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**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

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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."<sup>1</sup> 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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<sup>1</sup>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 assumed 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<sup>2</sup> 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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<sup>2</sup>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 standardized. 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<br>Classification | Question one                       |     | Question two                         |    |
|-------------------------|------------------------------------|-----|--------------------------------------|----|
|                         | Is drawing one of<br>your hobbies? |     | Have you had any<br>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.<sup>3</sup>

#### 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,<sup>4</sup> is based on the Wartegg test blank. The author traces extensive validation studies, as well as the origin and

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<sup>3</sup> Profile Chart for the Guilford-Zimmerman Temperament Survey (Beverly Hills, California: Sheridan Supply Company, 1955).

<sup>4</sup> 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."<sup>5</sup>

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<sup>5</sup>  
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<sup>6</sup> 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

Physiognomy  
Ornaments  
Style  
Organization  
Symmetric Abstraction

Creative Imagination

Expansion  
Fantasy (Fancy, Phantasm, Symbolism)  
Originality  
Asymmetric Abstraction (Technical)  
Dark Shading

---

<sup>6</sup>  
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<sup>1</sup> has indicated

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<sup>1</sup> J. P. Guilford, "Creativity," The American Psychologist, V (1950), p. 446.

this continuum to exist for all abilities while Wilson<sup>2</sup> 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.<sup>3</sup>

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<sup>4</sup>, 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<sup>5</sup> and by the

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<sup>2</sup>R. C. Wilson, "An Operational Definition of Originality," The American Psychologist, VI, No. 7 (1951), p. 297.

<sup>3</sup>David H. Russell, Children's Thinking (Boston: Ginn & Company, 1956), p. 307.

<sup>4</sup>E. A. Kirkpatrick, "Individual Tests of School Children," Psychological Review, V, No. 7 (1900), p. 274.

<sup>5</sup>R. M. Simpson, "Creative Imagination," American Journal of Psychology, XXXIII (1922), pp. 234-243.

investigations conducted by Torrance.<sup>6</sup>

As a result of his investigations in developing and using The Minnesota Tests of Creative Thinking, Torrance<sup>7</sup> 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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<sup>6</sup> E. Paul Torrance, Rewarding Creative Behavior (Englewood Cliffs, N. J. : Prentice-Hall, Inc., (1965), pp. 245-246.

<sup>7</sup> 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<sup>8</sup> 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<sup>9</sup>, Simpson<sup>10</sup>, McCloy and Meier<sup>11</sup>, and Barron.<sup>12</sup>

The impact of the conforming nature of traditional measures of intelligence were noted by Torrance<sup>13</sup> in studying children of West

<sup>8</sup> G. V. Dearborn, "A Study of Imagination," American Journal of Psychology, V, No. 9 (1898), pp. 183-190.

<sup>9</sup> Laura M. Chassell, "Tests for Originality," Journal of Educational Psychology, VII (1916), pp. 317-328.

<sup>10</sup> R. M. Simpson, "Creative Imagination," American Journal of Psychology, XXXIII (1922), pp. 234-235.

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

<sup>12</sup> Frank Barron, "Originality in Relation to Personality and Intellect," Journal of Personality, XXV (1957), pp. 730-742.

<sup>13</sup> 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<sup>14</sup>, 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<sup>15</sup> 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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<sup>14</sup> J. Ornstein, "New Recruits for Science," Parents' Magazine, XXXVI, No. 2 (February, 1961), pp. 42 ff.

<sup>15</sup> 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<sup>16</sup> 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."<sup>17</sup> As

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

<sup>17</sup> D. W. MacKinnon, "The Nurture of Creative Talent," The American Psychologist, XVII (1962), p. 488.



McClelland<sup>18</sup> 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 though by no means identical. The study by Richards, Cline, and Needham<sup>19</sup>, 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<sup>20</sup> reported correlations ranging between 0.55 and 0.75 on a heterogeneous sample of high school students.

Meer and Stein<sup>21</sup>, 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

<sup>18</sup>D. C. McClelland, "Issues in the Identification of Talent," Talent and Society, eds. D. C. McClelland, A. L. Baldwin, U. Bronfenbrenner, and F. L. Strodbeck (Princeton, N. J.: D. Van Nostrand, 1958), p. 13.

<sup>19</sup>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.

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

<sup>21</sup>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<sup>22</sup> 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<sup>23</sup> 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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<sup>22</sup> Frank Barron, "Some Relationships between Originality and Style of Personality," The American Psychologist, IX (1954), p. 326.

