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# A validity study of the Wonderlic personnel test

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A VALIDITY STUDY  
OF THE WONDERLIC  
PERSONNEL TEST

BY

WILLIAM DANIEL BUCKLEY, JR.

A THESIS  
SUBMITTED TO THE GRADUATE FACULTY  
OF THE UNIVERSITY OF RICHMOND  
IN CANDIDACY  
FOR THE DEGREE OF  
MASTER OF ARTS IN PSYCHOLOGY

AUGUST, 1957

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TABLE OF CONTENTS

CHAPTERS

I. INTRODUCTION AND PURPOSE OF STUDY	1
II. PROCEDURE	4
III. RESULTS	7
IV. DISCUSSION	9
V. SUMMARY	11

APPENDICES

A. DIFFERENCES IN WAIS SCORING BETWEEN EXAMINER A AND EXAMINER B	
B. WAIS I. Q.'S AND WONDERLIC RAW SCORES	
C. WAIS AND WONDERLIC I. Q.'S	

BIBLIOGRAPHY

VITA

## I. INTRODUCTION AND PURPOSE OF STUDY

Business and Industry is turning more and more to the use of standardized psychological tests as an aid in the selection and placement of personnel. Many concerns want to have, along with all other pertinent information, a measure of a potential employee's general intelligence. Therefore, some sort of intelligence test is found in their test batteries. Management, in most cases, prefers these various tests to be as simple as possible in their administration and evaluation, thus avoiding unnecessary time and expense. There are a number of short intelligence tests which meet the above requirements (3), (5). One of these, the Wonderlic Personnel Test, is used widely in business and industry.

The Wonderlic Personnel Test is a restandardized abridgement of the Otis Self-administering Test of Mental Ability, Higher Form (21). It is particularly adapted to the needs of business and industry in that it is practically self-administering and can be given and scored by a trained clerk. The Wonderlic is called a personnel test, rather than an intelligence test, in order to lessen the hesitancy and fear that is often created in persons taking mental ability tests (19).

It can be used as an individual or as a group test. "The test consists of fifty items which measure the ability to solve various types of problems; problems that measure his ability to (1) understand and think in terms of numbers, (2) understand and think in terms of words, (3) think in terms of symbols, and (4) think in terms of ideas"(19). A more detailed description of the test may be found in (20).

Various reports and studies (7), (14), (15), attest to the widespread use of the Wonderlic. One of these studies (15) reports that out of 108 companies questioned, 60 per cent were using the Wonderlic. The types of business and industry surveyed in this study included: Banking and Finance, Management Consultants, and Manufacturing. There is little doubt concerning the wide use of the Wonderlic by personnel departments today.

A review of the literature concerning the validity of the Wonderlic (7), (13), (14), (15), (16), reveals that most research has been associated with the functional validity of the test. As set forth in the manual (20) the validity of the Wonderlic is based on its use in determining success on a number of different jobs wherein, over a period of five years the number of questions "Right" clearly distinguished between good and poor groups of employees differentiated on work records accumulated over this period. All the studies support the validity of the Wonderlic in distinguishing between good and poor employees on various jobs when adequate local norms are used. However, many personnel departments do not take the time to build up local norms; they merely revert to the norms given in the manual and use the score obtained as an index to the applicant's mental ability. The purpose of this study was to

compare the Wonderlic Personnel Test with the Wechsler Adult Intelligence Scale, or the WAIS as it is commonly called. The WAIS (17) is the most carefully standardized test of general intelligence available, and its validity has been proven in numerous studies. The Wonderlic Personnel Test also purports to measure general intelligence, but it lacks the research and study that has been given to the WAIS.

Considering the wide use of the Wonderlic as a test of mental ability, a validity study with the well-standardized WAIS as a criterion seems desirable.

## II. PROCEDURE

The Wonderlic is available in five forms: A B D E and F. Although the manual states that these forms are equal, two studies are reported (1), (22), which indicate that there are slight but significant differences in the difficulty of the various forms. Form D was selected for this study because it has the highest reliability coefficient and is similar enough to the other forms to warrant generalization of results.

