AN EVALUATION OF A PICTURE OCCUPATIONAL PREFERENCE TEST FOR EDUCATIONALLY HANDICAPPED PEOPLE

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FOREWORD

Existing training programs are not designed to meet the needs of workers having limited education despite the fact that this group makes up the majority of unemployed persons. The need for such programs is becoming more and more prevalent as automation continues to eliminate those jobs which are held essentially by unskilled labor. At present there are inadequate means for determining what sort of training programs would be of interest to individuals with limited education.

This report describes the initial development and the first trial administration of a new type of vocational interest test designed to assess the job preferences of individuals having limited educational backgrounds.

These trials were conducted at the Ohio Valley Goodwill Industries Rehabilitation Center, Cincinnati, Ohio and the Beckley Memorial Hospital, Beckley, W. Va. The cooperation of the Executive Director, Ohio Valley Goodwill Industries and the Director of Social Services, Beckley Memorial Hospital is gratefully acknowledged, as is the cooperation of the volunteers who participated in this study.

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SUMMARY

A first version of a picture vocational interest test was constructed to identify preferential job interests, via pictures, of workers having educational and cultural handicaps. Pictures of 11 widely different job situations were included in the test, each job situation being paired with all others in accordance with a forced-choice paired comparison procedure. Each testee indicated which one of a given pair of jobs shown he preferred. This test was administered to 39 male volunteers at Goodwill Rehabilitation Center and to 6 miners hospitalized at Beckley Memorial Hospital. For comparison, the Brainard Occupational Preference Inventory (a written standardized test) was also administered to the Goodwill group. Results of the two tests were found to be at variance in that the Mechanic job interest was overwhelmingly preferred on the Picture Test by both test groups, but was ranked in much lower position in the Brainard Inventory. The limited number of jobs depicted in the Picture Test and/or a wording bias in the Brainard Inventory favoring other job interests over Mechanic were suspected as being the basis for the discrepant results. The wording bias also tended to make the subject groups prefer job interests on the Brainard Inventory that many could not realistically perform in view of their limited education. To alleviate the problem of insufficient job choices on the Picture Test, it was recommended that two picture tests be administered, the first to identify a broad occupation interest category and a follow-up test to identify a specific job interest within that broad occupational category initially identified.

It was impossible to give the Brainard Inventory to subjects unable to read. As expected, the Picture Test was administered to all of the volunteers without difficulty.

The results of both tests indicated that the subjects' educational level influenced the types of jobs preferred. This further supported the need for separate training programs for lower educational groups.

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INTRODUCTION

Recent studies indicate that 12 per cent of all laborers were unemployed in 1962 (5). Unemployment of this unskilled group is primarily due to automation and other industrial changes which have substituted mechanical equipment for the simple, more routine types of jobs (6). The increasing trend toward automation is expected to decrease further the need for unskilled labor and therein create a more serious employment situation among unskilled workers. Finding new positions for these individuals will be difficult since available jobs will probably require some degree of skill and training.

In recognition of the numerous jobs being made obsolete, the U.S. Department of Health, Education, and Welfare is sponsoring, under the Manpower Development and Training Act, training programs to develop new and different skills among people for purposes of obtaining new employment (7). As of the present time, however, these programs are not geared to the unskilled labor group in that they require at least an eighth-grade education. It should be noted that more than one-third of the unemployed persons have less than an eighth-grade education (7). Acknowledgment of the inability of these training programs to cover the labor group having limited formal education is given in the Report of Secretary of Labor which states that the educationally handicapped worker will "require courses specially tailored to their learning ability and habits, and special methods of testing and selecting for training." (7, p. 58).

This report summarizes the initial development and first test trials of a picture vocational preference test, aimed at identifying job interests of workers having educational and cultural handicaps, so as to provide information for orienting training programs for these people. Existing occupational interest tests used in selecting men for job-training are not feasible for the worker having limited formal education, since they require a reading level much beyond their comprehension and also contain job interests that are unrealistically high for such a worker group.

