THE UNIVERSITY OF DETROIT

THE RELATION BETWEEN ADJUSTMENT AS SHOWN ON THE PIKUNAS GRAPHOSCOPIC SCALE AND TEACHERS' RATINGS OF CHILDREN BETWEEN THE AGES OF 10 AND 12

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CHAPTER I

INTRODUCTION

In the last fifty years research in psychology and practical needs have stimulated the development of many psychological tests. The area of psychological testing in which there has been an especially vigorous growth in recent years has been that of the projective technique. This technique attempts to gain a "global"[1] rather than an "atomistic" evaluation of personality, seeing it as a dynamic, integrated unit and as a depth phenomenon. It has been assumed by projective technique theorists that the "global" view is possible because the phenomenon of personality can be tapped without greatly modifying it. Another assumption they make is that personality can be evaluated by the study of behavior and achievement as they are expressed through means of the projective technique.[2]

One type of projective technique is concerned with evaluating the personality of a subject through the study of his graphic productions. Projective drawing tests as such are a relatively recent development in psychology.

1. The term "global" applied to personality signifies the individual's behavior as a whole. The term "atomistic" signifies studying the personality by analysis of "fundamental elements" of behavior as separate processes.

2. John E. Bell, Projective Techniques; a Dynamic Approach to the Study of Personality, pp. 7-11.

The interest psychologists have shown in developing drawing tests was prompted by the spontaneous nature of drawing production.[3] At present there are many drawing tests. The Goodenough Draw-a-Man test, Napoli's finger-painting technique, the Mira Myokinetic test, the Bender Visual-Motor Gestalt test, and the Machover Draw-a-Person test are among the many tests utilizing the subject's drawing production. Others which have become familiar, through use and discussion, are the Geosign test, J. N. Buck's House-Tree-Person technique, Karl Koch's Tree Test, the Wartegg Test, and G. M. Kinget's scoring analysis of the Wartegg which she calls the Drawing Completion Test.

In general, the tests mentioned have been used with both children and adults. However, projective techniques using drawing seem to be especially suitable for testing children. They can be made to appear much less frightening and offer an opportunity for the child to engage more or less spontaneously in an activity which he usually regards as pleasant and amusing. Besides these advantages, projective drawing tests have those features which are common to all projective techniques. One of these features, a view of the personality as a whole has already been mentioned. Another advantage of the projective technique is that the subject produces less self-conscious revelations. This occurs

3. Bell, op. cit., pp. 350-53.

because there are no objective items in the test materials, items for which there is only one correct response. In general, the subject does not know anything about the remote psychological inferences that can be made from what to him seem to be "meaningless" responses.[4]

The Pikunas Graphoscopic Scale, hereafter usually referred to as the PGS, the test with which this thesis is concerned, is this type of test. It is a projective technique utilizing children's drawings. The aspects of personality which it seeks to examine are intelligence, self-expressive balance,[5] and adjustment level. This is achieved by an analysis of the elements of drawings initiated through responses to unstructured and semi-structured stimuli presented in the test.[6]

The PGS may be used with both adolescents and children. It may be administered either individually or in a group situation. A more detailed description of this test and its

4. Lee J. Cronbach, Essentials of Psychological Testing, p. 433.

5. This term refers to the ratio between self-expression as prompted by motives from within the "self" and self-expression as prompted by motives from the "environmental press." It is somewhat akin to the terms "introversion-extroversion" and "Erlebnistyp." However, it is not identical with either of those terms.

6. The terms "unstructured" and "semi-structured" refer to stimuli which have no generally accepted meaning. Hence, any meaning assigned to them is a projected attribute of the person responding to them.

administration and scoring procedure is included in Chapter IV, Methodology, page 46.

CHAPTER II

THE STATEMENT OF THE PROBLEM

The Problem to be Investigated

The problem with which this thesis is concerned is the relationship that exists between scores[1] obtained by subjects on the adjustment dimension of the PGS and behavior ratings given those subjects by their teachers. The subjects are 100 children between the ages of 10 and 12.

Delimitation of the Problem

This study refers to boys and girls between the ages of 10 and 12 who attend a parochial elementary school in the Detroit area. The subjects used in this study are among the first of their age group to be tested with this form of the PGS. Information compiled from the data will serve for further research with this new projective drawing technique and for the establishment of norms for children in this age group.

Definitions

There are three terms which need definition, so that

1. The term "score" as used here refers to the composite score obtained by summing the scaled scores of the categories in that part of the PGS designated as "Adjustment Level".

their use in this thesis will be more specific. These terms are projection, projective technique, and adjustment.

Projection: This term and the meaning assigned to it were first advanced by the psychoanalysts. Therefore, it is proper that some psychoanalytic definitions of the term be presented. Helen Sargent states Sigmund Freund's definition as follows:

> A wish, attitude or habit-hierarchy which is not compatible with other attitudes or habits of an individual may be attributed by that individual to other persons rather than to himself, providing he lacks insight into the fact that he himself possesses the trait in question. This process of attribution is unconscious, i. e., the subject does not give any verbal evidence that he knows his perception is false.[2]

This definition is substantially the one still accepted, as evidenced in F. S. Freeman's book Theory and Practice of Psychological Testing:

> Psychologically, the term projection means the unconscious process whereby an individual attributes certain thoughts, attitudes, wishes, emotions, or characteristics to objects in his environment or to other persons. Projection also takes the form of attributing one's own needs to others in his environment. Or it may take the form of drawing incorrect inferences from an experience. The process is not recognized as being of personal origin, with the result that the content of the process is experienced as an outer perception.[3]

2. Helen Sargent, "Projective Methods: Their Origins, Theory, and Application in Personality Research," Psychological Bulletin, XLII (1945), 258.

3. F. S. Freeman, Theory and Practice of Psychological Testing, p. 400.

Another of Freud's definitions of projection, which is comparable to Freeman's reads:

> The projection of inner perceptions to the outside is a primitive mechanism which, for instance, also influences our sense-perceptions, so that it normally has the greatest share in shaping our outer world. Under conditions that have not yet been sufficiently determined even inner perceptions of ideational and emotional processes are projected outwardly, like sense perceptions, and are used to shape the outer world, whereas they ought to remain in the inner world.[4]

The foregoing definitions regard the term projection as an unconscious psychological defense mechanism. However, in reference to projective techniques, the term is not used in the specific sense of a mechanism. The meaning applied to it is broader. The fourth definition is an example of the broader type of definition. John E. Bell's conception of projection is the sense in which the "projection" is taken when speaking of projective techniques:

> The writer would prefer to apply the most common meaning of "projection," stemming from the Latin roots, to the use of the word. In this sense, it means "to cast forward" which is the action involved in the techniques. The subject manifests his personality in them by "thrusting it out" where it may be inspected. In the "throwing," the personality is not grossly modified; it is only externalized in behavior that is typical of the individual.[5]

4. Quoted in John E. Bell, op. cit., p. 1.

5. Bell, op. cit., pp. 3-4.

Projective Technique: The term "projective technique" refers to those apperceptive testing devices which produce a sample of the maturity, flexibility, integration, and sensitivity of the total personality through the subject's free, typical responses to unstructured or semi-structured stimuli presented to him.

Adjustment: Human adjustment is a difficult term to define because it embraces complex behavior of complex organisms. A psychologist's definition of adjustment is influenced by his theoretical viewpoint. Here are three definitions, each somewhat different in their emphasis on particular facets of the adjustment process. The definition following these three endeavors to incorporate as many valid and essential notes of adjustment as these three definitions contain plus a few other terms which are also considered to be essential.

> Adjustment is defined as a process involving both mental and behavioral responses, by which an individual strives to cope successfully with inner needs, tensions, frustrations, and conflicts, and to effect a degree of harmony between these inner demands and those imposed on him by the objective world in which he lives.[6]

> Adjustment is defined as the efforts of a person to meet his needs and adapt to his internal and external environment.[7]

6. Alexander A. Schneiders, Personal Adjustment and Mental Health, p. 51.

7. Kimball Young, Personality and the Problems of Adjustment, p. 679.

> Adjustment: The relationship that exists between an individual and his environment, especially his social environment, in the satisfaction of his needs.[8]

The following definition of adjustment is the one which will be used in this thesis. It is restricted to the "normal," "good," or "adequate" adjustment of human subjects. Maladjustment ("abnormal," "bad," or "inadequate" adjustment) can result when any of the terms of this definition are violated. The definition is the author's own.

Adjustment is the achievement and maintenance of an adequate relationship between the personal needs of the individual and the demands of his physical, psychological, and social environment (the school environment in this particular case) so that the activity of that individual, directed toward personal goals within his natural capacity and towards satisfying his reasonable obligations as a member of society, may be carried out efficiently.

Justification for This Study

Since drawing offers an excellent outlet for self-expression in children, it is a good medium for projective testing. The non-verbal nature of this technique allows for free expression and, therefore, a more intimate and less self conscious sample of personality

8. Clifford T. Morgan, editor, Introduction to Psychology, p. 625.

organization.

The PGS drawing test intends to put more stress on the quantitative aspects of measurement than has previously been the case with projective techniques. This will be attempted by analyzing the formal elements of drawings and scoring the amount of contribution these elements make to the gestalt of the drawings. Quantitative data are always welcome in psychological research; and the initiation of quantitative analysis of a projective technique, although a difficult task in many cases, is one of the cardinal motives for this study.

The Statement of the Hypothesis

The hypothesis advanced for this thesis is that there is a signficant relationship between adjustment as measured by the Pikunas Graphoscopic Scale and adjustment as measured by means of rating scales of children between the ages of 10 and 12.

CHAPTER III

REVIEW OF LITERATURE

This review of literature is divided into several parts. The first part deals with the theoretical foundations of projective methods and their validity and reliability. This is followed by a short discussion of projective methods used with children. The last three parts concern three types of drawing production. The first type is what is ordinarily called "free drawing". That is, the subject spontaneously draws whatever comes to his mind. In the second type of drawing the subject is asked to produce a particular object. In the third type the drawing is performed in connection with some previously drawn or printed stimuli which are presented to the subjects, in other words, completion drawing.

The Theoretical Foundations of Projective Methods

A review of the literature clearly illustrates that the projective approach did not spring into being fully armed. On the contrary, it grew by drawing upon many streams of thought for its rationale, methods and techniques. The most notable of these sources were medical psychology, dynamic psychology, especially psychoanalysis, and Gestalt psychology. The persons involved in these disciplines or schools were more interested in the individual as an

individual. In contrast, psychometrics, based more on the study of the individual as a member of a group, developed in the mathematico-deductive milieu of the behavioristic, functional, and structural schools of psychology.

The brief examination of the rationale of projective methods which follows will add to the understanding of the studies cited in this chapter. It will also contribute to a clearer eveluation of the results and conclusions discussed in the subsequent chapters.

The key concepts in understanding projective methods lie in the questions concerning approaches to the study of personality and the norms derived from these approaches. There are basically two types of approach, each yielding its own peculiar norms. The first is the acturial, statistical or normative type. The second is the individual, "clinical," or idiographic approach. From the first are obtained universal norms or group norms which may be applied to all individuals or to all members of a particular group. The ideographic approach yields individual norms which are applicable only to a particular unique personality and refer to other individuals only in an analagous fashion. Which of these sometimes apparently contradictory methods is most suitable depends on the investigator's frame of reference.[1]

1. G. W. Allport, "The Psychologist's Frame of Reference", Psychological Bulletin, XXXVII, (January 1940) 1-28.

Sometimes the methods may overlap, and the investigator must use both of them. An example of this is cited by P. E. Meehl in which he suggests that a clinician may make an individual, unique prediction by going through an "unconscious" comparison of "unique" occurrences in actuarial relation to other "unique" occurrences.[2]

L. K. Frank in his monograph on projective methods discusses methods and norms in a similar manner. He states that psychometrics views personality from the standpoint of group norms, while projective techniques yield a sample of the typical behavior of a unique personality. His claim is that there is no conflict between these methods and that they complement each other.[3]

S. Rosenzweig in reference to the individual and norms presents a brief history of psychological methodology. Universal norms which are generally applicable to all individuals he cites as a contribution of experimental psychology and the structuralists. Galton introduced the wide use of statistics for group norms. The third approach Rosenzweig calls the individual-centered method, which he divides into three sub-sections. First there is the psychoanalytic technique which includes such things

2. P. E. Meehl, Clinical versus Statistical Prediction, a Theoretical Analysis and a Review of the Evidence, pp. 11-149.

3. Lawrence K. Frank, Projective Methods, pp. 34-5.

as psychoanalysis, projective methods, and the phenomenological theory of Carl Rogers. Second is the personalistic type of approach of W.Stern and G. Allport which regards personality structure in terms of traits, habits, and individual patterns of behavior.

Lastly, he cites Gestalt theory, especially as exemplified by K. Lewin and the importance of the individual event. The individual-centered method yields individual norms. The person is his own standard, a law unto himself, an unique personality.[4]

The above discussion anticipates in some degree the investigation of the rationale of projective methods. It has been pointed out that they are instruments for obtaining insights into the typical behavior of a unique personality. Frank indicates that they are not new, having been used for centuries. However, they have been given their rationale and studied only recently in response to the stimulus afforded by the development of new methods, frames of reference, and techniques in the physical sciences. This stimulus came especially from modern quantum physics and field theory, which placed more emphasis on the individual event.[5]

4. Saul Rosenzweig, "Norms and the Individual in the Psychologist's Perspective" in Martin L. Reymert, ed., Feelings and Emotions, pp. 327-35.

5. Frank, op. cit., pp. 3-32.

A . F. Korner points out three assumptions on which projective methods are based. The first is that all behavior is a manifestation or expression of individual personality. Secondly, the subject gives material that he will not or cannot give otherwise. Thirdly, each response is the result of causal influence and not a chance occurence.[6] In this Korner is supported by D. Rappaport.[7]

Projective methods may be classified according to the particular technique they employ in obtaining a sample of personality structure. Frank classifies them in the following manner:

1. Constitutive methods using unstructured or semi-structured material, as in the Rorschach and drawing.

2. Constructive methods in which the subject re-arranges definite material into new or larger configurations, as in the World Test.

3. Interpretive methods in which there is an interpretation of some experience or composition, as in the Thematic Apperception Test.

4. Cathartic methods which also add affective reactions, as in doll play and observing drama.

6. A. F. Korner, "Theoretical Considerations Concerning the Scope and Limitations of Projective Techniques", Journal of Abnormal and Social Psychology, XLV, (1950), 619-28.