<sup>23</sup> 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<sup>24</sup> 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<sup>25</sup> 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<sup>26</sup> reported some descriptive

<sup>24</sup> J. P. Guilford, "Creative Abilities in the Arts," Psychological Review, LXIV (1957), pp. 110-118.

<sup>25</sup> John E. Drevdahl, "Factors of Importance For Creativity," Journal of Clinical Psychology, XII, No. 1 (1956), pp. 21-26.

<sup>26</sup> 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<sup>27</sup> 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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<sup>26</sup>  
John L. Holland, "Creative and Academic Performance Among Talented Adolescents," Journal of Educational Psychology, LII, No. 3 (1961), pp. 136-147.

<sup>27</sup>  
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<sup>28</sup>, 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<sup>29</sup> 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

<sup>28</sup> 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.

<sup>29</sup> 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<sup>30</sup> 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<sup>31</sup> 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

<sup>30</sup> 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.

<sup>31</sup> 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."<sup>32</sup>

Holland<sup>33</sup> 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<sup>34</sup> and by Gough<sup>35</sup> 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<sup>36</sup> and MacKinnon<sup>37</sup> have implied that good grades in high school and college may be either unrelated to, or negatively correlated with, potential for creative performance.

<sup>32</sup> Ibid., p. 31.

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

<sup>34</sup> Ibid., pp. 219-223.

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

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

<sup>37</sup> 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."<sup>38</sup>

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<sup>39</sup> 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 proficiency 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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<sup>38</sup> Catherine Patrick, What is Creative Thinking? (New York: Philosophical Library, Inc., 1955), p. 185.

<sup>39</sup> 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

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

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<br>Classification | Total Imagination |       |               |       |       |               |
|-------------------------|-------------------|-------|---------------|-------|-------|---------------|
|                         | Mean              |       |               | S.D.  |       |               |
|                         | M                 | F     | Both<br>Sexes | M     | F     | Both<br>Sexes |
| Sophomore               | 40.30             | 39.52 | 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<br>Classification | Combinative Imagination |       |               |       |       |               |
|-------------------------|-------------------------|-------|---------------|-------|-------|---------------|
|                         | Mean                    |       |               | S.D.  |       |               |
|                         | M                       | F     | Both<br>Sexes | M     | F     | Both<br>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<br>Classification | Creative Imagination |       |               |       |       |               |
|-------------------------|----------------------|-------|---------------|-------|-------|---------------|
|                         | Mean                 |       |               | S.D.  |       |               |
|                         | M                    | F     | Both<br>Sexes | M     | F     | Both<br>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<br>Classification | Age in Months |        |               |       |       |               |
|-------------------------|---------------|--------|---------------|-------|-------|---------------|
|                         | Mean          |        |               | S.D.  |       |               |
|                         | M             | F      | Both<br>Sexes | M     | F     | Both<br>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<br>Variables   | $\chi^2$ Values |          |       |
|----------------------------|-----------------|----------|-------|
|                            | d.f.            | $\chi^2$ | p     |
| Total<br>Imagination       | 42              | 38.493   | >0.05 |
| Combinative<br>Imagination | 72              | 63.287   | >0.05 |
| Creative<br>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<br>Classification | I. Q. Scores |        |               |       |       |               |
|-------------------------|--------------|--------|---------------|-------|-------|---------------|
|                         | Mean         |        |               | S.D.  |       |               |
|                         | M            | F      | Both<br>Sexes | M     | F     | Both<br>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<br>Variables   | $\chi^2$ Values |          |        |
|----------------------------|-----------------|----------|--------|
|                            | d.f.            | $\chi^2$ | p      |
| Total<br>Imagination       | 48              | 100.501  | 0.0005 |
| Combinative<br>Imagination | 72              | 119.273  | 0.0005 |
| Creative<br>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<br>Classification | Male |          | Female |          | Both<br>Sexes |            |
|-------------------------|------|----------|--------|----------|---------------|------------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$   |
| 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<br>Classification | Male |          | Female |          | Both<br>Sexes |           |
|-------------------------|------|----------|--------|----------|---------------|-----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$  |
| 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<br>Classification | Male |          | Female |           | Both<br>Sexes |          |
|-------------------------|------|----------|--------|-----------|---------------|----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$  | d.f.          | $\chi^2$ |
| 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<br>Variables   | Coefficients of Correlation |        |       |
|----------------------------|-----------------------------|--------|-------|
|                            | d.f.                        | r      | p     |
| Total<br>Imagination       | 258                         | 0.3426 | 0.005 |
| Combinative<br>Imagination | 258                         | 0.3526 | 0.005 |
| Creative<br>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 (Ascendancy), 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<br>Variables | Sophomore |       | Junior |       | Senior |       | All Grades |       | Both<br>Sexes |
|--------------------------|-----------|-------|--------|-------|--------|-------|------------|-------|---------------|
|                          | M         | F     | M      | F     | M      | F     | M          | F     |               |
| 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<br>Variables | Sophomore |       | Junior |       | Senior |       | All Grades |       | Both<br>Sexes |
|--------------------------|-----------|-------|--------|-------|--------|-------|------------|-------|---------------|
|                          | M         | F     | M      | F     | M      | F     | M          | F     |               |
| 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<br>Variables | $\chi^2$          |          |        |                         |          |        |                      |          |        |
|--------------------------|-------------------|----------|--------|-------------------------|----------|--------|----------------------|----------|--------|
|                          | Total Imagination |          |        | Combinative Imagination |          |        | Creative Imagination |          |        |
|                          | d.f.              | $\chi^2$ | p      | d.f.                    | $\chi^2$ | p      | d.f.                 | $\chi^2$ | 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 (Ascendancy), 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 Ascendancy, 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 Ascendancy 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<br>Classification | Male |          | Female |          | Both<br>Sexes |           |
|-------------------------|------|----------|--------|----------|---------------|-----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$  |
| 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 Ascendancy 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 Ascendancy 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<br>Classification | Male |          | Female |          | Both<br>Sexes |                     |
|-------------------------|------|----------|--------|----------|---------------|---------------------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$            |
| 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 <sup>*</sup> |