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TEST CONSTRUCTION

A basic requirement to the construction of this test was finding ammeans for selecting jobs to be depicted that, as a group, would meet the following conditions: a) range in required skill level from unskilled to highly skilled, b) cover a broad range of interests, c) be within the grasp of individuals having limited educational, cultural, and vocational backgrounds. Initially, an attempt was made to use standard sources such as the Dictionary of Occupational Titles (4) and the Occupational Handbook (6) for purposes of identifying jobs meeting the aforementioned criteria. However, these references were found unsuitable for this task because jobs were not classified in a definitive enough way so as to insure the choice of work situations covering a broad range of skill levels. Instead, another approach was decided upon in which judges grouped pictures of men performing many different types of work according to the skills demanded.

Pictures showing 184 different kinds of non-professional jobs being performed were obtained from various industrial journals. A rating panel comprised of three work physiologists, three laboratory technicians, and three research psychologists were instructed to classify the jobs pictured as falling into unskilled, semi-skilled or skilled categories. Only those pictures characterizing jobs which all of the raters placed in the same skill classification were chosen for further examination. There were 34 such pictures, and these were then redistributed to the raters with the instructions being to select from within the three skill classifications those pictures of jobs that were widely different in nature from one another. On the basis of these judgments, there were 11 pictures agreed upon by the panel as representing the greatest variety of occupations within the three skill levels indicated. Included were: skilled - auto mechanic, stone cutter, instructor, and welder; semi-skilled - cook, painter, farmer, and miner; unskilled - packager, janitor, and railroad section worker. These 11 pictures of jobs comprised the final test items.

It was decided to use a forced-choice paired comparison procedure (9) for obtaining an indication of the subjects' order of preferences for the various jobs pictured as opposed to using a more simple ranking or rating procedure. The paired-comparison technique not only provides a ranking of the jobs in terms of preference, but also supplies scale values for each of the ranks, such that the size of the intervals between any two successive tanks can be identified. This latter measure provides additional information relevant to the preferential strength of the various

jobs presented. That is, the interval between the job ranked first and second is liable to be much greater than the interval between the jobs ranked second, third, and fourth. This would suggest that the top ranked job is clearly preferred to the next three ranked items which, in turn, are quite close to one another in preferential value.

The forced-choice paired comparison procedure required that each of the 11 jobs pictured be paired with every other pictured job until all possible pairs were exhausted. This made a total of 55 pairs.[1] Using 3" x 4" black and white photograph prints of each of the 11 jobs, the pictures were secured in a booklet with a different pair on each page. The test subjects were required to decide which of the two jobs in a given pair he would prefer and to indicate his preference on separate answer sheets provided. No equal judgments were allowed. No time limit was enforced upon the subjects, although none of the subjects used in this study took longer than 20 minutes to complete the test.

RESULTS OF TEST TRIALS

OHIO VALLEY GOODWILL INDUSTRIES REHABILITATION CENTER

A first version of the Picture Test was administered to 39 male volunteers at the Ohio Valley Goodwill Industries Rehabilitation Center. Twenty-nine of the men were enrolled in various vocational training programs and 10 were employed in unskilled jobs there at the Center. The Goodwill group was selected for subjects because of the diverse age (16-51) and educational backgrounds represented (education ranged from sixth grade through two years of college).

For comparison, the Brainard Occupational Preference Inventory (2) (a written standardized test, published by The Psychological Corporation) was also given to those subjects who were able to read the material.

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[1] Eleven items taken two at a time in accordance with the formula $\frac{N!}{r!(N-r)!}$ yield a total of 55 possible combinations. The computation is

$$\frac{11!}{2!(9)!} = \frac{11.10}{2.1} = \frac{11 \times 5}{1} = 55.$$

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Their reading ability was determined by having each subject read the Brainard instructions aloud. Only those who could read fluently were given this test. The Brainard was chosen because it requires a relatively low level of reading skill and consequently may be used at lower educational levels than many similar tests. Brainard test items are designed to measure occupational interests in six major areas. They are: commercial, scientific, mechanical, professional, esthetic, and agricultural. The testee indicates the degree to which he likes a job by the length of line he draws in a response space designated for each item. A long line indicates that he likes the job cited while a short one shows that he dislikes the job described.

Raw scores, based upon the lengths of the lines given for the various job items are converted into percentile ranks for each of the six major occupational interests. Percentile ranks, in this instance, refer to the number of people in the population used in standardizing this device who preferred a particular job interest more than the testee. For example, if an individual scores in the 95th percentile for professional, it means that only 5 per cent of the population preferred that job interest more than he did. The Brainard Inventory raw scores can also be converted into broad categories A, B, C, D, E, with A representing a strongly liked occupational area and E, a strongly disliked occupational area.

