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THE ROLE OF THE CONCEPT IN READING ABILITY ¹

PAUL MURPHY

One of the most fruitful fields of research in the psychology of reading has been that concerned with the analysis of specific psychological functions involved in reading. A cursory perusal of the literature, however, reveals the fact that the great majority of such investigations have dealt with the mechanical phases of the process, such as eye-movements, rate of reading, typographical factors, and related functions, leaving more or less untouched such processes as reasoning, conception, understanding, and the like. It was the hope of shedding some light on some of these untouched areas that the present investigation was undertaken.

Specifically, the study was designed to investigate the role played by the concept in reading ability. Taking our cue from the fact that the efficient reader is actually better equipped than the poor reader from the standpoint of vocabulary (which is assumed to be a measure of the individual's verbal concepts, at least), the problem was to make a more intensive study of the factors underlying this concomitant of reading ability. In other words, we were interested in finding out how the adequacy of a person's concepts reacts upon his ability to read.

The study was carried on principally through the medium of various comparisons between two groups of readers, 10 in each group, representing the two extremes of reading ability. The assumption was that other capacities in which the groups might be demonstrated to differ significantly are functionally correlated in some way with reading ability.

Having settled upon the method of divergent groups as the most appropriate approach to the problem, there still remained the problem of the specific techniques to be utilized in analyzing the concepts of the individuals selected for study. The solution of this problem appeared to demand a systematic description of the concept, so the following scheme was set up as the systematic cornerstone of the study. In the first place, attributes of both a generic and quantitative order appear to characterize the concept. Differences of a generic nature are perhaps not so clearly discernible as in the case of sensation; however, such differences as are exemplified in concrete as opposed to abstract concepts seem to be of

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this nature. The varying mental content of concepts might also serve as a basis for a generic classification. The applicability of quantitative categories is more obvious. From this point of view, each concept possesses a given degree of richness, completeness, or fullness; it possesses a definite degree of organization; it is characterized by a certain amount of clarity in the experience or mind of the individual; and it stands in a certain degree of accuracy or fidelity to the accepted meaning of the concept. In terms of this scheme, then, the purpose of the investigation was to determine how the concepts of good and poor readers vary, first, generically, and second, quantitatively, the latter category subsuming the attributes of richness, organization, clarity, and accuracy.

Let us consider first differences of a generic nature. The most obvious approach to this phase of the problem was to undertake a comparison of the concrete as opposed to the abstract concepts of the two types of readers. Since, however, this comparison eventually resolves itself into a discussion of certain quantitative differences between these two types of concepts, it will be taken up later. Another possibility that suggested itself as a basis for generic differentiation was the varying mental content of the two types of concepts. An introspective study bearing upon this point was undertaken, but the results of this study have not yet been fully analyzed. This problem was also attacked from the point of view of a comparative study of the types of associations exhibited by the two groups. 50 words selected from the Kent-Rosanoff list in such a way as to contain an equal number of abstract and concrete terms were presented tachistoscopically to the 20 Os of the experimental groups, with the instruction to "respond each time with the first word that comes into your mind." The responses were then classified into 6 categories according to a modification of Jung's scheme. Only 2 of these categories need concern us here — the "inner," which includes roughly associations based on similarity of meaning between stimulus and response, and the "outer," wherein contiguity of stimulus and response, either in time or space, is the connecting principle. According to Fisher's method for computing the significance of differences between the means of small samples, the two groups of readers did not differ reliably in either of these two categories. This is not to say that no such differences exist. If there are such variations, though, this experiment has not revealed them.

Turning next to differences of a quantitative nature, let us consider first the relative richness of the concepts of the two types

of readers. By the richness of a concept we mean, theoretically at least, the number of items of knowledge included within a given concept. Upon the assumption that the richness of a concept is indicated by the richness and rapidity of the train of associations which passes through the mind of the individual as the concept is brought into the foreground of consciousness, both continuous and free association techniques were used as means of comparing the two groups of readers in this respect. Summarizing the results of these experiments in a word or two, no significant differences in the richness of the concepts of good and poor readers were revealed by these techniques.

It seemed to the experimenter that it might be worthwhile to approach the problem from a somewhat different angle by determining the relationship between the richness of an individual's concepts in a specific field of knowledge and his ability to read material taken from that field. The data for such a study was available in the scores made by University of Iowa freshmen on certain of the Iowa Placement Tests. Accepting the training series of these tests as measures of the richness of the individual's informational background or concepts within specific fields, the problem was to determine the correlation between certain of these training examinations and the reading tests in the related aptitude series. This was done in the chemistry and mathematics series. A high gross correlation was found between the training tests and the reading sections of the related aptitude series (mathematics, $.534 \pm .04$; chemistry, $.472 \pm .04$); however, when general intelligence was partialled out the net correlations became insignificant (mathematics, $.08 \pm .05$; chemistry, $.148 \pm .06$). This attempt too, then, secured no evidence that richness of concepts is at all related to reading ability.

