII

CHI-SQUARE VALUES FOR CREATIVE IMAGINATION AND EMOTIONAL STABILITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	9	11.319	4	2.070	9	12.642
Junior	16	40.404**	12	9.883	30	93.710***
Senior	9	6.151	25	45.027*	25	87.680***
All Grades	25	144.287***	25	127.680***	30	269.078***

* Significant at 0.01 level
** Significant at 0.001 level
*** Significant at 0.0005 level

Emotional Stability and between Creative Imagination and Emotional Stability. For the junior female subjects, the obtained Chi-square value for Combinative Imagination and Emotional Stability was significant at the .05 level of significance. It appeared, therefore, that contributing to the rejection of the hypotheses of independence between each of the three imagination variables and Emotional Stability were the performances on these variables by several of the groupings by sex distribution for the separate grade classifications. It was interesting to note that the data for the sophomore group did not yield any Chi-square values of significance in the tests of independence between each of the imagination variables and Emotional Stability.

Since the null hypotheses of independence were rejected for each of the imagination variables and Emotional Stability at the same level of significance in each case, the variable of Emotional Stability was considered

further in an attempt to understand this trait.

The assessment of Emotional Stability by The Guilford-Zimmerman Temperament Survey is associated with personality traits of self-confidence, cheerfulness, a certain degree of stability of moods, and an optimistic nature. The contrasting personality traits are described as depression, emotional instability, moody, and pessimistic. It appears that one's imaginative behavior is relatively dependent upon emotional stability factors.

Coefficients of correlation were computed to obtain the mangitude and direction of the relationships between each of the three imagination variables and Emotional Stability. The obtained coefficients of correlation are reported in Table XXVIII. The results of these computations yielded significant positive relationships between Total Imagination and Emotional Stability at the 0.05 level of significance and between Creative Imagination and Emotional Stability at the 0.01 level of significance. The lack of significant correlation between Combinative Imagination and Emotional Stability indicates that a within-person relationship was non-existent in this case; the dependence occurred when the scores were grouped by level categories.

The three imagination variables and the variable Objectivity were examined further, using Chi-square tests of independence, in an attempt to determine if the occurred dependence in each case was due to differences in sex distribution by the separate grade classifications. The obtained Chi-square values for testing the independence between Total Imagination and Objectivity by sex distribution and by grade classification for the total sample are presented in Table XXIX. The data for Combinative Imagination and Objectivity are reported in Table XXX and for Creative

TABLE XXVIII

COEFFICIENTS OF CORRELATIONS BETWEEN THE THREE IMAGINATION VARIABLES AND EMOTIONAL STABILITY FOR THE TOTAL SAMPLE
(n = 260)

Imagination Variables	Coefficients of Correlation		
	d.f.	r	p
Total Imagination	258	0.1130	0.05
Combinative Imagination	258	0.0696	>0.05
Creative Imagination	258	0.1510	0.01

TABLE XXIX

CHI-SQUARE VALUES FOR TOTAL IMAGINATION AND OBJECTIVITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	20	10.538	6	3.929	20	9.959
Junior	25	46.338*	20	20.488	35	102.638**
Senior	9	6.830	15	57.256**	20	65.890**
All Grades	30	79.805**	24	57.987**	30	93.815**

* Significant at 0.01 level
** Significant at 0.0005 level

TABLE XXX

CHI-SQUARE VALUES FOR COMBINATIVE IMAGINATION AND OBJECTIVITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	25	20.581	10	10.322	25	23.438
Junior	30	33.196	28	27.269	40	63.188*
Senior	15	11.781	24	78.492***	32	76.295***
All Grades	35	57.373**	32	71.144***	45	119.139***

* Significant at 0.025 level
** Significant at 0.01 level
*** Significant at 0.0005 level

TABLE XXXI

CHI-SQUARE VALUES FOR CREATIVE IMAGINATION AND OBJECTIVITY BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	15	6.351	4	6.561	15	9.045
Junior	20	41.117*	16	10.364	30	92.708**
Senior	9	8.057	20	53.954**	20	53.883**
All Grades	25	73.170**	20	53.434**	30	88.169**

* Significant at 0.005 level
** Significant at 0.0005 level

Imagination and Objectivity can be found in Table XXXI.

The results of the tests for independence by sex distribution for the separate grade classifications yielded Chi-square values that were significant for each of the imagination variables and Objectivity for the junior subjects, for the senior subjects, for all males in the sample, and for all females in the sample. In addition, the null hypotheses of independence between Total Imagination and Objectivity and between Creative Imagination and Objectivity were rejected for the male subjects classified as juniors. The data on those subjects classified as sophomores did not yield significant Chi-square values on any of the tests. It appeared that the dependence between each of the three imagination variables and Objectivity was due to differences in sex distribution, in grade classification, and in interactions between these two. Major contributors to this dependency were the junior and senior groups, the entire group of males, and the total female group. The female subjects classified as seniors and the male subjects classified as juniors contributed to the significant Chi-square values for the various groupings by sex and grade classification.

The variable Objectivity as ascertained by The Guilford-Zimmerman Temperament Survey appeared to be associated with imaginative behavior as measured by The Kinget Drawing-Completion Test. The personality characteristic of Objectivity suggests such traits as a lack of personal bias, a broad outlook or perspective, and a certain amount of independence by not yielding to the suggestions of or pressures from others. In contrast, a subjective individual is apt to vascillate in his opinions as he yields or conforms to group or individual pressure. Objectivity appears to be

closely associated with traits of independence, a lack of restraint, and non-conformistic behavior patterns and, as such, would be expected to be a factor in creative and imaginative behavior. One would expect, therefore, a degree of relationship between an individual's performance on the Objectivity variable and his performance on the imagination variables under study.

Since dependency occurred between each of the imagination variables and the personality variable of Objectivity, coefficients of correlation was computed to obtain the strength and direction of relationships present. The obtained coefficients of correlation can be found in Table XXXII.

TABLE XXXII

COEFFICIENTS OF CORRELATION BETWEEN THE THREE IMAGINATION VARIABLES AND OBJECTIVITY FOR THE TOTAL SAMPLE
(n = 260)

Imagination Variables	Coefficients of Correlation		
	d.f.	r	p
Total Imagination	258	0.0837	>0.05
Combinative Imagination	258	0.0715	>0.05
Creative Imagination	258	0.0899	>0.05

The results of these computations failed to produce any significant relationships between Objectivity and each of the imagination variables. The dependency between the three imagination variables and Objectivity occurred when the scores were grouped by level categories. The lack of

significant correlations, however, indicated the absence of a within-person relationship.

To determine if the dependency between each of the imagination variables and Personal Relations was due to differences in sex distribution, in grade classifications, or in interactions between sex and grade classification, further Chi-square tests of independence were used for the various groupings of subjects. The obtained Chi-square values for testing the independence between Total Imagination and Personal Relations by sex distribution for each grade classification are presented in Table XXXIII.

TABLE XXXIII

CHI-SQUARE VALUES FOR TOTAL IMAGINATION AND PERSONAL RELATIONS BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	16	21.613	12	12.029	16	17.702
Junior	20	26.299	25	32.967	35	53.625*
Senior	12	14.164	20	44.074**	25	58.289***
All Grades	24	40.292*	35	82.381***	35	101.630***

* Significant at 0.025 level
** Significant at 0.005 level
*** Siginficant at 0.0005 level

The same data for Combinative Imagination and Personal Relations can be found in Table XXXIV. The obtained Chi-square values for Creative Imagination and Personal Relations are reported in Table XXXV.

TABLE XXXIV

CHI-SQUARE VALUES FOR COMBINATIVE IMAGINATION AND PERSONAL RELATIONS BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	20	15.539	20	20.152	24	16.308
Junior	24	28.455	35	48.829	40	60.431*
Senior	20	15.723	32	68.366**	40	90.439**
All Grades	28	37.565	40	98.750**	45	153.927**

* Significant at 0.025 level
** Significant at 0.0005 level

TABLE XXXV

CHI-SQUARE VALUES FOR CREATIVE IMAGINATION AND PERSONAL RELATIONS BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATIONS AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	12	28.134**	8	8.356	12	23.208*
Junior	16	27.067*	20	28.134	30	46.308*
Senior	12	15.187	25	53.935****	25	74.670*****
All Grades	20	42.162***	25	86.414*****	30	93.543*****

* Significant at 0.05 level
** Significant at 0.01 level
*** Significant at 0.005 level
**** Significant at 0.001 level
***** Significant at 0.0005 level

An examination of Tables XXXIII, XXXIV, and XXXV reveals that the null hypotheses of independence between each of the imagination variables and Personal Relations were rejected for the junior subjects, for the senior subjects, for the total number of female subjects, and for the female subjects classified as seniors. For the male subjects in the sample, the obtained Chi-square values were significant for Total Imagination and Personal Relations and for Creative Imagination and Personal Relations. Additional significant Chi-square values were obtained for Creative Imagination and Personal Relations for the male subjects classified as sophomores, for the male subjects classified as juniors, and for the group of subjects classified as sophomores. The differences by sex distribution and by grade classification appeared to have been factors in the dependence that occurred between each of the imagination variables and Personal Relations. Major contributors to this dependence were the junior and senior subjects and the female subjects classified as seniors.

The variable Personal Relations, assessed by The Guilford-Zimmerman Temperament Survey, reflects a personality trait of cooperativeness as opposed to traits of criticalness or of intolerance. A cooperative individual is one that helps, aids, or assists others; he is a supporter and encourager. To be cooperative necessitates a respect for the ideas and actions of others -- a tolerance in relationships with others. One can not be successful in these personal relationships if he fears, distrusts, or belittles the actions of others. The imaginative personality is a producer of ideas which must be received respectively by others if the imaginative behavior is to persist. Through mutual cooperation, creative and imaginative traits appear to flourish. One can expect, therefore, a

dependency to exist between displayed and continued imaginative behavior and traits associated with the variable Personal Relations.

Coefficients of correlation were computed to determine the magnitude and direction of relationships between each of the imagination variables and the personality variable of Personal Relations. The obtained coefficients of correlation are reported in Table XXXVI.

TABLE XXXVI

COEFFICIENTS OF CORRELATION BETWEEN THE THREE IMAGINATION VARIABLES AND PERSONAL RELATIONS FOR THE TOTAL SAMPLE (n = 260)

Imagination Variables	Coefficients of Correlation		
	d.f.	r	p
Total Imagination	258	0.0922	>0.05
Combinative Imagination	258	0.0915	>0.05
Creative Imagination	258	0.0824	>0.05

The results of these computations revealed no significant relationships between each of the imagination variables and Personal Relations. The lack of significant correlations indicated that a within-person relationship was not present. The dependency that occurred between each of the imagination variables and Personal Relations was present when the scores were grouped by level categories.

Imagination and Grade Point Averages in Selected Curricular Areas

The cumulative record files were checked to obtain the grades or

marks received by each subject in each of his school classes. All marks received by the subjects in the senior high school, from the ninth grade to and including the marks received during the fall semester of 1963-64, when the tests used in this investigation were administered, were included for consideration. Grade point averages in the selected curricular areas were computed using the following scale: A = 4, B = 3, C = 2, D = 1, and F = 0.