The WAIS consists of six verbal sub-tests and five performance sub-tests. This study is based on the verbal sub-tests only as it was felt that this was sufficient due to its high correlation with the Full Scale WAIS. There was also the practical problem of obtaining subjects for the study and, had the Full Scale WAIS been administered, it would have been difficult to obtain the desired number of subjects because of the additional time involved.

The subjects were fifty adults, thirty-seven of whom were students enrolled in the following classes: Child Behavior and Adjustment, General Psychology, Case Studies, and Educational Psychology. The remaining thirteen were applicants for positions in local concerns. The WAIS and Wonderlic were given to the subjects



rotated so that no two consecutive subjects started with the same test. This was done so as to rule out any effects due to the order of presentation of the tests. The detailed description given below describes the pre-testing period experienced by all subjects:

Upon reporting to the psychology department the subject was met by the tester who introduced himself and then led the subject to the testing room. The following introductory explanation was then given to the subject:

"We are interested in obtaining scores on two psychological tests. One of these tests, the Wechsler Adult Intelligence Scale, is probably the most widely used intelligence test today, and is considered by many to be the best of its kind. The other test you will take is not so well known and still needs further research. In order to find out more about this test, known as the Wonderlic Personnel Test, we plan to give it along with the Wechsler Adult Intelligence Scale to a large number of people so that we may compare the total results.

We will not be concerned with your scores on a personal basis but only as they contribute to the total results. I can assure you that what you do here today will be strictly confidential. Unless you have any questions we can begin now."

The tester then proceeded to administer the two tests, their order of presentation based on the above mentioned counter-balanced order.

Upon presenting the Verbal WAIS to the subject, the tester stated:

"I am now going to ask you some questions having to do with a number of things. Some of these questions will probably seem very easy while others may prove to be quite difficult and, unless you are exceptional, you will not be able to answer some of them, so please do not feel bad when this happens. Just answer to the best of your ability and I am sure you will do well."

The test was then administered, using the standard procedure as outlined in the WAIS manual.

The administration of the Wonderlic Personnel Test was kept as realistic as possible. The subject was given the test booklet and

told to read the instructions; do the sample problems, and wait for further word from the tester before opening the test booklet. Having checked to see that the subject had solved the sample problems correctly and having answered any questions concerning the directions, the tester then said:

"Before you begin, let me stress two things that have been mentioned in the directions; first, do not spend too much time on any one item. Since you only have 12 minutes, you will hurt yourself doing that, and secondly, please answer the items in order as they are arranged according to difficulty. If you do not know the answer to any one item, you may pass over it to the next, but do not skip around haphazardly. Are you ready to start now? All right, remember you have 12 minutes. Begin."

Following each testing period, the subjects were asked not to discuss what had taken place.

The examiner then scored both tests at the end of the testing periods to rule out the effects that a known Wonderlic score might have on the scoring of the WAIS; the examiner always scored the WAIS first. As a check on the reliability of the scoring, the subjective items in ten of the WAIS forms were scored by a second examiner and the results showed little difference by inspection.

### III. RESULTS

The product-moment coefficient of correlation between the Verbal WAIS I.Q. scores and the Wonderlic raw scores was computed and found to be .63. This indicates a substantial degree of relationship between the two tests in that those who scored high on the WAIS tended to score high on the Wonderlic. The correction for attenuation was applied; this statistic taken from (6) gives us the correlation we could expect if we were dealing with "true scores" from each test, that is, scores free of any chance errors that have arisen. This correction gave a correlation coefficient of .67.

The reliability of  $r$  was determined with two measures: the Standard Error of  $r$  and the Standard Error of Fisher's  $z$  function.<sup>1</sup> The S.E. of  $r$  was .09 meaning that the .95 confidence interval for the true  $r$  is .46 to .80. The Standard Error of  $r$  obtained from the use of Fisher's  $z$  function was .14 signifying that the .95 confidence interval is .36 to .90.