\* Significant at 0.05 level

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

The obtained Chi-square values, as reported in Table XVIII for ascertaining independence of Combinative Imagination and the personality trait of Ascendancy, 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 Ascendancy 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<br>Classification | Male |          | Female |           | Both<br>Sexes |           |
|-------------------------|------|----------|--------|-----------|---------------|-----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$  | d.f.          | $\chi^2$  |
| 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 Ascendancy (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 Ascendancy, 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 dependency 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 positively 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<br>Classification | Male |          | Female |          | Both<br>Sexes |           |
|-------------------------|------|----------|--------|----------|---------------|-----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$  |
| 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<br>Classification | Male |          | Female |          | Both<br>Sexes |          |
|-------------------------|------|----------|--------|----------|---------------|----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$ |
| 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<br>Classification | Male |          | Female |          | Both<br>Sexes |           |
|-------------------------|------|----------|--------|----------|---------------|-----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$  |
| 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 manifests 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<br>Variable    | Coefficients of Correlation |        |       |
|----------------------------|-----------------------------|--------|-------|
|                            | d.f.                        | r.     | p     |
| Total<br>Imagination       | 258                         | 0.0542 | >0.05 |
| Combinative<br>Imagination | 258                         | 0.0750 | >0.05 |
| Creative<br>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 CLASSI-  
FICATION AND FOR THE TOTAL SAMPLE  
(n = 260)

| Grade<br>Classification | Male |           | Female |           | Both<br>Sexes |           |
|-------------------------|------|-----------|--------|-----------|---------------|-----------|
|                         | d.f. | $\chi^2$  | d.f.   | $\chi^2$  | d.f.          | $\chi^2$  |
| 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<br>Classification | Male |           | Female |            | Both<br>Sexes |            |
|-------------------------|------|-----------|--------|------------|---------------|------------|
|                         | d.f. | $\chi^2$  | d.f.   | $\chi^2$   | d.f.          | $\chi^2$   |
| 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 CLASSI-  
FICATION AND FOR THE TOTAL SAMPLE  
(n = 260)

