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A New Departure in Mental Measurements

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A NEW DEPARTURE IN MENTAL MEASUREMENTS

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At the 1933 meeting of this group we presented a brief discussion of a proposed new departure in the field of mental measurements. At that time we pointed out the rather widespread dissatisfaction with current types of mental and educational tests. The first criticism was based upon the lack of agreement of test theory with the best psychological knowledge. Another criticism dealt with the fact that tests (especially educational tests) tended to emphasize the measurement of mere possession of knowledge rather than the functional significance of such knowledge. Finally, it was noted that the primary concern of the psychologist in test building was to study the behavior of minds, and that to expect to study such behavior through an instrument not constructed in the light of our best knowledge of how the mind works was, in itself, an invalid procedure.

As illustration of the underlying philosophy of this new departure we may note an excerpt from the paper given last year:

> Following Stoddard we note that intelligent activity is characterized by:
>
> 1. Difficulty
> 2. Complexity
> 3. Abstractness
> 4. Economy
> 5. Adaptiveness to goal
> 6. Social value
> 7. Emergence of originals
>
> These seven characteristics functioning in varying amounts but withal as a unity, characterize by their quantitative and qualitative differences the mind of the moron as contrasted with that of the genius.
>
> In the adjustment to and solution of any given problem situation the chief function of the intellect is the perception of and reaction to relationships. It is in the former activity that individual differences are primarily and basically operative. The moron is differentiated from the normal or super-normal person in terms of the difference in dynamic situation which each perceives when given exactly like stimuli. This concept of perception places it far beyond mere sensory perception and calls upon the highest levels of the nervous system, tying them into a dynamic interrelation, which we shall refer to as "intellection," or which may be called dynamic cognition. It is an active process in more than a simple time-space notion, and implies a more genuinely dynamic interpretation. Individual differences are thus seen to be due to the fact that the perceived situation to which the reaction is made differs from individual to individual. Also, for a given individual the same stimulus may be differently perceived dependent upon the attendant conditions.

From the data now available we have chosen the results on a test constructed according to the new principles and administered to all entering freshmen in the fall of 1933. As best descriptive of its nature, this test is called a reading comprehension maturity test. It consisted of three parts, as follows:

Part I. An excerpted passage from H. H. Newman's lecture on evolution to the University of Chicago freshmen. The test items purported to test comprehension of factual material.

Part II. An excerpted passage from Rousseau's *Confessions*, this one dealing with his religious beliefs. The test items were constructed to test for appreciation.

Part III. An excerpted passage from Schopenhauer's essay, *On Education*. The test items were constructed to test ability to make inferences.

These new type items were arranged in groups of four. In each group one statement was false, one indicated the grasp of an outstanding detail, one indicated a more complete comprehension of the paragraph, and one a complete summary of the paragraph made into a general statement. Similarly, for the appreciation type of reading this gradation was effected; for the inference items the gradation began with a simple inference and proceeded to more extensive ones, the attempt being made always to lead the student to think beyond the material immediately before him and envision it in its wider significance. In each case the students were instructed to write a B before the best statement and a W before the worst or false statement.

Reliabilities computed by the chance-halves method and stepped up by means of the Spearman-Brown formula are as follows: for the best answers only (B's) .83; for both best and worst answers (B's + W's) .88. In this connection we may point out that in all the tests built so far, the practice of using B's and W's yields a more reliable and more valid instrument. The part-whole correlations are as follows:

$$r_{I-Total} = .68 \qquad r_{II-Total} = .75 \qquad r_{III-Total} = .83$$

The inter-part correlations are:

$$r_{I-III} = .37 \qquad r_{II-III} = .43 \qquad r_{I-II} = .31$$

In these data we have the measurement of the test by one of the most rigorous of test criteria — high part-whole correlation and low inter-part correlation. The latter feature in this case indicates, at least tentatively, that the distinctions in "types" of relational perception we have assumed may be valid. However, several fundamental issues are raised at this point. Some are now under investigation but results are not yet available.

It is obviously infeasible to set up some other test as an outside criterion against which to validate the present test, so the following data are *not* to be considered as measures of the validity of the Reading Comprehension Maturity Test, but rather as indications of its place and value in use at the college and university level.

Each year entering freshmen are given the Iowa Qualifying Examinations, which consist of the High School Content Examination, the Mathematics Aptitude, and English Training Tests of the Iowa Placement Examinations series, and the Iowa Silent Reading Test. From these is derived a composite score for each student.

Table I — Correlations between Reading Comprehension Maturity and the Iowa Qualifying Examinations.

Composite	H. S. C.	M. A.	E. T.	I. S. R.
.68	.56	.51	.61	.70

In Table I we see correlations which are fairly typical of the reported correlations between intelligence and subject matter achievement. Somewhat higher correlations between the R. C. M. test and the I. S. R. test suggest that performance on both tests is probably influenced by a marked common factor. This led to the substitution of the R. C. M. for the I. S. R. in the composite score. A series of correlations was then run with first semester achievement as expressed in grade point averages. These are given in Table II.

Table II — Correlations with Grade Point Averages

*Comp. 1	**Comp. II	RCM (Tot.)	RCM (Pt. 1)	RCM (Pt. 2)	RCM (Pt. 3)
.70	.68	.51	.36	.27	.45

* Standard Qualifying Examination.
** With R. C. M. substituted for I. S. R.

From these figures the serviceability of the R. C. M. test as a predictive measure may be noted. By itself it gives a correlation equal to the average of those yielded by the more traditional tests of intelligence. When included in the qualifying examination it functions as well as a traditional reading test. From the part score correlations we may note the interesting fact that the best prediction of achievement was secured from the test on ability to make inferences. However, none of these correlations is sufficiently high to warrant use of any part by itself. A more extensive study of the possibilities for prediction of specific subject matter performance as well as general achievement is now under way.

Analysis of the responses of an individual reveals a tendency to react upon a given level of response quite consistently throughout a part of the test. That this does not obtain throughout the

test is obvious from the low inter-part correlations. This confirms one of the basic assumptions of our theory, namely the level of response of an individual is determined by his level of relation-perceiving ability.

In the present report we have presented the utilitarian aspects of this type of mental measurements. From these results we may infer a satisfactory degree of usefulness for college and university personnel work. Preliminary reports from the Reading Clinic of the department of psychology indicate that the test has considerable value as a diagnostic instrument. The test results show a well-marked relationship to the actual clinical findings with regard to comprehension.

Furthermore, experimentation now in progress indicates that we have here a highly reliable instrument, which, through a meaningful total pattern approach, supplies the possibilities for a study of intelligence in its manifold aspects. As a technic for use in educational measurements it may be used with a marked degree of success in measuring those aspects of learning which require discrimination, functional application, and valid interpretation of the learned materials.

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