A STUDY OF THE PROGNOSTIC VALUE OF TESTS OF ARTISTIC ABILITY

A Thesis Presented for the
Degree of Master of Arts

BY

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PREFACE

The present study developed out of the writer's concern regarding the apparent lack of satisfactory instruments available for the measure of talent or ability in the graphic arts. As an educational and vocational counselor he has been faced with the task of whether or not to recommend training in art to students and prospective students who profess an interest for such training. For many phases of scholastic activity, we can, by reviewing the results of a battery of aptitude or ability tests which have been administered to an individual, determine with a fair degree of certainty whether he should enter into or continue in a particular field. Not so in the arts. While it is true certain measures are available, relatively little use has been made of them, few studies have been performed on them, and little or no statistical information is available to demonstrate their actual worth.

Part of the present study will devote itself to summarizing the progress that has been made in the field of artistic ability measurement. Such knowledge can be of great assistance to the person who is called upon to advise a student upon the feasibility of following a curriculum in art. In addition the counselor who has an understanding of the techniques available and who knows how much significance to place upon them will have a valuable tool to use in an exploratory manner with individuals who are unable to decide on a career.

The most important part of the study concerns the results the author found in attempting to determine the predictive value of several of these instruments. As this experiment was carried on

with but a small group, any evidence obtained is inconclusive in itself. However the present findings are of considerable interest in comparison with previous research as are those indications that seem to warrant further study. This work was intended as a preliminary study of a project to develop some valid measuring device for prospective students in Fine Art at Ohio State University.

The writer wishes to express his gratitude to Dr. H. A. Edgerton of the Department of Psychology under whose guidance the study was made, for valuable criticism and advice. He also wishes to thank Mrs. Marian Gatrell of the Department of Fine Arts for her assistance in administering the tests and for taking part in the rating of the Horn tests. Statements of appreciation are also in order for Mr. Barkan and Miss Marjorie Campbell of the Department of Fine Arts, Mr. K. F. Pidgeon and Mr. Jule Hofstetter, Counselors at the Occupational Opportunities Service, and Mr. A. E. Offensend, former Counselor, for rating the drawings of the Horn test. Finally the writer is indebted to Mr. Frank P. Cassens and his psychometric staff at the Occupational Opportunities Service for their splendid assistance in administering and scoring tests.

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PART ONE

CHAPTER I

INTRODUCTION

It is the purpose of this study to examine the measures of artistic talent that have been developed with the aim of determining their predictive value as indicators of future success in fine art. For purposes of clarity and understanding, the study has been divided into two parts. Part One, composed of Chapters I through V, consists of a brief summary of what has been done in the field of artistic ability measurement. The present chapter discusses artistic ability and the capacities of which it is constituted. Chapter II takes up the early studies of measurement and discusses the tests for special capacities. Chapter III offers a critical analysis of the more complex tests, which attempt to measure various factors of artistic ability through a battery of sub-tests. Chapter IV deals with the problem of measuring simple drawings by objective means. Chapter V concludes Part One by pointing out the importance of art tests in educational and vocational guidance.

Part Two, including Chapters VI through VIII, discusses the present research. Chapter VI describes his study of the prognostic value of a battery of tests of artistic ability. Chapter VII involves a special consideration, a validation and reliability study of the ratings used in one of the tests of the battery, the Horn Art Inventory. Chapter VIII consists of a summary, and attempts to integrate present findings with previous research, as well as to point out any potentialities that seem worthy of further study.

Before launching into any discussion of measurement of artistic ability, it is necessary to arrive at some conclusion as to what constitutes artistic ability. We can receive some assistance in the matter by considering the nature of art itself. A work of art is usually viewed according to form and content. The form refers to the mode of expression used, such as line and color and to the pattern, i.e., the balance and composition. The content refers to the subject matter, the meaning of the work.

The content of a work of art is a very subjective quality, as it may vary considerably according to individual interpretation. The form can be contemplated more objectively in accordance with certain principles of balance, perspective, etc. Thus we really have two types of appreciation: the completely subjective, involving contemplation of meaning or content; and the less subjective, involving satisfaction derived from pleasant arrangement.

Both form and content entwine the feelings and motives of the artist, and consequently possess a highly subjective element. However, since there is some agreement as to which examples elicit a pleasant response from the satisfaction of balance and coordination, we can in fairly objective manner ascertain just what constitutes good art - aesthetically speaking. Works of art that are extremely sensitive to physiological balance and coordination yield greatest satisfaction.

It is evident then that one attribute of the successful artist is to be able to determine the aesthetic quality of composition. However, many people with a high degree of aesthetic appreciation are unable to produce art.

Let us then consider several studies that have attempted to ascertain what other qualities are required for artistic success. Knauber,[1] in trying to ascertain the component elements of artistic ability, used expert opinion as a guide. Art teachers and psychologists presented their views as to what abilities were necessary in the creation of art.

By this technique she concluded that visual memory, observation, accuracy, imagination, creative imagination, ability to visualize, ability to analyze, and sensitivity for design were critical factors in determining success in art.

Grippen,[2] comparing the drawings of talented and untalented children, found that the talented children not only showed far more compositional skill but also were more self critical, spent more time on their drawings, and used more colors in their work. They did less talking during their drawing than did the non-talented children. Thus the talented children showed greater interest, energy, and effort than did the non-talented group.