The curricular areas selected for study were (1) English, (2) social studies, and (3) science and mathematics. These three areas comprised the general education or common learnings required of all students in the high school.

Imagination and English Grade Point Average. Means and standard deviations for grade point averages in English by sex distribution for each grade classification and for the total sample can be found in Table XXXVII.

TABLE XXXVII

MEANS AND STANDARD DEVIATIONS FOR ENGLISH GRADE POINT AVERAGES BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	English G. P. A.					
	Mean			S.D.		
	M	F	Both Sexes	M	F	Both Sexes
Sophomore	2.07	2.31	2.16	0.91	0.93	0.92
Junior	1.91	2.50	2.24	0.91	0.92	0.96
Senior	2.20	2.47	2.33	0.98	0.84	0.92
All Grades	2.06	2.43	2.24	0.93	0.90	0.93

The mean grade point average in English for the total sample was 2.24 with a range in average from 0.40 to 4.00 and a standard deviation of 0.93. Observed differences were noted in the means and standard deviations for the two sexes for the separate grade classifications, thus leading to the question of possible dependence between imagination and grade point average in English.

Chi-square tests were used to test the independency of each of the imagination variables and English grade point average. The obtained Chi-square values for the three imagination variables with respect to English grade point average are reported in Table XXXVIII.

TABLE XXXVIII

CHI-SQUARE VALUES FOR IMAGINATION AND ENGLISH GRADE POINT AVERAGE FOR THE TOTAL SAMPLE (n = 260)

Imagination Variables	χ^2 Values		
	d.f.	χ^2	p
Total Imagination	56	68.641	>0.05
Combinative Imagination	72	81.850	>0.05
Creative Imagination	48	47.087	>0.05

The treatment of the null hypothesis of independence between imagination and grade point average in English yielded no Chi-square values significant at the 0.05 level. On the basis of these data, the English grade point average of a senior high school student does not appear

to be relevant to scoring level on the imagination variables as measured by The Kinget Drawing-Completion Test.

Imagination and Social Studies Grade Point Average. Means and standard deviations for grade point averages in social studies by sex distribution for each grade classification and for the total sample are presented in Table XXXIX.

TABLE XXXIX

MEANS AND STANDARD DEVIATIONS FOR SOCIAL STUDIES GRADE POINT AVERAGES BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Social Studies G. P. A.					
	Mean			S.D.		
	M	F	Both Sexes	M	F	Both Sexes
Sophomore	2.10	2.09	2.10	1.22	0.91	1.11
Junior	2.10	2.34	2.23	1.10	0.96	1.03
Senior	2.32	2.39	2.36	1.08	0.86	0.97
All Grades	2.16	2.28	2.22	1.15	0.92	1.05

The mean grade point average for the total sample in social studies was 2.22; the range in averages was 0.00 to 4.00 with a standard deviation of 0.93. Observed differences were noted in the means and standard deviations for the two sexes for the separate grade classifications questioning the possible dependence between imagination and grade point average in social studies.

Chi-square tests were used to test the independence of each of the

imagination variables and social studies grade point average. The obtained Chi-square values for the three imagination variables with respect to social studies grade point average can be found in Table XL.

TABLE XL

CHI-SQUARE VALUES FOR IMAGINATION AND SOCIAL STUDIES GRADE POINT AVERAGE FOR THE TOTAL SAMPLE (n = 260)

Imagination Variables	χ^2 Values		
	d.f.	χ^2	p
Total Imagination	63	97.382	0.005
Combinative Imagination	81	112.040	0.025
Creative Imagination	54	73.222	0.05

The treatment of the data regarding the null hypotheses of independence between each of the imagination variables and grade point average in social studies yielded significant Chi-square values in each case.

Since dependency occurred between each of the three imagination variables and social studies grade point average, the data were examined further in an attempt to determine if the dependency was due to differences in sex, in grade classification, or in interactions between sex and grade classification. Chi-square tests were used to test the independence of imagination and social studies grade point average for each of the groupings by sex and by grade classification. The obtained Chi-square values for Total Imagination and grade point average in social studies are presented

in Table XLI; the same information for Combinative Imagination and social studies grade point average is reported in Table XLII. The obtained Chi-square values for Creative Imagination and social studies grade point average can be found in Table XLIII.

TABLE XLI

CHI-SQUARE VALUES FOR TOTAL IMAGINATION AND SOCIAL STUDIES GRADE POINT AVERAGE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	32	50.508**	18	15.608	32	66.778*****
Junior	32	54.234***	40	39.003	54	85.204*
Senior	27	38.170	40	39.378	45	56.033
All Grades	45	59.010	54	53.557	63	97.382****

* Significant at 0.05 level
** Significant at 0.025 level
*** Significant at 0.01 level
**** Significant at 0.005 level
***** Significant at 0.0005 level

The test of independence between each of the imagination variables and grade point average in social studies yielded significant Chi-square values in each case for the male subjects classified as juniors and for the group of subjects classified as juniors. In addition, the data for the group of students classified as sophomores yielded significant Chi-square values for social studies grade point average with respect to both Total Imagination and Combinative Imagination. Lastly, the obtained Chi-square

TABLE XLII

CHI-SQUARE VALUES FOR COMBINATIVE IMAGINATION AND SOCIAL STUDIES GRADE POINT AVERAGE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	40	55.072	30	28.811	40	65.624**
Junior	48	76.278**	56	66.701	72	128.959***
Senior	45	43.685	64	54.496	72	59.516
All Grades	63	80.953	72	70.251	81	112.040*

* Significant at 0.025 level
** Significant at 0.01 level
*** Significant at 0.0005 level

TABLE XLIII

CHI-SQUARE VALUES FOR CREATIVE IMAGINATION AND SOCIAL STUDIES GRADE POINT AVERAGE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	24	30.127	12	9.821	24	34.036
Junior	24	40.866**	32	29.256	45	64.598**
Senior	27	32.720	40	30.016	45	46.259
All Grades	36	48.869	45	39.604	54	73.222*

* Significant at 0.05 level
** Significant at 0.025 level

value between Total Imagination and grade point average in social studies was significant at the 0.025 level of significance for the male students classified as sophomores. A major contributor to the dependency between each of the imagination variables and grade point average in social studies appears to have been the group of junior subjects with the dependency arising from the male subjects in this group. Other contributors noted were the group of sophomore subjects with the male subjects in this group as outstanding contributors.

Since dependency occurred, coefficients of correlation were computed to obtain the strength and direction of the relationship between each of the three imagination variables and grade point average in social studies. The obtained coefficients of correlation are reported in Table XLIV.

TABLE XLIV

COEFFICIENTS OF CORRELATION BETWEEN THE THREE IMAGINATION VARIABLES AND SOCIAL STUDIES GRADE POINT AVERAGE FOR THE TOTAL SAMPLE
(n = 260)

Imagination Variables	Coefficients of Correlation		
	d.f.	r	p
Total Imagination	258	0.3058	0.005
Combinative Imagination	258	0.3043	0.005
Creative Imagination	258	0.2834	0.005

The results of these computations yielded significant positive relationships between grade point average in social studies and the three imagination variables at the 0.005 level of significance.

Imagination and Science/Mathematics Grade Point Average. Means and standard deviations for grade point averages in the science and mathematics curricular area by sex distribution for each grade classification and for the total sample are presented in Table XLV.

TABLE LXV

MEANS AND STANDARD DEVIATIONS FOR SCIENCE/MATHEMATICS GRADE POINT AVERAGES BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	Science/Mathematics G. P. A.					
	Mean			S.D.		
	M	F	Both Sexes	M	F	Both Sexes
Sophomore	2.02	1.80	1.94	0.93	0.66	0.84
Junior	2.07	2.25	2.17	0.90	0.80	0.84
Senior	2.21	2.31	2.26	0.89	0.81	0.85
All Grades	2.09	2.13	2.11	0.91	0.79	0.85

The mean grade point average in science and mathematics for the total sample was 2.11 with a range in grade point averages from 0.40 to 4.00. The standard deviation for the data on the total sample was 0.85. Observed differences in the means and standard deviations for the two sexes for the separate grade classifications questioned the possible dependence between imagination and grade point average in science and mathematics.

Chi-square tests were used to test the indepencence between each of the imagination variables and grade point average in science and mathematics. The obtained Chi-square values for the three imagination variables with respect to science and mathematics grade point average can be found in Table XLVI.

TABLE XLVI

CHI-SQUARE VALUES FOR IMAGINATION AND GRADE POINT AVERAGE IN SCIENCE/MATHEMATICS FOR THE TOTAL SAMPLE (n = 260)

Imagination Variables	χ^2 Values		
	d.f.	χ^2	p
Total Imagination	63	111.954	.0005
Combinative Imagination	72	113.837	.005
Creative Imagination	48	69.549	.025

The treatment of the data yielded significant Chi-square values in each case thus rejecting the null hypotheses of independence between each of the imagination variables and grade point average in science and mathematics.

Since dependency occurred between each of the three imagination variables and science and mathematics grade point average, the data were examined further in an attempt to determine if the dependency was due to differences in sex distribution, in grade classification, or in interactions between sex and grade classification. Chi-square tests

were used to test the independence of imagination and the grade point average in science and mathematics for each of the groupings by sex and by grade classification. The obtained Chi-square values for Total Imagination and grade point average in science and mathematics are reported in Table XLVII and for Combinative Imagination and grade point average in science and mathematics are presented in Table XLVIII. The obtained Chi-square values for Creative Imagination and grade point average in science and mathematics can be found in Table XLIX.

TABLE XLVII

CHI-SQUARE VALUES FOR TOTAL IMAGINATION AND SCIENCE/MATHEMATICS GRADE POINT AVERAGE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	32	38.428	18	17.022	32	41.192
Junior	40	36.073	40	54.602	56	63.327
Senior	21	20.728	35	42.329	35	48.082
All Grades	48	62.308	48	84.315*	63	111.954**

* Significant at 0.001 level
** Significant at 0.0005 level

The obtained Chi-square values for testing the independence between Total Imagination and grade point average in science and math and the independence between Combinative Imagination and the science and math grade point average were significant for the female subjects in the study.

TABLE XLVIII

CHI-SQUARE VALUES FOR COMBINATIVE IMAGINATION AND SCIENCE/MATHEMATICS GRADE POINT AVERAGE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	40	34.176	30	35.619	40	48.114
Junior	48	53.346	56	60.896	64	64.826
Senior	35	38.594	56	53.486	56	68.926
All Grades	56	75.215*	64	88.638**	72	113.83***

* Significant at 0.05 level
** Significant at 0.025 level
*** Significant at 0.005 level

TABLE XLIX

CHI-SQUARE VALUES FOR CREATIVE IMAGINATION AND SCIENCE/MATHEMATICS GRADE POINT AVERAGE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	24	25.180	12	7.985	24	24.969
Junior	32	34.079	32	51.632*	48	51.946
Senior	21	17.863	35	24.727	35	30.617
All Grades	40	44.330	40	54.074	48	69.549*

* Significant at 0.025 level

The data on the male subjects yielded a significant Chi-square value on the tests of independence between Combinative Imagination and grade point average in science and mathematics. The only Chi-square value that was significant on the tests between Creative Imagination and the science and mathematics grade point average was for the female subjects classified as juniors. The major contributor to the dependency between imagination and the science and mathematics grade point average appeared to have been the group of female subjects in the sample. Other contributors to the dependency were the group of male subjects and the female subjects classified as juniors.