| Grade<br>Classification | Male |           | Female |           | Both<br>Sexes |           |
|-------------------------|------|-----------|--------|-----------|---------------|-----------|
|                         | d.f. | $\chi^2$  | d.f.   | $\chi^2$  | d.f.          | $\chi^2$  |
| 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<br>Classification | Male |           | Female |            | Both<br>Sexes |            |
|-------------------------|------|-----------|--------|------------|---------------|------------|
|                         | d.f. | $\chi^2$  | d.f.   | $\chi^2$   | d.f.          | $\chi^2$   |
| 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<br>Classification | Male |            | Female |            | Both<br>Sexes |            |
|-------------------------|------|------------|--------|------------|---------------|------------|
|                         | d.f. | $\chi^2$   | d.f.   | $\chi^2$   | d.f.          | $\chi^2$   |
| 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 magnitude 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<br>Variables   | Coefficients of Correlation |        |       |
|----------------------------|-----------------------------|--------|-------|
|                            | d.f.                        | r      | p     |
| Total<br>Imagination       | 258                         | 0.1130 | 0.05  |
| Combinative<br>Imagination | 258                         | 0.0696 | >0.05 |
| Creative<br>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<br>Classification | Male |          | Female |          | Both<br>Sexes |           |
|-------------------------|------|----------|--------|----------|---------------|-----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$  |
| 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<br>Classification | Male |          | Female |           | Both<br>Sexes |            |
|-------------------------|------|----------|--------|-----------|---------------|------------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$  | d.f.          | $\chi^2$   |
| 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<br>Classification | Male |          | Female |          | Both<br>Sexes |          |
|-------------------------|------|----------|--------|----------|---------------|----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$ |
| 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 vacillate 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<br>Variables   | Coefficients of Correlation |        |       |
|----------------------------|-----------------------------|--------|-------|
|                            | d.f.                        | r      | p     |
| Total<br>Imagination       | 258                         | 0.0837 | >0.05 |
| Combinative<br>Imagination | 258                         | 0.0715 | >0.05 |
| Creative<br>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 CLASSIFI-  
CATION AND FOR THE TOTAL SAMPLE  
(n = 260)

| Grade<br>Classification | Male |          | Female |           | Both<br>Sexes |            |
|-------------------------|------|----------|--------|-----------|---------------|------------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$  | d.f.          | $\chi^2$   |
| 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

\*\*\* Significant at 0.0005 level

The same data for ~~Combina~~ve 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 CLASSI-  
FICATION AND FOR THE TOTAL SAMPLE  
(n = 260)

| Grade<br>Classification | Male |          | Female |          | Both<br>Sexes |           |
|-------------------------|------|----------|--------|----------|---------------|-----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$  |
| 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<br>Classification | Male |           | Female |             | Both<br>Sexes |             |
|-------------------------|------|-----------|--------|-------------|---------------|-------------|
|                         | d.f. | $\chi^2$  | d.f.   | $\chi^2$    | d.f.          | $\chi^2$    |
| 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<br>Variables   | Coefficients of Correlation |        |       |
|----------------------------|-----------------------------|--------|-------|
|                            | d.f.                        | r      | p     |
| Total<br>Imagination       | 258                         | 0.0922 | >0.05 |
| Combinative<br>Imagination | 258                         | 0.0915 | >0.05 |
| Creative<br>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<br>Classification | English G. P. A. |      |               |      |      |               |
|-------------------------|------------------|------|---------------|------|------|---------------|
|                         | Mean             |      |               | S.D. |      |               |
|                         | M                | F    | Both<br>Sexes | M    | F    | Both<br>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   | $\chi^2$ Values |          |       |
|-------------------------|-----------------|----------|-------|
|                         | d.f.            | $\chi^2$ | 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<br>Classification | Social Studies G. P. A. |      |               |      |      |               |
|-------------------------|-------------------------|------|---------------|------|------|---------------|
|                         | Mean                    |      |               | S.D. |      |               |
|                         | M                       | F    | Both<br>Sexes | M    | F    | Both<br>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   | $\chi^2$ Values |          |       |
|-------------------------|-----------------|----------|-------|
|                         | d.f.            | $\chi^2$ | 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<br>Classification | Male |           | Female |          | Both<br>Sexes |             |
|-------------------------|------|-----------|--------|----------|---------------|-------------|
|                         | d.f. | $\chi^2$  | d.f.   | $\chi^2$ | d.f.          | $\chi^2$    |
| 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<br>Classification | Male |          | Female |          | Both<br>Sexes |            |
|-------------------------|------|----------|--------|----------|---------------|------------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$   |
| 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<br>Classification | Male |          | Female |          | Both<br>Sexes |          |
|-------------------------|------|----------|--------|----------|---------------|----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$ |
| 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<br>Variables   | Coefficients of Correlation |        |       |
|----------------------------|-----------------------------|--------|-------|
|                            | d.f.                        | r      | p     |
| Total<br>Imagination       | 258                         | 0.3058 | 0.005 |
| Combinative<br>Imagination | 258                         | 0.3043 | 0.005 |
| Creative<br>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<br>Classification | Science/Mathematics G. P. A. |      |               |      |      |               |
|-------------------------|------------------------------|------|---------------|------|------|---------------|
|                         | Mean                         |      |               | S.D. |      |               |
|                         | M                            | F    | Both<br>Sexes | M    | F    | Both<br>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 independence 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   | $\chi^2$ Values |          |       |
|-------------------------|-----------------|----------|-------|
|                         | d.f.            | $\chi^2$ | 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<br>Classification | Male |          | Female |          | Both<br>Sexes |           |
|-------------------------|------|----------|--------|----------|---------------|-----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$  |
| 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<br>Classification | Male |          | Female |          | Both<br>Sexes |           |
|-------------------------|------|----------|--------|----------|---------------|-----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$  |
| 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<br>Classification | Male |          | Female |          | Both<br>Sexes |          |
|-------------------------|------|----------|--------|----------|---------------|----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$ |
| 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<br>Variables   | Coefficients of Correlation |        |       |
|----------------------------|-----------------------------|--------|-------|
|                            | d.f.                        | r      | p     |
| Total<br>Imagination       | 258                         | 0.3257 | 0.005 |
| Combinative<br>Imagination | 258                         | 0.3204 | 0.005 |
| Creative<br>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<br>Classification | Total Grade Point Average |      |               |      |      |               |
|-------------------------|---------------------------|------|---------------|------|------|---------------|
|                         | Mean                      |      |               | S.D. |      |               |
|                         | M                         | F    | Both<br>Sexes | M    | F    | Both<br>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<br>Variables   | $\chi^2$ |          |        |
|----------------------------|----------|----------|--------|
|                            | d.f.     | $\chi^2$ | p      |
| Total<br>Imagination       | 258      | 116.241  | 0.0005 |
| Combinative<br>Imagination | 258      | 109.976  | 0.005  |
| Creative<br>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 DISTRIBUTION FOR EACH GRADE  
CLASSIFICATION AND FOR THE TOTAL SAMPLE  
(n = 260)

