1951

The construction of a non-verbal vocational interest inventory for use at the high school and adult levels

BOSTON UNIVERSITY

SCHOOL OF EDUCATION

Thesis

THE CONSTRUCTION OF A NON-VERBAL VOCATIONAL INTEREST INVENTORY FOR USE AT THE HIGH SCHOOL AND ADULT LEVELS

Submitted by

Joel Berg, Jr.

(B.S. in Ed., Boston University, 1950)

In partial fulfillment of the requirements

for the degree of Master of Education.

1951

First Reader: J. Wendell Yeo

Professor of Education

Second Reader: John G. Read

Professor of Education

ACKNOWLEDGMENT

In completing this work, the author wishes to acknowledge with deepest appreciation the valuable assistance of his many friends whose suggestions, criticisms, and physical labor made this thesis possible. First, his thanks are due to his advisors and readers, Dr. J. Wendell Yeo and Dr. John G. Read, who furnished much technical advice.

Further thanks are due to Mr. Kenyon S. Fletcher of D.C. Heath and Co., whose personal interest and suggestions made possible the procurement of the photographs, and to the members of Alpha Phi Omega, National Service Fraternity, for their time and effort in assembling the test books.

Special mention must be made of the students and faculty at Brookline High School, Brookline, Mass., for their cooperation during the trial testing, and deep appreciation must be extended to Dr. Robert G. Andree, headmaster of the school, to Mr. Robert H. Archibald and to Mr. Raymond H. Woodman, guidance counselors, for continual advice and assistance.

A distinct note of gratitude must be accorded to Miss Elinor M. Garland, who has given her untiring assistance throughout the entire process.

Particular appreciation is due to Miss Eleanor Berg, whose generosity at this time has been of the greatest assistance.

And last, but by no means least, my deepest gratitude is proffered to my parents and my sister, Marcia E. Berg, to whom, in greatest measure, any success of this thesis is due.

J.B.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

THE NATURE OF THE PROBLEM

Purpose. -- This thesis has two fundamental objectives in view: first, to prepare a non-verbal inventory of general vocational interests consisting of sets of action pictures, and second, to correlate the inventory so constructed with a selected verbal interest inventory: the Kuder Preference Record, Form C[1].

It is the intent of the author to develop an interest inventory for use in cases where reading difficulties in general or difficulties in comprehending the English language in particular make inadvisable the use of the standard inventories of vocational interests which are set up on a verbal basis.

Source. -- This type of problem was suggested first, by the lack of such an inventory in the field that was at all well known; second, by the increased general interest in non-verbal techniques; and third, by the need for such an instrument at the proposed level for construction.

Definition of terms. -- It may be well here to consider specific definitions of the terms employed in this thesis. Inasmuch as there is considerable disagreement in the definition of some of these terms, one must necessarily discuss them as they are presently used by the leaders in the field and then

---

[1] Kuder, G.F., The Kuder Preference Record, Form C.

proceed to formulate those same definitions in that way which will best befit his purpose.

Strong[2] believes that the definition of interest contained in Webster's Dictionary is as satisfactory as any. He explains that this definition emphasizes three terms that are included in most of the definitions of interest, namely attention, stirred-up, and objects. And in another work, Strong[3] says that if "vocational interest" is defined as "the occupation an individual likes best now," then the conclusion must be reached that vocational interests are very unstable. He points out that there are ample data to prove that boys and girls and also older persons change their "first choices" very frequently and in most cases without apparent rhyme or reason. But if, as he adds, "vocational interest" is defined as "the sum total of all interests that bear in any way upon an occupational career," then we find surprising stability, certainly among adults, and, as far as we have been able to judge, also among young men of college age and presumably among still younger people.

Super[4] criticizes Lehman and Witty[5] for decrying the use

---

[2] Strong, E.K., The Role of Interests in Guidance.

[3] Strong, E.K., Change of Interest with Age.

[4] Super, D.E., Appraising Vocational Fitness, Ch. XVI.

[5] Lehman, H.C., and Witty, P.A., Vocational Counseling—the Interest Inventory.

of interest inventories in the counseling situation, claiming that they (Lehman and Witty) had not really tested inventories of interests but merely, as he puts it, expressions of interests. Super then goes on to classify four different ways of measuring interests, illustrating the principles of each and presenting various evidences of their respective values.

As he puts it, expressed interest is the verbal profession of interest in an object, activity, task, or occupation. He notes that Fryer[6] called it a specific interest, and maintains that there has been relatively little research in this area since Fryer's detailed review in 1931. He concludes that the expressed or "specific" interests of children and adolescents are unstable, and do not yet provide useful data for diagnosis and prognosis. However, he adds, the picture is more optimistic for adults since Strong[7] showed that such interests are rather stable in them over a short period. Thus, Super[8] continues, the importance which may be attached to expressions of specific interests clearly varies with the maturity of the client. He refers also to studies made by Gilger[9], Lurie[10],

---

6 Fryer, D., The Measurement of Interests.

7 Strong, E.K., Vocational Interests of Men and Women.

8 Super, op. cit.

9 Gilger, G.A., Declaration of Vocational Interest.

10 Lurie, W.A. and Weiss, A., Analyzing Vocational Adjustment.

and Trow[11], wherein it is shown that the value of the expressed interest depends upon the ways in which the questions are phrased, for some questions concerning vocational interest are so put as to elicit information concerning vocational choice, some to ascertain vocational preference, and some to evoke vocational fantasies. The degree of realism represented by the expression of interest varies, he points out, with the type of question asked.

Super[12] defines manifest interest as synonymous with participation in an activity or an occupation. He uses the term tested interest to refer to interest as measured by objective tests, as differentiated from inventories which are based on subjective self-estimates.

Inventoried interest, says Super[13], is assessed by means of lists of activities and occupations which bear a superficial resemblance to some questionnaire for the study of expressed interests, for each item in the list is responded to with an expression of preference. The essential and all-important difference is that in the case of the inventory each possible response is given an experimentally determined weight, and the weights corresponding to the answers given by the person

---

11 Trow, W.C., Phantasy and Vocational Choice.

12 Super, op. cit.

13 Ibid.

completing the inventory are added in order to yield a score which represents not a single subjective estimate as in the case of expressed interests, but a pattern of interests which research has shown to be rather stable.

From these definitions and descriptions one may be sure that the last word has not yet been spoken. If one takes Strong's acceptance of Webster's definition for interest, adding, however, the alternative of process to objects, interest may be defined as the excitement of feeling and attention to certain objects or processes, and degree of interest may be measured according to the degree of feeling and attention, pleasant or otherwise, that these objects or processes provoke.

Preference shall be defined as the act of choosing among two or more interests so that that interest is chosen which produces the highest degree of pleasant feeling and attention.

Vocational interest shall be defined as any interest considered in terms of an occupational career. This will avoid the generality of Strong's second definition which does not demand a consciousness of the occupational relationship, and yet not limit one to instantaneous interests[14].

Let a general vocational interest be defined as a vocational interest which comprehends one or more specified occupational fields, and further, let a specific vocational interest be defined as a vocational interest comprehending one and only

---

[14] For Strong's statements and their sources see p. 2.

one occupation, job, or position.

The measurement of interest shall be defined as any attempt made to evaluate the degree of interest regardless of the means employed to do it. In this definition, the definitions of Super[15] may be dispensed with, and under it may be introduced specific methods of measuring interests which are more useful inasmuch as they are clarified and delimited to a greater extent.

A professed interest shall be defined as an interest claimed to be held by the subject. Professed interests are expressed by subjective means, be they oral, written, or gesticulatory.

An inventoried interest shall be defined as an interest discovered by means of an objective instrument, which may be designated as an interest inventory. The value of the interest inventory lies in the fact that it analyzes specific interests and ultimately integrates them according to a prearranged formula to form an integrated picture of a general interest pattern. The subjective measures of interest, on the other hand, seek from the start to synthesize qualitative estimates of interest into a pattern wherefrom certain judgments may be made.

Interest inventories today are built either as rating scales or as preference sequences. The former kind presents to

---

[15] Super, op. cit.

the subject an object or activity and asks for a rating as to the degree of liking or disliking which that object or activity evokes in the subject. An example of this type of inventory is the Brainard Occupational Preference Inventory[16]. An example of the preference sequence type is the Kuder Preference Record[17]. This latter type presents a certain number of items together and asks the subject to select the object or activity he likes the most. Many people feel that it is much more difficult to give an accurate rating of a like-dislike sort than to express a preference. And others feel that it is unfair to give equal weight to activities which are just to be tolerated and to those which are very much desired. These latter, however, are not well enough acquainted with the scoring procedure for preference sequences; otherwise they would see that while equal weight is given item for item, the inventory is interpreted in terms of sums of items classified according to a certain pattern which must, if the test is at all worth while, reflect the true interest pattern of the individual. Thus Chambers'[18] critical comments are quite out of order in view of the true nature of the preference sequence type.

---

[16] Brainard, P.P., and Brainard, R.T., The Brainard Occupational Preference Inventory, Form A.

[17] Kuder, op. cit.

[18] Chambers, E.G., "The Kuder Preference Record" (reviewer); Buros, O.K., The Third Mental Measurements Yearbook.

Justification. -- Before one should proceed to develop a new instrument for evaluating interests, he must decide whether or not a significant contribution can be made to the measurement program by so doing, or whether such efforts would be valueless in that the instrument did less efficiently that which could be done by other devices. Edds[19] undertook a study in which he sought answers to the following questions:

1. Are verbal and non-verbal abilities independent capacities or are they the same capacities tested differently?

2. Do these abilities possess group factors?

3. Is the group factor present in both verbal and non-verbal tests?

4. What is the relationship between these abilities and intelligence?

5. How should these activities be weighted in order to predict school grades?

By a series of tests it was seen that verbal and non-verbal abilities correlated practically the same with school grades[20]. It may be said then, that the non-verbal tests combined are as good a measure of success in school as a combination of the verbal tests. While verbal and non-verbal abilities seem to be rather different capacities sharing low

---

[19] Edds, J.H., The Nature of Verbal and Non-Verbal Abilities.

[20] Ibid.

relationship to each other, and while each contains a factor not present in the other, and while even a common group factor does not seem to be present in each in the same degree, nevertheless verbal and non-verbal have practically equal weight in predicting class scores. Edds[21] found a correlation of .54 between verbal ability and measured intelligence; a correlation of .42 between non-verbal ability and intelligence; a correlation of .38 between verbal ability and school grades; and a correlation of .40 between non-verbal ability and school grades, all correlations being positive. These figures are just about what we would expect to find with respect to the ordered relationship of each to the others; however, we may well be surprised at the quantitative proximity of the scores obtained from each means, with perhaps the exception of the twelve hundredths difference between the intelligence correlations. While Edds suggests that that difference may be real, he also suggests that the difference may be due to the inadequate method of measuring intelligence without verbal means.

Arthur[22] built a point performance scale in response to a general need, as she says, for a non-verbal scale that could be used satisfactorily in clinical work. She claims that highly verbalized Binet tests are inadequate because of foreign

---

[21] Ibid.

[22] Arthur, G., A Point Scale of Performance Tests.

language handicaps, speech or hearing defects, or failure to give an adequate report of the intelligence of the individual in whom verbal and non-verbal abilities are markedly unequal in their development. She states further that in cases where a valid Binet rating cannot be obtained because of language difficulty, speech defect, or emotional repression, the performance scale can be used as a substitute. But she adds that the performance scale rating must not be accepted at face value in the case of a patient suffering from acute emotional disturbance. She claims further that the performance scale gives a safer index of the ability of the child to meet new situations, eliminating much of the environmental influence in answering. This, however, seems extremely open to question.

From these studies and others, it is becoming increasingly apparent that non-verbal tests have a place in educational and vocational measurement when such factors exist as reading, language, hearing, or symbolic understanding to prevent either concept mastery or practical response among those who have difficulty along these lines. Non-verbal techniques have come into their own now; they are being used more and more widely in the universal attempt to obtain more accurate interpretations of test scores.

There is no non-verbal interest inventory on the market today that is widely known or widely used. Already the need has been felt for such a test that will relate the test matter

more closely to the direct experiences of the testee. According to Super:[23]

> Little is known of the role of experience in the development of vocational interests in the formative period—adolescence. This is still the outstanding problem to be studied.