7. David Rappaport, Diagnostic Psychological Testing, Vol. 1, p. 10.

5. Refractive methods which study the distortion of conventional mediums of communication, such as language and handwriting.[8]

Rosenzweig has a tri-partite division of the projective techniques. It includes the "motor-expressive" techniques (such as drawing) "perceptive-structural" techniques (such as the Rorschach), and the "apperceptive-structural" techniques (such as the Thematic Apperceptive Test).[9]

In tapping personality through projective techniques the examiner is getting a glimpse of the individual's private world. He is aware that "every person has his own, personally relevant world, briefly, his personal world . . . . In contrast to the cosmic world, the personal world is centered, each person is the center of his own world".[10] This private world has its own idiomatic structure. The examiner seeks "signs" that will indicate the structure of the private world.[11] He also wants to know how these signs can help him predict behavior as a function of the person operating in a field composed of the person and

8. Frank, op. cit., pp. 47-8.

9. S. Rosenzweig, "Investigating and Appraising Personality," in T. G. Andrews, Methods of Psychology, pp. 539-68.

10. William Stern, General Psychology from the Personalistic Viewpoint, p. 88.

11. Florence Goodenough "The Appraisal of Child Personality", Psychological Review, LVI, 3, (May, 1949) 123-31.

the environment.[12] He will use all possible approaches to gain this glimpse, even examining dreams, diaries, and autobiographies.[13] The information gained through projective methods includes a diagnosis of the private world and an exploration of the person's fantasies, attitudes, and aspirations.[14]

There are, of course, limitations to the use of projective methods. The most important is that they are designed to identify the individual and not a group. Therefore, they cannot be validated accurately for this specific purpose by ordinary sampling theory.[15] They are inconsistent in predicting behavior, require skill in interpreting them, involve innumerable variables, and have not been able to identify an ego synthesizer or organismic, unifying principle.[16]

Although they differ from normative approaches, projective methods should be used in conjunction with

12. Kurt Lewin, A Dynamic Theory of Personality, pp. 3-28.

13. Gordon W. Allport, The Use of Personal Documents in Psychological Science.

14. Korner, op. cit., pp. 619-20.

15. Frank, op. cit., pp. 62-6.

16. Korner, op. cit., pp. 627-28.

normative approaches. General normative patterns are possible in projective methods, even though the most important contribution projective methods make are of an idiographic nature.[17] In the following statement Lewin indicates how the two approaches blend:

> The problems of general laws and of individual differences frequently appear to be unrelated questions which follow somewhat opposite lines. Any prediction however, presupposes a consideration of both types of questions.[18]

Rosenzweig supports Lewin in this viewpoint. He thinks universal, group and individual norms all fulfill specific needs particular to themselves. Universal norms have a "regulative value" as general laws applicable directly to and referring to intrapsychic living and the development of the individual. Group norms have a "delimiting value". Individual norms, in their seekings for "signs," have a "semantic value". Psychology should study the individual as an individual, but it should also study the individual as a person within his social, physical, and environmental ecology.[19]

17. Frank, op. cit., p. 45.

18. Lewin, op. cit., p. 73.

19. Rosenzweig,"Norms and the Individual in the Psychologist's Perspective" in Martin L. Reymert, ed., Feelings and Emotions, pp. 334-35.

Projective Techniques Used with Children

This section will deal with projective methods used with children. It will not discuss drawing, one of the most prolific sources of projective information, as drawing will be specifically discussed in the subsequent sections.

Abt and Bellak[20] and Anderson and Anderson[21] give a comprehensive review of the many projective devices that may be used with both children and adults as well as tests which have been designed for specific use with children. The number is great and varied as to particular technique.

Perhaps the best known and most widely used technique is the Rorschach. Originally it was meant to be used with adult subjects. However, it is now rather widely used with children. M. G. Seigel indicates how it might be used in a child guidance clinic[22] and L. B. Ames outlines development trends as exhibited in the

20. L. E. Abt and L. Bellak, Projective Psychology.

21. Harold Anderson and Gladys L. Anderson, An Introduction to Projective Techniques and Other Devices for Understanding Human Behavior.

22. Miriam G. Seigel, "The Diagnostic and Prognostic Validity of the Rorschach Test in a Child Guidance Clinic", The American Journal of Orthopsychiatry, XVIII (1948), 119-132.

Rorschach.[23]

As to the validity of the Rorschach, that is another question. Perhaps the difficulty of the enigma may be illustrated by the following statement of F. Halpern: ". . . methods for validating certain aspects of the Rorschach procedure and the meaning of many of the test factors are yet to be discovered."[24]

Using Frank's classification of projective methods, tests such as the World Test and the Make-a-Picture Story (MAPS) Test may be classified as "constructive methods".

In the World Test the subject builds "his world" out of material supplied to him. He peoples it with humans in various postures, situations, and dramatic inter-communications.[25]

The MAPS Test is similar to the World Test. The subject is given twenty-one background pictures. He uses these backgrounds in conjunction with sixty-seven figures representing various sexes, social positions, and age levels. They may be fictional or real personages.

23. Louise B. Ames, et. al. Child Rorschach Responses.

24. Florence Halpern, A Clinical Approach to Children's Rorschachs, p.VII.

25. Saul Rosenzweig, Psychodiagnostics, pp. 159-66.

After the figures are placed against a particular background, the subject tells a story about them. Scoring is conducted on two bases. The first is called MAPS "signs" and includes the choice of figures, their use, and their placement. The second is called "aspects of performance." This includes the use of backgrounds, the stories, and time measurements analagous to those used with the Rorschach and the Thematic Apperception Test.[26]

E. A. Haggard has an interesting technique, not too much unlike the World Test and MAPS Test, in which he uses comic strip characters. The subject chooses comic strip characters, tells something about them, and then uses them to make his own comic strip.[27]

In play therapy and psychodrama catharsis and therapy may be as important as diagnosis. Play therapy may therefore be used, either in a directive or non-directive manner, both as a projective device and as a therapeutic session.[28] Likewise, psychodrama (role playing in various situations and employing various themes) may be used for either therapeutic or diagnostic purposes.[29]

26. Edwin S. Shneidman, The Make-A-Picture Story (MAPS) Projective Personality Test: A Preliminary Report, Journal of Consulting Psychology, II (1947), 315-25.

27. E. A. Haggard, "A Projective Technique Using Comic Strip Characters." Character and Personality., X (1947), 289-96.

28. Virginia Axline, Play Therapy.

29. J. L. Moreno, The Theatre of Spontaneity.

The interpretive (Frank's classification) or the apperceptive-structural (Rosenzweig's classification) techniques are represented by many tests. Most familiar of these is the Thematic Apperception Test, which had been designed for adults but has been used with children.[30]

L. Bellak and S. Bellak have developed a Children's Apperception Test (CAT) which is a correlate of the TAT. As in the TAT the subject tells a story about the picture presented to him. However, the pictures use animal figures and situations familiar to the child.[31]

Adolescents from twelve to seventeen years of age can be tested in a similar manner with a test developed by P. M. Symonds. This test is called the Picture-Story Method of Personality Study. It closely resembles the TAT.[32]

The CAT covers the age range of early childhood and the Symonds test has the period of adolescence as its scope. The test which bridges the age range between them is the Michigan Picture Test. Its age range is

30. Mary Leitch and Sarah Shafer, "A Study of the Thematic Apperception Tests of Psychotic Children," American Journal of Orthopsychiatry, XVII (1947), 337-42.

31. Leopold Bellak and Sonya Bellak, "An Introductory Note on the Children's Apperception Test (CAT)," Journal of Projective Techniques, XIV (1950), 173-80.

32. Percival M. Symonds, Adolescent Fantasy: An Investigation of the Picture-Story Method of Personality Study.

from eight to fourteen. It is like the TAT and the Picture-Study Test and contains twenty-one pictures.[33]

G. S. Blum's Blacky Test is a picture interpretation test designed to portray the stages of psychosexual development or the type of object relation experienced by the subject. Its material consists of twelve cartoons depicting a dog family: Blacky, Papa, Mama, and Tippy, a sibling.[34] Validation studies involve comparison of Blacky Test techniques, prediction of behavior in a group setting, and clinicians' judgments.[35]

Another picture interpretation technique is S. Rosenzweig's Picture-Association Study for Assessing Reaction to Frustration, more commonly known as the Picture-Frustration technique. It is a limited projective procedure used specifically for determining patterns of reaction to usual, important frustrating situations. The test consists of twenty four cartoon pictures showing two people in a frustrating situation. One of them,

33. S. W. Hartwell, M. L. Hutt, C. Andrew and R. Walton, "The Michigan Picture Test", American Journal of Orthopsychiatry, XXI (1951), 21-24.

34. G. S. Blum, "A Study of the Psychoanalytic Theory of Psychosexual Development", Genetic Psychology Monographs, XXXIX (1949).

35. G. S. Blum and Howard F. Hunt, "The Validity of the Blacky Picture", Psychological Bulletin, XLIX, 3, (May, 1957).

the frustrating principal, has just said something. His remark is contained in a dialogue balloon. The dialogue balloon of the other person is blank, and the subject is asked to supply the reaction to the frustrating situation by filling in the blank balloon.[36] Validation work on this technique is also under way.[37]

The Four-Picture Test of D. J. Van Lennep adds a few innovations to the usual picture interpretation approach. These innovations are the use of color, and requiring the subject to incorporate all four pictures into a sequence which tells a story. The subject may take as much time as he likes and place the pictures in any order he wishes.[38]

Many of the techniques used in projective psychology, including many of those discussed above and in the sections to follow, drew in some part upon the study of expressive movement. Some of the principal work on expressive movement was done by Allport and Vernon and W. Wolff. Allport and Vernon based their study on fourteen elements influencing expressive movement.

36. Saul Rosenzweig, Psychodiagnostics., pp. 159-66.

37. Saul Rosenzweig and Esther L. Mirmow, "The Validation of Trends in the Children's Form of the Rosenzweig Picture Frustration Study", Journal of Personality, XVIII (1945), 306-43.

38. D. J. Van Lennep, "The Four-Picture Test" in Anderson and Anderson, Introduction to Projective Techniques, pp. 149-80.

Included are such things as the exingencies of the immediate goal, strain and fatigue, and convention and fashion. They examined expressive movement in gesture and style, reading and counting, walking, and drawing. From their studies they concluded that they could classify and diagnose personality according to the expressive movement exhibited.[39]

Wolff also made similar studies of voice, gait, and handwriting. He found a relation between personality structure and certain elements in expressive behavior.[40]

Graphological analysis is the most often used technique in studying the expressive movement aspect of personality. Klages is probably the leading exponent of this technique, and many of his original hypotheses are used in motor projective techniques.[41]

Sonnemann in his explication of graphology states that handwriting analysis may use three approaches. The first is the "impressionistic" approach in which the examiner attempts to empathize with the subject and gain an impression from the handwriting sample. The second is the "atomistic" or statistical approach. In the last of these approaches,

39. G. W. Allport and P. E. Vernon, Studies in Expressive Movement.

40. W. Wolff, The Expression of Personality.

41. Ludwig Klages, Graphologisches Lesebuch.

the "systemic," graphic production is regarded as the expression of personality as a total configuration functioning as a unit or system with a governing qualitative principle.[42]

Children do not as a rule express themselves as easily in abstract verbal terms as they do in action and drawing. Therefore, they tend to express their feelings and thoughts in the latter medium because it is easy for them to understand.[43]

Free Drawing

F. Goodenough says that psychological interest in children's drawings began about 1885 with the work of Cooke (1885) and Ricci (1887). An examination of the bibliography of the article she wrote in 1928 shows that French and German sources are heavily represented.[44] In her 1950 article, which is about six times as large, English sources outnumber sources in other languages. There was also a shift in the approach to drawing analysis. This change was engendered by interest in projective

42. Sonnemann, Ulrich,. Handwriting Analysis as a Psychodiagnostic Tool: A Study in General and Clinical Graphology.

43. Anderson and Anderson, op. cit., p. 342.

44. F. L. Goodenough, "Studies in the Psychology of Children's Drawings", Psychological Bulletin, XXV (May, 1928), 272-83.

theory. Previously studies of drawing were concerned primarily with tabulation of content and the identification of developmental stages in drawing. Now the attack is directed toward the need for defining and classifying measurable dimensions in the drawing and establishing their validity and reliability.[45] This trend is exhibited in the series of articles by A. Anastasi and J. P. Foley.[46]

Bell states that almost every child will use drawing if it is available as a tool. The child employs it as a mode of functioning in his exploration of space dimensions.[47] Van der Horst supports him in saying that graphic tools give a child a chance to express himself and develop toward a wider mental life.[48]

45. Goodenough, op. cit., p. 273.

46. Anastasi, A., and Foley, J. P.: "A Survey of the Literature on Artistic Behavior in the Abnormal: "I. Historical and Theoretical Background", Journal of Genetic Psychology, XXV (1941), 111-42. "II. Approaches and Interrelationships", Annals of the New York Academy of Science, XLII (1941) "III. Spontaneous Productions." Psychological Monographs, LII, 6, (1940). "IV. Experimental Investigations". Journal of Genetic Psychology. XXV (1941), 187-37).

47. J. E. Bell, "Perceptual Development and the Drawings of Children." American Journal Orthopsychiatry, XXVII (1952), 386-93.

48. L. Van der Horst., "Affect, Expressive and Symbolic Functions in the Drawings of Children" in Reymert, op. cit., pp. 398-417.

The developmental stages of drawings and the sequence and changes in these stages have been widely studied. As the individual grows graphic production is modified through the development of the perceptual processes.[49] Changes in other aspects of personality also affect how the individual will draw. One of the more important is emotional development. Anderson discusses it in the following manner:

> 1. With growth and development the emotional life of the person becomes differentiated.
> 2. With growth and development changes in somatic processes within the organism affect and modify emotionality.
> 3. With development there are progressive changes in the sensitization of the organism that in the main reduce the effect of most stimulation but may increase the effect of some.
> 4. With growth and development the organism successively masters situations and as he builds skill in meeting them gains control over his emotions.
> 5. With social pressure and cultural demands the pattern of emotions and the manner in which emotion is manifested vary widely.[50]

The development of a normal individual's drawing follows a basic sequence. However, this sequence is individuated by the person's "patterns of field forces, both intra and extra-organic."[51] Wide and spontaneous use of drawing

49. J. E. Bell, "Perceptual Development and the Drawings of Children." American Journal of Orthopsychiatry, XXVII (1952), 386-93.