Lark-Horovitz[3] found, in studying the drawings of untrained adults, results similar to those of children. The drawings were of common objects, but were made from memory. On questioning these

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1. Knauber, Alma J., Testing for Art Ability. M.A. Thesis, O.S.U., 1928.
2. Grippen, V. B., A Study of the Creative Artistic Imagination in Children by Constant Contact Procedure. Psychol. Monog. 45, 1, 63-83.
3. Lark-Horovitz, Betty, Interlinkage of Sensory Memories on Relationship to Training in Drawing. Journ. of Genet. Psychol., 49, 69-89.

people she found that they had tried to follow a logical basis in making the drawings, but became confused by failure to disentangle various schemata. Failure was attributed to lack of training in visual discrimination and synthesis.

Tiebout,[4] working with children; and Dreps,[5] working with college students, found that artistically superior individuals differed significantly from an artistically inferior group in: (1) completeness and accuracy of observation, (2) recall of observed materials after intervals of ten days and six months, (3) uniqueness in imaginal construction of objects and situations from meaningless forms (ink blots), (4) originality as expressed in line drawings, (5) form discrimination or apprehension of the main form of objects, (6) feature discrimination involving observation and comparison to determine various items in a series of visual stimuli, (7) I.Q.s, and (8) aesthetic judgment.

The same observers found small but seemingly insignificant differences between the groups in immediate memory recognition, completing drawings from memory, visual imagery, and neutrotic tendencies. They found no significant differences in hand and eye coordination, steadiness of movement, and color matching.

Meier,[6] in summing up the results of his ten year study, lists six factors which he believes are important for success in art:

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4. Tiebout, Carolyn, The Psychophysical Functions Differentiating Artistically Inferior Children. Psychol. Monog.,45, 108-133.
5. Dreps, Hildegarde, The Psychophysical Capacities and Abilities of College Art Students of High and Low Standing. Psychol. Monog.,45, 134-146.
6. Meier, N.C,, Final Summary of a Ten Year Study of a Special Ability. Psychol. Monog.,51, vol III, 140-158.

1. Manual skill, This ability is regarded as inherited, not inherited as a skill from parents, but as a phase of general constitutional stock inheritance from a line of ancestry which may not include artists, but does include a comparatively large number of individuals having craftsman ability.
2. Energy of output of perseveration, concentration upon the task at hand for long periods.
3. Aesthetic intelligence, a study by Tiebout and Meier showed a relationship between general intelligence and artistic ability. Although in the test which was used, the Otis Self Administering, it was not found by a breakdown of test elements into categories that artists were particularly weak or strong in any category, it is possible that a more detailed analysis of mental functions may show the artist type of mental habits probably stronger in visualizing, speed in perceiving, and similar functions than in facility with numbers, or verbal fluency. Superior intelligence conditions the rate of development and the functioning of other factors. It ordinarily determines the artist's competency in handling a given theme, and the adequacy of his treatment.
4. Perceptual facility, By this is meant the ability to observe and recall sensory experiences.
5. Creative imagination, the ability to utilize vivid sense impressions effectively in the creation of a work having some degree of aesthetic character.
6. Aesthetic judgment, the ability to recognize aesthetic quality residing in any relationship of elements within an organization. It is present in children to some degree, but is undoubtedly subject to considerable development through learning and experience.

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Cain stressed the necessity for ability to present subject matter accurately. He states, "While accuracy of presentation is by no means synonymous with, or proportional to high aesthetic quality in a work of art, it is never-the-less an important factor in art education. However, far an artist may depart from photographic realism in his work, if he is professionally competent, these departures are to a large extent intentional and controlled, not merely acci-

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7. Cain, T.I., The Objective Measurement of Accuracy in Drawings. American Journal of Psychology, 56, 32-53.

dental. Even if he works entirely with abstract forms which bear no resemblance to natural forms, he needs a keen perception of his invented shapes, and should be able to express that perception on occasion by means of drawings."[8]

Lewerenz, in reviewing all the data available, concludes that the following factors ascribed to natural endowment which are required for art occupations can be or have been measured:

1. Basic interest in art - a natural inclination to want to know more about artistic matters, and to retain such information easily.
2. Originality of expression - If an artist would rise above the level of mediocrity, he must have the urge and capacity to adapt and create designs, and plans to meet new situations. Originality brings life and variety into art expression.
3. Color vision - the ability to recognize colors seems largely a matter of native endowment. People range from color blind to those who are highly sensitive to color. An artist who plans to work with color should have at least an average sensitivity to color values, intensities, and variations of hue.
4. Sense of proportion - though subject to training, some individuals seem to have natural aptitude for making balanced arrangements and well proportioned constructions.
5. Manual dexterity - good motor control, steadiness of hand, and smoothness of movement are fundamental to accurate delineation. Training may improve dexterity, but lack of it will prove a serious detriment to the person who aspires to an art career.
6. Observation - an artist must be able to observe detail closely and accurately. He may interpret what he sees, but first his mind registers the layout and content of the subjects he is about to depict. Good artists are not careless about spacing and detail.

Lewerenz also discusses measurement of skills and knowledges acquired through training in art school. However, as these mea-

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8. Lewerenz, A.S., Measurement in Art from the Vocational Guidance Approach. Education, 66, 454-460.

sure progress in advanced training rather than potentialities for it, such tests do not fall under our topic and consequently will not be discussed.

The foregoing survey then indicates that certain factors have been established as contributing to success in fine art, although the list is not necessarily conclusive. In addition to aesthetic judgment for composition, such capacities as visual memory, imagination, ingenuity, originality, and intelligence are required for success in art. We shall now turn our attention to methods for measuring such capacities.

CHAPTER II

MEASURES FOR ARTISTIC CAPACITY

There are two tests that have been used extensively for the measurement of aesthetic appreciation, the McAdory Art Test, and the Meier Seashore Art Judgment Test.