Coefficients of correlation were computed to obtain the magnitude and direction of the relationship between each of the three imagination variables and grade point average in science and mathematics. The obtained coefficients of correlation are presented in Table L. The results of these

TABLE L

COEFFICIENTS OF CORRELATION BETWEEN THE THREE IMAGINATION VARIABLES AND SCIENCE/MATHEMATICS GRADE POINT AVERAGE FOR THE TOTAL SAMPLE (n = 260)

Imagination Variables	Coefficients of Correlation		
	d.f.	r	p
Total Imagination	258	0.3257	0.005
Combinative Imagination	258	0.3204	0.005
Creative Imagination	258	0.3035	0.005

computations yielded significant positive relationships between grade point average in science and mathematics and the three imagination variables at the 0.005 level of significance.

Imagination and Total Grade Point Average

The grades or marks received by each subject in all classwork were obtained from the cumulative record files. All marks received by the subjects from the ninth grade to and including the semester when the tests were administered for this study were included for consideration. Each subjects total grade point average was computed using the following scale: A = 4, B = 3, C = 2, D = 1, and F = 0.

Means and standard deviations for the total grade point averages by sex distribution for each classification and for the total sample are reported in Table LI. The mean total grade point average for the total sample was 2.28 with a range in averages from 0.43 to 3.92 and a standard deviation of 0.80. Observed differences were noted in the means and standard deviations for the two sexes for the separate grade classifications, thus questioning possible dependence between imagination and total grade point average.

Chi-square tests were used to test the independency of each of the imagination variables and total grade point average. The obtained Chi-square values for the three imagination variables with respect to total grade point average are presented in Table LII. The results of the tests of independence between imagination and total grade point average yielded significant Chi-square values in each case. The null hypotheses of independence between each of the imagination variables and total grade point average were rejected.

TABLE LI

MEANS AND STANDARD DEVIATIONS FOR TOTAL GRADE POINT AVERAGE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Total Grade Point Average					
	Mean			S.D.		
	M	F	Both Sexes	M	F	Both Sexes
Sophomore	2.11	2.13	2.12	0.85	0.68	0.79
Junior	2.17	2.49	2.35	0.68	0.78	0.81
Senior	2.31	2.54	2.42	0.84	0.72	0.78
All Grades	2.18	2.39	2.28	0.84	0.75	0.80

TABLE LII

CHI-SQUARE VALUES FOR IMAGINATION AND TOTAL GRADE POINT AVERAGE FOR THE TOTAL SAMPLE
(n = 260)

Imagination Variables	χ^2		
	d.f.	χ^2	p
Total Imagination	258	116.241	0.0005
Combinative Imagination	258	109.976	0.005
Creative Imagination	258	72.563	0.025

Since dependency occurred between each of the three imagination variables and total grade point average, the data were examined further

in an attempt to determine if the dependency was due to differences in sex, in grade classification, or in interactions between sex and grade classification. Chi-square tests were used to test the independence of imagination and total grade point average for each of the groupings by sex and by grade classification. The obtained Chi-square values for Total Imagination and total grade point average are presented in Table LIII, and for Combinative Imagination and total grade point average are reported in Table LIV. The obtained Chi-square values for Creative Imagination and total grade point average can be found in Table LV.

TABLE LIII

CHI-SQUARE VALUES FOR TOTAL IMAGINATION AND TOTAL GRADE POINT AVERAGE BY SEX DISTRIBTUION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE (n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	32	27.521	18	13.572	32	31.909
Junior	40	31.273	35	39.338	56	70.792
Senior	21	13.001	30	28.898	35	27.960
All Grades	48	49.495	48	79.025*	56	116.241**

* Significant at 0.005 level
** Significant at 0.0005 level

The data for the group of female subjects yielded a significant Chi-square value at the 0.005 level of significance on the tests of independence between Total Imagination and total grade point average. This was the only significant Chi-aquare value in the tests of independence

TABLE LIV

CHI-SQUARE VALUES FOR COMBINATIVE IMAGINATION AND TOTAL GRADE POINT AVERAGE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	40	38.768	30	30.592	40	40.261
Junior	48	47.378	49	50.223	64	78.385
Senior	35	41.220	48	43.394	56	43.472
All Grades	56	66.179	64	77.351	72	109.976*

* Significant at 0.005 level

TABLE LV

CHI-SQUARE VALUES FOR CREATIVE IMAGINATION AND TOTAL GRADE POINT AVERAGE BY SEX DISTRIBUTION FOR EACH GRADE CLASSIFICATION AND FOR THE TOTAL SAMPLE
(n = 260)

Grade Classification	Male		Female		Both Sexes	
	d.f.	χ^2	d.f.	χ^2	d.f.	χ^2
Sophomore	24	23.082	12	7.609	24	20.451
Junior	32	23.084	28	31.886	48	58.051
Senior	21	16.901	30	24.191	35	21.450
All Grades	40	38.816	40	49.812	48	72.563*

* Significant at 0.025 level

TABLE LVI

COEFFICIENTS OF CORRELATION BETWEEN THE THREE IMAGINATION VARIABLES AND TOTAL GRADE POINT AVERAGE FOR THE TOTAL SAMPLE (n = 260)

Imagination Variables	Coefficients of Correlation		
	d.f.	r	P
Total Imagination	258	0.3440	0.005
Combinative Imagination	258	0.3456	0.005
Creative Imagination	258	0.3136	0.005

between each of the imagination variables and total grade point average for the various groupings by sex distribution and by grade classification. The group of female subjects appeared to have been a major contributor to the dependency between imagination and total grade point average. The separate grade classifications were not found to be main factors in this dependency.

Since dependency occurred between each of the imagination variables and total grade point average for the total sample, coefficients of correlation were computed to obtain the strength and direction of relationships between the dependent variables. The obtained coefficients of correlation are reported in Table LVI. The results of these computations yielded significant positive relationships between total grade point average and each of the imagination variables at the 0.005 level of significance.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND THEORETICAL IMPLICATIONS FOR THE CURRICULUM

Summary

Attempts to develop measurements of creativity and its manifestations have taken many approaches. It is of special interest to note that relatively few studies of creativity have been reported for the high school group. This paucity encouraged the investigator to pursue the problem of the development of individual creativity in the senior high school.

It was the purpose of this study to determine relative curricular effectiveness in developing individual imagination and creativity in senior high school students. The criteria selected for assessing the effectiveness of the curriculum were the school course marks received by each student. Selected additional non-aptitude factors were studied in an attempt to isolate those variables which were dependent of scoring levels on the creativity and imagination measures.

The variable, Imagination, as proposed in Kinget's personality schema reflects certain individual personality patterns. The two factors critical to Imagination are the "combining" and "creative" types of imagination. The "combining" type of imagination appears to draw its material from the surroundings, to organize it according to objective

standards, and to produce forms which fit into the world of sensorial experience. This kind of imagination is essentially based on perception and oriented towards visible reality. It may also present a fairly emotional undercurrent, as manifested in its products which often show an esthetic tendency, though of a conventional variety. The "creative" type of imagination appears to be characterized by its nebulous contact with visible reality as evidenced by its preference for abstract constructs or for symbols of an emotional, philosophical, or mystical nature. The presence of minimal creative imagination may likely enhance the personality and be valuable in certain spheres of activity; conversely, a marked predominance of this kind of imagination may be an obstacle to adjustment to ordinary life. Therefore, the interrelationships between these types of imagination and school course marks should be crucial in determining the behavior patterns being rewarded and evaluated in the educational situation.

Observed differences were noted between the mean scores for the two types of imagination. The general results revealed the higher mean for Combinative Imagination. Creative Imagination, however, yielded the greater range in scores indicating a wide range of affective variability.

The distribution of data on chronological age was not found to be relevant to scoring level on either of the defined imagination variables. High and low scores on the imagination measurements (Combinative, Creative, and Total) appeared to be randomly scattered through the sample, and, as such, these results fail to concur with the growth curves for creative development reported by Torrance. The steady increase in creative development expected during the high school years was not apparent for the group of subjects of this study.

The measurement of mental ability revealed a range in I. Q. scores from 61 to 147. In terms of results, mental ability was found to be statistically dependent upon imagination. This dependence appeared to be partially a matter of differences between the two sexes and between the various grade classifications. The female group of subjects apparently was the major contributor to the overall dependence, with the junior female subjects being the outstanding contributing group. Correlational analyses yielded significant positive relationships between mental ability and (1) Total Imagination, (2) Combinative Imagination, and (3) Creative Imagination. The substantial relationship between imagination of the creative type and intelligence is in agreement with the results of the Richards, Cline, and Needham study and of the Ripple and May investigation. These two research studies and the present investigation included a broad range of scores on both measures of intelligence and creativity. In the Getzels-Jackson study and the Torrance investigations, restricted sampling conditions were imposed and yielded a contrasting picture of the relationship between creativity and imagination as was observed in the present investigation.

The results of the analyses of personality characteristics revealed statistical dependence between each of the imagination variables and (1) Ascendance, (2) Social Interest, (3) Emotional Stability, (4) Objectivity, and (5) Personal Relations, thus indicating a relevance between performance on these five personality characteristics and the aforementioned imagination factors. Differences were observed for the various groupings by sex and grade classification which appeared to contribute to the occurred dependency in each case. No one group appeared to be a major contributor

throughout. Interestingly, the only appearance of the sophomore group of subjects as contributors was in the dependency between Creative Imagination and Personal Relations with the boys in this group being the outstanding contributors. Correlational analyses yielded only two significant relationships between each of the imagination variables and these five personality factors. Significant positive relationships were found between Total Imagination and Emotional Stability at the 0.05 level of significance and between Creative Imagination and Emotional Stability at the 0.01 level of significance. Low positive but not significant relationships were observed for each of the other four personality characteristics and the imagination measures.

The occurred dependency and low positive relationship between Imagination and Ascendance is in agreement with the relationship between ideational fluency and ascendance reported by Guilford. The description of the creative individual as withdrawn and quiescent by Drevdahl and as asocial by Holland cannot be supported by the data obtained in the present study.

The scoring level on the three imagination variables were not found to be relevant to performance on the five personality characteristics: (1) General Activity, (2) Restraint, (3) Friendliness, (4) Thoughtfulness, and (5) Masculinity. These five characteristics are relatively individual concerns and may appear at any point on the continuum of imagination. The opposite behavior pattern of restraint is impulsiveness. The present investigation found Restraint to be independent of Imagination which fails to concur with the results of Barron's study which reported an existing relationship between originality and impulsivity.