50. John E. Anderson, "Changes in Emotional Responses With Age," in Reymert, op. cit., pp. 418-28.

51. J. E. Bell, "Perceptual Development and the Drawings of Children". American Journal of Orthopsychiatry, XXVII (1952), 393.

terminates when it is replaced by abstract verbal-symbolic processes.[52] England points out that the development of verbal concepts is the reason why drawing that was spontaneous during childhood is inhibited in the adult.[53]

According to Russell, there are four stages in drawing. They are:

1. The scribble stage: During this stage, which occurs around the age of three years, there is apparently aimless scribbling activity.

2. Schematic: Here the subject draws rough approximations of objects. He lacks proportion in his drawing. The age range is about from five to six.

3. Representative: An attempt is made during this stage to represent the object as seen. It is most noticeable during the ages of eleven and twelve.

4. Mature-productive: This stage is characterized by the addition of an aim for unity and coherence in the idea expressed.[54]

Van der Horst presents the following sequence of development:

1. From four to six years of age children draw content of an animistic, physiognomic nature.

52. Ibid., p. 394.

53. A. D. England, "A Psychological Study of Children's Drawings: Comparison of Public School, Retarded, Institutionalized and Delinquent Children's Drawings. American Journal of Orthopsychiatry, XIII (1943), p. 525-30.

54. David H. Russell, Children's Thinking, pp. 87-89.

2. When they are nine or ten years old children begin to objectify their drawings and drawing reaches its zenith in the tenth year.

3. From the tenth to the twelfth year there is a need for reality contact. However, a strong fantasy world is still present. At this time words become easier to handle and drawings are often labelled.

4. Use of verbal concepts finally comes to predominate, and drawing diminishes.[55]

Barnhart corroborates the preceding analysis of drawing development in his discussion of compositional structure in children's drawings. He classifies drawing into three "representation levels". They are the "schematic", "mixed schematic" and "true-to-appearance" or visually realistic levels. The first is more prevelant at seven and one-half years of age, the second at nine and one-half and the third at twelve years of age.[56]

As will be noticed in the discussion of specific studies, formal elements in the execution of the drawings and the subject's behavior in a drawing situation are as significant for interpretation as content of the drawing.

Content was studied by McCarty on the basis of 31,239

55. Van der Horst, op. cit., pp. 398-417.

56. E. N. Barnhart, "Developmental Stages in Compositional Construction in Children's Drawings", Journal of Experimental Education, XI, (1942) pp. 156-84

drawings collected from twenty-nine cities. The subjects ranged from four to eight years of age. The most frequently appearing content was the human figure (16%). This was followed by houses (14%) and trees (9%). Content as a sign of personality structure was also discussed.[57]

Bender makes several suggestions about the significance of content. The first is that boats are a commonly drawn object among emotionally disturbed children.[58] Another states that aggressive children draw aggressive animals.[59]

In a comprehensive study that took ten years to complete, Alschuler and Hattwick investigated the relation between painting and personality. The study included content analysis, investigation of individual dynamics expressed through the use of color, line, form and space, and developmental trends. Applications of the information obtained are also considered.[60]

Finger-painting was originated in 1930 by Ruth F. Shaw as a recreational and teaching device. Napoli became

57. S. A. McCarty, Children's Drawings.

58. L. Bender, "The Nautical Theme in the Art and Fantasy of Children," American Journal of Orthopsychiatry, XIII (1943), 462-67.

59. L. Bender and J. Rapoport, "Animal Drawings of Children", American Journal of Orthopsychiatry, XIV (1944), 521-27.

60. R. H. Alschuler and L. W. Hattwick, Painting and Personality.

interested in it a decade later as a projective technique for the diagnosis of personality. He indicates that content, formal elements of the paintings, and the behavior of the subject are used as variables in analyzing the painting.[61] In a later study Napoli outlined the diagnostic meaning of different areas of the paper used in finger painting, the significance of different colors, and the "scoring" of finger painting products.[62]

Elkisch found that the content of drawing did not differentiate accurately between adjusted and maladjusted children. Analysis of formal elements gave her more significant differences. The criteria by which she judged drawings were as follows:

1. Rhythm vs. rule (flowing inner dynamics vs. the static external world).

2. Complexity vs. simplicity (organized and differentiated drawing vs. primitivism).

3. Expansion vs. compression (potentiality for contact with the other world vs. isolationism).

4. Integration vs. disintegration (cosmic order in the subject vs. chaos).

5. Realism vs. symbolism (the world of objects vs.

61. P. J. Napoli, "Finger-painting and Personality Diagnosis", Genetic Psychology Monographs, XXXIV (1946),129-31.

62. P. J. Napoli, "Interpretive Aspects of Finger Painting," Journal of Psychology, XXIII (1947), 93-132.

the inner world of symbols).[63]

Schmidl-Waehner also concerned herself with formal elements of drawing. In one study she investigated the use of different criteria for the judging of drawing elements.[64] A second study concluded that analyzing drawings in this manner demands a knowledge of dynamic psychology and experience with the material used.[65]

Another study of free drawing which deserves mention is that of Hurlock. She assembled the spontaneous drawings of adolescents under the pretext of collecting their notebooks, which contained "doodles," and picking up scraps of paper which the subjects had thrown into the wastebasket.[66]

Directed Drawing

The term "directed drawing" as used here signifies drawing tasks in which the subject is asked to produce a particular object or reproduce a standard design.

63. P. Elkisch, "Children's Drawings in a Projective Technique", Psychological Monographs, LVIII (1945), No. 1.

64. T. Schmidl-Waehner, "Formal Criteria for the Analysis of Children's Drawing", American Journal of Orthopsychiatry, XII (1942), 95-104.

65. T. Schmidl-Waehner, "Interpretation of Spontaneous Drawing and Paintings", Genetic Psychology Monographs, XXIII (1946), 3-70

66. E. Hurlock, "The Spontaneous Drawings of Adolescents", Journal of Genetic Psychology, LXIX (1946), 97-120.

Goodenough is the author of the Draw-a-Man test, one of the best known and widely used drawing tests of intelligence. It is about thirty years old (1926), and much study has been devoted to analyzing its possibilities. She found that a relation existed between intelligence and concept development as exhibited in drawing. She chose the human figure as the object to be drawn because it is the most frequently appearing object in children's drawings.[67]

As a corrollary to the above, Elkisch suggests that boys between the ages of nine and eleven will draw machines as hypothetical body images instead of human figures. She thinks this is due to modern culture, where the machine is a symbol for strength, superhuman ability, and the ideal of a technical society. Out of twenty-two boys she studied in this age range twenty of them preferred to draw machines above any other content category.[68]

It was stated previously that the Draw-a-Man test has been widely studied because of the relatively long time it has been in use. Since its inception it has been used to investigate personality structure as well as an index of intelligence. The following examples illustrate

67. F. L. Goodenough, Measurement of Intelligence by Drawings.

68. P. Elkisch, "Significant Relationships between the Human Figure and the Machine in the Drawings of Boys", American Journal of Orthopsychiatry, XXII (1952), 379-85.

some of the work that has been done with the Draw-a-Man test as a projective technique of personality.

Berrian has used the Draw-a-Man test to differentiate successfully between adjusted and maladjusted children.[69] Contrarily, Brill claims that the differentiation can be made only on a group and not on an individual basis.[70] According to Springer, the apparent contradiction in these results is due to failure on the part of these investigators to complement statistical analysis with insight into the individual case as an individual case.[71]

Des Lauriers and Halpern included the Draw-a-Man test among a battery of a dozen tests administered to schizophrenic children. They found that certain subjects elaborated the extremities of the limbs. The drawings contained signs that indicated the subjects were disorganized in regard to the "self-unit" and the "field" in which they functioned.[72]

69. F. K. Berrian, "A Study of the Drawings of Abnormal Children," Journal of Educational Psychology, XXVI (1935), 143-50.

70. M. Brill, "Study of Instability Using the Goodenough Drawing Scale", Journal of Abnormal and Social Psychology, XXXII (1937), 288-302.

71. N. N. Springer, "A Study of the Drawings of Adjusted and Maladjusted Children", Journal of Genetic Psychology, LVIII (1941), 131-38.

72. A. Des Lauriers and F. Halpern, "Psychological Tests in Childhood Schizoprenia," American Journal of Orthopsychiatry, XVII (1947), 57-67.

Machover expanded upon the lead furnished by the Draw-a-Man test by developing the Draw-a-Person technique. The test is designed to diagnose personality by the analysis of the drawings of a female figure and a male figure.[73]

Reliability for the Machover test has been investigated by Lerner. Measures of reliability which he used were the re-rating, inter-rater reliability, and test-retest techniques. The conclusion was that the Draw-a-Person test is a reliable graphic index of personality structure. However, there should be more refinement and clearer definition of the traits measured and more training for interpretors of the test.[74]

Berman, Klein, and Lippmann asked one hundred psychoneurotic patients to draw two human figures, one of each sex, engaged in some pertinent behavior. They compared the results to information derived from a psychiatric examination and were able to correlate various factors in the drawings with the psychiatric examination.[75]

Human figure drawing was also analyzed by Zesbaugh.

73. K. Machover, Personality Projection in the Drawing of the Human Figure.

74. G. F. J. Lerner, "Reliability of Graphic Indices in a Projective Test (the Draw-a-Person)", Journal of Clinical Psychology, VIII (1952), 125-28.

75. A. B. Berman, A. A. Klein, and A. Lippmann, "Human Figure Drawing as a Projective Technique", Journal of General Psychology, XLV (1951), 57-70.

The subjects were to draw the figure of an adult human postman. Zesbaugh categoried the details of the drawings according to age level and grade level.[76]

Vernier uses the case study method in her discussion of projective drawing. She investigated the variables in the human figure drawings of abnormal subjects and compared them to other indices of personality structure and function.[77]

It is a logical step from the drawing of single human figures to the drawing of groups. Appel had children draw a series of social situations. These could be such things as "home," parents, siblings, playmates, and friends. The results were used as an aid to personality study.[78]

Hare and Hare have a test actually called the Draw-a-Group Test. Its purpose is to identify the structure of a group and to identify leaders, followers, and isolates. Children draw a group engaged in the activity they most enjoy. An inquiry is conducted to ascertain the names of the children in the drawing, the order in which

76. H. A. Zesbaugh, Children's Drawings of the Human Figure.

77. C. M. Vernier, Projective Drawing.

78. K. E. Appel, "Drawings by Children as Aids to Personality Studies", American Journal of Orthopsychiatry, I (1931), 129-44.

the figures were drawn, and what the children in the drawing are supposed to be doing. An average rank-difference correlation of +.52 was obtained between the results of the drawings and teachers' ratings of the subjects.[79]

The H-T-P technique, developed by Buck, consists of having the subject draw a house, a tree, and a person. An inquiry is then made on the content and execution of the drawings. The test is designed as a personality index of the person and his relation to his field.[80]

In the Bender Visual-Motor Gestalt Test the subject copys stimuli presented to him by the examiner. It is the first personality test based on visual-motor methods. The stimulus figures are based on designs suggested by Max Wertheimer. Scoring criteria for the test include how the subject perceives and uses the stimuli.[81]

The Mira Myokinetic Psychodiagnosis test is similar in design to Bender's instrument. Once again the subject

79. A. P. Hare and R. T. Hare, "The Draw-a-Group Test", Journal of General Psychology, LXXXIX (1956), 51-60.

80. J. N. Buck, "The H-T-P Test", Journal of Clinical Psychology, IV (1948), 151-59.

81. L. Bender, "A Visual-Motor Gestalt Test and Its Clinical Use," Research Monographs of the American Orthopsychiatric Association, Number 3 (1938).

is asked to reproduce stimuli presented to him. The stimulus figures are a zigzag line, a chain of circles, a "staircase" line, and a "top of the castle" or "ramparts" line. During the test the subject is blindfolded. Both hands are used alternately or simultaneously. The test is an expressive movement technique and shows the influence of graphology and the use of formal criteria in the judging of graphic production.[82]

A technique similar to Mira's test is Kutash and Gehl's Graphomotor Projection Technique. As in the Mira Myokinetic Test the subject is blindfolded. However, the first drawing is a free drawing. After the drawings are completed, associations to the drawings are made during an inquiry period.[83]

Completion Drawing

New drawing completion tests have been making frequent appearances lately. In them the subject is instructed to complete a drawing which has already been begun with some ambiguous stimulus.

Ames has compared completion drawing (using the Gesell Incomplete Man Test) to free drawing (using the

82. J. E. Bell, Projective Techniques, pp. 328-40.

83. S. B. Kutash and R. H. Gehl, The Graphomotor Projection Technique.

Draw-a-Man Test). She attempted to gain insight into the relative influences of the level of maturation and situational factors. Her conclusion was that maturation seems to be more important as a determining factor in drawing form and content than situational factors.[84]

Eleven symbols are individually presented on eleven sheets of paper are the material of the Symbol Elaboration Test (SET). The first eight symbols are straight lines, semi-circles, or various combinations of both. A "diffuse mass," inverted "V's" and a jagged line are the others. After graphically elaborating these symbols, the subject is asked to describe what he has done and how he feels about it.[85]

The Geosign Test has only one stimulus but is otherwise similar to the SET. It is a rough screening instrument of detecting general maladjustment.[86]

The Horn-Hellersberg Test is based on a drawing aptitude test developed by C. Horn. Lines from famous

84. L. B. Ames, "Free Drawing and Completion Drawing: A Comparative Study of Preschool Children", Journal of Genetic Psychology, LXVI (1945), 161-65.

85. J. Krout, "Symbol Elaboration Test (SET): The Reliability and Validity of a New Projective Technique", Psychological Monographs, LXIV (1950), Number 4.