The McAdory Test[1] consists of a set of 72 plates, each of which contains four small variations of one picture. The subject states his order of preference for each plate. Scoring is on the basis of one point for each judgment expressed in the correct order on the basis of expert opinion. The experts included artists, art critics, art teachers, art buyers, and architects. The test is divided into six groups: furniture and utensils, texture and clothing, architecture, shape and line arrangements, dark and light masses and color.[2] This selection has the advantage of including practical material along with the disadvantage of basing a test on material which is subject to changes in taste. Automobiles, furniture, and clothing are excellent examples of such changes.

Like most measures in this field, evidence of validity of the McAdory is limited. Its primary claim to validity is based on the fact that it differentiates people with some artistic background from those without it.[3] Also validity is claimed because there is a

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1. McAdory, Margaret A., The Construction and Validation of An Art Test. Teacher's College, Columbia U. Contributions to Education. No 383.
2. Meier, N.C., Review of McAdory Test, O.K.Buros, 1940 Mental Measurement Yearbook, Rutgers Univ. Press. 1947.
3. McAdory, op cit. 27-28.

gradational change of scores from first grade students up through the grades and high school and on into college. Reliability coefficients have variously been reported in the 50's and 60's[4] indicating a lack of internal consistency in the test. Experimental evidence has indicated that art judgment is very specific, and that there is little relation between judgments in different fields.[5]

The Meier Seashore Art Judgment Test as originally constructed, consisted of 125 pairs of uncolored pictures. One of each pair is a reproduction of a recognized masterpiece. The pictures include examples of landscapes, portraits, pottery designs, oriental designs, woodcuts, murals, and medallions. The other member of each pair displays the same work but with some feature changed. The subject's answer sheet calls his attention to the point of difference, and he is asked to state his preference. Scoring is based on a consensus of expert opinion.

This test was revised and published in 1940 under the name Meier Art Judgment Test. The revision eliminates 25 of the items found to be of least worth, and gives a double weight to 25 which were found to have greatest diagnostic value. Rescoring old tests by this procedure tends to make high scores go up and low scores go down. This is presented as evidence increased validity over the old form. However, the validation of the original test was vague,

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4. Dewar, Heather, A Comparison of the Tests of Artistic Appreciation. British Journal of Educational Psychology, 8, 29-41.
5. Ziegfeld, Edwin, Review of McAdory Test. O. K. Buros, 1940 Mental Measurement Yearbook. Rutgers Univ. Press, 1947.

and involved chiefly its ability to differentiate between groups with art and non-art backgrounds. The reliability of the original was not high (71-85). The author defends the use of the instrument dispite its low reliability on the grounds that it is aimed primarily at pointing out those individuals with aesthetic appreciation rather than distinguishing the relatively small degrees of difference between people with a great amount of such appreciation.[6]

Several less known tests for the appreciation of artistic composition have been devised. Whitford[7] brought forth a test which included fourteen preferences to be made in 15 minutes. Appropriateness of form, line, proportion, color, rhythm, and perspective were to be judged.

A test, constructed at the University of Wisconsin, featured three aspects of art: unity, proportion, and fitness. Nine plates were prepared with 5 small pictures, a "perfect" picture and 4 variations on each.

Christensen developed an instrument which consisted of 105 plates with 4 pictures to a plate. Separate scores were given for paintings of groups of persons, pictures of an individual, architecture and sculpture, industrial arts, and abstract design.

Related to the composition of the whole design is the appreciation of elements of the design such as line and color.

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6. Meier, N. C., Examiner's Manual, Meier Art Judgment Test. Bureau of Educational Research and Service, Univ. of Iowa, Iowa City, Iowa. 19.
7. Greene, E. B., Measurements of Human Behavior. Odyssey Press. 1941. 395.

An early investigator in this field, Lundholm,[8] found that individuals could give expression to adjectives such as furious and lively by drawing certain types of lines. Poffenberger and Barrows[9] found surprising agreement on the extent to which individuals could match a group of different lines with a list of feelings or emotional states which the lines engendered in them.

Guilford[10] made use of this research and applied it to the study of individual differences involved in the ability to express one's feelings in lines. He selected the twenty-four out of Lundholm's original forty-eight adjectives upon which there was the greatest agreement regarding the kind of line used to express them. Each subject was asked to draw a line that expressed each activity presented to him. Scoring was on the basis of form, direction, and type. The form was described according to wave ~~~, curve ∿∿, angle ⋀⋀, and strait _____. Three directions were distinguished, up (upward slant), down (downward slant), and horizontal (including vertical lines). The three degrees of heaviness were classed as heavy, medium and light. Classification yielded twelve categories to grade each line. Scores were obtained according to an elaborate system of weights. The test showed correlations of .58 and .65 with art teachers' ratings but because of

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8. Lundholm, H., The Effective Tone of Lines, Psychological Review, 28, 43-60.
9. Poffenberger, A. T., and Barrows, B. E., The Feeling of Value of Lines, Journal of Applied Psychology, 8, 187-205.
10. Guilford, J. P., and R. B., A Prognostic Test for Students in Design, Journal of Applied Psychology, 15, 335-345.

low reliability it is untrustworthy as a measuring devise.

Lack of sensitivity to color can be measured by a standard test for color blindness such as the Ishahara. As to keen discriminative ability between slightly varying shades of a given color, measures have been devised such as sub-tests #2 and #3 of the Varnum and #9 of the Lewerenz both of which will be discussed in the following chapter. Another test of this type is the one described by Dimmick.[11] This instrument was developed for the selection of trainees in the dyeing industry. However the test is of value primarily for industrial purposes and as there is no evidence to indicate that a high degree of sensitivity to color is required for success in art, we shall not pursue the matter farther.