Performance on the imagination measures appeared to have no relationship to grade point average in English. The grade point average

in social studies, in the science and math area, and the total grade point average, however, were found to be associated with performance on the three imagination variables. The dependency in each case appeared to be partially a matter of differences between the two sexes and between the various grade classifications. The outstanding contributors to the dependency between imagination and social studies grade point average were the male subjects at the sophomore and junior levels. The senior subjects and the female subjects did not appear to be contributors. The performances of the female subjects apparently contributed to the overall dependence between imagination and science/mathematics grade point average. The sophomore boys did appear as contributors to the dependency between Creative Imagination and science/mathematics grade point average. Absence of the senior subjects as contributors to the dependency was evident. The sole contributors to the dependency was evident. The sole contributor to the dependency between total grade point average and the imagination measures was the group of female subjects, but only with relationship to the Total Imagination variable. Correlational findings indicated significant positive relationships to exist between each of the three imagination variables and (1) social studies grade point average, (2) grade point average in science and math, and (3) total grade point average.

The occurred dependency in each case and the significant positive relationships between the measures of imagination and (1) social studies grade point average, (2) science/mathematics grade point average, and (3) total grade point average failed to agree with Drew's study in which the creative intellectuals received lower school marks than either the studious individuals or the social leaders. It is important to note, however, that

Drew's sampling was restricted in that only talented high school students were included for study, whereas such sampling restrictions were not imposed in the present investigation.

The significant positive relationships between Imagination and grade point averages (social studies, science/mathematics, and total) fail to support the general description of the creative individuals being perceived as less desirable as indicated by lower grades and ratings by teachers as reported in the Getzels-Jackson study and in the investigations by Holland and by Gough. The restricted sampling conditions in each of these studies, however, may account for the contrasting results observed in the present investigation.

A final analysis of the results indicated that the measures of imagination were statistically dependent upon (1) mental ability, (2) the personality characteristics of ascendance, sociability, emotional stability, objectivity, and personal relations, (3) grade point average in social studies and in the science and mathematics area, and (4) total grade point average. Statistical independence was established between imagination and (1) chronological age, (2) the personality characteristics of general activity, restraint, friendliness, thoughtfulness, and masculinity, and (3) grade point average in English.

The purpose of this investigation, as previously stated, involved the following problematic questions:

(1) What indices reflect or have relationship to imagination and creativity?

(2) Is there a relationship between imagination and chronological age?

(3) Does a relationship exist between imagination and mental ability?

(4) What personality characteristics appear to reflect imaginative behavior?

(5) Is there a relationship between imagination and academic achievement in selected curricular areas as indicated by grade point average?

(6) Does a relationship exist between imagination and overall academic achievement as indicated by an overall grade point average?

These questions stipulated the following hypotheses:

(1) Imagination as ascertained by The Kinget Drawing-Completion Test is statistically independent of chronological age.

(2) Imagination as ascertained by The Kinget Drawing-Completion Test is statistically independent of mental ability as measured by The Otis Quick Scoring Mental Ability Test.

(3) Imagination as ascertained by The Kinget Drawing-Completion Test is statistically independent of personality characteristic as measured by The Guilford-Zimmerman Temperament Survey.

(4) Imagination as measured by The Kinget Drawing-Completion Test is statistically independent of academic achievement as reflected by grade point average in selected curricular areas derived from the subjects' cumulative record files.

(5) Imagination as measured by The Kinget Drawing-Completion Test is statistically independent of total grade point average derived from the subjects' cumulative record files.

To test these hypotheses a sample of students was drawn from

one senior high school. The composition of the sample was controlled by obtaining approximately an equal number of subjects from each grade level. The selection of the sample was made on the basis of completion of the administered tests and the presence of an intelligence score on The Otis Quick Scoring Mental Ability Test taken from the cumulative record file of each subject. Random sample was then made to obtain the 260 subjects for the investigation. The subjects were administered tests designed to measure creative imagination and personality characteristics. The Kinget Drawing-Completion Test was administered to assess creativity and imagination, and The Guilford-Zimmerman Temperament Survey was given to measure the personality traits of the subjects. The cumulative record files yielded the school marks received in the senior high school by each subject in the sample.

Chi-square tests of independence were used to determine independency of the variables under study. When dependency occurred between two variables, additional Chi-square tests of independence were used in an attempt to determine if the dependency was due to differences in sex, in grade classification, or in interactions between sex and grade classification. When a null hypothesis of independence between two variables was rejected, the Pearson product-moment coefficient of correlation was used to ascertain the degree and direction of the relationship between the variables concerned.

Conclusions

The findings are presented in Chapter III and summarized in the first portion of this chapter. The results of the study indicate the following conclusions:

(1) The null hypothesis of statistical independence between

imagination and chronological age was accepted. The chronological age of a subject did not appear to be a significant factor in determining scoring levels on measurements of creativity and imagination.

(2) The null hypothesis of statistical independence between imagination and mental ability was rejected. Significant positive relationships were found between mental ability and imagination in this non-restricted sample of senior high school students.

(3) The null hypothesis of independence between imagination and personality characteristics was accepted for the traits identified as general activity, restraint, friendliness, thoughtfulness, and masculinity. These traits did not appear to reflect or to determine creative and imaginative behavior patterns.

(4) The null hypothesis of independence between imagination and personality characteristics was rejected for the traits identified as ascendance, social interest, emotional stability, objectivity, and personal relations. Significant positive relationships were found to exist between emotional stability and creative imagination; the traits of ascendance, social interest, objectivity, and personal relations were indicated as having a low positive relationship with creative and imaginative behavior.

(5) The null hypothesis of statistical independence between imagination and grade point average in English was accepted, whereas it was rejected in the instances of the social studies area, the science and mathematics area, and the overall curriculum. In terms of these separate curricular areas, and indeed the total school program, creativity seemingly can be identified with achievement in all areas except with that of English.

Looking at these conclusions, the writer has indicated several points

of disagreement as well as agreement with previous studies. This should be an adequate indication that one cannot make blanket statements concerning relationships between the variables included in this study in hopes that these statements could be extrapolated to cover all school situations. Indeed, Conant's[1] comment in The American High School Today that a comparative and all encompassing statement cannot be made for the entirety of secondary education, indicates that comments and conclusions must be made within a special frame of reference unique to each secondary school.

With this last statement in mind, the creative student may be identified as having above average levels of ability or aptitude, as the case may be, with respect to the variables of intelligence, the personality factors of ascendance, social interest, emotional stability, objectivity, and personal relations, and success as indicated by grades achieved primarily in social studies during the early years of senior high school. Thus it would seem that the curriculum in the particular school is not even approaching the level of maximum development of the student's creative powers and abilities.

In terms of the original purposes and in light of the findings of this study, the theoretical projections for the curriculum structure should be discussed. Restricted facets are presented in the following discussion.

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[1]James G. Conant, The American High School Today (New York: McGraw-Hill Book Company, Inc., 1959), p. 16.

Theoretical Implications for the Curriculum

An analysis of the data in this study has revealed several interesting conclusions which appear to suggest certain implications for the senior high school curriculum. The first consideration in the following discussion will focus on the curricular effectiveness in developing creativity and imagination with respect to the separate disciplines.

The rewards for learning, as indicated by marks received, appeared to have no relationship to the development of individual creativity in the curriculum area of English. This particular finding is not too startling when one considers the criticisms of fragmentation and seemingly lack of articulation which have been leveled toward the English curriculum. Wilson[1], at the recent Conference on the Structure of Knowledge and the Curriculum, expressed doubt that an over-all structure in the discipline called English could be satisfactorily accomplished. As a solution, he suggested that order might be discovered by thinking of English as language and literature thereby allowing the discovery of structure or order in these two components of the whole. This suggestion may imply an abandonment of the traditional high school English requirement, as such, by a reorganization into the disciplines of language and of literature. Whatever the solution, it appears that the senior high school English curriculum is not fostering creativity. Perhaps the concept of "correctness of form" and the adherence to a normative behavior code have been the stultifying elements.

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[1]Graham C. Wilson, "The Structure of English," The Structure of Knowledge and the Curriculum, eds. G. W. Ford and Lawrence Pugno (Chicago: Rand McNally & Company, 1964), pp. 71-86.

A significant positive relationship between success in social studies and individual creativity and imagination was observed in the present investigation. The reason for this existing relationship would be more conjecture, but an educated guess appears to be in order. The area of social studies is by nature multi-disciplinarian, in that the goal of the learning process is focused on the solution of problems by drawing data from several separate disciplines. An important aspect of this approach to the teaching learning situation is that inter-relationships are stressed in the problem-solving situation thus leading to some semblance of order and structure in the social studies curriculum. Particularly significant in the analysis of these data was the absence of any relationship between success in social studies and imagination for the senior group of students. The writer observed that American History was a required course for the school population normally as a part of the junior and senior year. Could it be that stressing the historical, which oftens amounts to little more than mere accumulation of isolated bits of information, resulted in fragmented knowledge in which case the more conforming and less imaginative student would receive the higher grade? The answer to this question is beyond the realm of the present study, but does indicate the need for further study. It does appear, however, that the creative individual could perhaps be identified in the early years of high school through grade point average in social studies, thus enabling the school to maximize his development.

Significant relationships and dependency in each case appeared for the total sample between imagination and success in science and mathematics as indicated by grade point average. Strangely, independence between the two variables was observed when the students were placed in the various groupings by sex and grade classification although high positive relationships

occurred between imagination and grade point average in science and mathematics for the majority of the various groupings. This lack of dependency and, at the same time, significant positive relationships occurring for the various groupings suggests that success in the science and mathematics areas may be a factor of intelligence rather than of creative imagination, as predicated on the relationship observed between intelligence and imagination. The apparent lack of rewarding creative behavior patterns in the science and mathematics areas can be sharply contrasted with the current trends in methodology and content in these two areas. Basic to the modern approaches in science and mathematics is a focusing on structure and order within each of the two disciplines with regard to content and on the process of scientific inquiry or the act of discovery as the natural learning process. The emphasis, therefore, is on the inquiry in rather than the acquiring of the structure of knowledge. The process of scientific inquiry has been described by several authors, Northrup[2], Bridgman[3], and Bruner[4], as being a creative process. It logically follows, then, that the science and mathematics curricula should nurture creative development in every student. Higher marks, as one of the rewards of learning, would have been expected for the more creative individuals in these two areas if the objective of excellence is developing individual abilities structured the teaching-learning situation in science and mathematics. It appears that this objective was not

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[2]F. C. S. Northrup, The Logic of the Sciences and the Humanities (New York: The Macmillan Company, 1947).

[3]P. W. Bridgman, Reflections of a Physicist (New York: The Philosophical Library, Inc., 1950).

[4]Jerome S. Bruner, The Process of Education (New York: Random House, Inc., 1960).

being fulfilled for the group of senior high school students in this study.