It is hoped that through the non-verbal technique the pupil may relate the occupation-image more directly to his own experiential background.

The fact also exists that every verbal test presents some difficulties in the way of vocabulary. Also, lengthy instruments encourage careless answers and prevarication. Margaret McCarthy used the Kuder Preference Record on eighth grade pupils. Her findings lend further justification to the development of a non-verbal inventory:[24]

> The Kuder Preference Record was designed for high school and college students as well as for use in employee counseling. Therefore, when used on eighth grade pupils' level, it is not possible to overcome all vocabulary difficulties. Furthermore, many given items are not within the range of experience of pupils this age.
>
> The retarded reader and the child with poor vision encounter difficulties in applying the selective method to many items.

---

[23] Super, op. cit.

[24] McCarthy, M., A Comparison of Interests as Determined by the Kuder Preference Record with Interests as Determined by the Pupil Activity Record.

On a measured instrument of this kind, the prevaricator may attempt to show a false interest[25].

But it must be recognized that the Kuder Preference Record is intended primarily for grades nine and above. While one may feel that perhaps the vocabulary load is a little too much for some people at this level, and therefore attempt to justify a non-verbal technique, yet it seems that a correlation of the results of the non-verbal form with the results of the Kuder might prove worthwhile. It is hoped that many of the difficulties due to vocabulary deficiency, reading method deficiency, and abstraction power deficiency may be overcome by means of the non-verbal instrument. It is further hoped that the novelty of the situation will discourage prevaricators from harming themselves and the validity results; there is good reason to believe that such will be the case.

Assumptions. -- There are three basic assumptions fundamental to this thesis:

1. All people will react similarly to a comparison of picture stimuli if they have the same interests, qualitative and quantitative. The validity of this assumption may be adequately measured by the reliability of the instrument.

2. Due to the elementary nature of the inventory and the type of test, geographic location will not cause variance in

---

[25] Ibid.

the method of taking the test nor of formulating choices between the pictures. This inventory is built on an impression basis. It is not necessary to analyze each item, but merely to indicate whether one activity is preferred to another. The simplicity of the method is also a factor that is reflected in the coefficient of reliability. Note, however, that this assumption does not imply that the test is valid, without reference to the person who is to take the test.

3. While a picture cannot present a complete view of an occupation, yet it does at least as good a job as does a verbal description. This assumption is based on the fact that most psychologists recognize that verbal expressions form mental images in the mind which have reference to some aspect of previous experience. The picture does precisely the same thing, but reduces the amount of symbolic complexity so that it represents a closer proximity to the concrete than does the verbal expression. Billett presents this idea admirably with respect to the teaching-learning situation; however, the same principles apply to the use of any non-verbal test:[26]

> ... certain auditory and visual aids can increase immensely the educative growth achievable by pupils of less-than-average general intelligence or academic aptitude. These pupils have more-than-average difficulty with symbolism, the difficulty increasing with decrease in academic

---

[26] Billett, R.O., Fundamentals of Secondary School Teaching.

aptitude and with increase in the degree of abstractness of the symbolism. Many forms of auditory and visual aids provide vicarious experience with a minimum of abstractness. Through the wide use of such aids, pupils of less-than-average academic aptitude will be able to develop concepts and resultant ideals, attitudes, and appreciations of kind and degree otherwise impossible within the limits set by time, classroom environment, and native aptitude.

Scope. -- We shall build a non-verbal interest inventory consisting of 94 distinct photographs, size 3½ by 4½ inches in length and width, each used three times, once in a sequence, with three sequences in the inventory. Thus there will be in each complete inventory 282 photographs. These photographs shall be presented for preference discrimination by pairs so that the testee may choose simply between two pictures that one which best suits his fancy. He does not have to identify the specific occupation represented by the photograph. The full details of the test construction may be found in Chapter II of this thesis.

The inventory shall compare basic interests within ten general fields: Outdoors, Mechanical, Computational, Scientific, Persuasive, Artistic, Literary, Musical, Social Service, and Clerical. These categories were chosen in order that the inventory might be compared with the Kuder Preference Record[27] and thus provide an opportunity for a check on validity.

---

27 Kuder, op. cit.

When completed, the inventory shall be administered to about 150 young people at the ninth grade level or higher.

Summary. -- Most ninth and tenth grade pupils have begun to think seriously about their choices of vocations. They seek to learn more about their own capacities for engaging in certain fields of work. They want to procure a written scale or profile of their interests and preferences in order to enable them to make wiser decisions as to future vocational plans, since interest is a major criterion of success, not to mention happiness in one's work.

Numerous verbal interest inventories have been built to serve this need. However, the use of these verbal inventories has been severely limited with young people who have difficulty with reading, hearing, or symbolic understanding, or who have been brought up in homes where a foreign language is spoken dominantly. So that the interests of those persons with any of these difficulties may be measured more adequately (for surely they have interests of the same nature as those without such handicaps), a non-verbal type of general vocational interest inventory shall be developed to classify interests according to the fields suggested on page 14.

Ensuant to the preparation of the inventory, it is necessary to administer it to those who can be of service in correlating it with those tests previously established, and later, to those with whom the previous tests have failed, in an

effort to demonstrate the significance of the new test. And finally, the problem exists of gathering up the assembled data, correlating the test scores as desired, and tabulating the results so that they may be most useful to the test user. This, then, is the nature of the problem at hand.

CHAPTER II

THE DEVELOPMENT OF THE INSTRUMENT

Introductory. -- Before any instrument or tool may be built it is necessary, if one would proceed rationally, to consider first of all what the aim of the tool or instrument is to be, and what it is to accomplish; second, how that aim or accomplishment may be realized most effectively and most expediently; and third, how a plan may be formulated whereby the pursuit of the objective may be followed in a thorough and well-defined manner. The principal aims of this thesis have been stated in the preceding chapter. We shall proceed here to lay out the instrument and the reasons for the ways in which it was developed.

It was stated that the non-verbal means to be used would be the presentation of pairs of photographs. Herein shall be presented the criteria by which those photographs were selected, paired, and established in each of the three sequences which comprise the whole inventory. Further, the system by which the inventory may be scored, and, as far as possible, interpreted will be presented.

Selection of pair method. -- The first issue to be decided in planning the arrangement of the test was the question of whether the test should be built on the rating scale principle or on the preference sequence plan[1]. Whereas most people,

---

[1] See pp.6 and 7.

and particularly the author, felt that the latter type which made a forced choice was more accurate, the preference sequence style was adopted.

The next question to arise was how should the items be presented. The Kuder Preference Record[2] presented three items at a time and instructed the testee to indicate his first and third choices. But it was felt that this method would be too complicated for the non-reader. Then again, there were space limitations to consider, inasmuch as a sentence occupies only a line, but a picture occupies half a page. And finally, a sentence deals primarily with three separate concepts, but a picture deals with a great many more. For these reasons, it was decided that the pictures would be presented by pairs, two pictures on each page, and by way of response to the test, the testee would indicate his preference with respect to each pair. This plan would combine efficiency and simplicity— two fundamental attributes of any good test.

Selection of photographs. -- Before engaging upon the actual work of selecting the photographs to be used in the inventory, it was necessary to draw up a list of samples within each category[3] so that the choice of pictures might be facilitated. This done, the photographs were then obtained from an agency subsisting on the rental and sale of specialized

---

[2] Kuder, op. cit.

[3] Each general field, as listed on page 14.

commercial photographs. The ultimate selection of each photograph was the result of arduous comparisons and contrasts of all photographs which might meet the criteria here listed:

1. Each picture must represent people working at a specific task.

2. This task must bear a direct relationship to a specific vocational interest, that is, to an occupation.

3. The picture must portray each specific vocational interest as nearly completely as possible.

4. Each picture should contain a minimum of glamor; yet it should not be excessively forbidding[4].

5. Each photograph must have a background encouraging and not discouraging its reduction to a size of 3½ by 4½ inches.

6. It is preferred that only one person be shown at work in each picture; however, where teamwork is necessary in the occupation or where there is an otherwise exceptionally good picture, this requirement should not stand in the way.

7. An ample distribution should be made with respect to the sex of the worker.

8. Each picture must be in good condition physically and photographically so that poor quality will not diminish its attractiveness or cause the testee to choose one picture over another merely because it is clearer or better-looking from a physical standpoint.

---

[4] An exception to this rule are validity checks.

9. Each picture must be typical of the nature of work performed in the category under which it is listed.

10. Each picture should be applicable to present day working conditions.

11. The general nature of the work being done should be readily intelligible to most people, and the category under which the picture falls should be intelligible to all.

12. No clue to the nature of the category should be derived from the existence of any readable printing matter within the picture, and no label should be affixed to any picture. None should be necessary.

Ten photographs were selected to represent typical illustrations of the kind of work performed in each category. Since there are ten categories, this represented 100 pictures that could be used in the test. However, four additional pictures were added as a check on validity alone, not to influence the regular scoring. This made the total sequence consist of 47 pairs, presented separately, or 94 different pictures. These pictures compared each of the ten categories in preference to each other one, but did not compare any one to itself.

It was possible to check the validity of some of the photographs with respect to category by presenting 26 of them to a jury consisting of the members of the Seminar in Guidance and Personnel[5] at Boston University. Nearly all the items were

---

[5] There were 18 graduate students in the seminar, plus the professor and the author.

upheld; two were rejected; and two were retained pending an item analysis.

Arrangement of items. -- It was mentioned[6] that the test consists of 94 distinct photographs, each of which is used three times in the test, once in each of three sequences. These sequences were patterned in the following way: the first was arranged from pairs of category numbers chosen at random and begins: 1,9; 4,5; 1,2; .... The second sequence runs like the first but in reverse orders: 9,1; 5,4; 2,1; ... to 0,5; 4,9; 1,8; 7,5. The third sequence runs backward and takes every fourth item indiscriminately of order: 0,5; 4,6; 6,1; ... 2,6; 6,0; 1,9. This pattern gives an excellent distribution of items and helps to balance the test.

It was found convenient to assign a number to each picture. The pictures were identified by the letter Q, followed by the number of the category it represented, then followed by a serial number within that category (e.g., the picture of a violinist was numbered Q70, since 7 is the category number of the musical field).

The pictures were arranged within the bounds of the category orders according to the criteria set up on page 19. Special attention was given to the amount of glamor in each picture and an attempt was made to equate that factor on each page.

---

6 See page 14.

Selection of form for presentation. -- In searching for a suitable form for the presentation, again several criteria were established so that various methods might be more accurately compared:

1. The test should be handled fairly easily; it should be portable without running the danger of displacing its items.

2. The arrangement of the items and the opportunity for response should be kept to maximum simplicity.

3. There should be no written directions except for the tester to read, and these should exist merely to facilitate and expedite the process of taking the test. In other words, if it became necessary to give the test to someone who could not speak a word of English, that could be done and the directions explained with a few simple gestures.

4. The test should be easily prepared for administration.

5. The test should be scored as easily as possible.

6. The testee should not have to read numbers in order to make a selection. An answer pad could be acceptable only if it was arranged so that numbers would not have to be followed by the testee.

7. The physical form should be minimally fatiguing to the testee.

8. The test should be administered in a group setting.

9. The photographs should be removable in the event that further research shows that a change in the order of items is

desirable or that the tester wishes to try a different order[7].

10. The test should be kept in such a form as to be most economical without loss of accuracy or time expediency.

The following form was settled upon in that it was deemed best suited to the purpose: each picture was reduced to size 3½ by 4½ inches. The page upon which each pair of pictures was mounted is made of very heavy paper, heavy enough to stand considerable wear but not so heavy that it results in an undue incumbrance. The page measures nine by twelve inches with the nine inch edge as the base. The pictures were placed on each page by means of a template which was cut from heavy cardboard according to the following manner:

A line was drawn parallel to the base midway between the top edge and the base, cutting the page into two equal rectangles. If the picture to be used in one or both of the rectangles is best shown with the 4½ inch edge parallel to the base, then the 4½ inch edge was placed three fourths of an inch above or below the dividing line, accordingly as the picture was to be in the top or bottom rectangle respectively, and 2½ inches from the left side of the page thus making a two inch margin on the right.