Picture Occupational Preference Test

The Picture Test was administered to all 39 volunteers without difficulty. Guilford's short-cut technique (9, pp. 236-238) was used in computing scale values for the ranks of the jobs presented in the paired comparisons testing. In this procedure, all of the subjects' judgments were initially pooled and the percentage of times that each job was chosen over all others determined. This percentage was then converted into a standard score (Z-score) which represented the raw scale value for each job rank. Such values ranged from -.6038 to .7554 for the 11 jobs presented to the Goodwill group, -.6038 being the scale value for the least preferred job and .7554 the scale value for the most preferred job. A constant of .6038 was added to each of the obtained scale values to make them all positive. The addition of this constant gave the least preferred job a scale value of 0.000.

A graphic illustration of the scale values for the 11 occupations is shown in Figure 1. Auto Mechanic is ranked highest among the jobs listed, the relatively large distance between its scale value and that of the second ranked choices (tie between Welder and Painter) indicating that

it was definitely preferred to those other jobs. The scale separation between Welder or Painter and Farmer is quite small despite differences in the rank order of those jobs. Such a small scale interval would suggest little preference difference among these jobs. For the same reason, jobs ranked fifth (Cook), sixth (Stone Cutter), seventh (Packager), and eighth (Instructor) can also be considered as quite similar in preference value. These jobs as a group, however, are distinctly less preferred to those of higher rank and clearly preferred over those of lower rank by virtue of the large-scale separation indicated. Janitor (ninth rank), Railroad Section Worker (tenth rank), and Miner (eleventh rank) are among the least chosen occupations, the scale distances between them indicating some real but slight difference in preference among them.

The preferential judgments of the Goodwill group to the 11 job items were also evaluated by amount of education to determine whether this factor significantly affected the relative ranking of these occupations. Figure 2 gives graphic representation of scale values for jobs ranked by persons having less than a tenth-grade education (average education=7.4 years), and at least a tenth-grade education (average education=11.4 years). Considering only rank order, the top four choices of occupation for each group are the same with Auto Mechanic remaining the most preferred job irrespective of educational level. On the other hand, differences in scale spacing among the top four jobs and marked differences in both order and scale separation in the remaining jobs reveal a lack of correspondence between the two educational groups. Instructor, for example, is ranked fifth in the higher educational group and ninth in the lower educational group. Packager is ranked seventh in the higher educational group with a scale value of .68; the same job item in the lower educational group is ranked almost identically (seventh position) but only has a scale value of .3458. A Pearson-product moment correlation coefficient (r) (8) computed for the two sets of scaled rank values was .55 This "r" value was found to be insignificantly different from 0, therein indicating that the scaled rankings of job preferences for the two educational groups were uncorrelated.

Brainard Occupational Preference Inventory

The test results for the 26 Goodwill subjects whose reading comprehension enabled them to take the Brainard Inventory are summarized for the entire group and for individuals classified by educational level in Table I.