Intelligence of a performance type has been ascribed by Meier and others[12] as an important element in the artist's success. Various tests of spatial perception have been developed which appear to measure something very much akin to the type of intelligence Meier refers to in his study. Most used of such tests is the Revised Minnesota Paper form board. This instrument requires but twenty minutes to administer, can be given in groups, and is easily scored. Although designed primarily as a test for general intelligence of a performance type and as a measure of mechanical aptitude there are indications of its merit as a measure for ability in art.

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11. Dimmick, F.L., A Color Aptitude Test, 1940 Experimental Edition. Journal of Applied Psychology, 30, 10-22.
12. Meier, N.C., Final Summary of a Ten Year Study of a Special Ability. Psychol. Monog. 51, vol III, 140-158.

Ability to create is essential to artistic success yet very difficult to measure.[13] Thorndike devised a scale for the rating of quality in drawings. It consisted of a series of thirty-four drawings of different subjects, arranged in order of excellence by sixty artists and sixty teachers. Other scales for rating drawings have been devised since but have largely followed the same technique.

Several tests have been developed which attempt to measure various abilities which are required for success in art. In the following chapter we shall discuss these instruments.

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13. Thorndike, E. L., Tests of Aesthetic Appreciation, Journal of Educational Psychology, 7, 509-522.

CHAPTER III

MULTICAPACITY TESTS

One of the first attempts to measure what were considered to be the components of artistic composition was devised by Knauber.[1] This is made up of two parts. Part A tests visual memory, hand and eye coordination, ingenuity, design sense, observation, knowledge of perspective, judgment and taste. It involves completing a design from memory, a steadiness test in which the subject traces a path with a pencil, drawing certain letters to conform with a style represented by several given letters, completing a rectangular border design involving an appropriate corner design, completing the drawing of well known objects, completing the drawing of objects where perspective is necessary, and the selection of the most appropriate of each of several series of objects.

Part B measures appreciation of proportion and line, sense of composition, creative ability, interest in art, sense of design, critical faculty, good taste, visual observation, and reasoning capacity. It includes drawing a design in a larger space, drawing certain specified objects into a picture according to the subject's own plan, drawing a design using certain given geometrical forms, a multiple choice art vocabulary quiz, filling given geometrical figures with three letters in the most pleasing manner, making a design of from twelve to twenty-four pieces, using three

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1. Knauber, Alma J., The Construction and Standardization of the Knauber Art Tests. Education, 56, 165-170.

basic forms, checking mistakes in a series of pictures, arranging objects in a choice of three backgrounds all alike except for varying aesthetic proportion, shading three drawings correctly, the direction of the source of light being given, and correcting errors in a series of pictures.

Validation of the Knauber is based upon the difference obtained in median scores of people with some art background and a group without it. Reliability is reported as being very high but is based on studies of small samplings.

The test requires about three hours to administer. Scoring is quite subjective and time consuming, consisting of rating the subjects work in comparison with a key giving examples of three degrees of skill. No correlations are presented of the various subtests with each other. Inspection of the test itself indicates there may be considerable repetition in the qualities being measured. Time required for administration and scoring greatly limits the use of this test. As in any case where rating is involved, the background of the person doing the rating is important. There is little evidence to indicate various judges would agree among themselves in their ratings. The greatest advantage of the test seems to be in its sampling of what the subject can produce under given circumstances and such work can scarcely be scored any way but by rating. However it appears that those elements not strictly creative in nature could be better measured by more objective means. The creative factor could be judged more accurately

if greater freedom for imagination were given the subject.

The Tests In Fundamental Abilities In Visual Art devised by Lewerenz[2] consists of nine sub-tests divided into three sections each of which can be administered in approximately a half hour. Part I consists of Tests 1 and 2. Test 1, Recognition of Proportion, involves selecting the best of a series of figures somewhat similar but varying in proportion. Test 2, Originality of Line Drawing, requires the subject to construct drawings using a series of dots as a theme. Part II is made up of Tests 3, 4, and 5. Test 3, Observation of Light and Shade, calls for the subject to mark each location on a series of drawings where shade or shadow should exist. Test 4, Knowledge of Subject Matter, is a matching quiz involving a knowledge of technical art terms. Test 5, Visual Memory for Proportion, measures the exactness with which the subject can duplicate an object which was shown him for a given time.

Part III includes the four remaining tests. Test 6, Analysis of Problems of Cylindrical Perspective, requires the subject to mark incorrect lines in a series of cylindrical objects. Tests 7 and 8, Analysis of Parallel and Angular Perspective respectively, involve the same procedure with these types of objects. Test 9, Recognition of Color, measures the subject's sensitivity to colors of varying hue.

The Lewerenz test makes use of the multiple choice type of item and to this extent greatly overcomes the objections to the

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2. Lewerenz, Alfred S., Manual, Tests In Fundamental Abilities In Visual Art. California Test Bureau, Los Angeles, California.

Knauber test regarding time required for administration and subjectivity of scoring. Test 5 permits objective scoring of a drawing. We shall discuss objective methods of scoring drawings in the following chapter. There is considerable questions as to the value of Test 9.[3] The importance of the ability to classify colors has not been shown to bear any relationship with success in art.[4]

Test 4 as is the vocabulary test of the Knauber, is of value only in determining interest in art. Considerable time could be saved by the elimination of this test especially since separate interest inventories are usually administered along with aptitude and ability batteries.

The author reports a retest reliability coefficient of .87 and a validity correlation of .40 against semester grades in art.