If, on the other hand, the picture to be used in one or both of the rectangles is best shown with the 3½ inch edge

---

[7] This applies only to the experimental editions.

parallel to the base, then the 3½ inch edge was placed half an inch above or below the dividing line, accordingly as the picture was to be in the top or bottom rectangle respectively, and three inches from the left side of the page thus making a 2½ inch margin on the right.

The paper was punched twice at standard distances so that it might be bound in a standard loose leaf binding. In order to reduce eye fatigue, a glareless, medium shade of green was selected as the color of the page.

The method of presentation, then, may be summarily described as a test book containing 141 pages with two pictures on each page[8], each representing persons working at an occupation different in fundamental characteristics from any other on the same page, such that a choice or preference might be made between each pair of pictures. This book was drawn up to meet those criteria which were established as necessary for efficiency in presentation and comparison with other standards.

Selection of form for response. -- It is, of course, an absurdity to claim that a non-verbal test can be given and significant results therefrom derived without the benefit of any language whatsoever. There are degrees in the attainment of language skills, even in so crude a means of communication as sign language. Therefore, a non-verbal test must be prepared

---

[8] Arranged as photographs in the experimental editions.

for administration to those who have mastered a certain level in the language arts whether they have mastered other skills or not. For example, one need not know that a capillary blood vessel is called such because of its resemblance to hair; a person need not even recall the name if he recognizes capillary bleeding and knows how to treat it, and how to describe the symptoms and treatment.

In this test, therefore, it is assumed that the pictures have some language meaning to the testee. It need not be that he can name the occupations, or even the workers, but he must be able to describe to himself what is being done as a basis for his judgment between two activities.

The perfect non-verbal test contains only pictures or drawings, and may be given with sign language. This test may be given in this manner by an examiner who is thoroughly familiar with its structure and purposes. This is all done by providing the testee with an answer pad and the book; also a device for holding the answer pad so that he may turn the test pages more conveniently. With the test book go two boxes, one placed above the book and one placed below it while the test is being taken. The testee tears one sheet from the pad with each page and places it in the top or bottom box accordingly as he prefers the top or bottom picture, respectively. These sheets are serially numbered to coincide with the test pages so that the test may be scored from a special sheet at its completion.

In order that the testee may be sure that he is working on the right page with each sheet, every fifth page and every fifth sheet bear a blue star. If there should be a lack of correspondence between book and pad, the examiner may be called to adjust it.

This method of taking the test, however, is very uneconomical for the person who can read numbers. A case in point is the student from France or Germany who speaks little English but who nevertheless is as familiar with the system of Arabic numerals as are we who are giving the test. For them a second method is preferable. Instead of using the answer pads, boxes, and holders, a pencil and an answer sheet which may be scored by hand or by machine may be used. Here the pages are numbered in the book and the items are numbered on the answer sheet. The instructions may be given in any language but the response is the same for all.

This same method may be used when testing students who come from homes where a foreign language is spoken dominantly or who, for some other reason, can read numbers but have not the ability to read verbal expressions.

This method may be used also on people who can read well. Administration by this method takes less than a half-hour and thus is economical of time to the point where it can

be easily given in less than a full class period[9]. Comparison between this test and others in the verbal area may be made more easily using this method.

Scoring. -- Two types of scoring keys are necessary. The first consists of a paper containing the page numbers, serially ordered, and next to each, the classification number of the top and bottom pictures according to the numbers on the tally sheet, all arranged under the column headings of page, top, and bottom. With this type, the scorer tallies the classifications as indicated by the sheets in each box, sums the tallies, and then converts to percentile scores.

The other type consists of a set of stencils, punched according to the paper described in the preceding paragraph. This is used to score the answer sheets, and consists of ten regular stencils and one validity stencil, the use of which will be described in Chapter III.

---

[9] There is no time limit on the test; it takes about 25 minutes on the average. There are bound to be some, however, who will take considerably longer.

CHAPTER III

TESTING AND ESTABLISHING NORMS

Introductory. -- Having developed an instrument which, it is hoped, is worthwhile, the next task is to administer it to a sample of those for whom it was prepared. Following this, a pattern of norms must be set up based on the results, and lastly, the statistical significance of those results must be measured.

It has been stated previously that the test was designed so that it could be easily correlated with the ten categories of vocational interest found in the Kuder Preference Record[1]. In order to test this instrument, then, it was necessary to administer the Kuder Preference Record first to a large number of students, select those whose scores fell in the valid range and whose answer sheets were mechanically perfect, and then test them with this instrument. The author was very fortunate in securing the full cooperation of the school which he selected for his trial of the new test, without which the whole project would have necessarily been doomed to failure.

Selection of the validating group. -- It has been the custom of the school selected for the validating population to administer to its sophomores annually the Kuder Preference Record. This year, from January on, all the members of grade

---

[1] See page 14.

ten were administered Form C of the Kuder Preference Record. Therefore it was necessary only to correct those tests, to select a group of students whose V scores[2] fell between 38 and 44 (the prescribed limits of the validity range), and to confirm that the papers were mechanically perfect.

This done, it was necessary to arrange appointments with these students for study periods when they could take the Non-Verbal Inventory. Answer sheets were prepared, calling for identifying data and providing spaces for scoring with the stencils; pencils were provided to ensure a heavy marking; and a room was obtained with tables to make the testees more comfortable.

Of those students whose validity scores on the Kuder Preference Record made them eligible to be included in the validating group, about twenty percent were lost through program conflicts or other causes beyond control. The final population consisted of 153 students of which 88 were girls and 65 were boys. Of these 153 students, 11 were selected for retesting 12 days after their first test as a measure of reliability. These 11 students consisted of six boys and five girls.

It must be emphasized that the only criteria for the selection of these students for any phase whatsoever of the testing were satisfactory validity scores on the Kuder

---

[2] Scores on the validity scale.

Preference Record and convenient program schedules. No attempt was made to test on the basis of intelligence, previous test results, recommendations of teachers, or any other such basis which might tend to skew the results away from those which a random sample might produce. Students from all types of programs were amply represented: college preparatory, trade, commercial, and general programs were well represented in the sample.

When these individuals were selected, their Kuder Preference Record scores were recorded on three by five inch cards, leaving room for the recording of their scores on this test also. These cards were very useful for working out percentile distributions for the Non-Verbal Inventory as well as absolutely essential for making the correlations.

Giving directions. -- The test was given to several students at a time but not to more than ten at once. Pencils were passed out; answer sheets followed. A brief explanation of why the test was being given was afforded the students. Following this, the directions for administration were read by the examiner and oral instructions were given to the students.

The students filled in the requisite data on the answer sheets as soon as they were received. In addition, they were asked to place the date in the upper right hand corner (this was erroneously omitted on the answer sheets). During the test no questions were answered which would tend to help the testee

interpret the pictures; other questions were answered freely. A new set of directions will be found in the appendix, drawn up from the light of experience with the old set (also included there). It is not imperative that the directions be given such exact wording, but the same ideas must be conveyed in the same order if the test is to be properly administered. Therefore, it is recommended that the directions be adhered to fairly rigidly.

Timing. -- Due to the nature of the test, there was no time limit set for taking it. The average time taken was about 25 minutes. There were some who took less than 15 minutes, but these cases did not occur often. Only one person failed to finish by the end of the period, and that individual came in several minutes late, made a mistake on her paper, and became hopelessly confused by not following the directions. Here is a definite advantage over the Kuder Preference Record which requires from 40 to 60 minutes on the average for high school students.

Reactions to the Inventory. -- After the students were well along in the test but before any one of the group had finished it, the students were invited to set down their opinions of the test on the reverse side. They were asked to express their preference for this test or the Kuder Preference Record, together with the reasons for their preference. They were urged to answer honestly and carefully, but no answer was

required to be given unless the student were willing to answer. The results will be more fully elaborated upon in Chapter IV, but it will suffice to say here that the vast majority of students tested preferred this type of test, although many valid criticisms were offered.

Scoring the inventories. -- In using the answer sheet form of the test, which is almost mandatory for the testing of such a large group, scoring was done by means of eleven stencils numbered consecutively to correspond to the categories of the test: 0, Outdoors; 1, Mechanical; 2, Computational; 3, Scientific; 4, Persuasive; 5, Artistic; 6, Literary; 7, Musical; 8, Social Service; 9, Clerical; and V, Validity. These stencils were punched so that when they were properly placed over an answer sheet, the number of blacked-in spaces could be counted as the raw score for that category. By means of a slit in the stencil, the score could be immediately recorded on the answer sheet in the appropriate place.

Estimating a theoretical percentile distribution. -- In order to see approximately how the scores were coming out, and in order to see how a theoretical distribution would look, the mean, standard deviation, and percentile score for each raw score were computed on a theoretical basis. One might say this would represent the true percentile distribution of those answering merely by chance. The estimate was made on the basis of a binomial distribution to procure the mean and standard

deviation, and the results were then fitted to a normal curve of frequency distribution for the percentile scores. This theoretical percentile distribution is presented in Table I.

TABLE I. THEORETICAL PERCENTILE SCORES FOR THE BERG NON-VERBAL INTEREST INVENTORY, BASED ON A BINOMIAL DISTRIBUTION

Raw Score	Percentile Score	Raw Score	Percentile Score
27	99+	13	43
26	99+	12	28
25	99+	11	16
24	99+	10	8
23	99+	9	3
22	99+	8	2
21	99+	7	1
20	99	6	1-
19	98	5	1-
18	96	4	1-
17	92	3	0
16	84	2	0
15	72	1	0
14	57	0	0

Table I presents the theoretical percentile scores arrived at by taking the mean raw score at 13.5. The standard deviation is given by the binomial formula $\sigma = \sqrt{Npq}$, where Np is the mean and $q = 1$. The standard deviation comes out to be 2.46, and the scores of Table I are derived from the formula for the area under the normal curve[3].

[3] $A = \int_0^t \phi(t)dt$ where $\phi(t) = \frac{1}{\sqrt{2}} e^{-\frac{1}{2}t^2}$.

Determining the true percentile distribution. -- The theoretical percentile scores, while valuable for a quick view of the tendencies of the scores in general, were not at all adequate for determining the individual's true status in the testing population with respect to the several categories and so it became necessary that the true percentile distributions for each sex within each category be determined. This was done by determining the number of boys and the number of girls who got a particular score on the test, arranging them in a cumulative pattern, and with a slide rule, determining the percentile rating of each score.

The validity score. -- In building an inventory of this nature, it was felt desirable to have some way of checking on the consistency of responses. For that reason, the validity scale was set up. Thus far it is merely a subjective device for checking consistency. It was developed in three ways: first, by selecting occupations that most people would not ordinarily choose and comparing them with others that they would be more likely to prefer; second, by repeating two pairs each in reversed order; and third, by drawing on similar pairs with respect to category and watching for consistency.

The validity stencil was colored so that there would be one color for each category represented. Upon reviewing the arrangement of the colors and the preferences, and after comparing those preferences with the raw scores of each category,

a fair estimate could be made of the validity of the test.

There is little doubt but that this measure can be vastly improved and objectified. However, it does not seem at all wise to attempt it until an item analysis has been completed and the test itself improved. Until such time as the score is improved, though, it might well be the only means whatever of checking for carelessness, fabrication, and indifference any one of which will render valueless this or any other test.

Recording the data. -- The use of three by five inch cards for recording data has previously been mentioned[4]. Two types of cards were used to record the test results. One type was used to record by categories: 1) the raw scores on the Kuder Preference Record, 2) the percentile scores on the Kuder Preference Record, 3) the raw scores on the Non-Verbal Interest Inventory, and 4) the true percentile scores on the Non-Verbal Interest Inventory. The other type was used only for those people who were tested and retested with the Non-Verbal Interest Inventory and recorded by categories: 1) the raw scores on the Non-Verbal Interest Inventory for each testing, 2) the theoretical percentile scores on the Non-Verbal Interest Inventory for each testing, and 3) the true percentile scores on the Non-Verbal Interest Inventory for each testing. All cards bore the name of the testee, the home room number, and the bright red initial B for boys or G for girls. All

---

[4] See page 30.

recording, of course, was done with two objects in mind: first, the development of the true percentile norms, and second, the facilitation of the first step in the correlations to be made.