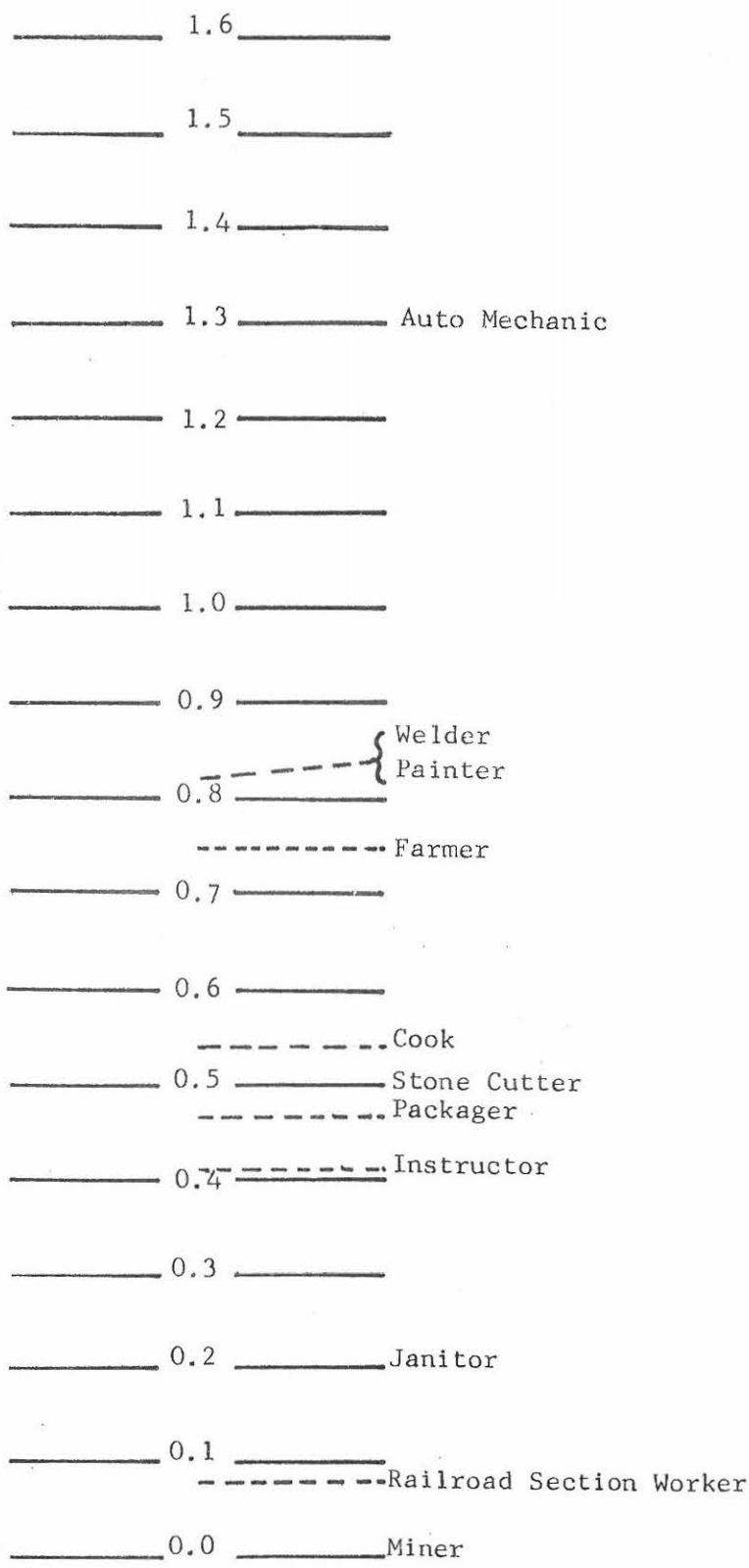

Figure 1. Scale Values for Jobs Ranked by Goodwill Rehabilitees on Picture Occupational Preference Test.