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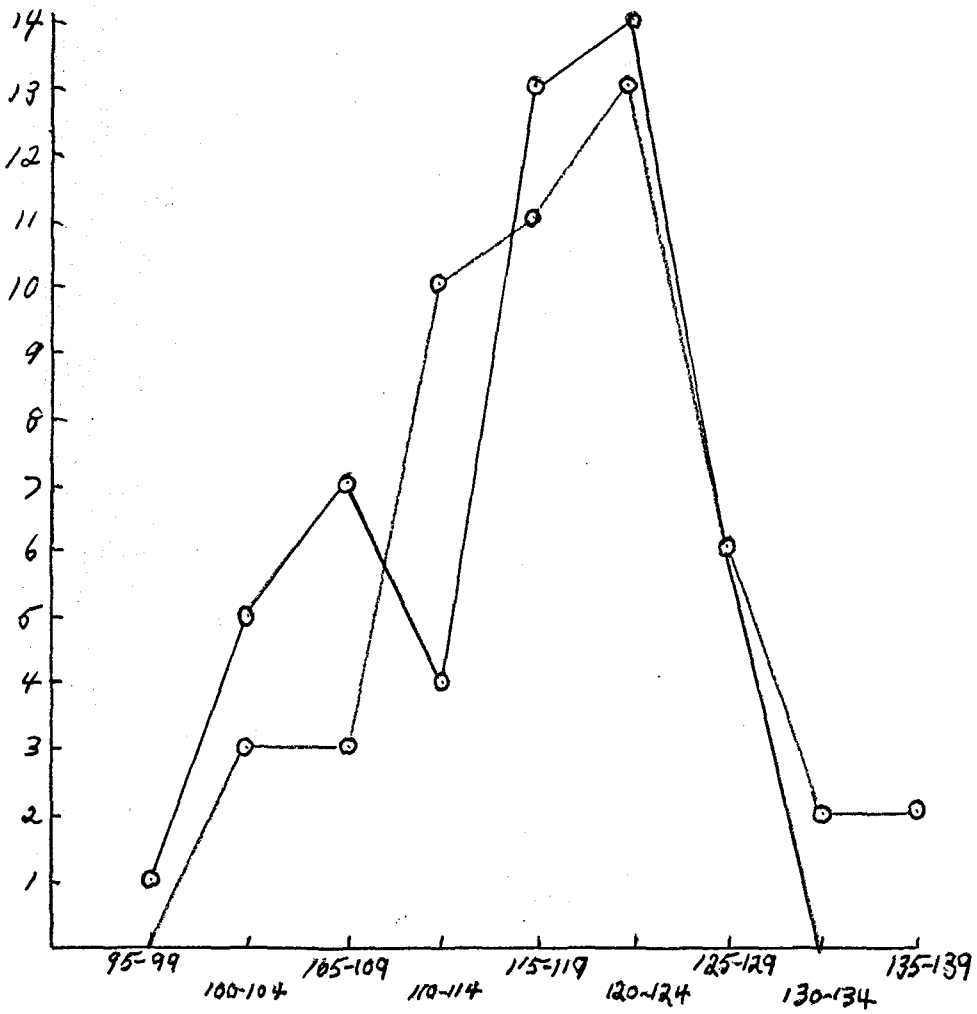
<sup>1</sup>

Henry E. Garrett, Statistics in Psychology and Education (New York: Longmans, Green and Company, 1953), p. 197.

The Wonderlic raw scores were first converted into equivalent Otis raw scores following the procedure outlined in the Wonderlic manual (20). These raw scores were then converted into I.Q. scores using the procedure given in the Otis manual (12). The obtained Wonderlic I.Q. scores were then compared with the WAIS I.Q. scores. The results of this comparison can be seen in Figure 1 and Table 2. A t test for correlated means revealed no significant difference between the means of the two tests ( $P > .10$ ).

The difference between the I.Q. scores for the individual subjects is shown in Figure 3. When the WAIS was higher the difference was considered plus; when the Wonderlic was higher the difference was considered minus.