CHAPTER IV

ANALYZING AND INTERPRETING THE RESULTS

Introductory. -- Having developed the plan and the instrument; having administered the test and established some basic norms; and having assembled and recorded the data, we may now set about evaluating the instrument. This is done by computing the coefficient of reliability, arrived at by obtaining the coefficient of correlation between the tests as given for the first time and the retests after a certain length of time has elapsed; computing the coefficients of correlation between the Non-Verbal Interest Inventory and a standard instrument in the field[1], by categories; and deriving the standard error and the probable error of each coefficient.

Correlation procedures. -- All correlations were done by means of Durost-Walker Correlation Charts[2]. These charts were chosen because they not only facilitate the computation of Pearson product-moment coefficients of correlation, but also because they furnish checks at frequent intervals, thus enabling the computer to present his figures with absolute confidence as to their accuracy.

The following correlations were made: 1) reliability; 2) ten correlations with the Kuder Preference Record according

---

[1] See pages 14 and 28.

[2] Durost, W.N., and Walker, H.M., Durost-Walker Correlation Chart.

to categories[3], for boys; and 3) ten correlations with the Kuder Preference Record according to categories, for girls.

Reliability correlations were made by correlating the raw scores made by the individuals, irrespective of sex and category, with the corresponding raw scores made by the same individuals on the retest.

The correlations with the Kuder Preference Record were made by correlating the percentile scores made on that instrument with the corresponding true percentile scores made on the Non-Verbal Interest Inventory, within an interval of five percentiles, for each individual. These correlations were broken down by sex and by category.

The formula for the Pearson product-moment coefficient of correlation is $r = \frac{\Sigma X_i Y_i}{N\sigma_x\sigma_y}$. An equivalent formula for this coefficient is given by $r = \frac{\sigma_x^2/\sigma_y^2 - \sigma_{y-x}^2}{2\sigma_x\sigma_y}$. In these formulae, r represents the coefficient of correlation, X_i and Y_i represent the product moments of the X and Y scores respectively, N represents the number of scores (the population), σ represents the standard deviation, and the subscripts indicate the sets to which the standard deviation refers.

The formula by which we may find the standard error

---

[3] See page 14.

of the coefficient of correlation is $\sigma_r = \frac{1 - r^2}{\sqrt{N}}$, where σ_r represents the standard error of the coefficient.

The probable error of the coefficient of correlation is obtained by multiplying the standard error by .6745.

Reliability. -- The coefficient of reliability was obtained by securing 11 students who had taken the test on the first day it was given, and readministering the test to them. These 11 students were chosen so as to get an approximately even number of boys and girls, and these particular ones were chosen simply because their programs made it convenient for them. At no time until the day before the retest did the students know that they would be recalled, and not until they arrived did they know that they would take the test again.

The population for the reliability check consisted of six boys and five girls, each of whom obtained ten numerical scores each time the test was taken. It was felt proper to dispense with the sex factor in establishing reliability, and so there was no differentiation made on that count. With this arrangement, the number of items to be correlated was 110.

The correlation yielded a coefficient of .891, with a standard error of .0216 and a probable error of .0145. These figures suggest that the test is reliable with a good degree of consistency. Perhaps after an item analysis has been performed, this figure may be improved.

It was interesting to note that of the 11 students tested, three scored a valid rating, three scored an invalid rating, and the other five scored as doubtful, the first time they took the test. Thus this reliability coefficient must be regarded as a conservative estimate of reliability, inasmuch as the proportion of invalid tests was abnormally high in the sample.

Validity. -- Table II represents the first effort to measure validity, by correlating the scores on this test with those of the Kuder Preference Record.

TABLE II. COEFFICIENTS OF CORRELATION BETWEEN THE BERG NON-VERBAL INTEREST INVENTORY AND THE KUDER PREFERENCE RECORD, FORM C, FOR BOYS AND GIRLS, TOGETHER WITH THE STANDARD ERROR AND THE PROBABLE ERROR OF EACH COEFFICIENT

	Boys			Girls		
Category	r	σ_r	P.E.	r	σ_r	P.E.
0. Outdoors	.532	.0889	.0599	.436	.0813	.0548
1. Mechanical	.675	.0674	.0454	.357	.0930	.0627
2. Computational	.519	.0906	.0611	.425	.0873	.0588
3. Scientific	.503	.0926	.0624	.558	.0733	.0494
4. Persuasive	.617	.0760	.0517	.414	.0884	.0595
5. Artistic	.386	.1055	.0710	.591	.0700	.0492
6. Literary	.559	.0852	.0574	.359	.0929	.0626
7. Musical	.540	.0878	.0591	.629	.0644	.0434
8. Social Service	.600	.0794	.0535	.351	.0935	.0630
9. Clerical	.561	.0850	.0573	.764	.0444	.0299

The range of correlation coefficients in Table II runs from .386 to .675 for the boys, and from .351 to .764 for the

girls. This table was based on the scores of 65 boys and 88 girls who took the test. It did not include any retests.

The arithmetic mean of coefficients for the boys is .5592; the mean for the girls is .4884. This indicates just about the result one would expect— that the test is geared slightly more to the interests of boys than of girls. The boys' coefficients seem to be more compact; the girls' coefficients cover a wider range and are more widely scattered. This would suggest that the boys' interests, at least as compared with the interests acknowledged on the Kuder Preference Record, are slightly more stable than those of the girls. This, however, need not necessarily be the case inasmuch as the population was weighted somewhat more heavily in favor of the girls.

If one takes as significant a difference in the value of the coefficient of correlation of .100 or greater between the sexes on each category, then he finds a stronger correlation with the Kuder Preference Record for the boys in the categories: Mechanical, Persuasive, Literary, and Social Service. The stronger correlation rests with the girls in the categories: Artistic and Clerical. And there is no significant difference in the strength of the correlations in the categories: Outdoors, Computational, Scientific, and Musical.

Table III presents the mean coefficients of correlation between the two tests irrespective of sex, but seriated according to the rank order of the categories.

TABLE III. MEAN COEFFICIENTS OF CORRELATION BETWEEN THE BERG NON-VERBAL INTEREST INVENTORY AND THE KUDER PREFERENCE RECORD, FORM C, ACCORDING TO RANK ORDER OF CATEGORIES

Category	$r_B \neq r_G$	$\frac{r_B \neq r_G}{2}$
9. Clerical	1.325	.663
7. Musical	1.169	.585
3. Scientific	1.061	.531
1. Mechanical	1.032	.516
4. Persuasive	1.031	.516
5. Artistic	.977	.489
0. Outdoors	.968	.484
8. Social Service	.951	.476
2. Computational	.944	.472
6. Literary	.918	.459

By summing the coefficients of correlation in each category, and then taking the arithmetic mean, the strength of the correlation in each category may be serially observed. Table III presents such a rank grouping. From this table it is observed that the Clerical, Musical, and Scientific scales are best correlated, indicating that both tests tend to measure these interests in the same way, whereas there is not so much agreement on the Social Service, Computational, and Literary scales. Indeed, the mean of these mean coefficients is .519, with a standard deviation of .060. This would place the Clerical score more than two standard deviations above the mean; it would place the Musical score more than one standard deviation above the mean; and it would place the Literary score exactly one standard deviation below the mean, with all other scores

falling within one standard deviation of the mean.

If it were assumed that the Kuder Preference Record is perfectly valid, which it probably is not, and if it were further assumed that its arrangement of items was by far the best set of items predicting true vocational interests, which is yet more improbable, then this test would be of dubious value. Inasmuch as the Kuder Preference Record must be considered as valid for the purposes of comparison, there are differences that are fundamental between the tests that must make any correlation between them understandably smaller, though still positive.

The greatest difference, probably, is that every item on the Non-Verbal Interest Inventory pictures a person at work in a specific occupation. The items on the Kuder Preference Record do not always involve actual vocational labor, but oftentimes avocational occupations. Then again, the Kuder Preference Record suggests by the written word a mental image which has been previously formed in the mind of the testee— a picture, as it were, long since formed in the light of the testee's knowledge, experiences, and prejudices. The Non-Verbal Interest Inventory, however, presents a ready image to the mind which may cause a comparison with the image already formed, and render judgment more deliberate.

Evaluating the category groups. -- In order to lay the groundwork for the improvement of the pictures within each category, it becomes necessary first to understand the strengths and weaknesses of the several categories as they now exist.

The Outdoors group had an advantage in that there could be no doubt about the inclusion of that common factor in all the occupations presented; however, there are few occupations that may be classified as purely outdoor activities. There are many occupations, for example selling, where the worker is primarily outdoors but which cannot be typified in a test such as this because of conflict with other categories. Thus many of the outdoors occupations were not too demanding in the amount of skill involved. This fault may be overcome by a revised form of the test with a system of weighting the responses so that due emphasis may be given to all the categories represented in the occupation (of course, it is understood that the best items are those which discriminate the most between one category and all others; yet it must be realized that in cases such as this, a better picture can be obtained by using certain well-chosen combinations than by using the pure category method, inasmuch as most occupations draw upon many categories other than the predominating one first thought of in connection with that occupation).

The Mechanical group did not correlate quite as highly as might have been presupposed. Perhaps one of the reasons

for this was the categorical separation that was found bothersome with the Outdoor group. Certainly, high mechanical skills are an essential attribute of engineers who are daily adding to the world's technological knowledge. More items are needed here and more integration is needed with the other categories. Item analysis should prove moderately helpful here but it cannot be likely to improve the scale much by itself.

To the subjective observer, the Computational group would be the most likely to vary from the computational category of the Kuder Preference Record. This is due to the fact that the computational category of that instrument is based upon interest in theoretical mathematics and associated skills, whereas this test bases its classification on the use of calculating machines and associated skills, not to the exclusion of theoretical work but on a more practical base. The criticism may be made that the use of calculating machines involves clerical skills rather than computational skills. To some extent, this is based on definition. But it seems clear, on second sight, that to operate any kind of computational machine most effectively takes a good deal of knowledge of mathematical principles. Then too, the clerical worker may have tasks to perform: filing, taking dictation, copying, ordering, etc. while the person behind the adding machine usually does only one thing, and that is to work with numbers. In this age of machines, the days of long column addition as a routine are

practically over. This scale, then, can be improved only through item analysis and further correlative techniques.

The Scientific group correlated somewhat better than average. The chief difficulty here was the inability to give pictorial expression to the myriads of occupations that might be labeled as scientific. The only recourse for this edition was to select the most popular occupations dealing fundamentally in scientific and technological work. This scale can be improved by lengthening it to include other scientifically based occupations and, of course, by the item analysis.

There is little doubt that persuasive, as it applies to vocational interests, means selling. Selling oneself has come to be a universal prerequisite to any type of vocation. Therefore, the Persuasive group has been based largely on selling and advertising of all forms. This is another scale that can be improved only by item analysis. A quantitative increase in the number of pictures should not by itself prove too valuable.

The Artistic group seemed to measure more consistently with girls than with boys. The reasons for this should be brought out by an item analysis. Here again, art is applied to vocational interests to a far greater extent than it is to avocational interests and youthful pursuits as it is on the Kuder Preference Record. The value of this scale can be appreciated only in the light of further study.

The Literary group fell lowest of all in strength of correlation with the Kuder Preference Record. The reason for this is fundamentally that it is difficult to obtain enough good varied pictures to illustrate many occupations in this field that are predominantly literary. There is little doubt that of all the scales, this is the weakest. It can be improved somewhat by item analysis, but it will probably have to be completely revised before it can become as effective as one would like to have it.

The most clearly demarcated of all the groups is the Musical. This shows itself by a fairly high correlation as compared to the other categories, but again is somewhat higher for the girls. Perhaps this scale presents a view of a career in music more than does the verbal scale and thus is more valuable for the purpose. Item analysis may help, but the scale as it now stands appears to be good and stable.