86. Reichenberg-Hackett, W., "The Geosign Test: A Semi-structured Drawing Situation Utilized as a Screening Test for Adjustment," American Journal of Orthopsychiatry, XX (1950), 578-95.

paintings are isolated and used as guides. The subject is supposed to complete a drawing which incorporated these lines. Hellersberg added a space for free drawing in her revision of the test. An inquiry is made after the performance of the test proper. Drawings are analyzed from three viewpoints: perceptual operations, formal aspects of the drawings, and associated verbalizations.[87]

Ehrig Wartegg's Zeichentest (WZT) is a drawing completion test that is a further extension of suggestions derived from F. Sander's Phantasie Test. Sander devised the Phantasie Test to test the theory of Ganzheit Psychologie (a type of Gestalt psychology) that both the experiencing subject and the experienced object are a "structure." Individuals regarded from this viewpoint should respond according to their idiomatic personality structures. He did not make a detailed analysis of his results since his motive was to illustrate only the broad differences among individuals in characteristic graphic production.[88] Wartegg outlined his continuation of Sander's work and introduced the WZT during the period from 1934 to 1939.[89]

87. E. F. Hellersberg, "The Horn-Hellersberg Test and Adjustment to Reality," American Journal of Orthopsychiatry, XV (1945), 690-710.

88. G. M. Kinget, The Drawing-Completion Test, pp. 3-6.

89. Ibid, p. 135.

Personality structure as sampled by the WZT is measured on four dimensions: "emotion," "imagination," "intellect," and "activity." These are further divided into more or less contrary aspects. Emotion is split into "outgoing" and "seclusive," imagination into "combining" and "creative," intellect into "speculative" and "practical," and activity into "dynamic" and "controlled."[90] An attempt at validating the WZT was made by comparing WZT results to a story completion test, the subjects' interpretation of non-objective designs, comparison to the typologies of Kretschmer, Jaensch, and Jung, and information derived from biographical sources.[91] Wartegg has applied his test to the diagnosis of both normal and abnormal subjects and has continued to expand his ideas on scoring dimensions and criteria.[92]

In developing the Drawing-Completion Test, which is based on the Wartegg test blank, Kinget carried out research on a wider scope. She used 383 subjects between the ages of 18 and 50. The personality scheme she used is similar to those of Sander and Wartegg. Another factor she discusses is the qualitative characteristics of the

90. Ibid., pp. 8-12.

91. Ibid., pp. 13-26.

92. E. Wartegg, Schichtdiagnostik: Der Zeichentest.

stimuli, based in part on the work of Kraus, Berger, and Hippius. Interpretation of the drawings is based on the relation of the drawings to the qualitative aspects of the stimuli, the content, and the mode of execution of the drawings. An inquiry on the subjects' reactions to the different stimuli is conducted after completion of the test performance. Validation is based on a questionnaire resembling the Bernreuter, a forced-choice test, and a rating scale.[93]

93. Ibid., pp. 27-135.

CHAPTER IV

METHODOLOGY

Description of the Subjects

The subjects used in this study were one hundred grade school children between the ages of 10 and 12. The sample contained an all-white population and included both boys and girls. All of the subjects were pupils at St. John Berchman's Parochial School in Detroit, Michigan.

The sample was selected so that it would represent an average classroom as well as possible. Actually, one hundred seven subjects were tested. The final number of acceptable protocols was one hundred. The major criterion for rejecting a test protocol was detection of the subject copying responses during administration of the PGS. Test protocols of six subjects were rejected because of detection of gross copying. One subject's test protocol was rejected because he had recently recovered from poliomyelitis and had not yet regained sufficient motor control and co-ordination.

The 100 acceptable test records were almost evenly distributed among the three age categories used. There were 33 ten-year-old subjects, 33 eleven-year-old subjects, and 34 twelve-year-old subjects in the final sample. Table I lists the average age and age range of each of the

three age categories of the entire sample.

TABLE I*

RANGE AND AVERAGE AGE OF SAMPLE

SIZE	GROUP	AGE RANGE PER GROUP	AVERAGE AGE
33	X	X, 0 to X, 11	X, 6.1
33	XI	XI, 0 to XI, 11	XI, 2.5
34	XII	XII, 0 to XII, 11	XII, 4.7
100	TOTAL	X, 0 to XII, 11	XI, 4.6

Other than their ages, no pertinent information about the subjects was obtained. The specific socio-economic status of their families, their home environment, or the occupation of their parents is unknown. However, from casual observation, they seem to belong generally to the lower-middle socio-economic class or slightly lower. The occupations of their parents are probably those associated with this stratum of society.

*Roman numerals indicate ages in years while Arabic numerals indicate months.

The Instruments to be Used

Two techniques of measuring adjustment are used in this study. One of these is the Pikunas Graphoscopic Scale (PGS). The other is a Behavior Rating Scale devised by the author. These techniques are described in the next two sections.

The Pikunas Graphoscopic Scale

The PGS is a semi-structured, multi-dimensional, culture-free projective drawing test for children and adolescents. Its scoring dimensions are intelligence, self-expressive balance, and adjustment level. Only the last of these dimensions is specifically considered in this investigation.

In its form and method the PGS bears some relationship to other drawing tests. Its closest correlates are the Wartegg Test and G. Marion Kinget's version of the Wartegg, the Drawing Completion Test. All three of these tests, Kinget's Wartegg's and the PGS, have common roots.

> The test which Miss Kinget has used resembles in method the well known Horn-Hellersberg test. However, the stimuli provided in the eight spaces in which to draw figures in Miss Kinget's test are based on an elaborate psychodiagnostic significance. Historically, this test goes back to a psychological theory propounded by F. Sander at the University of Leipzig known as Ganzheit Psychologie. Sander attempted to study the impact of structure on experience by means of a fantasy test. This work was picked up by

> Ehrig Wartegg and the testing form which Miss Kinget employs in her study is Wartegg's form. Wartegg has given particular attention to providing adequate variety of form, location and structure of signs on the test sheet. These signs may be characterized by their unstructuredness, which gives the subject the greatest possible freedom in conceiving and executing his drawing.[1]

This excerpt shows that Kinget's contribution has been a new scoring system and interpretative analysis for the Wartegg test. In the PGS six of the eight semi-structured stimuli have some resemblance to Wartegg stimuli. Because of this relation it would be well to examine Kinget's description of these stimuli. However, it must be remembered that in constructing the PGS J. Pikunas modified these stimuli. The most important difference is the the PGS employs chromatic as well as achromatic colors. Other differences are changes in the size of the stimuli, their number, their position in their plate or square, and the order in which they appear on the test blank. The other two semi-structured stimuli, an unstructured stimulus or "free drawing" square, and the inclusion of two direct questions to be answered by the subject are Pikunas' own innovations. The six stimuli of the Wartegg test which are similar to those used in the PGS are described by

1. G. Marian Kinget, The Drawing-Completion Test, p. v.

Kinget as having the following properties:

1. The dot has the characteristics of smallness, roundness and centrality . . . Its exact central position lends it importance. . . and calls for acknowledgement.

2. The wavy line suggests something lively, mobile. . .or flowing. . . It requires integration into something organic.

3. The black square appears heavy, solid. . . angular. . . and evokes concrete materiality.

4. The two opposed slanting lines express. . . conflict and dynamism. The position of the longer evokes something directed decidely upward while the shorter line shows frank opposition.

5. The dotted half-circle suggests something very fine, delicate, round and supple that is at the same time appealing and a little puzzling because of its complex, beadlike structure.

6. The broadly curved line has the organic qualities of roundness and flexibility. . . appears restful, large, fluent and easy to deal with.[2]

How these Wartegg stimuli differ from the PGS stimuli is included in the following description of the PGS test blank. A sample of the PGS test blank and the PGS scoring blank appear in Appendices A and B, respectively.

The PGS test blank itself contains ten plates or squares arranged on a sheet of heavy bond paper measuring 19 by 14 3/4 inches. These ten plates are numbered consecutively and contain the following elements.

Plate number 1, measuring approximately 4 7/8 by 5 1/4 inches contains a drawing which is rather complete in gross

2. Ibid., pp. 13-15.

structure. However, there are some details missing, and the subject may color, label, and finish the drawing. This plate is located in the upper right hand corner of the test blank. In contrast to plate 1, plate number 10 located in the lower right hand corner of the blank, has no drawing or stimulus in it at all. It offers the subject an opportunity for free drawing.

The plates numbered 2 through 9 contain semi-structured stimuli. The stimuli in the first four plates suggest animate objects. In plate number 2 there are two red, dotted semi-circles that most often suggest ears. This stimulus differs from the Wartegg "dotted half circle" in number, color, position in the plate and position on the test blank. Plate 3 has two green, solid circles suggesting eyes. Wartegg's dot is singular, smaller, black in color, and centrally located. Two short, wavy lines are the stimuli in plate 4, and they differ from the similar Wartegg stimulus in number and color and position on the test blank. Plate 5 has two black arcs suggestive of a smiling mouth. This stimulus differs from Wartegg's in number, thickness of the lines, and position on the test blank. Plates 6 through 9 contain stimuli that are meant to suggest inaminate objects. They are located directly below plates 2 through 5. Plate 6 contains a small, black, solid circle placed above three parallel black line of increasing length, the line directly

below the circle being the shortest. Wartegg has no similar stimulus. In plate 7 there are three parallel, blue, diagonal lines with the middle line being slightly longer than the other two lines. This stimulus is another of J. Pikunas's innovations. The final plate, number 9, contains two pairs of red lines. Each pair has two diagonal lines which are perpendicular to each other, but do not intersect. The stimulus differs from Wartegg's correlated stimulus in number of stimuli, color, and position both in the plate and on the test blank. The sizes of plates 6 through 9, as well as plates 2 through 5, are approximately 3 5/8 by 3 1/4 inches.

All ten of the stimuli are framed in heavy black borders. Below each of the plates is the number of that plate and a space for a label or title to be ascribed to the drawing by the subject.

In the upper left hand corner of the test blank is a section for including the subject's name, date of birth, total time of the whole test to the nearest whole minute, and pertinent notations which will aid in the scoring and analysis of the test. In the lower left hand corner of the test blank are two questions which the subject answers. The form of the first question is "What is the object you most often draw?" The second question reads, "What else would you like to draw?" In subsequent printings of the

PGS, the first question will be changed to read, "What is the thing you like to draw most often? Draw it in the space at the right."

Besides the test blank, the subject is supplied with a special set of soft lead, colored pencils. Each set of pencils contains six colors. The six colors are black, brown, red, blue, green, and yellow.

Behavior Rating Scale

The second instrument used in the experiment is a Rating Scale, the selection of which was a problem. After investigating the available rating scales, it was found that none of them fulfilled the specifications desired. The rating scales examined were rejected because they did not apply specifically to the problem, the language in which the items were couched was not exact enough, or the suggested behavior traits which they proported to measure included descriptive terms which are now obselete. Since these scales were not acceptable the alternative of constructing an original rating scale was taken.

Possible items for the rating scale were investigated. Some ideas for test items were found in tests and rating scales of adjustment, personality, and mental maturity. Others were obtained from the literature on personality and trait theory and case history material. Conferences with

teachers and psychologists produced some of the most significant items. Seventy-two items were collected in this fashion.

Selection of the items to be used in the final form of the behavior rating scale was based on several criteria. The first criterion applied to each of the items was the emphasis it received in the literature and the frequency of its use in tests and rating scales. The second criterion was the diagnostic significance of the items according to the judgment of six professional psychologists to whom the items were submitted. All six psychologists possess advanced drgrees and are engaged in work which is chiefly psychological in nature.

Sixteen items are in the final form of the rating scale. They include items concerning attendence, physical symptoms of anxiety, phobias, aggressive behavior, tattling, temper tantrums, verbal facility, reaction to recitation, ability to concentrate, social relations, egotism, reaction to frustration, impulsiveness, scrupulosity, negativism, suggestibility, feeling of insecurity and self-confidence. Thirteen of the sixteen items are arranged on a five-step graphic scale. A description of each trait is given, and there is a short descriptive phrase at each step of the scale. The rater indicated his ranking of the subject on that trait by placing a check at what he considered the appropriate place. The other three items are answered by

writing a phrase or a sentence. A sample copy of the rating scale is contained in Appendix D. Appendix E contains instructions for using the rating scale.

Administration of the Tests

The PGS: The subjects used in the sample were tested at St. John Berchman's school during the last two weeks of January, 1954. The tests were administered during the school day between the hours of 9:30 A. M. and 2:30 P. M., and the testing sessions were continuous and uninterrupted. An ordinary classroom was used for the testing sessions. The environment was cheerful, and the lighting, ventilation, and room temperature were adequate. Outside disturbances were kept to a minimum. The subjects were tested in groups ranging from 15 to 30 subjects per group.

After a particular group entered the room they were seated in alternate seats and rows. This was a precaution against copying. If copying or an attempt at copying was detected, the subject was warned to do his own work and was allowed to finish the test. His test was then examined and either rejected or accepted as a valid test, depending on whether or not there was any evidence of copying.

After the test blanks and pencils were passed out, the subjects were told to fill in their names. They were then asked to write the date of their birth if they could

remember it. When this was completed, the following directions were given:

> This is a drawing task. (Showed the test blank to the group). Look at these different squares or frames that have different marks on them. In the first one you see a half finished drawing; a child and a dog, in the background is a house, a mountain and probably clouds. You may try to complete it. Then look at each of those marks. (Pointed out marks in individual frames). They may suggest something to you to draw. You may draw anything you like, and in the way you choose. Use any of these pencils you find here. (Showed a set of pencils and how to take them out). Now you may start to draw at any square, and whatever the marks suggest. When you finish your drawing be sure to write down the name of the drawing in the space below it. When you finish all of your drawing, answer the two questions at the bottom of the page. (The questions were pointed out and read to the group). Tell me when you are finished.

During the test the subjects were encouraged to finish all the items but were not pressed if they balked. Any questions the subjects had concerning what they were to draw or the fashion in which it should be drawn were answered by, "It is up to you," or "Do as you like."

When the subject finished a test he brought it to one of the two administrators. The administrator checked the test for completeness and the total time used by the subject was recorded in the appropriate space.

The Behavior Rating Scale

A supply of rating scales and instructions for their

use were given to the school principal. The principal distributed them to the teachers of the subjects tested with the PGS. Each subject received one rating from the teacher who was best acquainted with him. When the teachers completed rating their students, they submitted the rating scales to the principal. The principal, in turn, returned the rating scales to the administrator.

Scoring of the Tests

The PGS: The PGS has three scoring dimensions. They are intelligence, experience balance, and adjustment level. This study is concerned only with the last of these scoring dimensions.

Each of the ten drawings were individually scored in eleven different categories. Five of the categories are designated as "positive scoring categories." Another five are designated as "negative scoring categories." The remaining category is the time category, i. e., the amount of time the subject spends in taking the test. It is generally considered to be a positive category, the less time the subject takes, the higher his score in this category. However, the time spent on the PGS depends a great deal on the quality of the drawings.