A similar picture to that described for science and mathematics appeared in the consideration of the relationship between creative imagination and total grade point average. For the total sample, the variables were found to be significantly dependent; for the various distributions by sex and grade classification, however, independence but significant positive relationships were observed in each case. Again, this may indicate the intelligence factor rather than the creative function. It did not appear that overall academic success reflected an environment that fostered the divergent thinking process -- one of the basic components of creativity.

The discussion to this point has referred to structure rather consistently as an element of a particular academic discipline or as basic to knowledge and to the learning processes. By way of definition, grasping the structure of a subject or discipline is understanding it in a way that permits many other things to be related to it meaningfully. According to Bruner[5], to learn structure is to learn how things are related. It appears that the teaching and learning of structure, rather than mastery of facts and techniques, is at the center of the problem of transfer of learning. Stated simply, current psychological theory indicates that massive general transfer can be achieved by appropriate learning, i.e., learning properly under optimum conditions leads one to "learn how to learn."[6] In short, earlier learning should make later learning easier, but this can be accomplished only by providing a general picture in terms of which the relations between things encountered earlier and later are made as clear

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[5] Ibid., p. 7.

[6] Ibid., p. 6.

as possible.

The learning process implied throughout this discussion is the act of discovery or the process of scientific inquiry. A basic element in the individual act of discovery or inquiry involves intuitive thought. Primarily, intuitive thinking is the intellectual technique of arriving at plausible but tentative formulations -- the training of hunches. Bruner has hypothesized that " . . . effective intuitive thinking is fostered by the development of self-confidence and courage in the student. A person who thinks intuitively may often achieve correct solutions, but he may also be proved wrong when he checks or when others check him. Such thinking therefore, requires a willingness to make honest mistakes in the effort to solve problems. One who is insecure, who lacks confidence in himself, may be unwilling to run such risks."[7]

The personality characteristics of ascendendance, sociability, emotional stability, objectivity, and personal relations which were identified in this study as dependent upon creativity and imagination, closely resemble the characteristics indicated to enhance intuitive thinking. Both sets of characteristics describe an individual who lacks shyness, is not necessarily submissive to others, possesses a degree of stability with regard to emotions, moods, and interests, is relatively open and tolerant of others as well as to criticism directed toward him, is objective rather than subjective or hypersensitive, and is ascendent to the point of boldness that reflects a degree of self-confidence. Can one deduce, then, that creative behavior in the classroom is much the same as behavior described as the act and/or climate conducive to thinking intuitively?

It appears to the writer that the traditional academic value system

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[7] Ibid., p. 65.

in the senior high school has often penalized the individual who possesses some or all of these personality traits. The present system of rewards or of assigning marks may actually tend to reward the student who is retiring and submissive to the teacher and/or his classmates -- the non-creative or conformistic student. With the emphasis on "the correct answer," for that is what is most easily evaluated, the assignment of marks typically stresses the acquisition of factual knowledge more often with the sacrifice of the logic of the discipline. The student then has become an accumulator of knowledge rather than the discoverer of the structure of knowledge.

The overall picture of the senior high school curriculum appears rather dismal in light of structure and provisions for learning. The focus on problemmatic situations, such as suggested in the discussion of social studies in the early years of high school may be the starting point enabling other disciplines to focus on structure and learning processes. The need to escape the bounds of conformity and to experiment in creative teaching-learning situations appears to be crucial to curriculum development.

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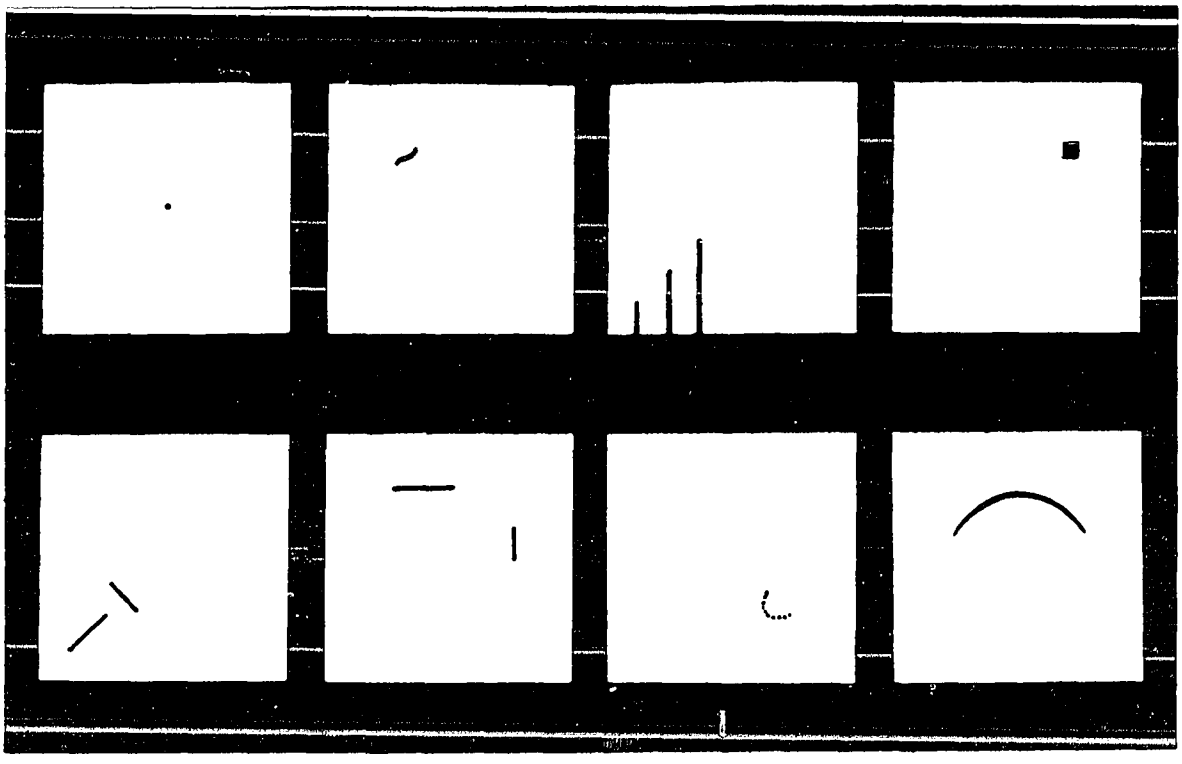
Profile Chart for the Guilford-Zimmerman Temperament Survey. Beverly Hills, California: Sheridan Supply Company, 1955.

APPENDIX A

MATERIAL USED IN INVESTIGATION



THE KINGET-DRAWING COMPLETION TEST

CRITERIA		Total Score	Drawings 1	2	3	4	5	6	7	8	Drawings 1	2	3	4	5	6	7	8	Total Score	CRITERIA	
NATURE	Animate																			Fancy	FANTASY
	Physiognomy																			Phantasm	
	Inanimate																			Symbolism	
	Atmosphere																			Original	
OBJECTS	Utility																			Symmetric	ABSTRACT
	Ornaments																			Asymmetric	
Style																				Technical	
Movement																				Careful	
COVERAGE	Full																			Casual	
	Empty																			Light	SHADING
	Expanded																			Dark	
	Constricted																			Orientation	
Organization																				Closure	
Detail																				Parts	
LINES	Curved																			Scribbles	
	Straight																			Duplication	
	Strong																			Repetition	
	Soft																			Schematism	

Anim. Phys.	Ina. Atm. Sof.	Phys. Orna.	Expo. FAN.	OBJECTS	Organized	Anim. Mov.	Emp. Con. Strai.
Expon. Curv.	Symb. As. SHA.	Styl. Organ.	Orig. Asy.	Detail	Technical	Ful. Strong	Stro. Care. Clo.
Casual	Po. Scr. Sch.	Symmetr.	Dark			Dark, Orie.	Rep. Dupli.
Open	Seclusive	Combinative	Creative	Practical	Speculative	Dynamic	Controlled
EMOTION		IMAGINATION		INTELLECT		ACTIVITY	

THE KINGET DRAWING-COMPLETION

SCORING PROFILE

Questionnaire to accompany The Drawing-Completion Test

Name_____ Date_____

1. Is drawing one of your hobbies?_____

2. Have you had any training in drawing or art?_____

   If yes, how much and to what extent?_____

   _____

3. What things do you usually draw?_____

4. Do you prefer a certain type of drawing or art?_____

   If yes, what kind?_____

****

Did the signs make you think of anything else besides what you draw? If so, of what?

Sign 1_____ Sign 5 _____

Sign 2 _____ Sign 6 _____

Sign 3 _____ Sign 7 _____

Sign 4 _____ Sign 8 _____

If you had been a skilled drawer what would you have made out of the signs?