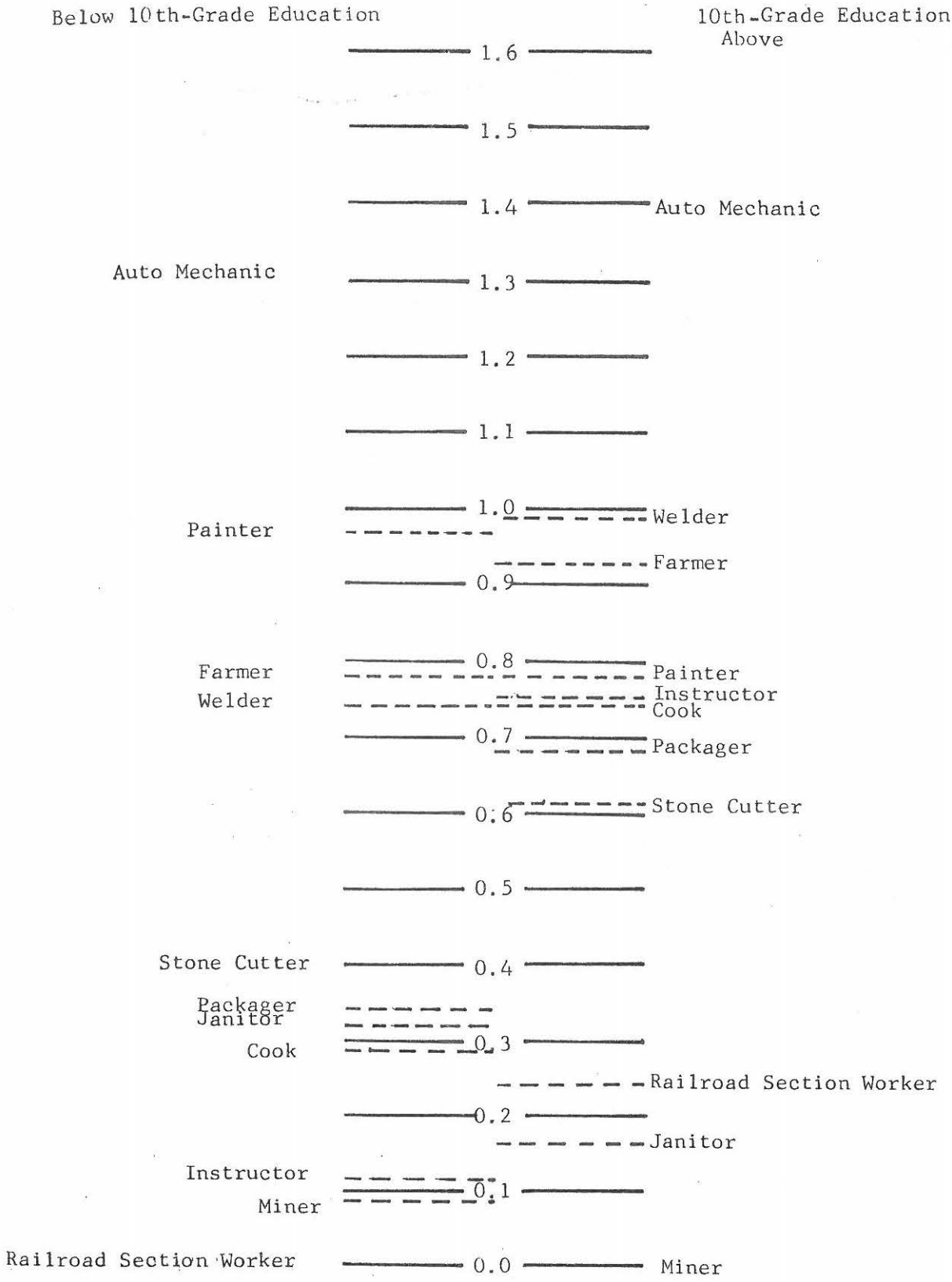

Figure 2. Scale values for jobs ranked by Goodwill Rehabilitees having more and less than tenth grade education on Picture Occupational Preference Test.

TABLE I

Results of Brainard Occupational Preference Inventory for Goodwill Rehabilitees for the Total Group and by Different Educational Levels

		Commercial	Professional	Esthetic	Agricultural	Mechanic	Scientific
Total Group (N=26)	Percentile	93	88	77	59	50	33
	Category Ratings	A	A	B	C	C	D
10th Grade Education or more (N=14)	Percentile	93	88	63	48	57	30
	Category Ratings	A	A	B	D	C	E
Less than 10th Grade Education (N=12)	Percentile	85	85	87	63	40	35
	Category Ratings	A	A	A	B	D	D

Note: Category ratings A through E refer to following degrees of preference:

A = strongly liked
B = liked
C = average
D = disliked
E = strongly disliked

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Based upon the total group's responses, percentile scores indicate that commercial occupations were preferred over all of the other occupations specified, with Scientific being the least desired. Considering only the broad category ratings, Professional was rated equally as high as Commercial. Comparing only percentile ratings, the order of preferences for the two educational groups differ from that of the total group as well as from each other. For example, Esthetic was ranked first in order of job preference by subjects with less than a tenth-grade education, while subjects with more than a tenth-grade education ranked Commercial and Professional higher than Esthetic. Agriculture, which was ranked in fourth position by the total group and the lower educational group, was ranked fifth by those with at least tenth-grade schooling. A Spearman Rank-Order Correlation (10) of the preferential order of job interests for the two education groups yielded a coefficient of .242 which was statistically insignificant. This would serve as evidence of there being differences between job preferences based upon educational level.

It is interesting to note that Mechanic, which was overwhelmingly preferred on the Picture Test by all of the Goodwill subjects, was given only average preference status (responses for total group and subjects with more than tenth-grade education) and even elicited "dislike" reactions from some individuals (responses for subjects with less than tenth-grade education).