A third test for the components of artistic ability is the Selective Art Aptitude Test by Varnum.[5] This measure consists of seven tests divided into three parts. Part A consists of Tests 1, 2, and 3. Test 1, Observation, involves the recognition of correct lines and shapes using the multiple choice method. Tests 2 and 3 deal with color discrimination. Test 2, a test for color memory requires recognition of colors observed in a design, while Test 3 necessitates recognition of minute color gradations.

Part B is made up of Tests 4 and 5. Test 4, Proportioning, deals with an aesthetic quality, requiring the recognition of the

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3. Saunders, A.W., Review of Lewerenz Visual Art Test; Buros, O.K., Nineteen-forty Mental Measurement Yearbook, Rutgers Univ. Press.
4. Tiebout, op. cit., 108-133.
5. Varnum, W. H., Manual, Selective Art Aptitude Test. International Textbook Co., Scranton, Pennsylvania. 1939.

most satisfying of several groups of lines and figures. Test 5 also of an aesthetic nature, demonstrates the subject's appreciation for proper balance. It calls for the arranging of given objects in a frame in the most pleasing manner, and is easily scored by measuring the distance from the center of the arrangement as the subject sees it from the true center as determined by expert opinion. This technique will be discussed in the following chapter.

Part C is comprised of Tests 6 and 7. Test 6 demands the dividing of geometrical figures into five parts, making no two alike. The test is aimed at discovering the subject's originality. Test 7 samples creative imagination by the use of an ink blot technique. An object which part or all of the blot resembles is given and the subject signifies recognition by circling the part of the blot in question.

The Varnum battery is published in elaborate fashion. Two of the tests involve color discrimination and as has previously been stated on this matter, no relationship has been demonstrated between fine color discrimination and artistic ability. Furthermore the use of color increases the cost of the test. The tests for creativeness appear inadequate. Test 6 is difficult to score and Test 7 involves only recognition of something that has been suggested. It is far easier to see an object when told what to look for, than to see it for oneself. In the writer's opinion there is nothing creative about this test.

The method of administration is complicated and opportunities for the subject to become confused are numerous. The author claims validity on the same basis as that used in support of most of the

art tests, its discrimination between groups with and without background in art. He also reports an extremely low correlation between the Varnum and the Meier-Seashore Test. High reliability coefficients are presented. Never-the-less the test does not appear to have sufficient virtue to offset the objections previously mentioned.

The final instrument of measurement we wish to discuss in this chapter is the Horn Art Aptitude Inventory.[6] The scope of the Horn is much narrower than that of the other multicapacity tests. It is designed primarily to determine ability to use line and to show creative imagination. The Test is composed of two parts. Part A constitutes "Scribble" and "Doodle" exercises which aim to obtain examples of the subject's originality, line quality, and compositional sense. Part B consists of a series of twelve rectangles $2\frac{3}{4}$ inches by $3\frac{1}{2}$ inches in which key lines are presented. The subject is asked to make drawings using these lines as "springboards". The purpose of this section is to measure creative imagination along with ability to present ideas in drawings.

The test is rated according to order, clarity, and color (even tone or smudged erratic line quality). Criteria sheets give examples of excellent, average, and poor work.

The Horn Art Inventory requires less than an hour to administer. The authors report a validity correlation of .53 with faculty ratings for a group of art students. They also indicate a high degree of reliability between the ratings of two art teachers and a layman.

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6. Horn, C. F., and Smith, L. F., The Horn Art Aptitude Inventory. Journal of Applied Psychology, 29, 350-355.

But rating is a highly subjective process and it would appear that the background of the person doing the rating would have much to do with the quality of the results. The reliability of ratings of art teachers and vocational counselors who have no background in art is discussed in Chapter VII.

The advantages of the Horn Art Aptitude Inventory are in the relatively short time required for administration and freedom it allows to creative imagination. In rating the Horn Drawings it is fairly easy to distinguish extremely good or poor work. In average cases where there is doubt it would seem advisable to pool a greater number of judgments or perhaps supplement the test with another measure such as the Lewerenz.

CHAPTER IV

OBJECTIVE MEASUREMENT OF DRAWINGS

In discussing tests requiring drawing on the part of the subject, we have pointed out the disadvantage that such drawings could be scored only by subjective means. This statement must be qualified to some extent. As we mentioned briefly in the last chapter, one of the tests in the Lewerenz battery involves the measuring of a drawing by objective means. The test item calls for the drawing of a vase from memory after seeing a picture of it for two minutes. The base and top of the vase are given along with a vertical axis. The problem then is for the individual to draw the two curved sides of the vase as near like the picture he saw as possible. The scoring key consists of a sheet of transparent paper upon which the outline of the vase is correctly drawn. However the lines representing the sides are over a sixteenth of an inch in width and are filled in only in alternating lengths, much resembling a series of dashes except that the open spaces are enclosed. When the key is placed over the original picture, the lines which form the lateral extremes of the vase show underneath all the openings in the lines on the key. The subject's drawing is placed under the key and aligned with the top, base and axis and his score is equal to the number of openings in the broken lines of the key under which the lines of his drawing appear.

Such methods for use in measuring artistic talent have been criticized on the ground that art is the production of aesthetic form while such "photographic techniques" are but the reproduction of it. In defense of the test it may be pointed out that the aim is not to measure the creative quality involved in art production but to sample memory for correct proportion.

Test 5 of the Varnum battery, while not measuring the subject's drawing, does measure something closely related to it. The subject is presented several arrangements of objects. He is to arrange these in a frame in the most pleasing manner. The frames, circular and rectangular, are printed on celluloid with a tiny hole in the center through which the subject marks a dot with his pencil. His score is based on the distance between his mark and the true center of the best possible arrangement according to expert opinion.