The preceding scheme of scoring categories yields three "adjustment scores." These scores are a "positive category score," a "negative category score," and a

difference score." The difference score is derived by determining the algebraic sum of the positive category and the negative category scores.

Several general criteria are applied to each of the drawings when they are scored. (The specific criteria for each category are included in the category descriptions on page 58). However, before discussing these criteria, one broad generalization must be assumed. This assumption is that the reaction of a subject to the stimuli reflects his mode of adjustment. If this is granted then the criteria described below possess more meaning.

First, the level of development will affect the quality and content of the drawing produced. Fantasy and symbolic drawing may be more prevalent in a particular age group. Another group may prefer drawing reality, real objects in a real environment. Some groups are characterized by the drawing of animate objects, others by drawings of inanimate objects. Another difference is the changing tendencies to draw general versus specific objects. During the pubertal stage subjects reject stimuli more frequently.

The other two general criteria are the "reality standard" and the "gestalt or configuration standard." In reference to the reality standard, drawings are judged according to the extent to which they correspond with real objects. When the drawing is of a fantastic or symbolic nature this criterion is applied with the reservation

demanded by such content. That is, the scorer must recognize that the drawing is an invention of the productive or creative imagination and, therefore, cannot be considered merely as reproductive imagery.

"Gestalt formation or configuration," the last of the general criteria, received emphasis in judging a drawing. The scorer estimates how adequately the parts of the drawing are related to each other, how well the stimulus is incorporated into the total configuration, and how much of a role the stimulus plays in the drawing.

Art talent and training were not considered in scoring the test. In a previous study the coefficient of correlation (r) between art class grades and the PGS was .10. The obtained r was not significant.[3]

The scoring of the PGS was based on a five point scale, ranging from a score of 0 to a score of 4. Each drawing was scored on this scale for each of ten categories which comprise the adjustment dimension of the PGS. The time credit category was not scored on the five-point scale. A score of 0 indicates that the drawing lacked any of the characteristics enumerated in a particular scoring category. A score of 1 was given when the drawing contained some of the characteristics subsumed by a particular category.

3. J. T. Bushey, "Relation Between Intelligence and School Success," Unpublished Master's Thesis, University of Detroit, June, 1955.

It indicates that there was a tendency toward an adequate configuration or gestalt. If the drawing element's use was average it received a score of 2 in that category. A score of 3 signified above average use of that particular element of drawing. Superior use of a drawing element received a score of 4. For purposes of finer discrimination half point scores of .5, 1.5, 2.5, and 3.5 were used. Plus signs were prefixed to scores in the positive categories and minus signs were prefixed to scores in the negative categories.

The scoring categories and a description of the drawing elements they include are as follows:

1. Positive scoring categories:

   a. Incorporation of Stimulus or Orientation: Whether or not the drawing incorporates the original stimulus with adequate use of form and color. Does it form an important part of the drawing or contribute a significant unit to it?

   b. Lightness: Are the parts of the drawing adequately connected? Is light pressure used? Does the subject draw smoothly and continuously? Are there few or no jagged, drawn-over lines?

   c. Relation to Objective Reality: Whether or not the drawing corresponds to reality. How close are the drawn objects to real objects in reference to size, shape and utility?

   d. Extension over Space and Completeness of the Drawing: How much of the available space does the subject use? Does he continue and extend the drawing if space

permits it? If at least 4/5 of the space is used the subject is making superior use of the available space.

e. Popularity of Contents: Original drawings receive the highest credit according to detail. Popular drawings receive scores of 2. When a theme was repeated the repetition received a score of 0. (A log was kept of the drawing content of the 10 to 12 year old group to determine popular content).

2. Negative Scoring Categories:

a. Disorientation of Stimuli: Inability to incorporate stimuli as meaningful units of the drawing.

b. Lack of Elaboration or Specification: Ambiguities; lack of connection between the object drawn and the title given. Lack of secondary and tertiary characteristics.

c. Disproportion: Relation among the various parts of the drawing. The reality standard is used.

d. Heaviness, Pressure: Crudeness; overuse of form or color; broken lines or connections.

e. Recurring Objects or Contexts: Copying of the subject's own drawings or any parts or contexts.

3. Time Credits: Time credits for elapsed time for the entire test were assigned according to a standard score scale. Each age group was scaled separately.[4]

All of the drawings were scored in each of the first ten categories enumerated above. The raw scores obtained

4. J. Pikunas, The Graphoscopic Scale: A Multi-dimensional Projective Technique of Personality, (Manual in Preparation).

by each drawing in a particular category were summed. This score represented the subject's performance as a whole in reference to that particular scoring category. The summed raw scores for each category were then converted into their equivalent T-scale scores[5] according to the technique outlined by J. P. Guilford.[6]

After the preceding operations were conducted, the next step was to sum the T-scale scores of the categories. This yielded two scores. One was the sum of the scores of the positive categories, and the other was the sum of the scores of the negative categories. A third score, the algebraic sum of the summed positive category scores and the summed negative category scores, was also determined.

Behavior Rating Scale

Two of the sixteen items on the Behavior Rating Scale were answered by a written phrase or sentence. These were item number two ("Does the subject have any physical expressions such as nervous tics, frequent headaches, crys easily? Please list.") and item number three ("Does the subject have any 'unreasonable fears' or phobias? Please indicate."). One point scores for each on a five

5. For ease of calculation the obtained T-scale score was multiplied by 0.2.

6. J. P. Guilford, Fundamental Statistics in Psychology and Education, pp. 494-98.

point scale (0 - 4) was alloted to the mention of each symptom.

The other fourteen items were answered by making a check mark at the appropriate point on a graphic scale. Of the remaining fourteen items there were nine unipolar items (a continuum proceeding from one basal origin to one exceptional level of behavior) and five bipolar items (two continuums proceeding from one common basal origin, designated as normal, to two contrary exceptional levels of behavior). These items and their nominal position in the rating scale are as follows:

A. Unipolar items:

(1) Number of absences and punctuality.

(4) Does the subject engage in bullying, find pleasure in injuring others, or belittling their work?

(5) Does the subject "tell" on others for the sake of attention?

(6) Does the subject exhibit temper tantrums?

(7) How adequate is the subject's verbal facility?

(8) How does the subject react to recitation, volunteering, or when called on unexpectedly?

(9) How much ability has the subject for concentrating attention, observation, or work

for any length of time?

(12) Infantile, demanding self-centeredness vs. emotional maturity.

(16) Inferiority, insecurity, and rejection vs. self-confidence, rapport with environment , and social ease:

B. Bipolar items:

(10) Quiet vs. talkative.

(11) Solitary vs. extreme interest in social activity.

(13) Reaction to frustration: Submissive, discouraged vs. agressive, highly persevering.

(14) Highly impulsive vs. extremely cautious.

(15) Highly negativistic vs. extremely suggestible.

In assigning raw scores to the unipolar items the score of "0" was placed at the origin of the scale and the score of "4" was placed at the terminal end of the scale. The bipolar items had a score of "4" at the origin and scores of "0" at both terminal ends of the scale.

Each of the items were scaled in the same manner as the PGS raw scores, the raw scores being converted into T-scale scores. The scale scores were summed to find a total "adjustment score".

Correlation Techniques

The three scores derived from the PGS were independently

correlated with the adjustment score of the Behavior Rating Scale according to the Pearson Product-Moment Method. This was done for each of the three age groups of the sample and for the whole sample, giving a total of twelve basic coefficients of correlation. Average coefficients of correlation were also determined for the three coefficients of correlation in each age group. An average of the three coefficients of correlation for the sample as a whole was also determined. Average coefficients of correlation were also found for the three coefficients of correlation using the positive scoring categories, the three coefficients of correlation using the negative scoring categories, and the three coefficients of correlation using the "difference" score. This gave a total of nineteen coefficients of correlation, including the averages.

Other statistical procedures included the t-test of significance of coefficients of correlation, the coefficient of alienation, the index of forecasting efficiency, and the coefficient of determination.

CHAPTER V

PRESENTATION OF THE DATA

The PGS tests were scored in the manner described in Chapter IV, pages 55 to 60, and statistical procedures were used in interpreting the results. No attempt was made to predict idiomatic behavior of particular individuals. The variables used are adjustment as reflected in the sum of the scaled scores in the positive and negative scoring categories of the PGS, the algebraic sum of these categories, and the sum of the scaled scores on the rating scale. Adjustment here is to be understood in terms of general school adjustment.

In Table II the data is presented in terms of raw score totals for all ten stimulus items and the time measurement. Scaled scores were used in the computing of coefficients of correlation.

The Correlation of the Data

In all, nineteen coefficients of correlation were obtained. Twelve of these correlations were computed from a scatter diagram according to the Person Product-Moment formula.

Three coefficients of correlation between the rating scale and each of the three adjustment scores of the PGS were computed for each age level and for the sample as a

TABLE II

MEAN RAW SCORES, RANGE OF SCORES, STANDARD DEVIATIONS, AND MEAN OF MEANS FOR EACH SCORING CATEGORY ACCORDING TO AGE GROUP

	10-YEAR-OLDS			11-YEAR-OLDS			12-YEAR-OLDS			
SCORING CATEGORY	MEAN	RANGE	σ	MEAN	RANGE	σ	MEAN	RANGE	σ	$\bar{X}$ OF $\bar{X}$
1. Incorporation of Stimulus or Orientation	14.0	9 to 19	2.7	17.5	11 to 29	4.5	14.8	9 to 27	2.7	15.4
2. Lightness	2.0	0 to 9.5	1.5	2.5	0 to 20	1.5	4.3	0 to 23	2.1	2.9
3. Relation to Objective Reality	13.1	8 to 17.5	2.5	16.3	10 to 31.5	3.7	14.1	9 to 27	2.5	14.5
4. Extension over Space and Completeness	14.4	9 to 20	2.9	17.5	9 to 28.5	4.0	15.2	11 to 29	5.3	15.7
5. Popularity of Contents	13.4	8 to 19	3.1	15.5	7.5 to 26	4.7	15.5	7 to 27	3.4	14.8

(Continued on next page)

TABLE II (CONTINUED)

	10-YEAR-OLDS			11-YEAR-OLDS			12-YEAR-OLDS			
SCORING CATEGORY	MEAN	RANGE	σ	MEAN	RANGE	σ	MEAN	RANGE	σ	$\bar{X}_{\bar{X}}$ OF
6. Disorientation of Stimulus	16.1	11.5 to 21	2.5	17.0	6 to 26.5	4.5	19.0	11 to 25	3.1	17.4
7. Lack of Elaboration	15.9	12 to 23	3.8	17.2	8 to 29.5	4.7	18.4	12 to 25	4.5	17.2
8. Disproportion	14.1	7 to 21	4.0	15.9	7.5 to 23.5	2.9	16.0	9 to 23	3.9	15.4
9. Heaviness, Pressure	15.8	5.5 to 21.5	5.3	11.7	3 to 24	4.5	11.5	3 to 28	2.1	13.0
10. Recurring Objects	6.3	3 to 17.5	3.2	9.3	0.5 to 19.5	3.1	9.0	2 to 16	2.8	8.2
11. Completion Time	41'	20' to 104'	12'	35'	20' to 54'	4'	41'	22' to 87'	8'	39'

whole. Average coefficients of correlation were computed for the three coefficients of correlation of each age group and the sample as a whole. Average coefficients of correlation were also determined for the three coefficients of correlation between the positive scoring categories and the rating scale in the three age groups, the negative scoring categories and the rating scale in the three age groups, and the positive-negative algebraic sum and the rating scale in the three age groups. The average of coefficients of correlation were computed by the Z method described in Guilford.[1] All of the obtained coefficients of correlation are listed in Table III.

Tests of Significance and Interpretive Indices

Several tests of significance and interpretive indices were applied to the obtained coefficients of correlation. These were the null hypothesis test through means of the standard error, the t-ratio test for significance of the Pearson Product-Moment coefficient of correlation, the coefficient of alientation (k), the index of forecasting efficiency (E), and the coefficient of determination (d).

In the case of small r's the measure of reliability afforded by the null hypothesis test is especially

1. J. P. Guilford, Fundmental Statistics in Psychology and Education, pp. 325-26.

desirable. The null hypothesis assumes that, the size of the sample being what it is, the obtained r could have occured by random sampling. That is, the population correlation is assumed to be zero, null, and the two variables are actually uncorrelated. Any deviation from zero correlation occured by chance and is not a real relationship between the variables. If the null hypothesis is rejected then the possibility that the obtained r occured simply by chance can also be rejected, within certain limits of statistical confidence. The r in question can then be assumed to have some measure of significance and reliability.[2]

As was stated above, the null hypothesis is approached by means of the standard error. The standard error of r when the population r is assumed to be zero is found by the formula $\sigma_{r_0} = \frac{1}{\sqrt{N-1}}$.[3]

This formula has been applied to each of the r's listed in Table III. The standard error for r when it is assumed to be zero and the applicability of the null hypothesis is tabulated in Table IV.