As has been pointed out, the free association tests utilized in this phase of the study, both continuous and discrete, were so constructed as to enable us to make a comparison of the relative richness of both abstract and concrete concepts of the two groups of readers. An analysis of three different sets of data bearing upon this point demonstrated no significant differences between the two types of readers in this respect. The results did reveal, however, that in general concrete concepts are richer than those of a more abstract nature. These conclusions are contingent, of course, upon the validity of the assumption that richness of concepts may be measured by the free association technique.

Coming to a consideration of the second of the attributive char-

acteristics of the concept, organization, we understand by this the availability of concept-meanings for immediate use, or the closeness of association between the concept-symbol and the meanings which it symbolizes. In the light of this interpretation of the attribute of organization, the controlled association test seemed to be the most adequate measuring instrument available for this phase of the study, the degree of organization being assumed to vary inversely with the length of the association time.

In a preliminary experiment involving three controlled association tests, the reaction times of good readers were found to be reliably faster than those of poor readers. However, since tests very similar to these are frequently used as measures of intelligence and since the factor of intelligence was not controlled in this study, a second experiment involving the 20 Os of the regular experimental groups, wherein the factor of intelligence was rigidly controlled, was set up.

While some of the differences found here are not sufficiently large to satisfy the demands of significance, in practically every case the chances are quite high that the observed difference is a true one.

It seemed desirable to substantiate this finding, if possible, with additional lines of evidence. The completion test included in the 1929 edition of the American Council of Education Psychological Examination was hit upon as an additional measure of what the investigator has chosen to call organization of concepts. Without going into a discussion of the assumptions underlying the utilization of this test as a measure of organization, a highly significant difference between the average scores of the two groups on this test was indicated. This provides further substantiation for the contention that the concepts of good readers are more efficiently organized than those of poor readers, at least in so far as this technique measures the quality of organization.

The most direct measure of the clarity of an individual's concepts, and one whose validity has a certain amount of experimental support, is to have him indicate the degree of certainty accompanying the identification of various concepts. After a consideration of various vocabulary tests, one of the word-recognition tests making up the College Aptitude Test used by the Association of Minnesota Colleges was selected as an adequate measuring instrument for use in this experiment. The test was administered to the 20 Os of the regular experimental groups, with the double instruction, **first, to select the correct answer from the five alternative answers pro-**

vided for each stimulus-word, and second, to indicate on the basis of a three-point scale the degree of certainty accompanying each reaction. The average degree of certainty accompanying the responses of each *O* was then computed by totaling the "assurance scores" and dividing this sum by the number of items attempted. The results of this experiment indicate that, in so far as this technique is valid, the concepts of good readers possess a significantly greater degree of clarity than those of poor readers. Statistically stated, the chances are 99 in 100 that the tendency here revealed is a true one.

Coming to a consideration of the fourth and last of the quantitative attributes of the concept, accuracy, here again an accumulation of evidence from several different sources was available. The first group of data was provided by an analysis of the scores made by the 20 *O*s of the experimental groups on a test wherein they were required to distinguish between such closely related concepts as *haste* and *speed*, *poverty* and *misery*, etc. The difference between the average scores of the two groups on this test was in favor of the good readers. The chances that this difference is a true one were found to be only 76 in 100, though, which is not significant. On the other hand, an analysis of the performances of the two groups on three different vocabulary tests, from the point of view of the percentage of items attempted that were correct, revealed, in every case, a significant superiority on the part of the good readers. An examination of the scores made by the *O*s on one part of the English Training test of the Iowa Placement Series which is quite similar in design to the test constructed by the experimenter for measuring accuracy also showed a highly significant difference in favor of the better group. The conclusion seems to be warranted, then, that the concepts of good readers are more accurate than those of poor readers, at least in so far as the methods of analysis here used measure this attribute.

By way of summarizing the results of the investigation as a whole, it has not been shown that either the generic nature or quantitative richness of an individual's concepts reacts in any way **upon his ability** to read and understand the printed page. The study has demonstrated, however, a definite relationship between this later capacity and those aspects of the concept which we have referred to as organization, clarity, and accuracy.

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