The Social Service group appears to be much more stable for boys than for girls. Item analysis should bring out the difficulty if there is one. Perhaps an increase in the quantity of occupation-types represented here would help. There is a need here too for a weighted response scale so that other categories might be integrated with social service. More study is needed of this group, especially in the fields of item analysis and the possibility of expanding the scale.

The best-correlated scale by far is the Clerical group which, like the Artistic and Musical groups, is much better correlated among the girls than with the boys. This would be expected inasmuch as the category is essentially built around the commercial program as offered by the high school, which, of course, is recognized as a girls' program. This scale also may be improved by item analysis, but it is presently evident that it measures on the whole just about what the Kuder Preference Record measures, for the girls at least.

On the whole, the indications are that the test does measure what the Kuder Preference Record attempts to measure, although perhaps not to the degree which one would prefer. There is evidence that the two instruments are attempting to measure the same thing in different ways, and so the results in that case could not be expected to be much greater.

Inasmuch as the Validity scale has already been discussed[4] there is no need to discuss it further, except to point out that it might well be objectified after the rest of the test is improved.

Testing adults and students not of this validating group. -- The author had the privilege of testing several persons other than the group used in validating the test. In all cases, the results were highly satisfactory. One adult tested

---

4 See page 34.

showed unmistakable signs of an interest in engineering and a side interest in music. This individual, it turned out, had worked with an engineering firm in earlier days and had left it only because an opportunity arose for him to earn a much better living in a closely related occupation. His wife was ignorant of the music interest, but he hastened to assure her that the test was perfectly correct in its results.

In another case, a high school senior took the test as a joke, more or less. She confided that she had taken the Kuder Preference Record and the results had been most unsatisfactory. When she finished this test, she agreed that the results were very accurate with but one minor exception.

The other cases were less spectacular, but nevertheless important as they showed that the test was valid for the people thus tested. In those few cases where the Kuder Preference Record was also taken, the results were generally in line on both. In those cases where the results did vary, the testee nearly every time chose the Non-Verbal Interest Inventory as the more accurate of the two[5].

Reactions to the test. -- It was mentioned before[6] that at the time the test was administered, the testees were asked to comment briefly on both instruments. Some of the comments

---

[5] In all fairness, it must be explained that in some cases the Kuder had been given several months earlier.

[6] See page 31.

were flatly opposed to others, but inasmuch as they represented the opinions of the individuals they were valid. The author at no time indicated to the students that he was seeking to validate his test, but stressed that he wanted strictly honest answers to the questions asked.

The students as a whole seemed to feel that the Kuder Preference Record was more complete than the other, but that the Non-Verbal Interest Inventory was more interesting to take. Some felt that the occupations on the Non-Verbal test were not varied enough— an excellent criticism. Some felt that the surroundings influenced the choice too much. Criticisms were made (but not many) of the bulkiness of the test and the danger of turning two pages at once. Some had difficulty in distinguishing what certain workers were doing. Several expressed the viewpoint that they thought it was an excellent test. Many felt that this test was shorter and hence less fatiguing. A few felt that the occupation could be more easily visualized by means of the pictures than by words. Some resented the forced choice. A few expressed the feeling that the test was less boring than the other. One girl felt that this test was too long. Several claimed that this test made more sense than the other. Nearly all the students felt that seeing the occupations not only made the test more interesting, but gave them something to think about before answering. A few thought that it was confusing because the pictures were repeated. Some felt

that it was easier to choose between two pictures than three verbal expressions.

In general, these comments were repeated over and over again. While a great many felt that the Kuder Preference Record offered a wider range to choose from, nearly all concurred in saying that the Non-Verbal Interest Inventory was by far more interesting and especially valuable in presenting a tangible pictorial representation of otherwise vague terms[7]. Thus it appears that this type of test is preferred by the students, and steps should be taken to take advantage of this natural reaction so that this type of instrument may be used with more confidence and more validity.

---

[7] See Assumption 3, page 13.

CHAPTER V

CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Conclusions. -- Having explained the nature of the problem, described the plan and the structure of the instrument, established the norms on a sample population, measured the validity and reliability of the test, and ascertained some of the reactions to it, one is now in a position to form some general conclusions as to the value of the test.

Certainly, there is no doubt but that the test is merely a start in the direction of measuring interests with non-verbal techniques; there is no doubt but that the test may be improved, revised, and improved again. But there appears to be little doubt that the results of this first attempt have value and are worth developing to the fullest. The correlations have indicated a fairly high degree of reliability (the Kuder reliabilities run from .84 to .92) and the coefficients of correlation between this test and the Kuder Preference Record have all been significantly positive.

But the greatest satisfactions are now in the offing. This instrument has been designed not for those who can benefit from verbal instruments, but for those for whom this may be the only feasible evaluator of their interests— for those whose reading ability is deficient— for those who have great difficulty with the English language. In the hands of these people will the ultimate value of this instrument and those to follow it be decided.

Suggestions for further research. -- The results of this instrument have clearly indicated the need for a thorough item analysis. This is the only step that should next be taken. Following that, the test should be revised, its form improved, and perhaps its structure. The test should then be administered to a large sample of students and adults of all levels, but particularly the high school and junior college levels, in a new attempt to measure the reliability.

Validity studies should be continued. This instrument and its successors should be measured against all the major interest inventories on the market and against persons who have attained satisfaction in their chosen vocations.

And last of all, continuous attempts should be made to revitalize the program of measuring interests to the end that it becomes more and more meaningful to the testee and the results become more and more valuable as indicators of the best paths to human satisfactions.

BIBLIOGRAPHY

BIBLIOGRAPHY

Adkins, D.C., and Kuder, G.F., "The Relation between Primary Mental Abilities and Activity Preferences", Psychometrika 5:251-262, 1940.

Allen, E.P., and Smith, P., The Value of Vocational Tests as Aids to Choice of Employment, City of Birmingham Education Committee, Birmingham, England, 1940.

Altus, W.D., and Mahler, C.A., "Significance of Verbal Aptitude in the Type of Occupation Pursued by Illiterates", Journal of Applied Psychology 30:155-160, 1946.

Arthur, Grace, A Point Scale of Performance Tests, The Commonwealth Fund, Division of Publications, New York, 1930.

Baldwin, G. Bernard, The Motivation Indicator, Educational Test Bureau, Philadelphia, 1947.

Bedell, R., "The Relationship between Self-Estimated and Measured Vocational Interests", Journal of Applied Psychology 25:54-66, 1941.

Bellows, R.M., "Procedures for Evaluating Vocational Criteria", Journal of Applied Psychology 25:499-513, 1941.

Berdie, R.F., "Factors Associated with Vocational Interests", Journal of Educational Psychology 34:257-277, 1943.

"Factors Related to Vocational Interests", Psychology Bulletin 41:137-157, 1944.

"Likes, Dislikes, and Vocational Interest", Journal of Applied Psychology 27:180-189, 1943.

Billett, Roy O., Fundamentals of Secondary School Teaching, Houghton Mifflin Co., The Riverside Press, Cambridge, Mass., 1940, pp. 592-593.

Bolanovich, D.J., and Goodman, C.H., "A Study of the Kuder Preference Record", Educational and Psychological Measurement 4:315-325, 1944.

Bordin, E.S., "A Theory of Vocational Interests as Dynamic Phenomena", Educational and Psychological Measurement 3:46-66, 1943.

BIBLIOGRAPHY (cont.)

Borow, H., "Growth and Present Status of Occupational Testing", Journal of Consulting Psychology 8:70-79, 1944.

Brainard, Paul P., and Brainard, Ralph T., The Brainard Occupational Preference Inventory, Form A, The Psychological Corporation, New York, 1945.

Brody, Leon, "Comparable Tests of Verbal and Non-Verbal Reasoning", Journal of Educational Psychology 31:180-194, 1940.

Burnham, P.S., "Stability of Interests", School and Society 55:332-335, 1942.

Buros, Oscar K. (editor), The 1940 Mental Measurements Yearbook, The Mental Measurements Yearbook, Highland Park, N.J., 1941.

The Third Mental Measurements Yearbook, Rutgers University Press, New Brunswick, N.J., 1948.

Canning, L., et al., "Permanence of Vocational Interests of High School Boys", Journal of Educational Psychology 32:481-494, 1941.

Carter, H.D., and Jones, Mary C., "Vocational Attitude Patterns in High School Students", Journal of Educational Psychology 29:321-334, 1938.

Carter, H.D., and Strong, E.K., "Sex Differences in the Occupational Interests of High School Students", Personnel Journal 12:166-175, 1933.

Carter, H.D.; Taylor, K.V.F.; and Canning, L.B., "Vocational Choices and Interest Test Scores of High School Students", Journal of Psychology 11:297-306, 1941.

Cattell, Raymond B., "A Culture-Free Intelligence Test, I", Journal of Educational Psychology 31:161-179, 1940.

Chambers, E.G., "The Kuder Preference Record", The Third Mental Measurements Yearbook by O.K. Buros, ed., Rutgers University Press, New Brunswick, N.J., 1948.

BIBLIOGRAPHY (cont.)

Christensen, T.E., "Some Observations with Respect to the Kuder Preference Record", Journal of Educational Research 40:96-107, 1946.

Congdon, N.A., "A Study of Cleeton's Vocational Interest Inventory", Occupations 18:347-352, 1940.

Crosby, R.C., and Winsor, A.L., "The Validity of Students' Estimates of Their Interests", Journal of Applied Psychology 25:408-414, 1941.

Darley, John G., Clinical Aspects and Interpretation of the Strong Vocational Interest Blank, The Psychological Corporation, New York, 1941.

Testing and Counseling in the High School Guidance Program, Science Research Associates, Chicago, 1943.

Dreese, Mitchell, and Mooney, Elizabeth, Interest Inventory for Elementary Grades, Center for Psychological Service, George Washington University, Washington, D.C., 1941.

Durost, Walter N., and Walker, Helen M., Durost-Walker Correlation Chart, World Book Co., Yonkers-on-Hudson, N.Y., 1937.

Edds, Jess H., "The Nature of Verbal and Non-Verbal Abilities", Journal of Experimental Education 3:225-229, 1935.

Flanagan, John C., Measuring Interests, Advisory Service Bulletin #4, Cooperative Testing Service, New York, 1940.

Frandsen, A., "Appraisal of Interests in Guidance", Journal of Educational Research 39:1-12, 1945.

Fryer, Douglas, The Measurement of Interests, Henry Holt and Co., New York, 1931.

Garretson, Oliver K., and Symonds, Percival M., Interest Questionnaire for High School Students, The Teachers' College, Columbia University, New York, 1942.

Gilger, G.A., "Declaration of Vocational Interest", Occupations 20:276-279, 1942.

BIBLIOGRAPHY (cont.)

Gordon, H.C., and Herkness, W.W., "Do Vocational Interest Questionnaires Yield Consistent Results?", Occupations 20:424-429, 1942.

"Pupils Appraise Vocational Interest Blanks", Occupations 20:100-102, 1941.

Hahn, Milton E., "Notes on the Kuder Preference Record", Occupations 23:467-470, 1945.

Healy, W., "A Pictorial Completion Test", Psychological Review 21:189-203, 1914.

Keys, Noel, "Measurement of Interest and Personality", Occupations 12:58-66, 1934.

Kitson, H.D., "Can We Predict Vocational Success?", Occupations 26:539-541, 1948.

Kopp, T., and Tussing, L., "The Vocational Choices of High School Students as Related to Scores on Vocational Interest Inventories", Occupations 25:334-339, 1947.

Kuder, G. Frederic, The Kuder Preference Record, Form B, Science Research Associates, Chicago, 1942 (Manual revised 1946).

The Kuder Preference Record, Form C, Science Research Associates, Chicago, 1948 (Manual published 1949).

"Note on 'Classification of Items in Interest Inventories'", Occupations 22:484-487, 1944.

"The Stability of Preference Items", The Journal of Social Psychology 19:41-50, 1939.

"The Use of Preference Measurement in Vocational Guidance", The Educational Record 29:65-76, 1948.

Laleger, Grace E., The Vocational Interests of High School Girls, Teachers' College, Columbia University, New York, 1942.

Lee, Edwin A., and Thorpe, Louis P., Occupational Interest Inventory, Advanced, California Test Bureau, Hollywood, Calif., 1944.