| Grade<br>Classification | Male |          | Female |          | Both<br>Sexes |           |
|-------------------------|------|----------|--------|----------|---------------|-----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$  |
| 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-square 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<br>Classification | Male |          | Female |          | Both<br>Sexes |          |
|-------------------------|------|----------|--------|----------|---------------|----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$ |
| 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 IV

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<br>Classification | Male |          | Female |          | Both<br>Sexes |          |
|-------------------------|------|----------|--------|----------|---------------|----------|
|                         | d.f. | $\chi^2$ | d.f.   | $\chi^2$ | d.f.          | $\chi^2$ |
| 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<br>Variables   | Coefficients of Correlation |        |       |
|----------------------------|-----------------------------|--------|-------|
|                            | d.f.                        | r      | P     |
| Total<br>Imagination       | 258                         | 0.3440 | 0.005 |
| Combinative<br>Imagination | 258                         | 0.3456 | 0.005 |
| Creative<br>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<sup>1</sup> 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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<sup>1</sup>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<sup>1</sup>, 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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<sup>1</sup>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<sup>2</sup>, Bridgman<sup>3</sup>, and Bruner<sup>4</sup>, 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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<sup>2</sup>F. C. S. Northrup, The Logic of the Sciences and the Humanities (New York: The Macmillan Company, 1947).

<sup>3</sup>P. W. Bridgman, Reflections of a Physicist (New York: The Philosophical Library, Inc., 1950).

<sup>4</sup>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<sup>5</sup>, 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."<sup>6</sup> 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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<sup>5</sup>Ibid., p. 7.