Sign 1_____ Sign 5 _____

Sign 2_____ Sign 6 _____

Sign 3 _____ Sign 7 _____

Sign 4 _____ Sign 8 _____

Which drawings do you like best?_____

Which drawings do you like least?_____

Which signs are easiest to complete?_____

Which signs were the most difficult?_____

APPENDIX B

DATA ON ALL VARIABLES FOR EACH SUBJECT

Raw Data

Student	Sex	Grade	Age In Months	IQ	Imagination			G-Z T Scores										Grade Point Average			
					Total	Combi-native	Creative	C	R	A	S	E	O	F	T	P	M	English	Social Studies	Science/ Math	Total
001	M	12	224	82	33	19	14	43	45	33	33	39	29	34	35	39	31	1.57	1.30	1.25	1.53
002	M	12	210	134	13	8	5	46	64	48	39	48	38	51	59	59	54	2.86	3.57	3.86	3.37
003	F	11	205	73	101	55	46	43	50	44	46	46	42	43	48	46	49	2.00	1.33	1.75	2.35
004	F	10	185	69	23	13	10	41	43	38	46	42	35	38	51	46	66	2.00	2.00	1.50	1.80
005	F	11	197	75	21	14	7	45	33	40	44	33	43	48	38	31	54	2.60	2.67	2.17	2.85
006	M	12	225	61	34	18	16	33	41	43	35	36	36	43	30	33	30	0.71	0.75	1.00	1.38
007	F	10	189	107	16	10	6	69	45	46	53	47	51	48	46	50	34	2.33	2.00	1.40	1.93
008	M	10	190	130	41	21	20	45	33	41	55	39	39	53	48	51	41	3.00	3.00	3.83	3.00
009	F	12	217	110	44	26	18	54	46	61	51	36	38	36	61	51	47	1.86	2.17	2.00	2.12
010	F	12	206	85	41	18	23	56	52	48	59	51	56	55	33	46	56	1.14	1.00	1.62	1.57
011	M	11	195	85	38	16	22	50	27	43	47	38	35	29	36	41	38	1.40	1.00	1.12	1.32
012	F	12	206	131	131	83	48	29	55	31	27	39	45	58	31	64	51	2.71	2.20	2.50	2.64
013	F	10	186	118	69	47	22	45	51	38	50	35	41	41	69	39	71	3.33	2.67	2.00	2.75
014	M	10	188	79	23	12	11	41	35	39	37	31	38	36	45	26	49	1.67	1.00	1.50	1.47
015	F	11	206	85	105	58	47	40	41	34	37	33	35	34	35	30	56	1.40	1.67	1.12	1.44
016	M	11	199	108	47	26	21	51	46	53	56	44	50	56	50	51	54	1.40	1.60	1.80	1.73
017	M	12	208	121	77	46	31	59	51	35	42	44	38	41	61	39	44	3.14	3.50	3.00	3.16
018	F	11	202	136	18	10	8	36	50	36	34	29	43	48	66	48	64	4.00	4.00	3.14	3.67
019	M	11	195	110	55	36	19	38	33	60	51	50	45	46	46	36	64	1.20	1.00	1.80	1.81
020	F	12	208	111	65	39	26	45	66	44	35	55	51	51	51	46	41	2.00	2.00	1.90	2.34
021	M	11	213	85	58	41	17	35	35	43	50	31	31	43	48	33	49	1.20	2.00	1.30	1.72
022	F	12	206	132	82	45	37	50	41	56	53	43	46	36	64	43	51	2.17	2.00	2.00	2.00
023	M	11	213	130	55	30	25	50	46	56	55	51	51	43	36	53	46	1.00	1.00	1.30	1.85
024	M	10	198	73	26	14	12	46	33	36	34	43	53	45	45	39	51	1.67	1.00	1.34	1.50
025	F	12	210	131	36	23	13	66	43	55	31	55	41	29	50	26	27	2.17	2.40	2.00	2.08
026	F	11	196	118	26	13	13	31	55	44	42	55	55	43	46	46	37	2.80	2.67	1.89	2.41
027	F	10	196	64	18	13	5	40	45	44	41	39	36	38	36	26	56	0.67	1.00	0.40	0.43
028	M	11	197	84	44	22	22	59	48	60	66	51	50	43	61	46	54	1.60	1.67	1.67	1.58
029	F	12	209	117	59	30	29	43	56	46	51	50	42	45	40	51	64	3.00	3.33	3.09	3.09
030	F	12	207	131	39	20	19	31	56	36	53	41	41	46	46	36	59	3.50	3.25	3.40	3.61
031	M	11	198	130	61	31	30	46	35	41	51	53	36	43	41	36	30	1.60	2.00	2.14	2.00
032	F	11	204	130	63	36	27	61	43	56	56	47	61	66	50	48	27	3.00	3.00	2.56	3.07
033	F	12	211	132	180	90	90	50	31	48	59	71	61	56	27	69	54	3.14	3.00	3.42	3.37
034	F	10	191	132	10	6	4	45	39	38	48	44	36	45	36	48	74	1.33	1.00	1.20	1.20
035	M	10	192	143	50	28	22	46	55	56	42	41	39	43	51	55	35	3.00	3.00	2.50	2.60
036	F	11	201	85	32	24	8	54	48	50	48	47	33	38	46	41	59	1.20	1.50	1.28	1.43
037	F	11	206	133	33	19	14	45	33	46	38	36	33	27	54	35	54	3.80	3.33	3.22	3.37
038	M	10	194	115	37	24	13	51	43	60	47	48	41	40	48	45	54	2.00	1.50	1.88	1.84
039	M	10	216	83	17	11	6	61	51	64	56	48	41	45	64	51	49	1.00	1.00	1.00	1.19
040	F	12	207	133	51	29	22	61	27	51	42	48	39	39	36	43	47	3.00	3.75	2.75	3.18

Student	Sex	Grade	Age In Months	IQ	Imagination			G-Z T Scores										Grade Point Average			
					Total	Combi-native	Creative	C	R	A	S	E	O	F	T	P	M	English	Social Studies	Science/ Math	Total
041	M	11	199	134	40	23	17	45	48	35	35	48	43	38	46	41	51	2.40	2.00	2.00	2.27
042	M	10	191	147	45	20	25	48	43	51	47	39	42	51	54	48	40	3.00	4.00	3.40	3.12
043	M	11	218	85	23	10	13	41	33	48	34	42	33	43	40	39	36	0.67	1.00	1.62	1.16
044	F	11	197	84	23	13	10	45	53	41	44	46	36	53	50	41	59	1.33	0.75	1.43	1.30
045	M	10	197	76	41	26	15	43	48	39	43	31	35	51	64	39	38	1.00	0.50	1.00	0.90
046	F	12	213	92	49	33	16	40	41	31	61	44	48	62	45	39	54	1.28	1.83	1.25	1.72
047	F	11	202	130	88	46	42	69	48	63	64	56	43	34	45	36	35	3.40	3.00	3.11	3.38
048	F	10	196	113	63	44	19	40	46	34	44	43	43	46	45	50	69	3.00	2.33	2.00	2.47
049	M	12	209	112	64	35	29	36	43	39	34	51	45	46	27	33	44	2.00	2.28	2.30	2.23
050	M	12	204	114	20	11	9	40	53	45	35	39	41	48	45	43	41	1.00	1.50	1.50	1.45
051	F	11	199	98	52	34	18	38	41	44	51	39	48	48	50	55	62	1.40	1.00	1.83	1.72
052	F	12	212	139	39	19	20	61	59	74	56	33	29	36	71	53	64	3.86	3.80	3.50	3.50
053	F	11	229	85	23	10	13	46	46	34	51	39	24	23	23	23	22	2.00	1.00	1.50	2.00
054	M	12	207	131	25	13	12	33	41	51	42	51	39	51	45	51	54	1.00	1.00	0.89	1.36
055	M	11	203	130	69	39	30	40	43	48	50	50	53	53	64	46	64	3.00	3.00	3.33	3.22
056	F	12	215	101	83	50	33	50	33	46	43	47	43	41	59	26	64	1.43	1.50	1.38	1.81
057	M	10	189	135	64	38	26	66	43	66	64	42	43	38	50	39	46	3.00	3.00	2.83	2.94
058	F	10	192	80	23	14	9	33	50	44	46	48	46	45	51	50	47	2.00	1.00	1.00	1.60
059	M	12	209	134	23	18	5	41	59	58	38	47	59	51	48	43	46	3.71	3.67	3.23	3.39
060	F	11	211	93	35	18	17	31	51	66	34	39	51	25	61	39	47	1.20	1.00	0.78	1.28
061	F	10	191	110	27	21	6	38	33	41	37	35	38	34	45	30	64	1.67	2.00	2.17	2.00
062	F	12	214	132	59	37	22	33	45	34	34	44	51	66	35	48	54	3.28	3.40	3.18	3.53
063	M	12	215	107	52	36	16	56	27	46	55	42	39	38	41	39	51	1.57	2.00	1.44	1.72
064	M	10	189	85	29	18	11	66	45	36	37	29	33	45	45	36	44	1.67	1.00	1.33	1.47
065	M	11	199	134	103	58	45	43	27	43	50	35	46	51	30	41	56	2.80	3.33	3.11	3.00
066	M	12	221	85	72	36	36	43	46	53	41	50	43	46	56	53	46	0.88	1.20	1.36	1.39
067	F	10	185	85	30	18	12	40	45	30	35	36	38	36	51	39	54	1.67	1.00	1.17	1.23
068	M	10	198	67	27	14	13	54	55	55	59	59	64	61	59	56	54	1.20	0.67	1.00	1.19
069	F	11	202	131	126	63	63	43	55	56	46	44	33	45	54	45	66	1.80	2.00	1.33	1.96
070	F	12	238	108	80	50	30	40	51	38	31	25	39	38	54	33	31	1.14	1.57	1.10	1.66
071	M	11	220	81	15	9	6	69	35	56	56	53	33	41	48	51	44	0.40	0.80	1.11	0.79
072	M	10	184	131	54	29	25	56	33	60	53	50	55	45	46	56	51	2.67	3.00	2.50	2.27
073	M	11	200	130	188	96	92	43	64	35	35	69	69	66	41	66	56	3.00	4.00	3.25	3.31
074	M	12	208	131	122	60	62	31	35	31	35	43	27	48	46	30	46	3.00	3.00	3.08	3.16
075	M	12	208	137	61	32	29	69	50	55	51	59	51	45	64	56	46	3.86	3.25	3.50	3.57
076	M	10	190	119	45	24	21	40	43	55	47	38	33	40	64	33	40	2.33	3.33	2.40	2.67
077	F	11	197	117	59	34	25	54	36	48	64	29	38	36	56	51	51	3.00	1.67	2.00	2.37
078	F	12	209	118	45	31	14	38	45	51	59	36	38	46	43	50	49	2.86	2.80	3.00	2.89
079	M	12	214	119	55	33	32	50	33	45	37	42	41	43	50	31	49	2.00	2.33	1.38	1.89
080	F	12	206	121	59	39	20	40	50	50	50	55	50	60	40	41	39	3.00	3.00	3.18	3.13