BIBLIOGRAPHY (cont.)

Lehman, H.C., and Witty, P.A., "Vocational Counseling— the Interest Inventory", American Journal of Psychology 44:801-805, 1932.

Lurie, W.A., and Weiss, A., "Analyzing Vocational Adjustment", Occupations 21:138-142, 1942.

Maller, J.B., and Glaser, Edward M., Interest-Values Inventory, Bureau of Publications, Teachers' College, Columbia University, New York, 1943.

McCarthy, Margaret M., A Comparison of Interests as Determined by the Kuder Preference Record with Interests as Determined by the Pupil Activity Record, Unpublished Ed.M. Thesis, Boston University, School of Education, Boston, 1949, pp. 169-171.

Moffie, D.J., "Validity of Self-Estimated Interest", Journal of Applied Psychology 26:606-613, 1942.

Murphy, Laura W., "The Relation between Mechanical Ability Tests and Verbal and Non-Verbal Intelligence Tests", The Journal of Psychology 2 (second half):353-366, 1936.

Nelson, E., and Nelson, N., "Students' Attitudes and Vocational Choices", Journal of Abnormal and Social Psychology 35:279-282, 1940.

Older, H.J., "An Objective Test of Vocational Interests", Journal of Applied Psychology 28:99-108, 1944.

Paterson, D.G., "Vocational Interest Inventories in Selection", Occupations 25:152-153, 1946.

Peters, E.F., "Vocational Interests as Measured by the Strong and Kuder Inventories", School and Society 55:453-455, 1942.

Pintner, R., "Comparison of Interests, Abilities, and Attitudes", Journal of Abnormal and Social Psychology 27:351-357, 1933.

Pritchard, John W., "Motor Performance as a Chance Factor in Test Scores", Journal of Educational Research 37:181-192, 1942.

BIBLIOGRAPHY (cont.)

Prosser, C.A., Selecting an Occupation, McKnight and McKnight, Bloomington, Ill., 1945.

Sarbin, T.R., and Berdie, R.F., "Relation of Measured Interests to the Allport-Vernon Study of Values", Journal of Applied Psychology 24:287-296, 1940.

Schaefer, B.R., "The Validity and Utility of the Allport-Vernon Study of Values Test", Journal of Abnormal and Social Psychology 30:419-422, 1936.

Stefflre, B., "The Reading Difficulty of Interest Inventories", Occupations 26:95-96, 1947.

Steinmetz, H.C., "Measuring Ability to Fake Occupational Interest", Journal of Applied Psychology 16:123-130, 1932.

Strong, Edward K., Jr., Change of Interest with Age, Stanford University Press, Palo Alto, Calif., 1931.

"Permanence of Vocational Interests", Journal of Educational Psychology 25:336-344, 1934.

"Predictive Value of the Vocational Interest Test", Journal of Educational Psychology 26:331-349, 1925.

"The Role of Interests in Guidance", Occupations 27:517-522, 1949.

Vocational Interest Blank for Men (Revised), Form M, Stanford University Press, Stanford, Calif., 1938.

Vocational Interest Blank for Women (Revised), Form W, Stanford University Press, Stanford, Calif., 1947.

Vocational Interests of Men and Women, Stanford University Press, Stanford, Calif., 1943.

"Weighted versus Unit Scales", Journal of Educational Psychology 36:193-216, 1945.

Strong, Edward K., Jr., and Carter, H.D., "The Vocational Interest Test", Occupations 12:49-56, 1934.

BIBLIOGRAPHY (cont.)

Super, Donald E., Appraising Vocational Fitness, Harper and Bros., New York, 1949.

"The Kuder Preference Record in Vocational Diagnosis", Journal of Consulting Psychology 11:184-193, 1947.

"Strong's 'Vocational Interests of Men and Women': a Special Review", Psychology Bulletin 42:359-370, 1945.

"Vocational Interest and Vocational Choice", Educational and Psychological Measurement 1:253-268, 1941; also 7:375-384, 1947.

Super, Donald E., and Roper, S., "An Objective Technique for Testing Vocational Interests", Journal of Applied Psychology 25:487-498, 1941.

Taylor, K.V.F., "Reliability and Permanence of Vocational Interests of Adolescents", Journal of Experimental Education 10:81-87, 1942.

Taylor, K.V.F., and Carter, H.D., "Retest Consistency of Vocational Interest Patterns", Journal of Consulting Psychology 6:95-101, 1942.

Thorndike, E.L., Adult Interests, The Macmillan Co., New York, 1935.

Thurstone, L.L., Thurstone Interest Schedule, The Psychological Corporation, New York, 1947.

Traxler, A.E., "Note on the Reliability of the Revised Kuder Preference Record", Journal of Applied Psychology 27:510-511, 1943.

Triggs, F.C., "A Study of the Relation of Kuder Preference Record Scores to Various Other Measures", Educational and Psychological Measurement 3:341-354, 1943.

Trow, W.C., "Phantasy and Vocational Choice", Occupations 20:89-93, 1941.

Van Dusen, A.C., "Permanence of Vocational Interests", Journal of Educational Psychology 31:401-424, 1940.

BIBLIOGRAPHY (conc.)

Vernon, Philip E., and Allport, Gordon W., A Study of Values, Houghton Mifflin Co., Cambridge, Mass., 1931.

"A Test for Personal Values", Journal of Abnormal and Social Psychology 26:231-248, 1931.

Wightwick, M.D., Vocational Interest Patterns, number 900, Teachers' College Contributions to Education, Columbia University, New York, 1945.

APPENDIX

BERG NON-VERBAL INTEREST INVENTORY

Directions for Administration

Using the Answer Sheets.

Set the test book on a large desk or table. Set an answer sheet beside it or distribute them to the class together, if given in a group setting. Supply the testees with an I.B.M. or a number one pencil. When all the examinees are seated, read the following directions aloud:

NO DOUBT YOU ARE CURIOUS ABOUT THIS BOOK IN FRONT OF YOU. OPEN IT UP— YOU SEE THAT IT CONTAINS A SET OF PICTURES, TWO ON EACH PAGE. THE PICTURES SHOW PEOPLE WORKING AT DIFFERENT JOBS.

NOW THIS IS NOT A TEST IN THE USUAL SENSE BECAUSE THERE ARE NO WRONG ANSWERS IF YOU ANSWER AS WELL AS YOU CAN. YOU ARE TO LOOK AT EACH PAGE CAREFULLY, AND DECIDE WHICH JOB YOU WOULD RATHER DO IF YOU ABSOLUTELY HAD TO CHOOSE ONE OF THEM. IF YOU CHOOSE THE TOP PICTURE ON PAGE ONE, MAKE A MARK ON YOUR ANSWER SHEET OPPOSITE THE NUMBER ONE IN THE LEFT COLUMN; IF YOU CHOOSE THE BOTTOM PICTURE, MAKE A MARK ON YOUR ANSWER SHEET IN THE RIGHT COLUMN. ANSWER THIS WAY UNTIL YOU FINISH.

PAY NO ATTENTION TO WHETHER YOU FEEL YOU CAN DO THE JOB OR NOT; THE IMPORTANT THING IS, WOULD YOU WANT TO DO IT IF YOU HAD THE ABILITY AND THE TRAINING. PAY NO ATTENTION TO WHETHER THE PERSON WORKING IS A MAN OR A WOMAN, YOUNG OR OLD, WORKING ALONE OR WITH OTHERS. REMEMBER THAT IN EVERY PICTURE, SOMEONE IS WORKING.

THERE IS NO TIME LIMIT, BUT YOU SHOULD BE FINISHED IN LESS THAN FORTY MINUTES. ARE THERE ANY QUESTIONS?

Answer all pertinent questions, here and during the test.

ALL RIGHT, GO AHEAD. BE SURE TO ANSWER EVERY ITEM.

During the test, the examiner should check each individual to see that he is answering properly. Absolute silence should be maintained.

BERG NON-VERBAL INTEREST INVENTORY

New Directions for Administration

A. Using the Answer Sheets.

Set the test book on a large desk or table. Set an answer sheet beside it or distribute them to the class together if given in a group setting. Supply the testees with an I.B.M. or a number one pencil. When all the examinees are seated, have them fill out the information called for on the answer sheet (name, grade, school, home room number, age, and the date; have the examiner fill in the space on handicaps if any exist) if they are able to do so. When all have finished, read the following directions aloud:

NO DOUBT YOU ARE CURIOUS ABOUT THIS BOOK IN FRONT OF YOU. OPEN IT UP— YOU SEE THAT IT CONTAINS A SET OF PICTURES, TWO ON EACH PAGE. THE PICTURES SHOW PEOPLE WORKING AT DIFFERENT JOBS.

NOW THIS IS NOT A TEST IN THE USUAL SENSE BECAUSE THERE ARE NO WRONG ANSWERS IF YOU ANSWER AS WELL AS YOU CAN. YOU ARE TO LOOK AT EACH PAGE CAREFULLY, AND DECIDE WHICH JOB YOU WOULD RATHER DO IF YOU ABSOLUTELY HAD TO CHOOSE ONE OF THEM. YOU MAY LIKE BOTH JOBS, OR DISLIKE BOTH JOBS, BUT YOU MUST CHOOSE ONE THAT YOU LIKE BETTER THAN THE OTHER. IF YOU CHOOSE THE TOP PICTURE ON PAGE ONE, MAKE A MARK ON YOUR ANSWER SHEET OPPOSITE THE NUMBER ONE IN THE LEFT COLUMN; IF YOU CHOOSE THE BOTTOM PICTURE, MAKE A MARK ON YOUR ANSWER SHEET IN THE RIGHT COLUMN. ANSWER THIS WAY UNTIL YOU FINISH.

If this test is to be given to a group, it may help to draw a picture of the first few items of the answer sheet on the blackboard, thus showing pictorially how to answer the questions. Then continue:

PAY NO ATTENTION TO WHETHER YOU FEEL YOU CAN DO THE JOB OR NOT; THE IMPORTANT THING IS, WOULD YOU WANT TO DO IT IF YOU HAD THE ABILITY AND THE TRAINING. PAY NO ATTENTION TO WHETHER THE PERSON WORKING IS A MAN OR A WOMAN, YOUNG OR OLD, WORKING ALONE OR WITH OTHERS. REMEMBER THAT IN EVERY PICTURE, SOMEONE IS WORKING.

THERE IS NO TIME LIMIT, BUT YOU SHOULD FINISH IN ABOUT HALF AN HOUR. ARE THERE ANY QUESTIONS?

Answer all pertinent questions, here and during the test.

YOU MAY NOT UNDERSTAND WHAT SOME OF THESE WORKERS ARE DOING. JUST DO THE BEST YOU CAN UNDER THOSE CONDITIONS.

ALL RIGHT, GO AHEAD. BE SURE TO ANSWER EVERY ITEM.

During the test, the examiner should check each individual to see that he is answering properly. Absolute silence should be maintained. The testees may be dismissed when they have finished.

B. Using the Numbered Pads.

Set the test book on a large desk or table. Place an open box just above it and another just below it. Set the answer pad firmly in the holder and clip the holder to the back cover of the book so that the pad is exposed when the book is opened.

Record each testee's name, grade, school, home room number, the date, and all other pertinent information desired on a separate piece of paper. (Note that this form of the test may be administered to individuals or to a group. The group, however, should not number more than ten persons at a time so that adequate attention may be given to each testee.)

When all are ready to begin, read the following directions aloud:

NO DOUBT YOU ARE CURIOUS ABOUT THIS BOOK IN FRONT OF YOU. OPEN IT UP— YOU SEE THAT IT CONTAINS A SET OF PICTURES, TWO ON EACH PAGE. THE PICTURES SHOW PEOPLE WORKING AT DIFFERENT JOBS.