To use the t-ratio test for significance of r the formula $t = r\sqrt{\frac{N-2}{1-r^2}}$ was used.[4]

2. Ibid., pp. 180-181.

3. Ibid., p. 180.

4. Ibid., p. 219.

TABLE III

VALUES OF r, CORRESPONDING t VALUES, REQUIRED t RATIO VALUES, COEFFICIENT OF ALIENATION (k), INDEX OF FORECASTING EFFICIENCY (E), AND COEFFICIENT OF DETERMINATION (d)

VARIABLES CORRELATED	r	t	REQUIRED t 5%	REQUIRED t 1%	k	E	d
1. Rating scale and positive scoring categories for 10-year-olds	+.31	1.819	2.042	2.750	.951	4.9	9.61
2. Rating scale and negative scoring categories for 10-year-olds	-.05	0.280	2.042	2.750	.999	0.1	0.00
3. Rating scale and algebraic sum of positive and negative categories for 10-year-olds	+.18	1.017	2.042	2.750	.984	1.6	3.24
4. Rating scale and positive scoring categories for 11-year-olds	+.26	1.500	2.042	2.750	.965	3.5	6.76

(Continued on next page)

TABLE III (CONTINUED)

VARIABLES CORRELATED	r	t	REQUIRED t 5%	REQUIRED t 1%	k	E	d
5. Rating scale and negative scoring categories for 11-year-olds	+.32	1.888	2.042	2.750	.947	5.3	10.24
6. Rating scale and algebraic sum of positive and negative categories for 11-year-olds	+.41*	2.505	2.042	2.750	.912	8.8	16.81
7. Rating scale and positive scoring categories for 12-year-olds	+.30	1.779	2.042	2.750	.954	4.6	9.00
8. Rating scale and negative scoring categories for 12-year-olds	+.30	1.779	2.042	2.750	.954	4.6	9.00
9. Rating scale and algebraic sum of positive and negative categories for 12-year-olds	+.32	1.888	2.042	2.750	.947	5.3	10.24

(Continued on next page)

TABLE III (CONTINUED)

VARIABLES CORRELATED	r	t	REQUIRED t 5%	REQUIRED t 1%	k	E	d
10. Average r for the three r's of the 10-year-old group	+.15	1.468	1.984	2.626	.989	1.1	2.25
11. Average r for the three r's of the 11-year-old group	+.34**	3.516	1.984	2.626	.940	6.0	11.56
12. Average r for the three r's of the 12-year-old group	+.31**	3.168	1.984	2.626	.951	4.9	9.61
13. Average r for the three positive category r's	+.29**	2.929	1.984	2.626	.957	4.3	8.45
14. Average r for the three negative category r's	+.20*	1.980	1.984	2.626	.980	2.0	4.00
15. Average r for the three algebraic sum r's	+.31**	3.168	1.984	2.626	.951	4.9	9.61

(Continued on next page)

TABLE III (CONTINUED)

VARIABLES CORRELATED	r	t	REQUIRED t 5%	REQUIRED t 1%	k	E	d
16. Rating scale and positive scoring categories for all 100 subjects	+.30^{xx}	3.114	1.984	2.626	.954	4.6	9.00
17. Rating scale and negative scoring categories for all 100 subjects	+.17	1.808	1.984	2.626	.985	1.5	2.95
18. Rating scale and algebraic sum scores for all 100 subjects	+.25^{x}	2.552	1.984	2.626	.968	3.2	6.25
19. Average r of the above three r's	+.25^{xx}	4.420	1.968	2.592	.968	3.2	6.25

x : Significant at the 5% level

xx : Significant at the 1% level

Note: These coefficients of correlation were not corrected for attenuation.

After the corresponding t value of an r was computed reference was made to the tables in Guilford[5] to determine whether the r was significant and, if it was significant, at what level of statistical confidence this significance could be tested. This information is listed in Table III.

A last test of significance utilized the Wallace-Snedecor table.[6] These tables give the required minimum significant r for samples of various sizes. The results of this test of significance are also included in Table III.

The other indices in Table III (coefficient of alienation, index of forecasting efficiency, and coefficient of determination) are used to indicate certain types of relationships between the variables in a given obtained r. They also help to determine the extent to which one may make reliable predictions based on the obtained r.

A Note on the Content of the Drawings

The experimental design of this study did not include a thorough analysis of drawing content. However, a log of the content was kept during the course of the principal reaserch as a sort of "by-product". Some limited

5. Ibid., pp. 538-539.
6. Ibid.

TABLE IV

STANDARD ERROR OF r WHEN r IS ASSUMED TO BE ZERO AND THE NULL HYPOTHESIS TEST

	r VALUE (see Table III)	N	σ_{r_o}	NULL HYPOTHESIS: REJECTED OR NOT REJECTED
1.	+.31	33	.18	Not rejected at 5% level
2.	-.05	33	.18	Not rejected at 5% level
3.	+.18	33	.18	Not rejected at 5% level
4.	+.26	33	.18	Not rejected at 5% level
5.	+.32	33	.18	Not rejected at 5% level
6.	+.41	33	.18	Rejected at 5% level*
7.	+.30	34	.17	Not rejected at 5% level
8.	+.30	34	.17	Not rejected at 5% level
9.	+.32	34	.17	Not rejected at 5% level
10.	+.15	100	.10	Not rejected at 5% level
11.	+.34	100	.10	Rejected at 1% level**
12.	+.31	100	.10	Rejected at 1% level**
13.	+.29	100	.10	Rejected at 1% level**
14.	+.20	100	.10	Rejected at 5% level*
15.	+.31	100	.10	Rejected at 1% level**
16.	+.30	100	.10	Rejected at 1% level**
17.	+.17	100	.10	Not rejected at 5% level
18.	+.25	100	.10	Rejected at 5% level*
19.	+.25	300	.06	Rejected at 1% level**

*= significantly reliable **= very significant

conclusions based on content are presented in the following chapter. A copy of the content log has been included in Appendix E.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Summary

This study involved comparing adjustment as measured by the author's Behavior Rating Scale and by the Pikunas Graphoscopic Scale (PGS). The PGS is a multi-dimensional drawing projective technique. It measures intelligence, self-expressive balance, and adjustment.

The hypothesis assumed was that there is a significant relationship between the PGS adjustment scores and teachers' ratings of children's adjustment between the ages of 10 and 12. To test this hypothesis 100 subjects were given the PGS and were rated by their teachers. The raw scores from the PGS and the rating scale were converted to normalized T-scale scores. These T-scale scores were correlated according to the Pearson Product-Moment formula. Twelve coefficients of correlation were obtained in this manner. Seven averages of coefficients of correlation were determined by the Z method. All were tested for significance and reliability, and interpretive indices were applied to them.

The following section of this chapter contains a description of the resolution of the hypothesis, conclusions which may be drawn from the study, a note on the content

analysis of the drawings, and suggestions for further research on the validation and use of the PGS technique.

Conclusions

Table II on pages 65 and 66 lists the distribution of raw scores on each of the eleven scoring categories used in the adjustment dimension of the PGS. Examination of the table shows that the distribution of scores is dependent on age level and the nature of the scoring category.

In the 10-year-old and 12-year-old groups the negative scoring category scores (numbers six to ten) are higher than the positive scoring category scores (numbers one to five). These two types of scores are about even in the 11-year-old group. The greatest and least deviation of scores occures among the 11-year-olds and 12-year-olds, respectively. The 10-year-olds had the narrowest range of scores, and the 11-year-olds had the widest range of scores.

Through employing the mean of means, it is seen that the highest positive category scores are in the category "Extension over Space and Completeness," and the highest negative category scores are in the category "Disorientation of Stimulus." "Lightness" is the lowest scoring positive category. The lowest scoring negative is "Recurring Objects".

The above differences may be due to several factors. First, variations are expected in test scores when they are viewed from a developmental aspect. Secondly, the skill of the scorer may have improved as the scoring of the tests progressed. How much and in what way this subtle influence may have affected the scores, if it affected them significantly at all, is unknown. A third factor is the possibility that the presence of elements in the drawings may have been easier to score than the absence of them.

Lastly, this particular age range of 10 to 12 includes the latter stages of childhood and the beginning of adolescence. After the child is 10 years old he is on the threshold of the pubertal phase. With the advent of puberty significant changes in personality and behavior are to be expected.[1]

Tables III and IV contain the results on which resolution of the hypothesis of this thesis is based. Whether the hypothesis can be accepted or rejected depends on the size of the sample, age-level, and the type of PGS adjustment score used.

The r's listed in Table III range from -.05 to +.41, varying according to the three factors cited in the above paragraph. Verbally described, r's below .20 show a "slight

1. Halpern, op. cit., p. VIII.

correlation and an almost negligible relationship" (in Table III numbers two, three, ten, and seventeen). Those between .20 and .40 show a "low correlation and a definite but small relationship" (in Table III numbers one, four, five, seven, eight, nine, eleven, sixteen, eighteen, and nineteen). Those between .40 and .70 indicate a "moderate correlation and a substantial relationship" (in Table III number six).[2]

Of course, verbal descriptions of this type may be validly ascribed only to those coefficients of correlation which are significant. Table IV indicates which of the obtained r's are statistically reliable according to the null hypothesis test. Table III does the same with reference to the t-ratio test for significance of coefficients of correlation.

The tables show that nine of the nineteen obtained r's are significant, three at the 5% level and nine at the 1% level. These were coefficients of correlation numbers six, eleven to sixteen, eighteen, and nineteen.

Without reference as to whether they are significant or not, the highest r's occur in the 11-year-old group. The type of PGS adjustment score which correlated the highest with the rating scale was the algebraic sum score of the negative and positive scoring categories. It was also noted that as the size of the sample increased

2. Guilford, op. cit., p. 145.

the possibility of definite, significant coefficients of correlation increased.

The other indices listed in Table III contribute to a knowledge of the extent to which the obtained r's may be used to predict behavior based on PGS results. Once again, only the significant r's should be used in this context.

The coefficient of alienation (k) indicates the lack of relationship between the variables, just as the coefficient of correlation indicates the strength of relationship. Since the object of this study was to stress relationship rather than lack of relationship between variables, k is not of itself an important measure here. However, k is used in calculating the next index, the index of forecasting efficiency. It might be noted, in passing, that as r rises, k decreases. They are equal when r = .7071.[3]

There is a clue to accuracy of prediction in the value of k. If k shows to what extent there is a lack of a relationship between variables, then by simple mathematical calculation it may also be used to determine how much less error there will be in predicting X with knowledge of Y in comparison to predicting X without knowledge of Y. This is the index of forecasting

3. Ibid., pp. 375-76.

efficiency, (E), the general formula of which is E = 100 (1-k). It is defined as "the percentage reduction in errors of prediction by reason of correlation between two variables".[4]

For example, the obtained r between the algebraic sum of the positive and negative categories of the PGS and the rating scale in the 11-year-old group is +.41 and E = 8.8. That means that the percentage reduction of error in predicting X from Y in this case is 8.8 per cent. This does not seem to be very much. However, the usual range of r's when they are used as a validity coefficient is .00 to .60, with most of them in the lower part of this range. The corresponding E value for an r of .60 is 20 per cent, and an r of .30 has an E value of 4.6 per cent. It might also be mentioned that the efficiency of prediction based on an average, unsystematic interview is rarely as much as five per cent. An E value of 8.8 per cent is even more significant when it is considered that the variables correlated, a projective technique and a rating scale, are instruments for which it is difficult to provide adequate outside criteria.

The E values for the r's obtained in this study range from 2.0 per cent to 8.8 per cent, with a median value of 4.6 per cent. They may all be interpreted in the manner

4. Ibid., p. 377.

5. Ibid., pp. 155-156, 378.

similar to that employed in the example cited in the preceding paragraph.

The coefficient of determination ($100r^2_{xy}$) is a ratio of the relation between the respective dispersions of the variables in a particular r. It indicates the percentage of variance in Y that is accounted for by the variance in X.[6] In the case of the present study, the X and Y variables are the PGS and the Behavior Rating Scale.

An investigation of Table III will show that the d values are approximately twice the size of the E values. Their range is from 0.00 to 16.81, and their median is 9.00. The d values of the significant r's range from 4.00 to 16.81, with a median value of 9.61. The significance of d values for the obtained r's is analogous to that of the E values.

In summary, these conclusions may be made:

1. The coefficient of correlation between the PGS and teachers' ratings of children between the ages of 10 and 12 ranged from -.05 to +.41, with an overall median of +.30. The median of the significant r's was also +.30. An r of +.30 is a low correlation. However, it indicates a definite relationship.

2. Whether the hypothesis is accepted or rejected

6. Ibid., pp. 378-79.

depends on three factors: the size of the sample, the age level, and the PGS adjustment score used in correlating the PGS with the rating scale. In those cases where the null hypothesis was not disproved there may be a relationship of a significant nature between the variables. However, it is not statistically valid to make that assumption.

3. As the size of the sample increases the possibility of obtaining significant r's increases.

4. The average r for each age group is as follows:

10-year-olds: +.15 (insignificant)

11-year-olds: +.34 (significant at 1% level)

12-year-olds: +.31 (significant at 1% level)

5. The PGS adjustment score which yields the highest correlation with the rating scale is the algebraic sum of the positive and negative scoring categories. The author of the PGS, J. Pikunas, intends to develop an index number which he calls the "adjustment quotient." This will be similar to the "difference" adjustment score used in this thesis.[7]

6. On the whole, the PGS scores tend to predict, as a group, teachers' ratings of children's adjustment

7. J. Pikunas, The Graphoscopic Scale: A Multi-Dimensional Projective Technique of Personality. (Manual in preparation).

in a significantly definite manner. If analysis of projective signs in individual drawings is added to the prediction, the accuracy of the prediction might be raised to an even higher level.

7. Since this study involved only general school adjustment, it may be that many signs which were exhibited in the PGS were not represented by correlates on the rating scale, which was a measure of observable behavior in a school situation. These "ignored signs" so to speak, may be important clues for assessing adjustment in areas other than the school environment. It might also be noted that the rating scale and the raters are both prone to the pitfalls inherent in the rating technique. Errors might be introduced into the data by such things as the halo effect and central tendency.

A Note on Content Analysis

In general, the most frequently drawn object was the human figure or a detail of the human figure. Animal drawings decreased with increasing age levels, and drawings of manufactured objects, especially houses and machines, increases. Girls in the 11-year-old and 12-year-old groups drew more human figures than the boys drew. The boys drew more machines than the girls. This distribution of content is analogous to the results of the studies on content analysis cited in Chapter III.

The 11-year-olds and 12-year-olds showed a greater tendency to reject some of the stimuli. This may be due to feeling a greater need to represent objects accurately and not merely schematically. The stimulus figures which were most often rejected were stimuli number six, seven, and nine. All of them are rather difficult to incorporate into meaningful figures.

Suggestions for Further Research

The PGS, which is a multi-dimensional projective drawing test of personality, has many features to recommend it. It is relatively short, uses an economical method, and may be administered either to the individual or a group. It uses methods of eliciting projective production on which there has been a great deal of research recently, namely, the "motor-expressive"[8] and "constitutive"[9] methods. The stimulus figures range from a highly structured one to an unstructured one. Use of color, labeling, and application of the self-expressive balance dimension should yield interesting and useful results.

A few suggestions for research that may increase the value of this technique are submitted as follows:

8. S. Rosenzweig, "Investigating and Appraising Personality," in T. G. Andrews, Methods of Psychology, p. 563.

9. Frank, op. cit., p. 48.

1. The global concept of adjustment and how it applies to the PGS should be examined. This might be attacked through more precise definition and taxonomy of the variables involved.

2. The relation between stimulus ambiguity and maladjustment and how much they each contribute to a score for a particular drawing in a particular category should be investigated.

3. Another area of inquiry which would prove fruitful is more research on the characteristics of the stimuli and what they elicit, especially in the case of color dynamics.