One of the earliest attempts at objective measurement of drawing was that of Paulsson.[1] His test for the completion of geometric designs consisted of irregular abstract figures, some rectilinear and some curvilinear, which the subjects used as models for the completion of a furnished copy in which one or more lines had been omitted. They were scored by means of stencils on transparent paper with a scale of millimeter gradations crossing at right angles each of the missing lines at one or more important points, by means of which the amount of divergence from correctness of the subject's line could be measured.

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1. Cain, op. cit. 23.

Hull[2] described a battery of art aptitude tests which included (a) the reproduction of isolated angles, scored by means of a protractor, (b) the reproduction of simple and regular geometric forms, the exact size of the models, scored with ruler measurements of height and width, (c) the freehand completion of circles of which arcs were given, scoring by measuring with a planimeter the areas of discrepancy between the reproduction and the true curve, and (d) the extension of lines under the handicap of the Poggendorf illusion with the divergence from correct extension scored by ruler measurements taken at right angles to the direction of the correct line at a fixed distance from the figure.

Cain[3] developed a test which consisted of copying five irregular hexagons each being copied twice, once from a distance of about five and a half feet, the other from twenty-seven to thirty feet. He found scoring by use of a protractor on the six angles superior to the target method (previously mentioned in connection with the Varnum test) or the perpendicular scale method such as Hull employed.

The criterion used for validation of the test consisted of judgments given to free hand drawings of the subjects who took the test. A correlation of .57 between scores and criterion is reported. Cain expresses the belief that instruments which require the drawing of certain objects, reflect previous training more than potentiality. He claims that his type of test involves no complex in-

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2. Hull, C. L., Aptitude Testing. World Book Co., Yonkers, N. Y. 1928. 325-373.
3. Cain, op. cit., 41-46.

terrelationship of detail which call for aspects of drawing ability especially subject to influence of training but requires accurate perception of fundamental proportions of character and shape which he states is much less influenced by training.[4]

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4. Ibid. 51.

CHAPTER V

ART TESTS AS INSTRUMENTS OF GUIDANCE

Having given consideration to the capacities or skills that make for success in artistic endeavor and having discussed the various measures available which attempt to quantify them, we now turn our attention to their prognostic value in the field of guidance.

The need for valid predictors of probable success in the graphic arts, as in other fields, is obvious. This is especially true under present conditions when schools all over the country are crowded to capacity and beyond. In Art Schools, like many others, acceptance is largely determined on a "first come - first served" basis. The natural result of such a procedure is to keep many potentially good art students on a waiting list while there are others enrolled in the schools whose talent does not justify their being there.

Much of this training, particularly in connection with veterans education, is aimed at preparing the individual for his vocational life. It is indeed a waste of time and money to complete or nearly complete a training program only to find out one is not suited for this type of career.

Further, art is an extremely competitive field. There are relatively few opportunities for employment. Only for those with an extremely high degree of ability does the probability of employment offer promise.[1] In a recent study made in Los Angeles it was found

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1. Lewerenz, A. S., Measurement in Art from the Vocational Guidance Approach. Education. 66. 455.

that out of a sampling of 12,000 gainfully employed people, approximately half men and half women, less than two men out of a hundred were engaged in the design and craft arts while slightly more than one woman per hundred were in the same areas.

Many people with artistic interest and talent will have to confine their artistic pursuits to the avocational level. Guidance must not encourage the prospective artist with mediocre talent and should not discourage the student with outstanding ability. Valid measures of artistic ability present the guidance officer with his most reliable measure for quantitatively judging artistic talent.

As a climax of our discussion on developments in the field of measurement of artistic ability and their significance in a guidance program, we shall describe a study of the predictive value of such instruments in a college situation.

The project was carried out at Hunter College.[2] The purpose of the project was to discover whether or not a group of juniors and seniors who were majoring in art in a liberal arts college could be differentiated, by means of a battery of tests, from a group of juniors and seniors majoring in other fields at the same institution.

For the study, 80 girls, 40 art majors and 40 upper classmen in other fields, all volunteers, were chosen. All were students who had made satisfactory grades and who were satisfied with their choice of major.

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2. Barrett, Dorothy M., Aptitude and Interest Patterns of Art Majors in a Liberal Arts College. Journ. of Appd. Psychol. 29, 483-492.

To this group the following tests were administered: The Meier Art Judgment Test (1940 Rev); The Strong Vocational Interest Blank for Women; The Allport Vernon Study of Values; The Revised Minnesota Paper Form Board; and Guilford's Prognostic Test for Students in Design.

A distribution of test scores made by art majors on the Meier Art Judgment overlapped markedly with distribution of scores for control subjects. As a group, however, art students made higher scores. Average for the art majors was 109, while average for the control group was 103.

A study of distribution of ungrouped scores resulted in the establishment of two critical scores. A minimum score of 99 eliminated a fair number of control subjects but only two art majors. A score of 107 or over included a large proportion of the art group, but only a few of the control group.

The Strong was scored for artists only. High scores were more often associated with specialization in art.

Results of the Study of Values showed considerable overlapping. Both groups scored high on the aesthetic scale, but a greater number of art majors scored at the extreme end of the scale than the controls did. More of the latter made very low scores.

The Paper Form Board yielded somewhat similar results for the two groups. The average for the controls was 43, for the art majors 47. However, extreme scores were significant in differentiating the groups. It was felt that the test showed sufficiently significant differences to justify its continued use.