NOW THIS IS NOT A TEST IN THE USUAL SENSE BECAUSE THERE ARE NO WRONG ANSWERS IF YOU ANSWER AS WELL AS YOU CAN. YOU ARE TO LOOK AT EACH PAGE CAREFULLY, AND DECIDE WHICH JOB YOU WOULD RATHER DO IF YOU ABSOLUTELY HAD TO CHOOSE ONE OF THEM. YOU MAY LIKE BOTH JOBS, OR DISLIKE BOTH JOBS, BUT YOU MUST CHOOSE ONE THAT YOU LIKE BETTER THAN THE OTHER. IF YOU CHOOSE THE TOP PICTURE ON THE FIRST PAGE, TEAR THE FIRST SHEET OFF YOUR ANSWER PAD AND PUT IT IN THE BOX ABOVE THE TEST BOOK; IF YOU CHOOSE THE BOTTOM PICTURE ON THE FIRST PAGE, TEAR THE FIRST SHEET OFF YOUR ANSWER PAD AND PUT IT IN THE BOX BELOW THE TEST BOOK.

The examiner should make certain that everyone understands these directions so far. Then he should continue:

PAY NO ATTENTION TO WHETHER YOU FEEL YOU CAN DO THE JOB OR NOT; THE IMPORTANT THING IS, WOULD YOU WANT TO DO IT IF YOU HAD THE ABILITY AND THE TRAINING. PAY NO ATTENTION TO WHETHER THE PERSON WORKING IS A MAN OR A WOMAN, YOUNG OR OLD, WORKING ALONE OR WITH OTHERS. REMEMBER THAT IN EVERY PICTURE, SOMEONE IS WORKING.

YOU WILL NOTICE THAT EVERY FIFTH PAGE IN YOUR TEST BOOK HAS A BIG STAR PRINTED ON IT. LIKEWISE, EVERY FIFTH SHEET OF YOUR ANSWER PAD HAS A BIG STAR ON IT. MAKE SURE THAT EVERY TIME THE PAGE HAS A STAR, YOUR SHEET FOR THAT PAGE HAS A STAR TOO. IF THE STARS AT ANY TIME SHOULD NOT MATCH, SPEAK TO ME ABOUT IT AT ONCE.

THERE IS NO TIME LIMIT, BUT YOU SHOULD FINISH IN ABOUT HALF AN HOUR. ARE THERE ANY QUESTIONS?

Answer all pertinent questions, here and during the test.

YOU MAY NOT UNDERSTAND WHAT SOME OF THESE WORKERS ARE DOING. JUST DO THE BEST YOU CAN UNDER THOSE CONDITIONS.

ALL RIGHT, GO AHEAD. BE SURE TO ANSWER EVERY ITEM.

During the test, and especially at the beginning, the examiner should check each individual to see that he is answering properly. Absolute silence should be maintained. The testees may be dismissed when they have finished.

[illegible] NON-VERBAL INTEREST INVENTORY

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Yrs. Mo.) Sex Handicaps and Disabilities If Any

	T	B		T	B		T	B		T	B		T	B
1			25			49			73			97			121		
2			26			50			74			98			122		
3			27			51			75			99			123		
4			28			52			76			100			124		
5			29			53			77			101			125		
6			30			54			78			102			126		
7			31			55			79			103			127		
8			32			56			80			104			128		
9			33			57			81			105			129		
10			34			58			82			106			130		
11			35			59			83			107			131		
12			36			60			84			108			132		
13			37			61			85			109			133		
14			38			62			86			110			134		
15			39			63			87			111			135		
16			40			64			88			112			136		
17			41			65			89			113			137		
18			42			66			90			114			138		
19			43			67			91			115			139		
20			44			68			92			116			140		
21			45			69			93			117			141		
22			46			70			94			118					
23			47			71			95			119					
24			48			72			96			120					

	R	S	%-ile	
0.				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

BERG NON-VERBAL INTEREST INVENTORY

BOYS' PERCENTILE NORMS BASED ON A POPULATION OF 65 BOYS IN GRADE TEN OF A LARGE HIGH SCHOOL IN MASSACHUSETTS

Raw Score	0	1	2	3	4	5	6	7	8	9	Raw Score
27	99+	99+	99+	99+	99+	99+	99+	99+	99+	99+	27
26	99+	99+	99+	99+	99+	99+	99+	99+	99+	99+	26
25	98	98	99+	95	99+	99+	99+	99+	99+	99+	25
24	98	96	95	92	99+	99+	99+	98	99+	99+	24
23	98	93	90	87	99+	99+	99+	98	99+	99+	23
22	96	93	81	86	96	99+	98	96	99+	99+	22
21	89	92	73	81	93	96	92	93	99+	99+	21
20	89	89	70	75	92	96	90	93	98	95	20
19	83	86	61	61	86	95	87	92	95	89	19
18	78	80	52	50	83	95	78	92	92	84	18
17	73	75	46	43	73	90	78	89	90	78	17
16	69	69	38	29	70	83	73	89	86	69	16
15	67	66	29	23	56	75	69	86	78	66	15
14	64	56	20	20	50	72	64	81	75	60	14
13	61	52	12	16	44	60	52	78	58	52	13
12	60	49	7	13	36	49	49	72	47	44	12
11	56	44	3	10	30	38	35	66	44	38	11
10	52	43	1	6	23	29	32	58	36	35	10
9	40	41	1	3	20	24	23	56	26	29	9
8	32	33	0	0	9	10	15	52	16	21	8
7	30	29	0	0	6	9	6	46	7	16	7
6	21	24	0	0	3	3	4	38	4	15	6
5	18	15	0	0	0	3	0	35	4	6	5
4	7	12	0	0	0	1	0	27	0	3	4
3	7	7	0	0	0	1	0	19	0	3	3
2	4	3	0	0	0	0	0	9	0	0	2
1	3	0	0	0	0	0	0	7	0	0	1
0	1	0	0	0	0	0	0	1	0	0	0

BERG NON-VERBAL INTEREST INVENTORY

GIRLS' PERCENTILE NORMS BASED ON A POPULATION OF 88 GIRLS IN GRADE TEN OF A LARGE HIGH SCHOOL IN MASSACHUSETTS

Raw Score	0	1	2	3	4	5	6	7	8	9	Raw Score
27	99+	99+	99+	99+	99+	99+	99+	99+	99+	99+	27
26	99+	99+	99+	99+	99+	99+	99+	98	99+	95	26
25	99+	99+	99+	99+	99+	98	98	98	99+	92	25
24	99+	99+	99+	99+	99+	98	97	96	99+	90	24
23	99+	99+	98	98	99+	93	96	89	99+	87	23
22	96	98	95	94	99+	90	95	88	99+	84	22
21	96	98	95	93	95	81	94	85	99+	81	21
20	95	98	90	88	95	72	89	81	97	80	20
19	94	98	87	84	90	65	86	77	93	75	19
18	92	97	77	75	85	56	80	68	88	69	18
17	89	96	67	69	76	52	70	62	82	64	17
16	87	96	58	63	67	37	61	54	71	62	16
15	87	96	46	56	52	30	50	46	61	56	15
14	87	95	42	50	43	27	43	38	50	50	14
13	86	94	34	42	35	25	37	34	38	43	13
12	82	92	23	29	30	21	26	29	30	38	12
11	78	89	15	18	20	17	17	28	26	30	11
10	75	88	11	14	13	12	13	28	20	29	10
9	68	86	7	9	11	7	9	25	13	22	9
8	59	79	2	4	7	4	5	20	7	20	8
7	57	75	1	1	5	3	5	19	5	17	7
6	52	61	0	1	4	2	3	19	1	11	6
5	43	45	0	0	2	2	2	13	0	9	5
4	32	34	0	0	2	1	1	7	0	4	4
3	22	22	0	0	1	0	1	6	0	4	3
2	13	7	0	0	1	0	0	2	0	3	2
1	9	4	0	0	0	0	0	1	0	1	1
0	5	1	0	0	0	0	0	0	0	0	0

DARC NON-VERBAL INTEREST INVENTORY

0

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Yrs. Mo.) Sex Handicaps and Disabilities If Any

	T	B		T	B		T	B		T	B		T	B
1			25			49			73			97			
2			26			50			74			98			122		
3			27			51			75			99			123		
4			28			52			76			100			124		
5			29			53			77			101			125		
6			30			54			78			102			126		
7			31			55			79			103			127		
8			32			56			80			104			128		
9			33			57			81			105			129		
10			34			58			82			106			130		
11			35			59			83			107			131		
12			36			60			84			108			132		
13			37			61			85			109			133		
14			38			62			86			110			134		
15			39			63			87			111			135		
16			40			64			88			112			136		
17			41			65			89			113			137		
18			42			66			90			114			138		
19			43			67			91			115			139		
20			44			68			92			116			140		
21			45			69			93			117			141		
22			46			70			94			118					
23			47			71			95			119					
24			48			72			96			120					

	R	S	%-ile
0.	[redacted]		
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

1

BARG NON-VERBAL INTEREST INVENTORY

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Yrs. Mo.) Sex Handicaps and Disabilities If Any

	T	B		T	B		T	B		T	B		T	B
1	●	●	25			49			73			97	●	●
2			26			50	●		74			98		
3	●		27			51			75			99		
4			28			52			76			100		
5			29			53			77			101		
6			30			54	●		78			102		
7	●		31			55			79			103	●	
8			32			56			80			104		
9			33			57			81			105		
10			34			58			82			106		
11			35			59	●		83	●		107		
12		●	36		●	60			84			108		
13			37			61			85			109		
14			38	●		62			86			110		
15			39			63			87			111		
16			40			64			88			112		
17			41			65	●		89			113		
18		●	42			66			●			114		
19			43			67			91			115		
20			44			68			92			116	●	
21			45			69	●		93	●		117	●	
22	●		46		●	70			94			118	●	
23			47			71			95			119		
24			48			72			96			120	●	

	R	S	%-ile	
0.				
1.	[redacted]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

95

DARE NON-VERBAL INTEREST INVENTORY

2

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Mos. No.) Sex Handicaps and Disabilities If Any

	T	B		T	B		T	B		T	B		T	B
1			25			49			73			97		
2			26			50			74			98		
3			27			51			75			99		
4			28			52			76			100		
5			29			53			77			101		
6			30			54			78			102		
7			31			55			79			103		
8			32			56			80			104		
9			33			57			81			105		
10			34			58			82			106		
11			35			59			83			107		
12			36			60			84			108		
13			37			61			85			109		
14			38			62			86			110		
15			39			63			87			111		
16			40			64			88			112		
17			41			65			89			113		
18			42			66			90			114		
19			43			67			91			115		
20			44			68			92			116		
21			45			69			93			117		
22			46			70			94			118		
23			47			71			95			119		
24			48			72			96			120		

	R	S	%-ile	
0.				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

3

EARO NON-VERBAL INTEREST INVENTORY

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Mos. No.) Sex Handicaps and Disabilities If Any

	T	B		T	B		T	B		T	B		T	B
1			25			49			73			97		
2			26			50			74			98		
3			27			51			75			99		
4			28			52			76			100		
5			29			53			77			101		
6			30			54			78			102		
7			31			55			79			103		
8			32			56			80			104		
9			33			57			81			105		
10			34			58			82			106		
11			35			59			83			107		
12			36			60			84			108		
13			37			61			85			109		
14			38			62			86			110		
15			39			63			87			111		
16			40			64			88			112		
17			41			65			89			113		
18			42			66			90			114		
19			43			67			91			115		
20			44			68			92			116		
21			45			69			93			117		
22			46			70			94			118		
23			47			71			95			119		
24			48			72			96			120		

	R	S	%-ile	
0.				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

4

BERG NON-VERBAL INTEREST INVENTORY

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Yrs. Mo.) Sex Handicaps and Disabilities If Any

	T	B		T	B		T	B		T	B		T	B		T	B
1			25			49			73			97					
2			26			50			74			98			122		
3			27			51			75			99			123		
4			28			52			76			100			124		
5			29			53			77			101			125		
6			30			54			78			102			126		
7			31			55			79			103			127		
8			32			56			80			104			128		
9			33			57			81			105			129		
10			34			58			82			106			130		
11			35			59			83			107			131		
12			36			60			84			108			132		
13			37			61			85			109			133		
14			38			62			86			110			134		
15			39			63			87			111			135		
16			40			64			88			112			136		
17			41			65			89			113			137		
18			42			66			90			114			138		
19			43			67			91			115			139		
20			44			68			92			116			140		
21			45			69			93			117			141		
22			46			70			94			118					
23			47			71			95			119					
24			48			72			96			120					

	R	S	%-ile
0.			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

5

EDRC NON-VERBAL INTEREST INVENTORY

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Yrs. Mo.) Sex Handicaps and Disabilities if Any

	T	B		T	B		T	B		T	B		T	B
			25			49			73			97		
2			26			50			74			98	122	
3			27			51			75			99	123	
4			28			52			76			100	124	
5			29			53			77			101	125	
6			30			54			78			102	126	
7			31			55			79			103	127	
8			32			56			80			104	128	
9			33			57			81			105	129	
10			34			58			82			106	130	
11			35			59			83			107	131	
12			36			60			84			108	132	
13			37			61			85			109	133	
14			38			62			86			110	134	
15			39			63			87			111	135	
16			40			64			88			112	136	
17			41			65			89			113	137	
18			42			66			90			114	138	
19			43			67			91			115	139	
20			44			68			92			116	140	
21			45			69			93			117	141	
22			46			70			94			118		
23			47			71			95			119		
24			48			72			96			120		

	R	S	%-ile
0.			
1.			
2.			
3.			
4.			
5.	[redacted]		
6.			
7.			
8.			
9.			