4. Attention might be focused upon determining which stimuli subjects like most, which they disliked or rejected, whether they could have drawn a different object for a particular stimulus, and the order in which they did their drawings.

5. An inquiry session in connection with the drawings and the titles ascribed to them together with verbalizations during the test might bear closer scrutiny.

6. Relationships among the three scoring dimensions and their influence upon each other might yield significant signs for personality interpretation.

7. A more thorough analysis of drawing content should be carried out.

8. Further validation and reliability studies through correlating the PGS with other techniques of personality assessment, both projective and non-projective, and biographical sources should be made.

9. It would be profitable if the PGS could be submitted to experiments whose design would admit the utilization of more sophisticated statistical techniques, as for example, factor analysis, applications of the analysis of variance, and suggestions offered by information theory.

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The uses to which a child puts drawing. How the development of the perceptual processes modify the use of drawing as a mode of expression for the child.

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The author studies handwriting, voice, and gait as expressive movement. Hypnosis and word-association are some of the techniques employed.

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A textbook in the psychology of adjustment. Well organized and easy to read.

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An exposition of the rationale, administration, scoring, interpretation, and applications of the PGS.

APPENDIX A

PGS SCORING BLANK

Serial No. _____

Name _____ Exam. by _____

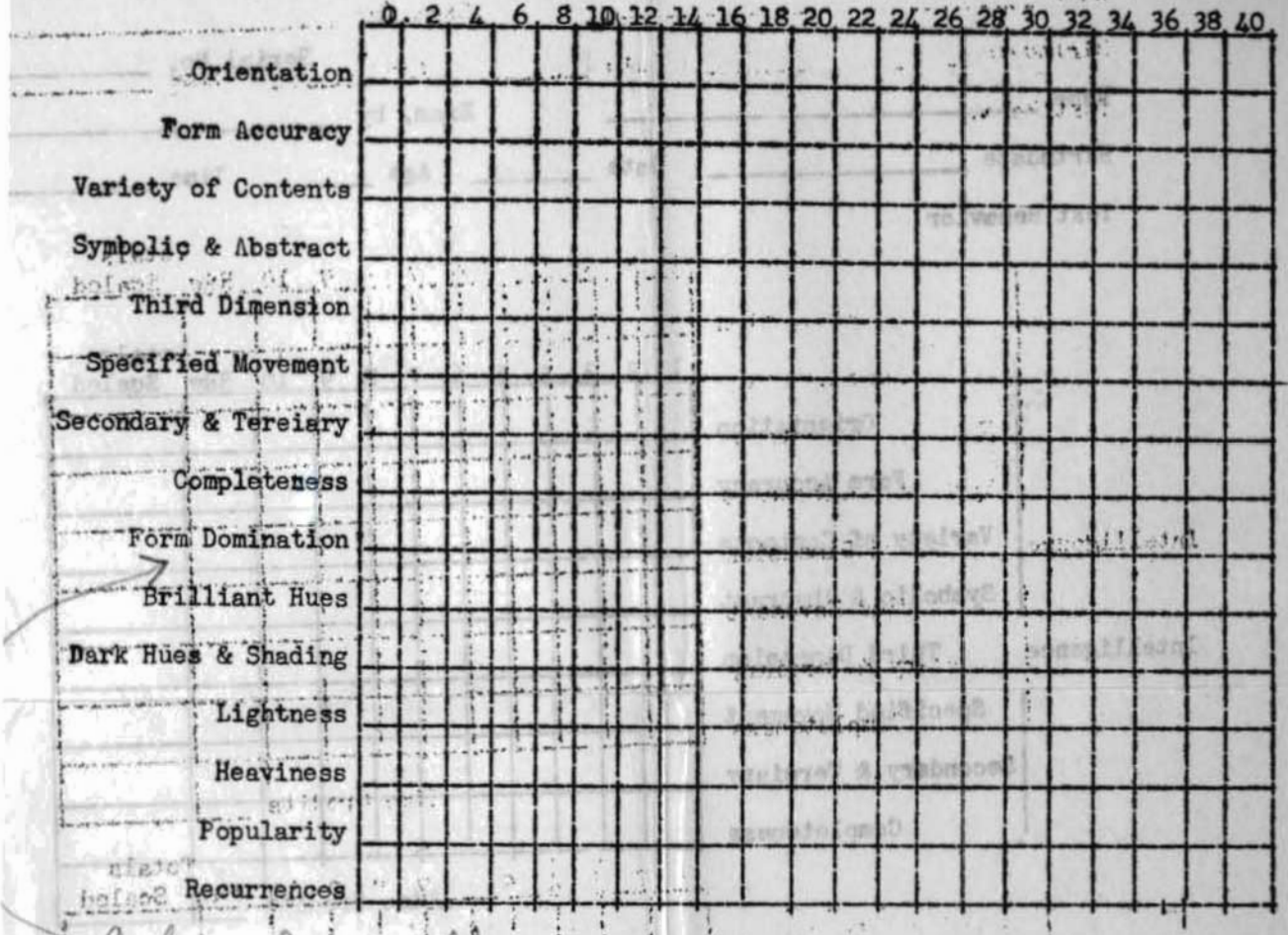
Birthdate _____ Date _____ Age _____ Time _____

Test Behavior

		1	2	3	4	5	6	7	8	9	10	Totals Raw	Totals Scaled
Intelligence	Orientation												
	Form Accuracy												
	Variety of Contents												
	Symbolic & Abstract												
	Third Dimension												
	Specified Movement												
	Secondary & Terciary												
	Completeness												
	Time Credits												

		1	2	3	4	5	6	7	8	9	10	Totals Raw	Totals Scaled
Experience Balance	Color Integration												
	Form Domination												
	Brilliant Hues												
	Color Disintegration												
	Color Domination												
	Dark Hues & Shading												

SCATTERGRAM



Color Domination

ANALYSIS

PGS SCORING BLANK (Cont.)

Name _____

	1	2	3	4	5	6	7	8	9	10	Totals Raw	Totals Scaled
Incorporation of Stimuli												
Relation to Obj. Reality												
Popularity of Contents												
Lightness												
Completeness & Continuity												
Time Credits												

Adjustment & M.H.

Disorientation												
Lack of Elaboration & Discontinuity												
Disproportion												
Heaviness												
Recurrences												

Form: Color= :

Chromatic: Achromatic= :

Original: Popular= :

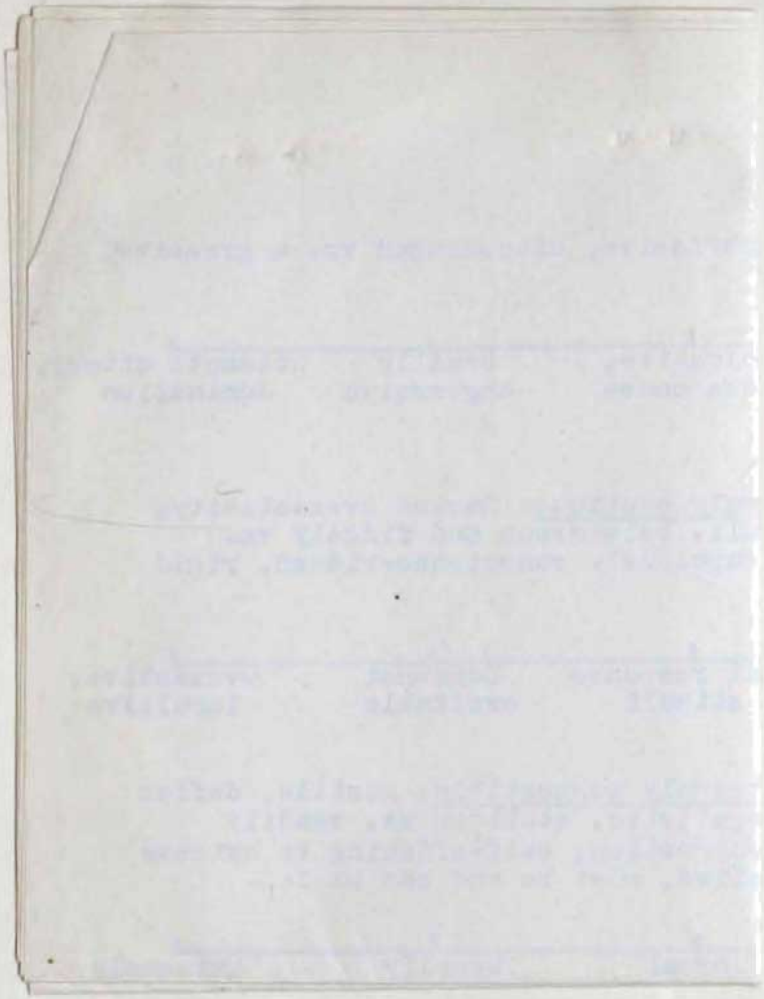
Human: Animal: Nature= : :

Total Scores

Intelligence	M.A. I.Q.
Experience Balance	Coefficient of Experience Balance or EB
Adjustment	Coefficient of Adjustment or AC
Mental Health	Mental Health Coeffecient or MHC
Personality Maturity	Personality Maturity Coefficient or PMC

Summary of Personality Analysis:

APPENDIX C



Read general directions first before attempting to make any ratings.

1. Number of absences and punctuality. (Give exact number or, if this is not possible, the pupil's standing in terms of quartiles on the scale below.) No._____

Perfect attendence	First Quarter	Second Quarter	Third Quarter	Fourth Quarter

2. Does the subject have any physical expressions such as nervous tics, frequent headaches, crys easily? (Please list.)

_____.

3. Does the subject have any "unreasonable" fears or phobias? (Please indicate.)

_____.

4. Does the subject engage in bullying, find pleasure in injuring others, or belittling their work?

Never	Once or twice	Occasionally	Frequently	Almost habitually

5. Does the subject "tell" on others for the sake of attention?

Never	Once or twice	Occasionally	Frequently	Almost habitually

6.. Does the subject exhibit temper tantrums?

Never	Once or twice	Occasionally	Frequently	Almost habitually

7. How adequate is the subject's verbal facility?

Difficulty in expressing self	Occasionally blocked	Normal for his group	Above avg. of his group	Superior ability for his group

8. How does the subject react to recitation, volunteering, or when called on unexpectedly?

Extremely disorganized; never volunteers	Seldom volunteers; poorly organized	Normal response	Organizes self adequately	Seeks opportunity to exhibit abilities

9. How much ability has the subject for concentrating attention, observation, or work for any length of time?

Easily distracted, inattentive	Below normal ability	Normal ability	Above normal ability	Superior ability, well-organized

10. Quiet vs. talkative: Shy, never criticizing, timid, and inhibited vs. boisterously overtalkative, overly critical, and uninhibited.

Rarely speaks	Usually quiet	Normally conversational	Talks more than usual	Aggressively interjecting and talkative

11. Solitary vs. extreme interest in social activity: Aloof, irritable, withdrawing, lives to himself vs. overly-blunt, extremely aggressive, "toughness" attitude.

Extremely solitary	Usually solitary	Normal interest in fellows	Usually seeks social life	Overly-active, meddling, gang-minded

12. Infantile, demanding self-centeredness vs. emotional maturity: Egotism, insensitivity to others feelings, irritable, hostile, cruel vs. actively concious of others, gains acceptance in interpersonal relationships, maintains friendly and likeable manner, flexible in new situations, sympathetic.

Extremely egotistic	Somewhat self-centered	Occasionally infantile, demanding	Usually mature	Quite mature

13. Reaction to frustration: Submissive, discouraged vs. aggressive, highly persevering.

Seeks escape, highly withdrawing	Usually withdraws	Objective, seeks cause	Usually aggressive	Attempts attack, domination

14. Highly impulsive vs. extremely cautious: Marked overactivity, immediate reaction to stimuli, boisterous and fidgety vs. compulsive carefulness, scrupulously conscience-ridden, rigid in reaction to stimuli.

Extremely rigid and cautious	Usually cautious	Normal response to stimuli	Somewhat excitable	Overactive, impulsive

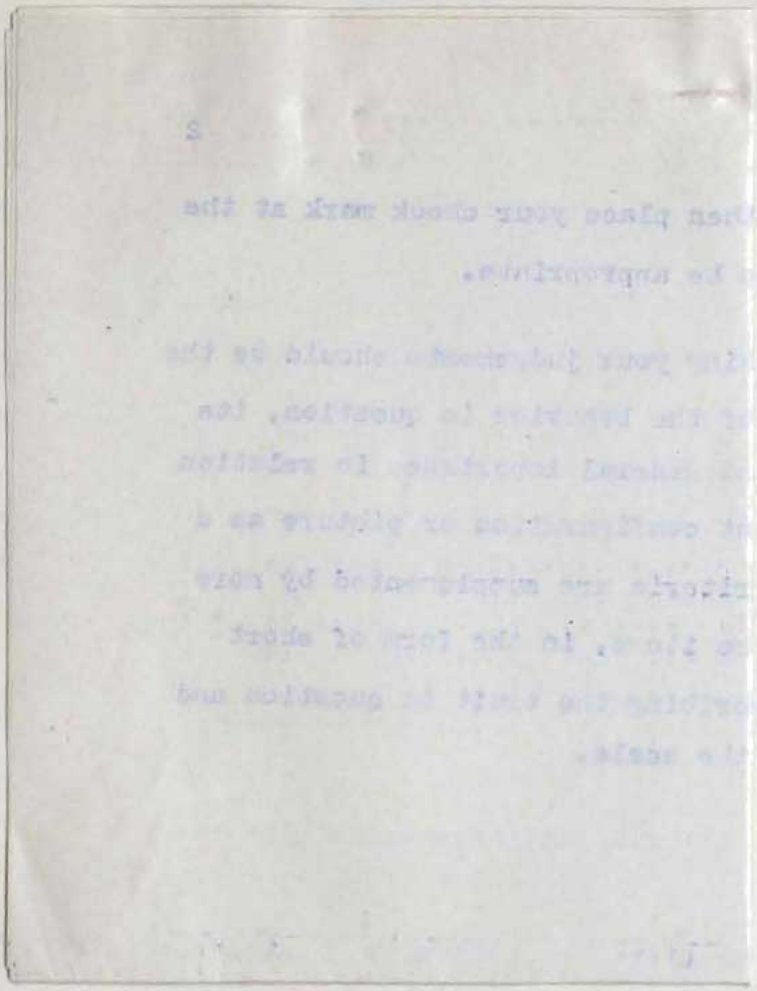
15. Highly negativistic vs. extremely suggestible: Hostile, defies authority and discipline, egotistic, stubborn vs. readily changes plans under least suggestion, self-effacing to extreme degree, shows little initiative, must be and can be led.