Student	Sex	Grade	Age In Months	IQ	Imagination			G-Z T Scores										Grade Point Average			
					Total	Combi-native	Creative	C	R	A	S	E	O	F	T	P	M	English	Social Studies	Science/ Math	Total
081	F	11	193	125	91	60	31	40	41	56	66	51	55	53	43	76	37	3.00	2.60	2.33	2.58
082	M	11	210	85	47	28	19	41	35	41	33	35	31	46	36	30	38	2.60	3.00	2.62	2.68
083	M	11	201	118	41	24	17	40	36	36	23	33	35	41	54	35	44	3.00	4.00	3.00	3.30
084	M	12	208	85	33	16	17	56	41	41	47	42	45	55	51	51	30	1.57	1.50	2.20	1.88
085	M	10	193	133	30	20	10	66	48	64	61	64	53	50	40	30	60	2.33	2.00	2.33	2.28
086	M	11	195	130	51	30	21	25	35	46	42	36	23	25	40	26	38	2.20	2.00	2.12	2.19
087	F	11	205	131	46	25	21	50	51	51	51	44	33	41	54	36	47	3.00	3.20	3.00	3.03
088	M	12	221	85	30	12	18	48	50	41	47	48	48	56	33	41	51	1.43	1.75	1.75	1.97
089	M	10	191	137	36	24	12	59	56	39	39	47	38	48	66	53	38	4.00	4.00	3.83	3.88
090	F	12	208	85	56	36	20	46	31	48	64	42	55	51	45	56	56	1.00	0.67	1.25	1.20
091	F	11	204	122	98	59	39	48	61	48	51	43	45	50	66	43	59	3.00	3.00	2.22	2.73
092	F	12	207	108	46	29	17	50	56	48	51	47	51	48	56	66	44	2.43	2.60	1.88	2.47
093	M	10	189	136	122	66	56	46	43	50	66	51	39	43	50	53	41	3.00	3.50	3.17	3.06
094	M	10	191	85	53	27	26	46	35	48	47	42	41	43	51	43	49	1.67	2.00	2.17	2.06
095	M	10	183	132	63	39	24	38	48	31	25	46	39	45	36	24	66	3.00	3.50	3.00	3.13
096	F	11	197	122	46	32	14	40	61	36	23	33	35	45	64	36	39	3.00	2.80	2.78	2.84
097	F	10	191	130	46	27	19	56	59	48	61	39	43	51	64	39	51	3.33	3.00	2.20	2.60
098	M	10	195	80	53	36	17	50	55	55	37	44	43	51	38	46	46	1.00	2.50	1.67	1.73
099	F	12	215	109	44	26	18	33	53	30	39	35	31	48	64	41	66	1.25	2.00	1.33	1.63
100	M	10	188	134	20	11	9	36	56	35	47	50	55	50	46	41	49	2.67	2.00	2.50	2.40
101	F	10	204	80	26	13	13	48	50	43	48	42	43	36	61	36	69	1.33	1.67	1.25	1.33
102	M	10	188	79	30	11	19	48	46	48	42	44	59	48	45	48	60	1.00	2.00	0.67	1.07
103	M	10	204	80	53	35	18	41	46	58	50	44	45	46	48	48	60	0.80	0.80	0.67	1.00
104	F	11	204	85	25	10	15	41	31	41	50	38	42	36	51	31	51	1.60	2.00	1.38	1.65
105	M	12	225	84	70	39	31	38	51	61	48	43	31	40	46	25	30	2.14	2.17	1.90	1.82
106	M	10	183	83	33	18	15	69	43	56	64	42	41	45	50	56	36	2.00	1.50	1.83	1.67
107	F	10	189	136	12	12	0	41	53	31	46	39	50	48	54	53	69	2.67	2.50	2.50	2.60
108	F	12	210	103	54	36	18	46	46	50	66	44	42	53	46	56	59	2.14	1.60	1.62	1.89
109	M	11	213	82	35	16	19	48	46	61	41	59	43	36	59	23	49	1.00	1.33	1.56	1.85
110	F	11	203	131	112	72	40	61	39	53	44	29	35	41	50	33	34	3.80	3.60	3.50	3.56
111	M	12	211	133	83	47	36	56	66	51	41	43	43	55	61	48	46	4.00	4.00	4.00	3.92
112	F	12	208	85	29	12	17	40	39	44	48	29	45	40	56	36	64	1.00	0.33	1.12	1.00
113	M	10	184	134	30	18	12	71	31	55	59	48	46	40	48	43	51	3.00	3.00	2.67	2.73
114	F	10	190	85	33	12	21	54	48	46	46	43	38	41	46	39	49	1.00	0.00	1.40	1.40
115	M	10	203	79	51	31	20	40	33	43	42	36	38	36	35	33	35	1.00	1.25	1.20	1.40
116	M	11	199	118	49	31	18	50	51	56	47	48	45	51	69	39	31	1.80	1.60	1.22	1.58
117	M	10	204	85	20	12	8	33	48	55	55	50	43	55	40	45	46	1.67	1.00	1.33	1.47
118	M	10	185	131	19	10	9	59	45	58	53	48	48	50	45	45	64	2.00	3.00	1.83	2.33
119	F	10	192	80	42	31	11	45	39	40	46	43	42	38	59	46	59	0.67	1.50	1.83	1.53
120	M	10	196	64	28	15	13	54	31	46	55	48	56	48	38	46	51	1.50	1.00	0.75	1.50

Student	Sex	Grade	Age In Months	IQ	Imagination			G-Z T Scores										Grade Point Average			
					Total	Combi-native	Creative	C	R	A	S	E	O	F	T	P	M	English	Social Studies	Science/ Math	Total
121	F	12	213	106	49	30	19	35	46	38	50	47	50	53	36	50	66	2.43	2.00	1.25	2.17
122	M	11	194	85	39	16	23	54	48	41	56	33	31	40	45	43	40	1.80	1.60	1.62	1.76
123	F	11	204	131	65	40	25	56	50	53	56	51	50	53	48	48	51	3.60	3.67	3.50	3.46
124	F	10	190	115	61	35	26	45	53	56	55	44	46	50	66	48	41	3.00	2.67	2.40	2.80
125	F	10	187	85	30	11	19	66	51	48	59	41	41	46	56	45	59	1.67	2.00	1.00	1.75
126	M	10	207	85	17	8	9	50	43	41	44	38	35	41	45	31	31	1.00	0.67	0.67	0.75
127	M	10	191	85	23	10	13	40	31	46	50	42	39	40	51	45	49	0.67	1.00	0.80	1.12
128	M	10	191	124	79	46	33	35	33	51	47	47	45	34	50	48	49	1.67	1.00	1.67	1.80
129	F	10	185	138	27	14	13	46	35	50	46	46	50	27	25	39	34	3.67	3.00	3.00	3.11
130	M	12	218	114	27	15	12	31	48	41	41	36	41	65	41	45	40	1.57	1.75	1.78	1.98
131	M	11	195	82	30	15	15	54	41	43	55	47	39	48	45	46	44	1.60	1.60	1.89	1.84
132	F	11	201	85	34	17	17	50	64	56	56	42	41	45	66	39	34	1.40	1.67	1.22	1.60
133	M	10	189	105	21	10	11	56	43	60	46	55	56	31	46	33	66	1.67	1.67	1.60	1.93
134	F	10	190	130	68	43	25	61	48	63	64	56	43	53	40	53	49	3.33	4.00	3.17	3.21
135	M	10	187	133	51	24	27	36	59	36	33	51	56	38	51	48	49	3.00	4.00	3.50	3.33
136	M	10	183	132	11	9	2	54	69	53	48	53	59	69	48	46	40	3.00	3.00	3.00	3.00
137	M	12	209	130	14	8	6	56	39	43	41	55	56	56	56	53	71	2.00	2.67	2.43	2.32
138	M	10	193	80	28	16	12	50	53	51	51	61	69	55	61	35	66	1.50	0.00	1.00	1.20
139	M	12	209	85	54	37	17	54	39	51	53	47	41	39	56	33	46	1.28	0.86	1.50	1.24
140	F	10	193	85	32	20	12	69	61	56	61	55	55	51	66	48	61	2.67	3.00	1.83	2.44
141	F	10	185	145	33	21	12	46	48	46	56	47	46	46	61	59	59	3.33	3.00	2.67	2.80
142	M	11	198	112	47	26	21	29	56	39	42	38	42	46	69	39	49	3.00	2.67	2.40	2.81
143	M	11	206	117	91	46	45	50	51	46	46	56	36	48	45	48	38	1.60	1.67	1.12	1.77
144	F	10	175	83	28	22	6	51	33	50	51	41	45	41	41	48	41	3.00	3.00	1.83	2.36
145	M	10	183	85	26	9	17	43	39	48	50	53	43	61	43	45	41	1.33	1.00	0.67	0.87
146	M	10	183	137	69	48	21	45	25	41	46	47	46	38	46	28	41	1.67	1.00	1.20	1.47
147	F	11	195	130	43	25	18	45	33	56	55	46	41	36	40	33	37	3.00	2.67	3.20	3.12
148	F	11	196	135	58	34	24	33	35	41	42	29	38	36	54	51	59	3.00	2.33	2.86	2.69
149	M	12	210	113	67	41	26	46	33	55	61	44	48	34	50	28	56	2.86	2.50	2.33	2.62
150	F	12	210	131	16	10	6	64	59	48	50	38	29	40	56	39	47	4.00	3.75	3.83	3.82
151	F	12	209	99	59	31	28	33	59	48	43	33	35	36	50	39	62	1.43	1.00	1.38	1.39
152	M	12	216	131	66	35	31	46	33	45	38	51	45	36	45	35	46	2.86	3.80	3.00	3.03
153	M	12	218	133	39	20	19	38	46	35	43	41	39	65	43	45	46	2.86	2.75	3.00	3.12
154	M	11	207	80	66	32	34	43	35	51	35	41	31	41	36	31	31	1.00	2.00	1.00	1.46
155	M	11	198	134	83	41	42	51	61	43	47	53	55	48	71	50	36	3.60	4.00	3.60	3.58
156	M	10	181	122	33	19	14	45	43	43	59	43	42	46	48	43	49	3.00	3.00	2.83	2.65
157	M	10	190	132	74	33	41	40	33	41	39	43	50	50	51	36	54	3.33	3.00	3.40	3.38
158	M	11	216	79	24	15	9	40	36	27	31	35	33	36	41	30	38	1.00	1.20	1.33	1.59
159	M	11	204	132	50	29	21	35	53	43	41	53	50	48	43	35	40	2.60	4.00	3.10	3.00
160	M	10	184	85	36	15	21	45	39	43	48	42	43	45	41	53	60	2.00	1.00	1.33	1.53