6 79

BERG NON-VERBAL INTEREST INVENTORY

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Yrs. Mo.) Sex Handicaps and Disabilities If Any

	T	B		T	B		T	B		T	B		T	B
1			25			49			73			97		
2			26			50			74			98		
3			27			51			75			99		
4			28			52			76			100		
5			29			53			77			101		
6			30			54			78			102		
7			31			55			79			103		
8			32			56			80			104		
9			33			57			81			105		
10			34			58			82			106		
11			35			59			83			107		
12			36			60			84			108		
13			37			61			85			109		
14			38			62			86			110		
15			39			63			87			111		
16			40			64			88			112		
17			41			65			89			113		
18			42			66			90			114		
19			43			67			91			115		
20			44			68			92			116		
21			45			69			93			117		
22			46			70			94			118		
23			47			71			95			119		
24			48			72			96			120		

	R	S	%-ile
0.			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

7

DARK NON-VERBAL INTEREST INVENTORY

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Mos. No.) Sex Handicaps and Disabilities If Any

	T	B		T	B		T	B		T	B		T	B
1			25			49			73			97		
2			26			50			74			98		
3			27			51			75			99		
4			28			52			76			100		
5			29			53			77			101		
6			30			54			78			102		
7			31			55			79			103		
8			32			56			80			104		
9			33			57			81			105		
10			34			58			82			106		
11			35			59			83			107		
12			36			60			84			108		
13			37			61			85			109		
14			38			62			86			110		
15			39			63			87			111		
16			40			64			88			112		
17			41			65			89			113		
18			42			66			90			114		
19			43			67			91			115		
20			44			68			92			116		
21			45			69			93			117		
22			46			70			94			118		
23			47			71			95			119		
24			48			72			96			120		

	R	S	%-ile
0.			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

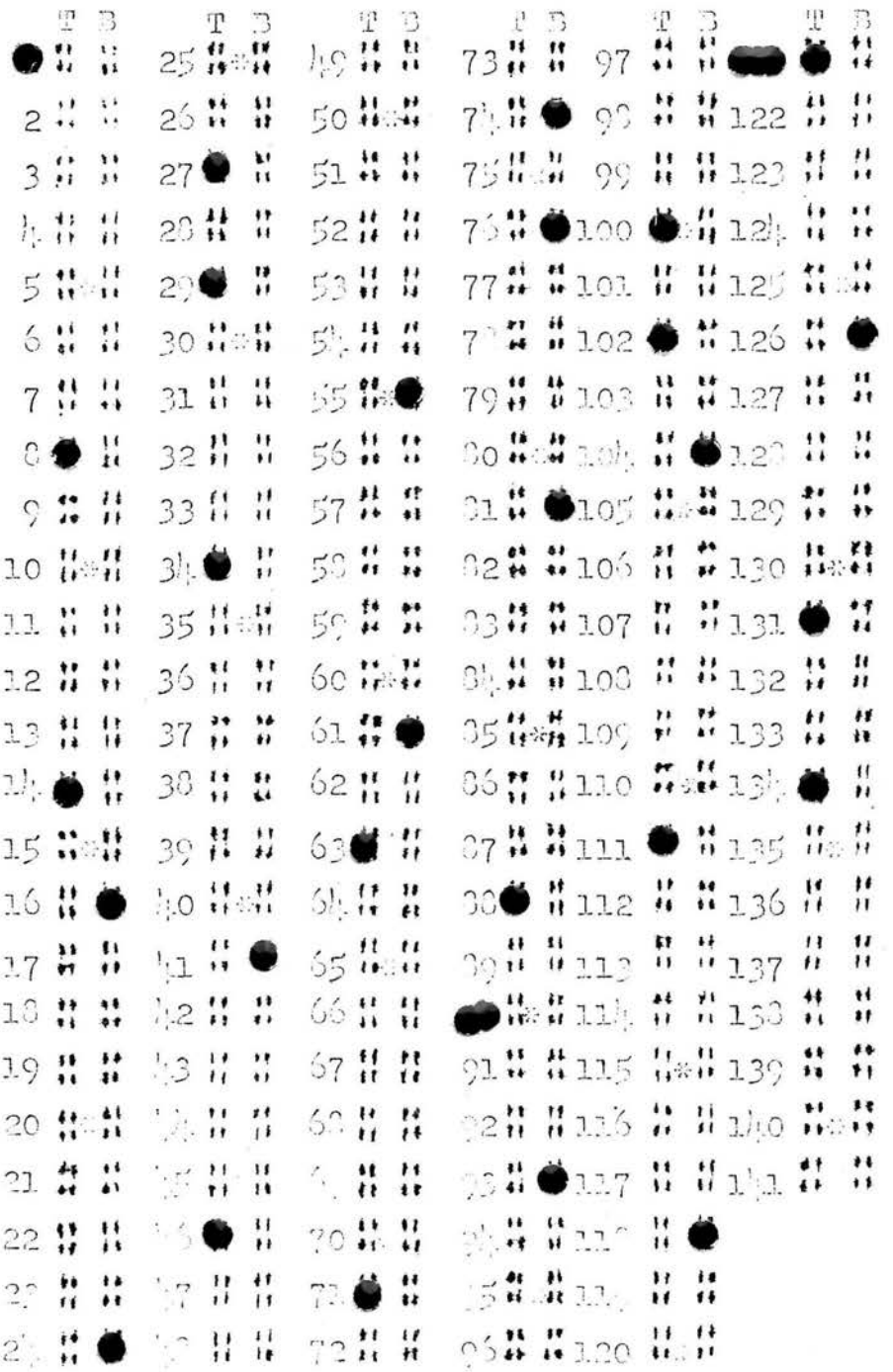
8

DARS NON-VERBAL INTEREST INVENTORY

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Yrs. Mo.) Sex Handicaps and Disabilities if Any



	R	S	%-ile
0.			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

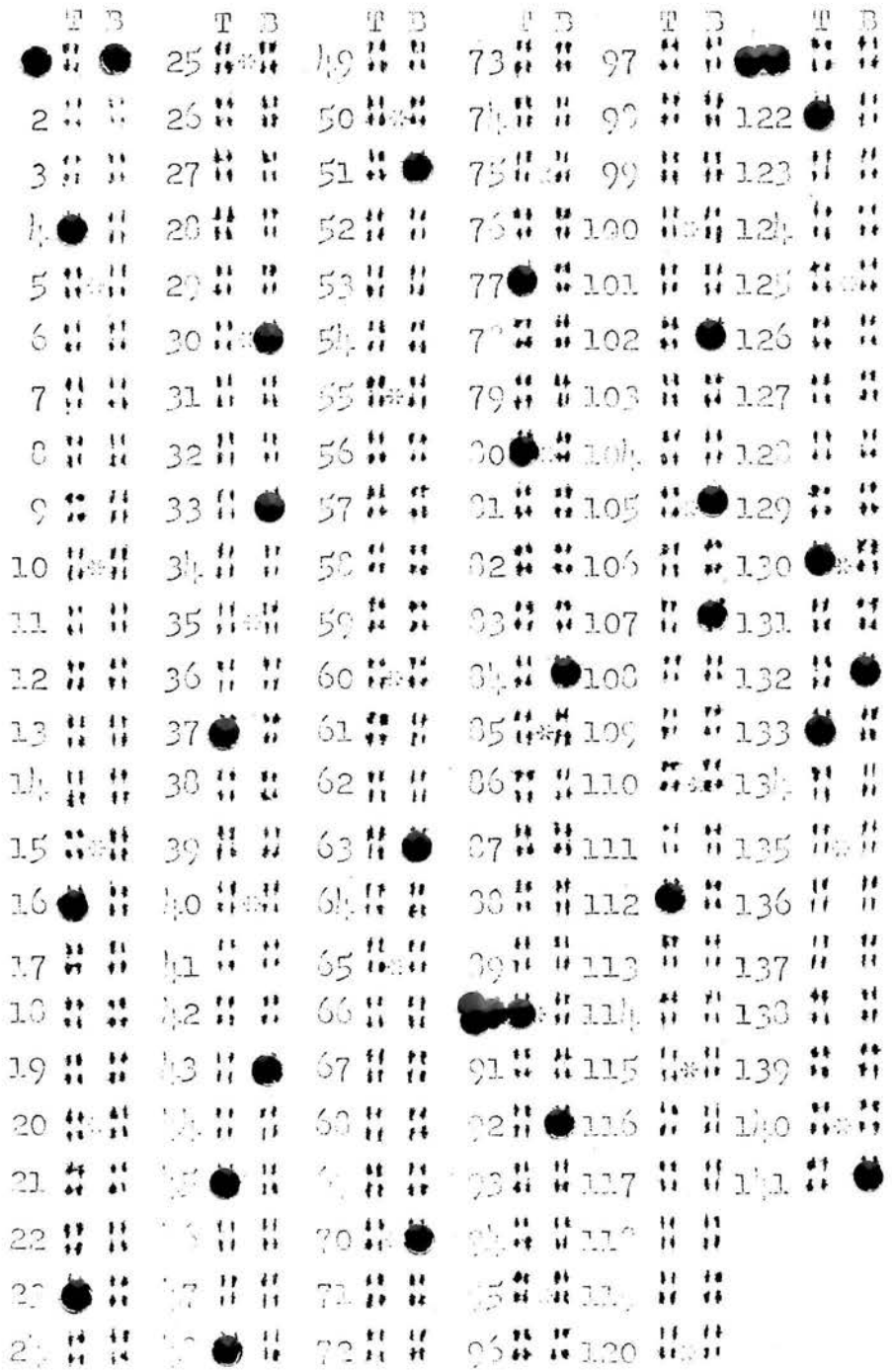
BERC NON-VERBAL INTEREST INVENTORY

9

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Yrs. No.) Sex Handicaps and Disabilities If Any



	R S	%-ile	
0.			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.	[redacted]		

V

[illegible] NON-VERBAL INTEREST INVENTORY

SCORE SHEET

Name (Last) (First) (Initial) Grade Room School

Age (Yrs. Mo.) Sex Handicaps and Disabilities If Any

	T	B		T	B		T	B		T	B		T	B
●			25			49			73			97			
2			26			50			74			98			122
3			27			51			75			99			123
4			28			52			76			100			124
5			29			53			77			101			125
6			30			54			78			102			126
7			31			55			79			103			127
8			32			56			80			104			128
9			33			57			81			105			129
10			34			58			82			106			130
11			35			59			83			107			131
12			36			60			84			108			132
13			37			61			85			109			133
14			38			62			86			110			134
15			39			63			87			111			135
16			40			64			88			112			136
17			41			65			89			113			137
18			42			66			●			114			138
19			43			67			91			115			139
20			44			68			92			116			140
21			45			69			93			117			141
22			46			70			94			118			
23			47			71			95			119			
24			48			72			96			120			

	R	S	%-ile
0.			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

- Social Service
- Musical
- Outdoors
- Artistic
- Literary
- Mechanical


Buick


SAVING FUND
SAVINGS