COAL MINERS AT BECKLEY MEMORIAL HOSPITAL

The Picture Occupational Preference Test was given to six coal miners, hospitalized at Beckley Memorial Hospital, as part of a psychological test battery.[2] The six miners ranged in age from 34 to 60 years, four being above age 45. Their education ranged from third grade through twelfth, only two having completed elementary school. Coal mining experience ranged from 14 years to 37 years.

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[2]The psychological test data on all miners tested at Beckley Hospital is summarized in a memorandum.

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The Picture Test was administered to these miners without difficulty, the paired comparison judgmental data being handled in the same manner as that already described for the Goodwill group. A graphic illustration of the obtained scale values for the job ranks for the six miners is given in Figure 3. Auto Mechanic was overwhelmingly preferred over all other jobs presented. In fact, the ten remaining occupations all rank in the lower half of the scale with little scale distance between them. This would suggest that the ten jobs, while different in rank, were not clearly different in terms of miner preference. Of possible significance here is the fact that the miners ranked Mining in the fourth position (actually tied with Welder) on the scale while the Goodwill group ranked this item in last place.

DISCUSSION

Both the Goodwill rehabilitees and the Beckley coal miners indicated a decided preference for Mechanic over the other ten job choices presented during the first trial administrations of the Picture Test. These findings would suggest that mechanical type occupations be considered in planning future training programs for low educational groups. However, Brainard Inventory rankings of occupational interests for those individuals who were able to take the Brainard Inventory in addition to the Picture Test, placed Mechanic in either fourth or fifth place out of six possible occupational choices. This discrepancy of job interests between the two tests may have occurred for one or both of the following reasons:

(1) The Picture Test did not offer a sufficient variety of jobs of interest to the subjects so as to tap their major job interest.

(2) The wording of the Brainard Inventory is biased in favor of Commercial, Professional, and Esthetic interests which it presented in more appealing terms than Mechanical interests.

Elaborating on the latter, Commercial and Professional categories contained questions such as "Would you like to shop around for bargains? explain to others how work is to be done? handle money? look up facts? make laws? make rules?" etc. The Esthetic category, which was also chosen over Mechanic and even ranked first choice by the lower educated group, included "write book reviews, draw up plans for houses, and make comparison of radio and T.V. programs." Many of these items would appear totally unrealistic to the test group in view of their limited education.

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Nevertheless, they were preferred to those items reflecting mechanical interests quite possibly as a consequence of the lack-luster casting of the mechanic-related items (e.g. lay cement, set stone, use a hammer and saw, solder, etc.). It would be noted also, that even though the Brainard items involving "instructing others" were most frequently scored "strongly liked" by a majority of the subjects, these same individuals rejected instructor in favor of Mechanic on the Picture Test. This might indicate that the subjects manifested a different attitude toward a job when they could see it being performed than when the same job was described in writing. Investigations of propaganda have also found that individuals tend to react differently to the same material when presented in picture form as opposed to oral or written form (11,12). It has further been determined in instructional programs (1,3) that the trainee understands and follows instructions more accurately when the instructions are portrayed by pictures than when in printed form. Although there is no evidence in the present study to indicate whether pictures or words elicited the most reliable job preference responses, it would seem reasonable to assume that the subjects had better comprehension of the pictured job than the job described in writing.

In regards to the first explanation of the discrepancy between the two tests, it is quite possible that Mechanic might not have earned such an overwhelming preference if there had been a greater variety of job situations presented. In fact, the lack of a sufficient number of different jobs is probably the major shortcoming of the Picture Test as it now stands. This limitation could be overcome, however, by administering two picture tests, the first of which would include picture items aimed at tapping only broad categories of job interest (e.g. Commercial, Mechanical, Scientific, Agricultural). The second picture test would include job items specific to the preferred occupational interest category as identified by the first test. This approach, of course, would require separate follow-up picture tests, each containing job items related to one of the broad occupational categories depicted in the first test.

As expected, the Picture Test was given to all testees without difficulty. Because of the reading requirement, however, the Brainard Inventory could be given to 26 out of the 39 volunteers or 66 per cent of the group who were slated to take it. Additional instructions, in some cases, were also needed to help some of the subjects understand this test even though they could read the test material. The latter difficulty might complicate group administration of this test device.

