The Pedagogical Seminary

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/vzps20>

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Roswell H. Johnson & Jessie McIntire Gregg

Published online: 30 Aug 2012.

To cite this article: Roswell H. Johnson & Jessie McIntire Gregg (1912) Three New Psychometric Tests, *The Pedagogical Seminary*, 19:2, 201-203, DOI: [10.1080/08919402.1912.10532817](https://doi.org/10.1080/08919402.1912.10532817)

To link to this article: <http://dx.doi.org/10.1080/08919402.1912.10532817>

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THREE NEW PSYCHOMETRIC TESTS

BY ROSWELL H. JOHNSON AND JESSIE MCINTIRE GREGG

Most recent papers that have dealt with the Binet and Simon "Measuring Scale for Intelligence" have referred to the desirability of finding additional tests for the adolescent years to round out the Binet schedule.

Recently we submitted the pupils of the high school in this city to the Binet tests as a group, and took advantage of the opportunity to add four new tests in order that their value be ascertained and that approximate norms might be established for them.

1. The one which proved to have the lowest age level was an alphabet discrimination test. The subjects were shown the letters L, X, Y, N, H, drawn on a large scale on a basis of breadth one-half of height, which is about the usual proportion. They were asked to rearrange the letters in the order of length of line utilized in the construction. The results given in the table shows that the critical period seems to be 15-16, when a decided improvement shows itself. The commonest error is the misplacement of Y and X. The scoring system used was three points out of a total twenty for each unit space each letter was moved from its correct position. This test is avowedly a mixed one, involving some element of visual discrimination, ability to compare lines at different angles, but mainly a feat of mental analysis. It is believed to be a suitable test, because fundamentally similar to many practical problems in life.

2. The next in difficulty was a test in reading the time from a clock with a dial marked counter-clock-wise. The particular time chosen was 4:37. A score of twenty was given for an answer nearer than 4:35 or 4:40, ten if at 4:35 or 4:40. Fifteen to sixteen years was, in this test also, the period of greatest improvement. The subject should be asked to state the time as correctly as possible. This test, as well as the next, penalizes the subject who is prone to "go off half-cocked," which is a desirable feature, since this is a great element of mental inefficiency in those who, in some tests, show up well.

3. The third test was suggested to me by hearing that some stenographers were mentally incapable of successfully

describing or checking land descriptions. It catches the mind which is easily lost in confusion. I was unprepared, however, for the very low scores obtained, so simple does the task appear. "Draw a square. Consider it a map of a square mile with north at the top. Now draw within this square another around the SE quarter of the SW quarter of the NE quarter." This formula is printed in large letters and exposed to view throughout the test. To make it clear, a similar problem solved, involving a different one-sixty-fourth was exposed. In scoring five of the twenty credits were allowed for the correct quarter, five if in the correct one-sixteenth and five for the proper one-sixty-fourth and five points were used for correct placing and proportions. The sense element is minimized in this test and the emphasis placed on ability to follow a sequence of choices particularly open to the danger of confusion.

The greatest improvement was found at nineteen and twenty years, if the small number of cases available for those years can be relied upon. The test is properly an adult test.

4. Much the most difficult was a test which I venture to describe as Royce's Ring, as it was first employed as a psychologic test by Prof. Josiah Royce. A strip of paper about twenty times as long as it is broad is held out flat. One end is now twisted 180° . The two ends are brought up to meet, forming a circle. The subject is asked to describe the result if the band was cut along the middle of the broad side its full length. In order that the reader may test himself, I refrain from giving the solution, which is readily discovered by the actual cutting. The subject should be asked to state precisely the result. None of my one hundred and five cases were successful, although four made an approximation to the truth, if I correctly interpreted their answers, for which I credited each ten points of a possible twenty. Of about twenty adults that I have tried, only two made this same approximation, none giving a complete reply. This agrees with Prof. Royce's results, who found the test one of great difficulty.

The test involves a feat of mental dexterity which could only be achieved by a highly efficient mind, and deserves a place a step past the regular adult tests. It is, therefore, an especially valuable test. In case of success and the subject has not been a student of such "one-sided surfaces" he may be asked to describe the result of such a strip one end of which had been twisted 360° . A correct solution of both by one new to the problems, would be of great interest.

The results obtained by Abelson (*British Journal of Psy-*

chology, IV, 268), and our own experience, convinces us that comparison by the total score, especially after the twelve-year series, is better than the step classification used in the Binet-Simon system. The order of difficulty for different individuals differs far too much in the later years to permit the stress laid by Binet in his 1911 revision on any one test. We believe all the tests in the Binet series, with a few others, should be given, except those too obviously easy or difficult for the subject's age. The subject should be credited twenty points for each test which was successfully met or assumed to have been met and a sum total used. By using twenty points for full satisfaction, it is possible to give fewer points for partial credit.

In the list of opposites test, for instance, it is clearly objectionable to give either full credit or no credit. The advantages of classification by years can still be obtained by comparison with the average score achieved by the children of each age.

AVERAGE SCORE BY AGE.

Age	13	14	15	16	17	18	19	20	Total
No. of Cases	1	10	18	30	28	11	5	2	105
Test	Average Score								
Alphabet	20.00	13.00	14.00	16.53	16.43	13.45	18.80	20.00	15.8
Reversed									
Clock	0.00	2.00	3.33	8.00	5.72	6.36	10.00	10.00	5.9
Section	0.00	2.00	2.61	1.33	1.89	1.18	4.00	13.00	1.9
Royce's Ring	0.00	0.00	0.55	0.00	0.71	0.91	0.00	0.00	.4
Total Score	20.00	17.00	21.50	25.00	24.04	21.91	32.80	36.50	23.7