

# FACTOR ANALYSIS OF SOCIAL AND ABSTRACT INTELLIGENCE

ROBERT L. THORNDIKE

George Washington University

It was suggested by E. L. Thorndike some twenty years ago that there might be three main types of intelligence—abstract, mechanical, and social. Since that time a great number of tests have been developed to measure abstract intelligence, and smaller numbers to measure mechanical intelligence and social intelligence. One of the better known of the tests purporting to measure social intelligence is the George Washington Social Intelligence Test. This test has been criticized because of its low correlation with other tests which were

TABLE I.—INTERCORRELATIONS OF SUB-TESTS

	2	3	4	5	6	7	8	9	10
1	530	577	265	481	394	466	581	301	401
2	...	414	317	287	284	294	322	143	275
3	...	...	315	375	315	354	399	307	313
4	...	...	...	326	196	143	178	077	176
5	...	...	...	...	337	345	423	286	477
6	...	...	...	...	...	379	411	196	290
7	...	...	...	..	...	...	450	233	313
8	...	...	..	...	...	...	...	219	369
9	...	...	...	..	..	...	...	...	304
10									

<sup>1</sup>The intercorrelations for the group of five hundred were computed by Mr. Saul Stein and appear in an unpublished MA thesis in the library of George Washington University. I wish to thank him for letting me use them.

also supposed to measure social intelligence (*i.e.*, Gilliland's Sociability Test), and because of high correlations obtained between it and tests of abstract intelligence.

The purpose of the present investigation is to determine whether this Social Intelligence Test measures any unitary trait which is distinct from the ability measured by an abstract intelligence test. This problem will be approached through a factor analysis of the sub-tests of this test and of one of the standard abstract intelligence tests (the George Washington Mental Alertness Test). The correlational matrix of the ten sub-tests from these two tests will be analysed

by Thurstone's simplified method of factor analysis, in an effort to determine the fundamental factors running through these two tests.

These two tests have been given regularly to new students entering George Washington University. The results reported here are obtained from the scores of a group of five hundred students taken at random from those entering in 1932 and 1933 and a group of two hundred fifty students taken from those entering in 1934. The correlations had been computed for these two groups separately.<sup>1</sup> The results from the two groups were combined, giving weight in inverse proportion to the variance, under the assumption that the true correlation was the same in both cases. This amounted to giving the correlations from the group of five hundred twice the weight of those from the group of two hundred fifty. In most cases, the correlations were quite similar for the two groups, and it is not thought that any important error was introduced by the method of combining.

The intercorrelations are given in Table I.

The ten variables studied were the following:

**Mental alertness test.**

Variable 1.....	Vocabulary
Variable 2.....	General information
Variable 3.....	Learning ability
Variable 4.....	Arithmetical reasoning
Variable 5.....	Comprehension

**Social intelligence test.**

Variable 6.....	Judgement in social situations
Variable 7.....	Recognition of mental state
Variable 8.....	Observation of human behavior
Variable 9.....	Memory for names and faces
Variable 10.....	Sense of humor.

A factor pattern of three factors was fitted to these correlations. The three factors reduced the residual correlation to approximately what would have been expected by chance. There is some doubt as to whether the third factor was necessary. The factor loadings for each variable are given in Table II.

We see that the first factor is overwhelmingly the most important. The first factor is weighted positively in every test, and corresponds roughly to what is general to all ten tests. It accounts for about nine times as much of the covariance as does the second factor. The second factor has predominantly positive weights for the Mental Alertness Test and negative for the Social Intelligence Test, though

most of the weights are small. The third factor is of even less importance, and discriminates the last subtest of each test from the others.

These results suggest that insofar as the parts of either of these tests measure a general trait of the individual, it is the same one that is measured by the other test. The size of the first factor loadings suggests that comprehension and use of words accounts for most of what is measured both by the Mental Alertness Test and by the Social

TABLE II.—FACTOR LOADINGS

Variable	Factor		
	1	2	3
1	.781	.009	.184
2	.579	.206	.151
3	.673	.141	.165
4	.396	.418	-.004
5	.651	-.005	-.253
6	.548	-.140	.053
7	.587	-.251	.115
8	.671	-.243	.070
9	.405	-.111	-.076
10	.579	-.076	-.420
$\Sigma k^2/n$ .....	.357	.040	.035

Intelligence Test. There is evidence in the second factor that the parts of the Social Intelligence Test do have a little in common that they do not share with the abstract test. The third factor seems to be a speed factor.

Our conclusion is, then, that though the George Washington Social Intelligence Test may tap slightly some unique field of ability, it measures primarily the ability to understand and work with words which bulks so large in an abstract intelligence test.