The Guilford Line Drawing Test brought out interesting differences between the two groups regarding creativeness; but the subjectivity of scoring proved too great an objection to its use.

Scores were available for both groups on the American Council of Education Intelligence Test. Identical scores were obtained for both groups. Profiles of the Michigan Vocabulary Test were available for most of the students in each group. The profiles showed higher scores in fine arts for the art group, but because scores were not available for all subjects, no direct comparison was attempted.

The Meier, Strong Allport-Vernon, and Paper Form Board were weighted in terms of the extent to which they differentiated the two groups. Combined scores from -20 to +18 were obtained. A division according to whether the subject was above or below zero, yielded the following differentation:

	-20 to -1	0 to +18
Art majors	4	36
Control group	32	8

The battery thus showed 85% accuracy in differentiating the two groups.

This concludes our summation of what has been accomplished thus far in the measurement of artistic talent. Let us now turn our attention to the present research regarding the predictive value of some of these instruments.

PART TWO

CHAPTER VI

A STUDY OF THE PROGNOSTIC VALUE OF AN ARTISTIC ABILITY BATTERY

The present study developed out of an interest in the degree of confidence that could be placed in available measures of artistic ability from the standpoint of guidance counseling. In advising a student to continue in, or enter into a training program in fine art, the counselor should have some trustworthy evidence of the student's ability. Tests, samples of work, or past scholastic records in art courses constitute about the only available sources for such information. Samples of work usually involve copied material which tells nothing about creative talent. Furthermore, the samples must be criticized by someone with an artistic background. It is not always possible to arrange such analysis.

Previous school records vary according to many conditions such as the general impression the student made on the teacher, personality factors, etc.

Some objective measure is needed before attempting to advise one on a career in art. An important consideration in this connection is the extent of interest in art. Some batteries such as that mentioned in the preceding chapter, include interest inventories, as the Strong Interest Blank, the Kuder Preference Record, the Allport Vernon Study of Values, or the Michigan Vocabulary Test. As previously mentioned, the art vocabulary tests of the Knauber and Lewerenz batteries are aimed at interest in art. However, as it is

common practice to assign to counselees some type of interest inventory regardless of other considerations, as there is a fairly high agreement among counselors as to how much significance to assign to interest profiles, and as we are concerned with ability rather than interest, we shall not include the interest inventories in the present study. This does not mean to imply that they should not be used in the counseling situation.

In selecting a battery of tests, time is of considerable importance. It is not usually feasible to assign a large number of exceedingly long tests. Other measurements of ability and interest are usually assigned in addition to the special capacity tests for a given area, especially in exploratory cases; and the administration of extremely long batteries usually decreases the reliability of the test results. The aim in this case was to hold the battery to a limit that could be administered in from two to two and one half hours.

In selecting the tests, consideration was given the qualities each measured. There is no point in remeasuring the same quality. As a test for aesthetic appreciation, a capacity upon which there is general agreement regarding its importance for artistic success, the Meier Art Judgment Test was chosen. The choice here lay between the Meier and the McAdory. The Meier was selected for several reasons. It is a comparatively recent revision of an older test; and has the advantage of statistical data, which increases the validity by elimination of the least effective items. Also more up to date norms are provided. In addition, the test

can be administered in from half to two-thirds of the time required for the McAdory.

It was felt that something that indicated creative ability should be included. For this purpose the Horn Art Aptitude Inventory was chosen. No other measure is available which, in so short a period, samples the creative and imaginative qualities declared a fundamental aspect of artistic ability by all authorities and writers in the field.

The Revised Minnesota Paper Form Board was included because of the writer's experience in its use with individuals who professed interest or ability in art. It was his experience that such persons almost always scored well above the average liberal arts freshman. The study cited in the previous chapter also found the test valid enough to be continued on an art ability battery. The test appears to measure a performance type of intelligence much like that described in chapter I by Meier as an important component of artistic ability. Thus the battery selected would seem to measure appreciation, creative imagination, and a performance type of intelligence, or spatial perception.

The tests were administered to a class of twenty-five beginning students in art. The students were taken at the beginning of their first quarter in school, and consequently test results were not affected by their college training. However, some variation in high school and other relevant background factors can be expected. We are interested in the ability students have at a given time, when they enter art school, and it can be assumed that in general those

with greater interest and capacity for art will have developed their talents to a greater degree by that time. For this reason we have attempted to avoid using the term 'aptitude' throughout the present study. Whether the capacities are inherited or acquired is of secondary importance here. We are primarily interested in determining the individual's relative chances for future success by an appraisal of his present abilities.

Grades for the group's first college art course were used as a criterion. This course was not an art production course; and for this reason can not be considered completely satisfactory as a measure of validity. However, the aim of the course was to develop an artistic point of view, to understand correct form, and to think creatively. As these are similar to the factors that the tests are attempting to measure, there is justification for expecting some agreement between the test results and the class grades.

Scores were obtained on the Horn Art Inventory by averaging the judgments of six raters, three members of the art faculty at Ohio State University, and three vocational counselors skilled in the use of psychological tests but without any training in fine art.

Scores obtained in each of the tests used were compared with each other to determine whether there was any indication that common elements were being measured. Ohio State Psychological Examination Scores were available for 23 of the 25 members of the class, and were compared with both class grades and individual

tests of the battery.

Results of the product-moment method of correlation between the class grades and the tests; and between the tests themselves are given in Table I.