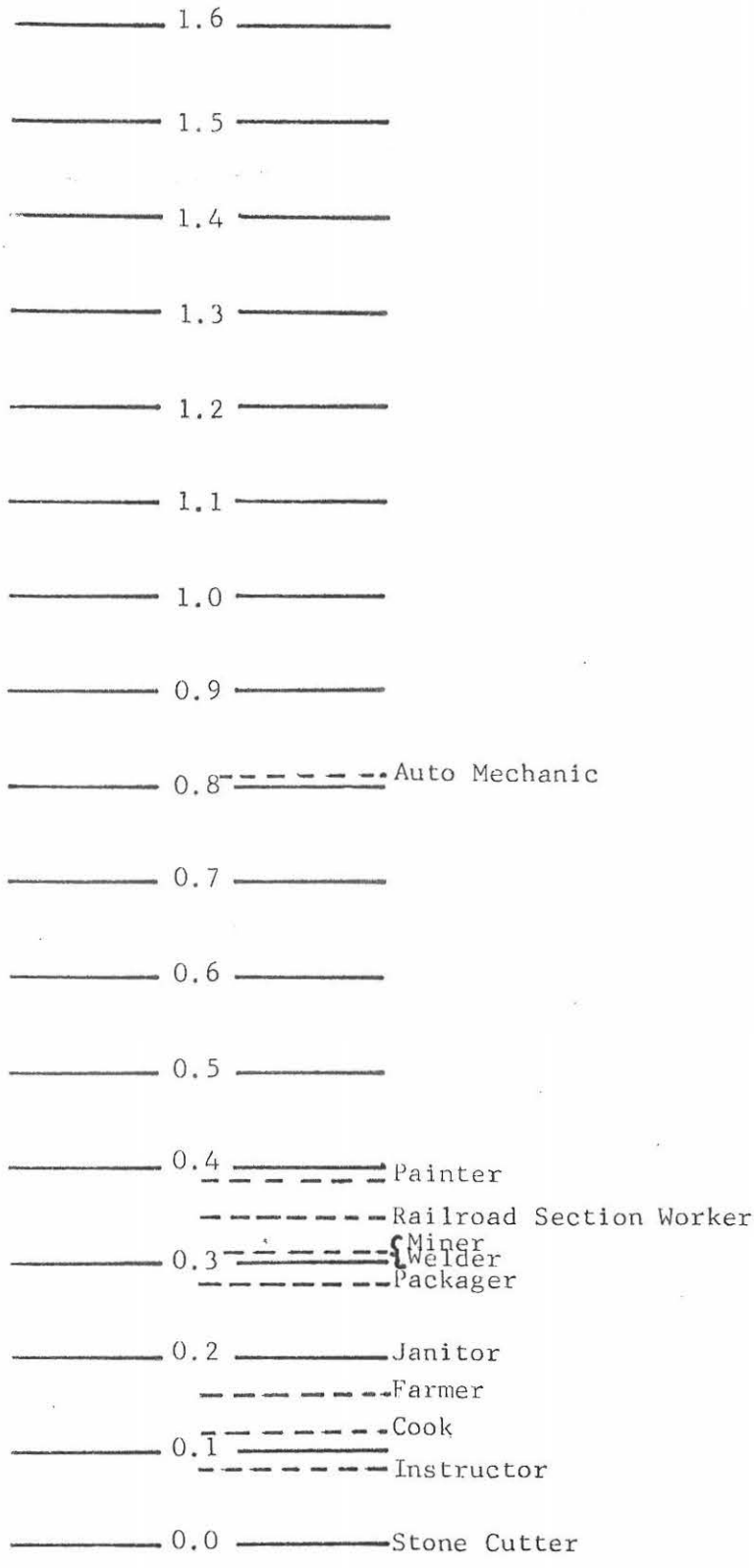

Figure 3. Scale values for jobs ranked by Beckley coal miners on Picture Occupational Preference Test.

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Also of significance in this study, was the finding that subjects with different amounts of education (less than 10th grade, more than 10th grade) gave different job preferences as measured by both the Picture Test and the Brainard Inventory. Differences in job interests coupled with differences in educational level would further substantiate the need for separate training programs for the workers having limited education.

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