<sup>6</sup>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."<sup>7</sup>

The personality characteristics of ascendence, 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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<sup>7</sup>  
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 problematic 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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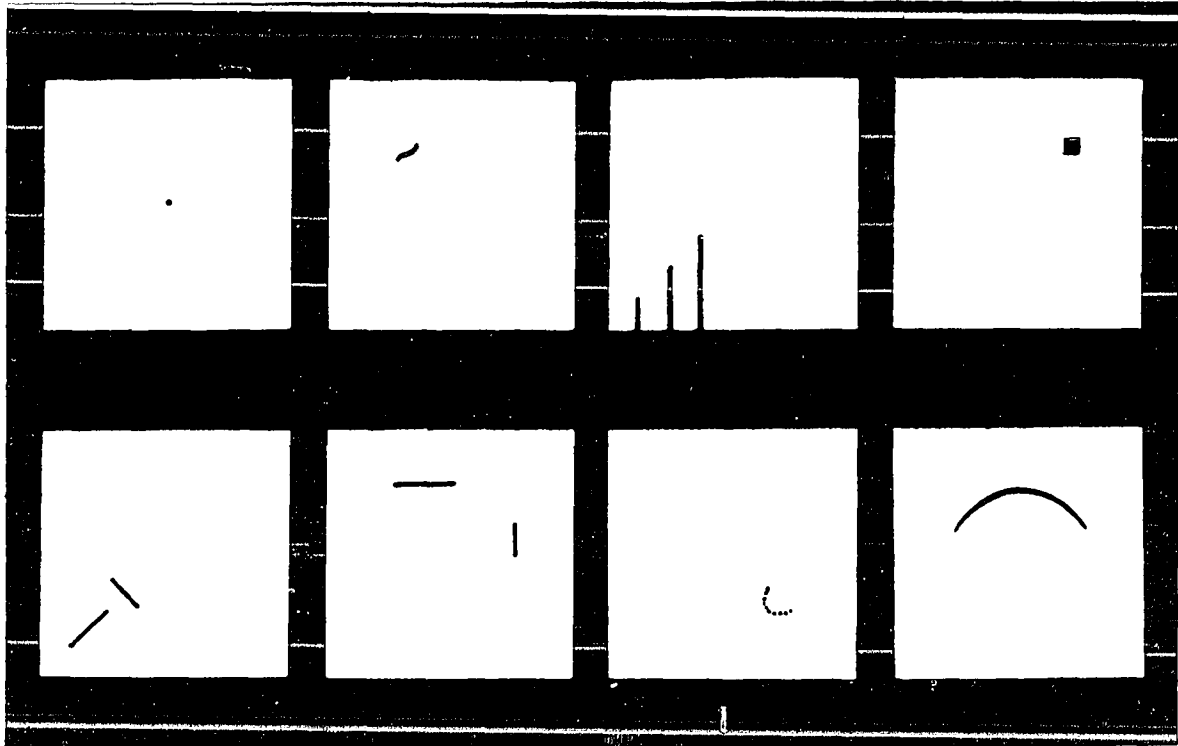
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**APPENDIX A**  
**MATERIAL USED IN INVESTIGATION**



THE KINGET-DRAWING COMPLETION TEST



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? \_\_\_\_\_

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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 | 51 | 2.86                | 3.57           | 3.86         | 3.37  |
| 003     | F   | 11    | 205           | 73  | 101         | 55           | 46       | 43           | 50 | 44 | 46 | 42 | 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       | 50           | 51 | 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 | 1.35                | 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-<br>native | Creative | C            | R  | A  | S  | E  | O  | F  | T  | P  | M  | English             | Social<br>Studies | Science/<br>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 |              |          | 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 |
| 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-<br>native | Creative | C            | R  | A  | S  | E  | O  | F  | T  | P  | M                   | English | Social<br>Studies | Science/<br>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 |              |          | D-Z T Scores |    |    |    |    |    |    |    |    |    | Grade Point Average |                |              |       |
|---------|-----|-------|---------------|-----|-------------|--------------|----------|--------------|----|----|----|----|----|----|----|----|----|---------------------|----------------|--------------|-------|
|         |     |       |               |     | Total       | Combi-native | Creative | C            | R  | A  | S  | E  | O  | F  | T  | P  | H  | 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 | 0.85                | 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 | 1.35                | 1.33           | 1.00         | 1.56  |
| 186     | M   | 10    | 183           | 134 | 65          | 29           | 36       | 61           | 46 | 61 | 55 | 38 | 31 | 46 | 54 | 36 | 38 | 2.35                | 2.50           | 2.00         | 2.56  |
| 187     | F   | 12    | 206           | 112 | 64          | 40           | 24       | 29           | 31 | 36 | 37 | 44 | 42 | 46 | 48 | 36 | 64 | 2.14                | 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 | 3.35                | 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         | 2.53  |
| 195     | F   | 11    | 225           | 79  | 21          | 13           | 8        | 29           | 46 | 34 | 34 | 36 | 27 | 25 | 35 | 35 | 69 | 0.67                | 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 | 2.31                | 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 | 41 | 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 | 2.85                | 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 | 0.85                | 1.00           | 1.22         | 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  |