TABLE I

Correlation coefficients between grades and tests

	Minn. Paper Fm. Bd.	Meier Art Judgment	Horn Art Inventory	OSPE	Class Grades
Minnesota Paper Form Board	———				
Meier Art Judgment	-.18	———			
Horn Art Aptitude Inventory	.18	.41	———		
Ohio State Psychological Examination	.05	-.19	.17	———	
Class Grades	.01	.58	.79	.01	———

The correlation between class grades and the averaged Horn ratings indicates high validity for the test. However, the question of reliability of individual ratings must be determined before the test can be used with any degree of confidence. The reliability of individual ratings will be taken up on the next chapter.

The Meier Art Judgment also shows validity coefficient high enough to warrant its continued use.

The extremely low correlation between the Minnesota Form Board and grades indicates that the test does not seem to discriminate between art students. On examining the individual scores obtained

on the test, it is noted that almost every member of the group scored appreciably above the average liberal arts freshman. The mean of the class was 47.56 which falls in the 85th percentile on the basis of liberal arts freshmen norms. Apparently while the Paper Form Board is not a valid measure for differences among those with artistic talent, it may have considerable value as a screening devise in eliminating those without artistic ability.

Further evidence of the value of the Paper Form Board can be found in the multiple correlation of the tests with the grades. The Meier and Horn together correlate .59 with the class grades. A correlation of the Meier, Horn, and Paper Form Board with class grades using the Doolittle method is .84. The validity of the battery is substantially increased when the Paper Form Board is included.

The Paper Form Board does not show any degree of correlation with either the Meier or the Horn. The correlation of .41 between the Meier and the Horn indicates some communality; but is not high enough to justify the substitution of one test for the other.

OSPE scores do not show any relationship to class grades or any of the tests of the battery.

CHAPTER VII

A VALIDATION AND RELIABILITY STUDY OF THE HORN ART INVENTORY

Scores on the Horn Art Aptitude Inventory were determined by averaging the results of all six of the raters. However in most cases it would not be possible to have so many ratings of an individual test. This poses several questions: How many ratings are necessary? What is the reliability of the individual rating? Are individuals without training in art competent to make judgments?

Correlations between individual raters employed in this study are given in Table II. Judges 1, 2, and 3 are art teachers; 4, 5, and 6 are vocational counselors.

TABLE II

Correlations between judgments of individual raters on the Horn Art Inventory

	1	2	3	4	5	6
1	—					
2	.46	—				
3	.56	.68	—			
4	.53	.63	.55	—		
5	.67	.63	.59	.75	—	
6	.67	.69	.63	.92	.85	—

These figures indicate a much greater degree of consistency between the counselors. Regardless of whether or not their ratings are valid it is evident that they are basing their judgments on the same factors.

As to validity the teachers have a small advantage. An average of the ratings of the three teachers correlates .49 with class grades. An average of the judgments of the three counselors with the same criterion shows a correlation of .40. However, when all six judgments are pooled, the correlation with grades rises to .79. The answer to the first of our questions at the beginning of the present chapter then, would seem to be that the more ratings available, the better.

The high agreement between the non-art judges would indicate that the instructions for rating are clear and objective enough to allow the individual without background in art, but who is skilled in the use of psychometric techniques to make reliable judgements. The small degree of difference in validity just mentioned would not rule out the value of ratings of competent individuals without an art background. Of course the coefficients just presented show that, if both the counselors' and teachers' ratings are used, the results will offer much greater validity. As such procedure is not possible in most cases, the ratings of two or three judges can be used with justification, provided interpretation of scores takes full account of how the judgments were derived. In the case of extremely good or poor drawings, the judgment of one person familiar with the test may be sufficient. For the more "average" cases where the quality of the work is not so obvious, at least two or three ratings should be combined.

One final word of caution; ratings of individual test results should not be attempted by the layman who has not had an opportunity to familiarize himself with the type of drawings he may expect.

A study of from twenty-five to fifty test results should afford examples of various quality, and as rating is a relative procedure, the judge will have some basis for his differentations. It is much easier to rate the drawings after seeing examples of the various degrees of skill than from printed instructions.

CHAPTER VIII

SUMMARY

From the first part of our study, we determined that success in the arts springs from a combination of various factors. Some of these, such as the artist's motivation and purpose, are too completely subjective to measure by any techniques now available. Others, such as appreciation for aesthetic form, creativeness and imagination, and intelligence of a performance nature which play an important role in determining artistic success can be measured fairly accurately. If by means of such devices, we can eliminate even a fraction of the potential artists who could never make good in such a highly competitive field, something has been accomplished.

From the study just concluded, we find results that indicate some of these measurements bear a relation to success. Two of the three tests used, the Meier Art Judgment, and the Horn Art Aptitude Inventory show enough agreement with grades to have some predictive value. The third test, the Minnesota Paper Form Board, shows evidence of being an effective screening device in eliminating individuals without artistic talent. A correlation of all three tests with class grades shows a much higher coefficient than any of the single tests against the same criterion.

The inference is that all three tests used together will offer greater predictive value of probable success than any of the tests taken separately. Of course the sampling is small, and consequently inconclusive in itself. However, indications are present which agree substantially with previous study.

We need more data on these measures to enable us to predict with greater accuracy what are the chances for success of a prospective artist.

Ratings are always less desirable than more objective measurements. Artistic ability includes elements such as creativeness and imagination that cannot presently be quantified in any other way.

The high reliability coefficients between the counselors' ratings on the Horn Art Inventory are interesting. With a validity correlation only slightly below that for the art teachers, they indicate that the factors being judged are simple enough; and instructions for rating clear enough to enable persons experienced in the use of psychological instruments, but who do not have a background in art, to make trustworthy judgments.

Future research will undoubtedly yield more effective measuring devices, especially in the more subjective phases of what constitutes artistic ability. The projective techniques offer considerable promise in this respect.

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