Figure 1: WAIS and WUNDERLIC I.Q. Scores



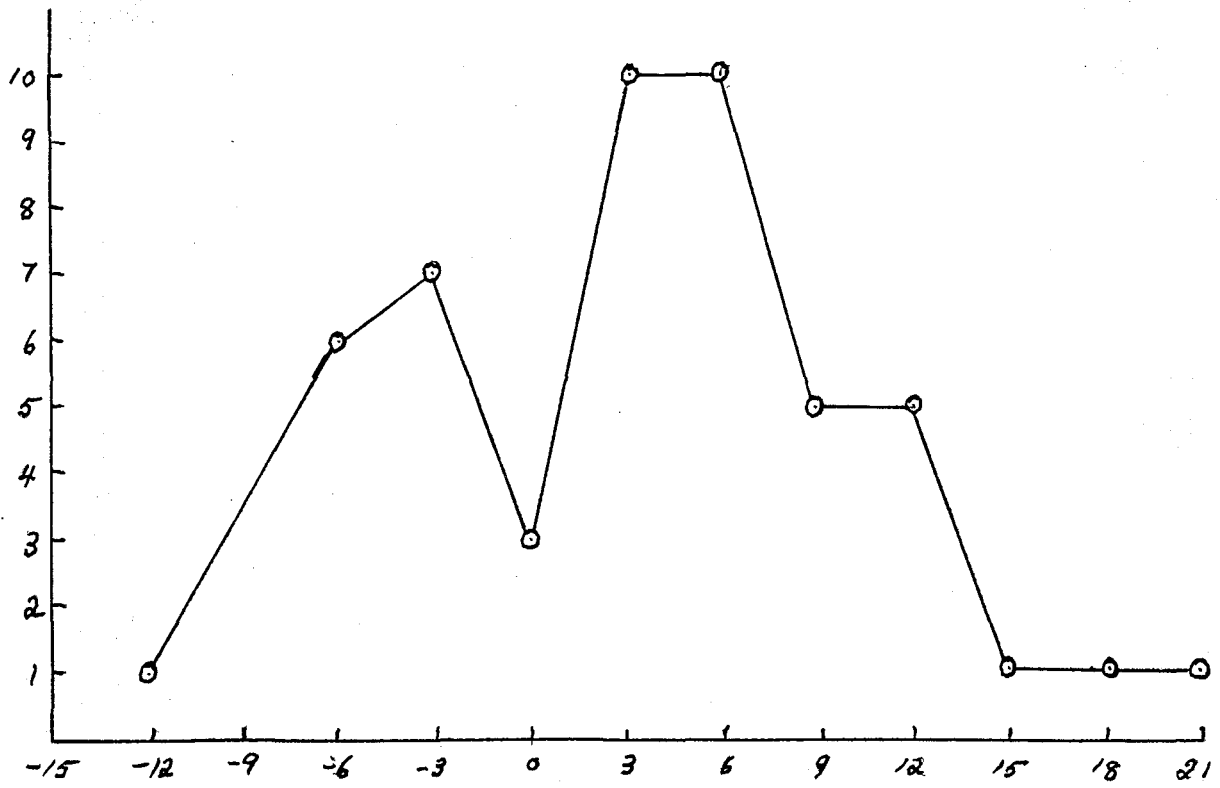
— WAIS I.Q. Scores

- Wunderlic I.Q. Scores

Table 2: Comparison of WAIS and Wonderlic I. Q. means

	Mean	Sigma	Difference	P
WAIS	118	8.24	.2	>.10
Wonderlic	116	8.02		

Figure 3: Difference Between Individual WAIS and  
Wonderlic I.Q. Scores



Difference Between I.Q. Scores

0 to 21 = WAIS higher

0 to -15 = WAIS lower

#### IV. DISCUSSION.

The degree of correlation obtained in this is misleading. One factor that has contributed to the lowering of the correlation coefficient is the range of our sample. If a sample is drawn from a group that is restricted in range in regard to either or both variables, the correlation will be relatively low. In this study the intelligence variable was restricted in range, for the fifty subjects were all either in college or college graduates. It is interesting to note that if we assume that the Wonderlic distribution is uncurtailed, we can adjust the correlation for the restriction in range using a formula from Mc Nemar<sup>2</sup>. This adjustment indicates that we could expect a correlation coefficient to the order of .80. Furthermore, if both distributions were uncurtailed we might expect a correlation to the order of .90. The WAIS and Wonderlic were curtailed however and the above is only interesting speculation.

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<sup>2</sup>  
Quinn Mc Nemar, Psychological Statistics (New York: John Wiley & Sons, Inc., 1955), P. 125.