Extremely negativistic	Occasionally negativistic	Normal response	Usually suggestible	Extremely suggestible

16. Inferiority, insecurity, and rejection vs. self-confidence, rapport with environment, and social ease: Sensitiveness, anxious emotionality, gloom, quitting, incoherence vs. spontaneity and vivaciousness, appropriate sense of humor, appropriate amount of perseveration at a task.

Extremely insecure, inferior	Somewhat insecure, inferior	Normally secure, accepted	Above avg. rapport with environment	Unusual ease and confidence

APPENDIX D



Behavior rating Scale

General Directions:

1. Make your judgements individually; do not confer with others judging the same individual ratee.
2. Base your judgements on your actual experience with the ratee; do not base your judgements on the basis of hearsay or evidence or other witnesses.
3. Compare the individual ratee's behavior with other individuals with whom you are acquainted who are of the same age, not grade, as the ratee.
4. It is advisable that the rater rate all individuals on one item or trait at a time. If you rate one individual completely on all traits at one time, take care that the rating on one trait does not influence the rating on another trait. Ratings influenced in this manner lose some of their significance.
5. Do not attempt to make too many rating at one sitting.
6. Some of the items are arranged on a scale which is bipolar. In some cases neither extreme on the scale is particularly desirable. In these items the better adjusted subjects tend to be scored at the mean or center of the scale.
7. In making your rating simply place a check mark on the scale at the point which best describes the particular subject's behavior as observed by yourself. It is possible that you believe that a subject would fall in some intermediate position between two discrete descriptions

on the scale. You may then place your check mark at the point which you judge to be appropriate.

8. The criteria used in making your judgements should be the frequency of occurence of the behavior in question, its intensity or quality, and general importance in relation to the general adjustment configuration or picture as a whole. These general criteria are supplemented by more specific criteria in some items, in the form of short descriptive phrases describing the trait in question and at different points of the scale.

APPENDIX E

CONTENT LOG

This is a record of the drawing content of each item of the PGS, excluding the first item. The number after each content category indicates the number of times that content appears in a particular age group. An attempt was made to keep as close as possible to the original titles the subjects ascribed to the drawings.

I. 10-year-olds

Item 2 (Red, dotted lines)

Bear (head) : 7
Human (full figure) : 4
Human (face) : 4
Balls : 2
Bear (full figure) : 2
Monkey (head) : 2
Monkey (half-figure) : 1
Barrel : 1
Car : 1
Cloud : 1
Deer's head : 1
Flower : 1
Frog : 1
Heart : 1
Mouse (head) : 1
Octopus : 1
Puppy : 1
Teapot : 1
T.V. : 1

Item 3 (Green dots)

Human (head) : 13
Cat : 4
Cat (head) : 3
Bear (head) : 1
Box : 1
Car : 1
Clock : 1
Dice : 1
Dog (head) : 1
Flowers : 1
Ghost : 1
Glasses : 1
Hat : 1
Mask : 1
Pumpkin : 1
Tree : 1

Item 4 (Blue, wavy lines)

Human (head) : 10
Human : 4
House : 3
Barn: 2
Hat : 2
Apron : 1
Bed : 1
Birds : 1
Boat : 1
Book : 1
Car : 1
Dish : 1
Dog (head) : 1
Robot : 1
Sign : 1
Sweater : 1

Item 5 (Black, curved lines)

Human (head) : 8
Dish : 4
Pumpkin : 2
Water : 2
Badge : 1
Boat : 1
Cat (head) : 1
Circle : 1
Cookie : 1
Crib : 1
Dress : 1
Drum with "face" : 1
Globe : 1
Inner Tube : 1
Moon : 1
Mouth : 1
Rocking chair : 1
Saw : 1
Seal (animal) : 1
Stove : 1
Target : 1
Tie : 1

Item 6 (Black, straight lines and black dot)

Hat : 9
Clown (head and hat) : 7
Tree : 4
Lamp : 2
Stairs : 2
Train : 2
Bathing-suit : 1
Bell : 1
Game : 1
Ladder : 1
School : 1
Shirt : 1
Tent : 1
Weight : 1

Item 7 (Straight, blue diagonal lines)

Rain : 5
Ball : 3
Sled : 3
Top : 3
Car : 2
Window : 2
Boat : 1
Cabinet : 1
Cat : 1
Chair : 1
Design : 1
Dish : 1
Fork : 1
Game : 1
Jail bars : 1
Jar : 1
Lantern : 1
Rocket : 1
Rug : 1
Skirt : 1
Slide : 1
Teapot : 1

Item 8 (Yellow blocks)

House : 5
Human head : 4
Weight : 4
Chair and table: 2
Human : 2
Window : 2
Barn : 1
Blocks : 1

Item 8 (Continued)

Boat : 1
Car : 1
Door : 1
Factory : 1
Flags : 1
Flowers : 1
Game : 1
Hobo stick-and-bag: 1
Houseboat : 1
House on fire : 1
Mail box : 1
Man from Mars : 1
Picture : 1
Radio : 1
School : 1

Item 9 (Red, conflicting lines)

Human head : 7
House : 6
Human : 3
Pick-up-sticks : 2
Rakes : 2
Airplane : 1
Bed : 1
Bench : 1
Cat's crib : 1
Chair : 1
Design : 1
Dog (head) : 1
Eating utensils : 1
Hammers : 1
Horse (head) : 1
Sail : 1
School room : 1
Spider : 1
Star : 1

Item 10 (Blank square)

House : 9
Boat : 8
Airplanes : 2
Car : 2
Human : 2
Apple : 1
Bird : 1
Bird house : 1
Church : 1
Doll : 1
Ducks : 1
Hat : 1
Horse : 1
Human (head) : 1
Landscape : 1
School : 1
Wagon : 1

Item 11 ("What is the object you most often draw?")

House : 12
Car : 5
Boat : 3
Airplane : 2
Horse : 2
Apple : 1
Clown : 1
Designs : 1
Dog : 1
Doll : 1
Flower : 1
"Funny things" : 1
Hat : 1
Human : 1
Human (head) : 1
Wagon : 1

Item 12 ("What else would you like to draw?")

Ship : 6
House : 5
Airplane : 2
Car : 2
Farm : 2
Human : 2
Ball : 1
Barn : 1
Bride : 1
Church : 1
Country : 1
Doll : 1
Faces : 1

Item 12 (Continued)

Flowers : 1
Horse : 1
Mother : 1
Rabbit : 1
School : 1
Snowman : 1
Soldier : 1
Tank : 1
Wagon : 1

II. 11-year-olds

Item 2 (Red, dotted lines)

Bear : 6
Bear (head) : 5
Mouse (head) : 4
Heart : 3
Human : 3
Flower : 2
Human (head) : 2
Butterfly : 1
Cat (head) : 1
Eyes : 1
Glasses : 1
Hat : 1
Jack-o'-lantern : 1
Puppet : 1
Rabbit : 1

Item 3 (Green dots)

Human (head) : 9
Cat (head) : 5
Human : 5
Car : 2
Cat : 2
Owl : 2
Balls : 1
Doll : 1
Doors : 1
Statue : 1
Tank : 1

Item 4 (Blue, wavy lines)

Human : 8
Human (head) : 8
Dress : 3
House : 2
Boat : 1
Car : 1
Hat : 1
Sweater : 1

Item 5 (Black, curved lines)

Human (head) : 9
Human : 3
Badge : 2
Dish : 2
Ball : 1
Bathtub : 1
Candy : 1
Crib : 1
Dog : 1
Doughnut : 1
Drum : 1
Game : 1
Hat : 1
Horse (head) : 1
Ice cream cone : 1
Mouth : 1
Pot of honey : 1

Item 6 (Black, straight lines and black dot)

Clown (head & hat): 16
Hat : 6
Bell : 2
Coat : 1
Door : 1
Hall : 1
Ladder : 1
Mouse (head) : 1
Pyramid : 1
Stairs : 1
Stool : 1
Tent : 1
Train : 1
Tree : 1
Triangle : 1
Walk : 1

Item 7 (Blue, diagonal lines)

Ball : 6
Top : 3
Bowl : 2
Lantern : 2
Rake : 2
Window : 2
Airplane : 1
Airplane pontoons : 1
Bird : 1
"Color" : 1
Design : 1
Fishbowl : 1
Flying saucer : 1
Fractions (math.) : 1
Human : 1
Jar : 1
Kite : 1
Mirror : 1
Rain : 1
Rocket : 1
Tablecloth : 1
Teapot : 1
Waterfall : 1

Item 8 (Yellow blocks)

House : 17
Design : 2
Human (head) : 2
Traffic light : 2
Barn : 1
Blocks : 1
Book shelf : 1
Garage : 1
Human : 1
Rocking couch : 1
School : 1
Sun and flowers : 1
Table : 1
Teeter-totter : 1
T.V. : 1

Item 9 (Red, conflicting lines)

Human : 5
Human (head) : 4
Clock : 2
Rabbit (head) : 2
Bombs : 1
House : 1
Lighthouse : 1
Rabbit : 1
Radio : 1
Skirt : 1
Spears : 1
Sunlight : 1
Tie : 1
Toy : 1
Windmill : 1

Item 10 (Blank square)

House : 9
Human : 7
Boat : 6
Landscape : 4
Airplane : 3
Dog : 2
Rocket : 2
Truck : 2
Book : 1

Item 10 (Continued)

Cross : 1
Gorilla : 1
The Host : 1
Human (head) : 1
School : 1

Item 11 ("What is the object you most often draw?")

Human : 8
House : 7
Airplane : 5
Boat : 3
Human (head) : 3
Landscape : 2
Book : 1
Butterfly : 1
Car : 1
Clown : 1
Cross : 1
Drum : 1
Flower : 1
Horse : 1
Rocketship : 1
Truck : 1

Item 12 ("What else would you like to draw?")

House : 7
Car : 4
Ship : 4
Animals : 3
Map : 3
Airplane : 2
Castle : 1
Clown : 1
Duck : 1
Faces : 1
Farm : 1
God : 1
Holy pictures : 1
Horse : 1
Human : 1
Landscape : 1
Nun : 1
Rabbit : 1
Rocket : 1
Space pictures : 1

III. 12-year-olds

Item 2 (Red, dotted lines)

Human (head) : 8
Bear (head) : 6
Bear : 5
Human : 4
Flower : 2
Monkey (head) : 2
Bearskin : 1
Bull : 1
Car : 1
Frog : 1
Glasses : 1
Heart : 1
Mouse : 1
Pig's nose : 1

Item 3 (Green dots)

Human (head) : 15
Human : 4
Cat (head) : 3
Pumpkin : 2
Signal lights : 2
Car : 1
Cat : 1
Curtains : 1
Dog : 1
Fish : 1
Flowers : 1
House : 1
Owl : 1
Tree : 1

Item 4 (Blue, wavy lines)

Human (head) : 13
Human : 8
Birds : 2
Dog (head) : 2
Hat : 2
Boat : 1
Building : 1
Coat : 1
Goat (head) : 1
Horse (head) : 1
Insect : 1
Landscape : 1
Mirror : 1
Sign : 1
Sweater : 1
Table and chairs : 1

Item 5 (Black, curved lines)

Human (head) : 6
Dish : 5
Bowl : 4
Circle : 3
Human : 3
Ball : 2
Boat : 2
Chair : 1
Glass : 1
Horse : 1
Inner tube : 1
Necklace : 1
Pumpkin : 1
Rocking chair : 1
Train : 1
Watermelon : 1
Wheel : 1

Item 6 (Black, straight lines and black dot)

Hat : 7
Clown (head and hat) : 4
Tent : 4
Train : 4
Tree : 3
Door : 2
Balance : 1
Bowling alley : 1
Human : 1
Ladder : 1
Metronome : 1
Plateau : 1
Pyramid : 1
Roof : 1
Sign : 1
Stairs : 1
Triangle : 1

Item 7 (Blue, diagonal lines)

Lantern : 4
Ball : 3
Rain : 3
Rocket : 2
Sled : 2
Airplane : 1
Box : 1
Candles : 1
Car : 1
Clouds : 1
Football field : 1
Kite : 1
Lightning : 1
Microphone : 1
"Object" : 1
Pencils : 1
Rugbeater : 1
Skis : 1
Snow : 1
Teapot : 1
Top : 1
Water : 1
Well : 1
Window : 1
Xmas ornament : 1

Item 8 (Yellow blocks)

House : 16
Apartment building : 3
Human : 3
Blocks : 2
Human (head) : 2
Army barracks : 1
Box : 1
Bridge : 1

Item 8 (Continued)

City scene : 1
Gauge : 1
Lightbulb : 1
Traffic light : 1
Window : 1

Item 9 (Red, conflicting lines)

Human : 5
Human (head) : 5
Boat : 2
Door : 2
Hat : 2
Jug : 2
Rabbit (head) : 2
Airplane : 1
Arrowhead : 1
Beehive : 1
Box : 1
Car : 1
Chair : 1
Design : 1
Dog (head) : 1
Hammer : 1
Heart : 1
House : 1
Skirt : 1
Tie : 1
Tree : 1
Triangle : 1
Well : 1
Windmill : 1
"Words" : 1

Item 10 (Blank square)

Boat : 7
Landscape : 7
Human : 6
House : 4
Airplane : 2
Bus : 2
Car : 2
Church : 1
Engine : 1
Flower : 1
Horse (head) : 1
Human (head) : 1
Rainbow : 1
Rocket : 1
Rosary : 1
School : 1
Sea : 1
Skirt : 1
Store : 1
Tree : 1
Wristwatch : 1

Item 11 ("What is the object you most often draw?")

House : 9
Human : 8
Human (head) : 5
Airplane: 3
Boat : 3
Landscape : 3
Animal : 1
Flower : 1
Funny pictures : 1
God : 1
Rocketship : 1
Tree : 1
War pictures : 1

Item 12 ("What else would you like to draw?")

Human : 11
Car : 5
Animal : 3
Clothes : 3
Airplane : 2
Horse : 2
House : 2
Mountain : 2
"Anything" : 1
Bird : 1
Building : 1
Clown : 1
Landscape : 1
Map : 1
Photo equipment : 1
Ship : 1