Student	Sex	Grade	Age In Months	IQ	Imagination			O-Z T Scores										Grade Point Average			
					Total	Combi-native	Creative	C	R	A	S	E	O	F	T	P	M	English	Social Studies	Science/ Math	Total
161	M	10	193	132	44	25	19	48	55	39	47	51	43	51	48	50	49	3.67	4.00	3.33	3.35
162	M	10	195	77	27	13	14	38	36	50	39	42	42	39	43	35	33	1.00	0.00	1.00	1.50
163	M	10	184	135	50	32	18	40	51	51	48	35	43	48	56	50	54	2.67	3.00	2.50	2.33
164	F	10	192	131	44	27	17	45	51	55	50	35	27	36	61	39	69	3.67	3.00	2.83	3.06
165	F	10	185	132	75	50	25	41	45	55	55	33	43	45	64	35	62	3.33	2.00	2.33	2.53
166	M	11	196	133	37	23	14	24	46	27	43	46	43	51	46	53	46	2.80	3.00	3.30	3.04
167	F	11	197	130	63	38	25	50	51	50	61	50	45	53	41	51	56	3.00	4.00	2.60	2.72
168	M	12	212	101	61	37	24	59	45	56	66	50	45	43	50	46	46	1.38	1.20	1.22	1.79
169	M	11	202	135	32	24	8	73	29	56	42	39	31	26	43	33	56	1.60	1.50	2.30	2.23
170	F	11	204	119	52	38	14	45	43	48	55	36	45	53	40	35	59	1.80	1.00	1.75	1.96
171	F	12	212	130	28	15	13	64	45	40	48	46	48	55	33	41	51	3.00	2.25	2.44	2.86
172	M	11	195	147	46	24	22	40	33	39	43	43	42	46	41	33	49	3.80	4.00	3.80	3.81
173	F	10	193	85	32	19	13	46	46	36	42	33	29	48	61	46	66	2.33	3.00	2.25	2.73
174	M	12	208	114	32	26	6	46	46	45	42	56	53	61	59	51	60	1.71	1.50	1.44	1.68
175	M	11	196	131	251	104	147	56	51	53	34	48	46	38	59	43	51	3.00	3.50	3.25	3.15
176	M	10	203	108	57	33	24	41	53	45	44	53	53	41	56	55	51	1.00	1.00	2.00	1.88
177	F	10	183	116	41	23	18	54	43	41	56	41	39	41	64	43	64	1.67	1.00	1.50	1.93
178	M	10	201	80	14	9	5	31	45	41	34	41	45	48	54	26	64	1.40	0.33	0.92	1.07
179	M	10	207	74	15	8	7	26	29	29	37	36	42	41	33	35	31	1.00	1.00	0.80	1.25
180	F	11	194	130	33	15	18	61	39	40	46	47	43	48	46	56	41	2.60	2.33	2.78	2.69
181	F	12	209	115	24	14	10	40	56	34	47	38	38	53	64	53	59	1.86	1.00	1.67	1.78
182	M	10	201	79	20	7	13	45	46	45	37	55	59	48	41	55	56	0.83	1.00	0.67	0.87
183	M	10	194	131	66	33	33	46	69	51	55	61	64	63	61	64	49	4.00	4.00	3.67	3.81
184	M	11	203	85	27	14	13	40	46	50	50	47	51	55	59	59	41	1.00	1.00	0.75	1.19
185	F	10	191	85	19	10	9	59	43	30	37	51	42	41	46	46	64	1.33	1.33	1.00	1.56
186	M	10	183	134	65	29	36	61	46	61	55	38	31	46	54	36	38	2.33	2.50	2.00	2.56
187	F	12	206	112	64	40	24	29	31	36	37	44	42	46	48	36	64	2.11	2.50	2.27	2.74
188	M	11	213	111	36	19	17	40	35	31	39	42	59	41	30	43	51	2.60	3.00	2.80	3.00
189	F	12	209	85	27	14	13	51	43	44	47	38	29	40	48	36	71	1.71	1.75	1.22	1.77
190	F	11	202	125	108	75	33	38	35	50	56	38	41	46	59	51	66	3.00	2.67	2.80	3.00
191	F	10	187	137	49	34	15	66	39	50	41	44	31	55	66	45	47	3.33	3.00	2.17	2.61
192	F	11	205	121	117	72	45	40	31	41	44	31	35	38	45	30	62	3.00	3.00	2.78	3.07
193	F	10	202	84	20	12	8	54	45	56	61	42	43	38	69	53	64	1.67	1.00	1.20	1.59
194	F	10	184	131	79	40	39	51	31	40	59	51	53	41	25	45	56	3.00	3.00	1.83	2.33
195	F	11	225	79	21	13	8	29	46	34	34	36	27	25	35	35	69	0.62	1.00	1.00	1.03
196	F	11	196	112	30	17	13	56	33	44	56	41	55	51	35	45	41	2.00	2.00	2.00	2.19
197	F	11	205	138	142	72	70	43	55	51	53	55	53	53	46	61	49	3.80	3.67	3.33	3.77
198	M	12	210	135	73	35	38	43	43	36	55	47	43	43	50	50	56	1.86	1.75	1.80	1.78
199	M	11	236	77	39	15	24	64	36	45	51	51	59	55	46	43	60	0.50	0.11	1.25	1.03
200	M	10	187	135	39	25	14	43	43	29	27	42	25	41	50	39	46	2.33	4.00	3.17	2.89

Student	Sex	Grade	Age In Months	IQ	Imagination			G-Z T Scores										Grade Point Average			
					Total	Combi-native	Creative	C	R	A	S	E	O	F	T	P	M	English	Social Studies	Science/ Math	Total
201	F	12	217	124	83	54	29	40	45	51	59	35	29	41	45	36	71	2.86	2.67	2.91	2.86
202	M	10	194	130	26	16	10	48	43	43	41	39	43	45	36	41	49	3.33	4.00	3.17	3.55
203	F	12	210	85	24	10	14	45	39	51	42	35	25	34	46	35	66	1.43	1.50	1.38	1.63
204	M	12	204	133	60	35	25	46	46	46	42	41	36	25	38	35	44	3.57	4.00	3.00	3.34
205	M	12	207	83	29	14	15	59	41	55	46	41	36	36	45	41	31	1.22	1.33	1.75	1.66
206	F	11	194	144	134	72	62	41	61	63	55	55	50	46	54	59	59	4.00	3.67	3.78	3.68
207	M	12	209	117	63	40	23	61	43	58	51	48	55	56	41	50	54	1.33	1.33	1.67	1.43
208	F	12	219	107	51	31	20	45	45	44	38	38	41	45	50	39	69	3.00	3.50	3.33	3.40
209	F	11	202	118	43	24	19	40	33	56	53	36	35	43	59	35	39	2.20	1.67	1.78	2.16
210	F	12	209	130	46	19	27	40	45	40	48	36	42	53	31	43	56	3.00	3.40	3.00	3.17
211	M	10	188	115	80	41	39	41	33	51	43	35	41	40	43	36	41	2.67	3.50	2.60	2.78
212	F	11	198	112	69	42	27	46	39	55	47	43	35	48	54	48	69	1.60	2.00	2.11	2.27
213	M	10	207	85	27	13	14	64	41	60	50	48	42	40	38	43	46	1.33	1.00	1.83	1.73
214	M	10	191	117	29	11	18	40	50	55	48	43	36	46	64	50	41	2.33	2.00	2.20	2.20
215	M	10	196	85	13	7	6	56	39	48	47	35	29	40	59	43	33	1.33	0.50	1.17	1.40
216	M	10	184	137	94	47	47	41	48	46	44	50	46	51	40	50	56	1.67	2.00	2.00	1.80
217	F	10	200	80	26	14	12	54	45	40	41	42	42	55	61	46	54	1.67	1.00	1.50	1.75
218	F	12	208	135	93	50	43	43	35	38	53	38	38	55	46	36	44	3.14	3.67	2.70	2.03
219	F	11	199	118	60	36	24	41	35	34	42	31	41	43	38	39	64	1.60	1.00	1.50	1.56
220	F	12	211	132	37	19	18	66	56	40	43	61	56	73	71	69	29	3.43	2.25	2.62	3.08
221	F	11	206	85	96	58	38	54	64	63	55	46	43	41	71	51	61	2.00	1.75	1.71	2.04
222	F	12	208	117	75	49	26	54	41	51	59	44	45	53	31	48	54	2.57	2.00	2.00	2.48
223	M	10	193	134	24	10	14	64	36	56	51	47	33	25	71	41	44	3.00	4.00	2.50	3.16
224	F	12	206	130	99	58	41	45	56	38	35	35	25	50	71	56	51	3.86	3.33	3.43	3.32
225	M	12	217	103	75	41	34	61	36	64	48	55	51	41	48	45	41	2.14	2.60	1.54	2.00
226	M	11	198	85	25	15	10	36	41	35	46	42	38	51	46	45	41	1.40	1.33	1.12	1.69
227	M	10	192	75	18	9	9	35	31	46	41	33	29	31	30	26	41	0.67	1.00	1.40	1.00
228	F	12	214	130	137	68	69	64	43	41	48	35	35	34	50	24	31	3.00	2.50	2.64	3.00
229	F	11	206	130	30	17	13	33	53	44	51	46	46	45	42	51	64	3.80	4.00	3.33	3.72
230	F	12	214	111	55	34	21	71	36	50	41	50	50	41	45	45	41	2.57	2.00	2.50	2.46
231	M	12	214	119	37	19	18	50	36	39	48	55	51	43	43	36	49	2.57	2.33	2.83	2.60
232	M	10	215	85	19	10	9	29	43	43	46	48	41	46	36	53	59	1.00	2.00	1.50	1.73
233	F	10	180	130	44	23	21	54	53	53	48	46	55	46	36	46	56	3.67	3.00	2.50	2.89
234	F	11	202	113	35	20	15	48	48	59	41	39	36	34	54	39	37	1.20	1.60	1.50	1.42
235	M	12	212	118	34	21	13	66	43	48	51	50	51	36	50	39	40	2.86	3.00	2.25	2.77
236	M	10	193	133	87	41	46	48	35	50	47	38	39	40	59	33	46	2.00	1.50	2.00	2.06
237	M	12	217	85	26	15	11	46	41	36	35	51	46	46	51	41	49	0.86	1.00	1.12	1.25
238	M	12	216	114	28	14	14	36	46	53	38	51	39	38	64	41	54	3.14	4.00	3.00	3.06
239	F	10	183	131	68	30	38	61	39	46	51	38	29	43	59	35	56	2.67	3.00	2.83	3.00
240	M	10	184	145	16	10	6	40	51	41	33	59	48	48	56	51	49	3.67	4.00	3.83	3.62

Student	Sex	Grade	Age In Months	IQ	Imagination			G-Z T Scores										Grade Point Average			
					Total	Combi-native	Creative	C	R	A	S	E	O	F	T	P	M	English	Social Studies	Science/ Math	Total
241	F	10	202	85	25	11	14	50	36	48	51	29	41	40	54	39	37	1.00	1.00	1.00	1.44
242	F	10	187	85	60	34	26	59	41	51	55	42	42	34	54	33	54	1.67	1.50	1.00	1.38
243	M	12	214	130	18	12	6	45	53	50	37	43	35	26	56	30	54	3.28	3.60	2.67	3.12
244	F	10	191	85	35	17	18	64	45	55	61	50	43	64	61	48	66	1.67	1.00	1.50	1.69
245	F	11	198	133	147	73	74	27	50	26	24	43	51	58	41	33	62	4.00	4.00	3.50	3.85
246	M	10	190	132	52	24	28	46	36	41	51	44	36	48	48	46	44	1.67	2.50	2.17	1.93
247	F	11	196	110	85	48	37	56	45	40	47	26	25	36	40	28	56	2.20	2.00	2.17	2.46
248	F	10	189	84	103	67	36	59	43	51	55	41	35	41	66	31	64	1.33	2.00	1.17	1.56
249	M	12	201	134	28	19	9	41	35	31	34	36	46	66	41	66	51	4.00	3.80	3.54	3.53
250	M	10	182	132	23	12	11	31	45	31	34	42	33	45	40	43	51	3.00	3.00	3.17	3.06
251	F	11	204	80	20	12	8	59	35	50	47	36	41	41	43	45	54	2.00	1.67	1.38	1.85
252	M	11	221	64	53	29	24	56	41	53	66	42	43	45	46	33	54	1.00	0.67	0.89	1.08
253	M	10	185	132	66	34	32	43	53	58	53	48	45	55	59	50	64	3.00	3.00	3.00	2.70
254	F	10	185	112	48	28	20	51	31	51	53	36	35	48	43	61	44	2.33	2.50	1.67	2.21
255	F	11	193	130	92	59	33	73	36	63	61	46	51	40	45	55	31	2.80	2.33	2.38	2.74
256	F	10	185	116	51	30	21	36	39	50	51	36	41	40	36	39	37	2.00	2.00	1.83	2.27
257	F	11	201	114	37	25	12	51	35	51	55	56	64	64	40	51	35	2.00	2.00	1.86	2.04
258	M	11	196	129	68	39	29	45	45	39	48	35	33	50	48	35	54	2.60	2.33	3.00	2.86
259	F	10	190	116	21	12	9	54	55	53	42	31	36	45	69	45	51	4.00	3.00	2.33	3.22
260	M	12	218	110	43	22	21	38	41	43	50	46	33	51	54	41	54	2.86	3.25	3.50	3.40