Figure 3 reveals that the WAIS scores are higher than the Wonderlic scores in most cases. There seems to be no apparent reasons for this as far as this study is concerned.

In a similar study it would be important to widen the range of the intelligence variable by including subjects at the lower end of the distribution. The addition of the performance part of the WAIS, which contains timed tests, might give some data concerning the time factor on performance between the two tests.

## V. SUMMARY

This study was concerned with the validity of the Wonderlic Personnel Test, using the WAIS as a criterion. The two tests were administered to fifty adults, thirty-seven of whom were students from the General Psychology, Case Studies, Child Behavior and Adjustment, and Educational Psychology Classes at the University of Richmond, and fourteen of whom were applicants for jobs in local concerns. The coefficient of correlation between the two tests was .67, corrected for attenuation, indicating a substantial relationship. It was pointed out that this correlation coefficient was misleading, due to the narrow range of the scores.

The individual test scores, when graphically presented, revealed that in most of the cases where differences existed, the WAIS score was higher than the Wonderlic. As a check on scoring reliability of the WAIS; a second examiner was given ten of the forms to score and there were no significant differences found in the results.

This study indicates a high degree of correlation between the WAIS and Wonderlic and justifies the use of the Wonderlic in industry.

**APPENDIX A**

Table 3: Differences in WAIS scoring between Examiner A and Examiner B.

Examiner A	Examiner B	Difference
108	105	-3
126	126	0
112	112	0
123	122	-1
116	116	0
128	131	3
110	110	0
122	121	-1
123	122	-1
125	125	0

**APPENDIX B**

Table 4: WAIS I.Q.'s and Wonderlic Raw Scores\*

Subject	WAIS I.Q. (Verbal)	Wonderlic R. S.
1	111	22
2	125	38
3	122	21
4	126	37
5	122	30
6	122	34
7	126	39
8	136	33
9	131	39
10	113	38
11	110	23
12	108	25
13	119	30
14	102	19
15	125	36
16	128	35
17	122	29
18	111	23
19	119	31
20	122	35
21	122	35
22	116	30

Table 4: Continued-

Subject	WAIS I.Q.	Wonderlic R. S.
23	123	28
24	118	25
25	119	29
26	124	34
27	123	37
28	131	32
29	115	31
30	122	34
31	112	23
32	104	21
33	119	30
34	113	30
35	101	23
36	120	36
37	116	29
38	135	33
39	118	30
40	112	26
41	109	20
42	112	25
43	113	22
44	118	34
45	123	34

Table 4: Continued-

Subject	WAIS I.Q.	Wonderlic R. S.
46	125	30
47	116	28
48	113	29
49	123	36
50	108	26

\* corrected for age factor



**APPENDIX C**

Table 5: Verbal WAIS and Wonderlic I. Q.'s

Subject	WAIS I.Q.	Wonderlic I.Q.
1	111	104
2	125	126
3	122	103
4	126	125
5	122	116
6	122	122
7	126	127
8	136	121
9	131	127
10	113	126
11	110	106
12	108	109
13	119	116
14	102	99
15	125	124
16	128	123
17	122	115
18	111	106
19	119	118
20	122	123

Table 5: Continued-

Subject	WAIS I.Q.	Wonderlic I.Q.
21	122	123
22	116	116
23	123	113
24	118	109
25	119	115
26	124	122
27	123	126
28	131	121
29	115	118
30	122	122
31	112	106
32	104	103
33	119	116
34	113	116
35	101	106
36	120	124
37	116	115
38	135	121
39	118	116
40	112	110
41	109	101

Table 5: Continued-

Subject	WAIS I.Q.	Wonderlic I.Q.
42	112	109
43	113	104
44	118	122
45	123	122
46	125	116
47	116	113
48	113	115
49	123	124
50	108	110

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## VITA

William Daniel Buckley Jr., was born in North Adams Massachusetts on July 26, 1931. He graduated from St. Joseph High School in 1948. In June, 1952, he received his B. S. degree from North Adams State Teacher's College, and after serving in the Armed Forces, entered the University of Richmond Graduate School in September, 1955.