

THE FACTOR OF SPEED OF REACTION IN RACIAL MENTAL MEASUREMENT

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The notion of "mental measurement" excites a great deal of animosity in persons who cherish various sentimental delusions concerning "mental life," as it does also in those who, perchance, have not been overly successful in an experience with mental tests. An individual who makes such a criticism, however, will not hesitate to pass judgment upon two of his associates relative to their respective mental capacities, rating A, say, as more intelligent than B. In support of his judgment he will cite various activities in which A obviously excels B; and if you are still in doubt he will call in other persons to corroborate his estimate. It is quite likely that all could agree that A is more alert mentally than B. If, however, you were to ask these judges to specify the mental level of A with reference to all other adults of the same race, nationality and sex they would probably be completely non-plussed, or if they essayed any judgment it would be pure conjecture.

Psychologists have been engaged for about half a century in standardizing and refining methods whereby the relative mental levels of any given group of human subjects might be determined with some degree of objectivity. The psychologists' criteria of intelligent behavior are not different essentially from those of the laymen whom we have been discussing. It is only that systematic, quantitative standards have been substituted for ill-defined, variable ones. Not that mental tests even after an unusual period of development are fool-proof. Unfortunately, individuals more interested in financial returns than in scientific advancement have been instrumental in fostering the notion that the psychologists have a device with which they, or anyone else, may measure a subject's *intelligence*—whatever that might be. No psychologist ever thought that, although many of them have been enthusiastic over the valuable results that have been secured from *applying* mental tests to various educational problems and to the study of mental deficiency. The mental test simply provides a situation where complex human reactions may be studied in a somewhat uniform and quantitative manner. It is a measure only in the sense that the amount accomplished by a given subject enables us to classify him with respect to the whole group of which he is a member. Mental measurement, then, is fundamentally relative, although statistical treatment of the scores often tends to obscure this fact.

Individuals may be thought of as mechanisms more or less ready both by nature and by training for certain kinds of performances. Some are more easily excitable along certain lines than are others; each person has special lines of aptitude and of interest. No two

are quite alike. The measurement of an individual's varied capacities is a much more difficult matter than many uncritical protagonists of mental testing seem to think. Such a question as the relationship of speed to quality of performance never seems to occur to the average person engaged in applying mental tests to various practical problems. Yet this question is extremely important inasmuch as the majority of these tests have definite time limits and take the amount done within the time limits as the measure of an individual's capacity for doing work of that type. This obviously puts a great deal of stress on speed, especially if the tests happen not to be too difficult.

The significance of this point for racial mental measurement cannot be too strongly emphasized. For the psychological study of races has been carried on almost entirely by means of various types of mental tests. The almost exclusive use of this method is due to the fact that practical considerations preclude any extensive research upon races in psychological laboratories. The difficulties of securing representative samplings of subjects are great enough even when psychologists go into the public schools and into other public institutions; it would be almost impossible to get groups free from errors in sampling by any other method. Besides, the mental test as a method is not intrinsically unsound, as we pointed out above. It consists of a carefully selected set of problems which presumably require for their solution the exercise of whatever capacity they are devised to measure. There are certain statistical requirements which a test must satisfy in order to establish its claim to consideration as a reliable and valid instrument. If it measures up well to these requirements all *a priori*, arbitrary criticism may perhaps be overlooked.

The use of mental tests, especially those of the *group* variety, in comparative studies of the mental capacities of different races has not always been justified. Many persons have pointed out, quite correctly, that the validity of any such comparisons depends upon an approximate equality of educational opportunity in each of the race groups compared. This is especially true of tests stressing verbal elements unduly; the criticism does not apply to non-linguistic tests. There is a further factor which affects performance on any kind of test and which has not received the consideration it deserves in racial studies. This is the factor of motivation. A test that has a time limit is used with the assumption that all of the individuals studied will work as rapidly as possible throughout the period. The average group of American white school children, say, can be depended upon to do this. Speed is an important element in our culture, although the relative parts played by heredity and training in bringing this condition about are not known. To the Indian or to the Negro speed of reaction may have little significance, or an unfavorable one, and a test which stresses this element is apt often to be measuring speed of reaction when it purports to be measuring something else entirely. This point has been emphasized very strongly in a recent monograph in which the author (Klineberg,

Archives of Psychology, No. 93) is inclined to think that many of the race differences in mentality that have been reported are really differences in speed. Klineberg's study is about the only one to consider the question of speed of reaction as a factor in racial performance on psychological tests and I shall report certain of his results before taking up my own experiments.

Klineberg studied Indians, negroes and whites with non-linguistic performance tests. Both rural and urban groups in all three races were used. The whites generally excelled the other groups in *time* scores, although in what he terms *accuracy* of performance, measured by the number of errors made, "there is no superiority and in some cases an inferiority" of the whites. Klineberg further interprets this to mean that it is only in speed of reaction that the whites are superior. He computes speed indices for each subject on two of the tests. The speed index of a given subject is secured by dividing the total time required on a test by the number of reactions made. This gives the average time per reaction for each subject. From these speed indices of each subject averages were figured for all of the groups studied. The following is the ranking of the three races from fastest to slowest: whites, negroes, Indians. Klineberg is inclined to attribute these differences to "environment," although he does not specify what he means by this term, other than to say that it includes everything not due to heredity. One of his arguments in favor of the environmental hypothesis is that when the seven groups studied are divided not on the basis of race but on the basis of a rural-urban classification the superiority of the urban groups in speed is greater than that of the whites over either of the two other races. This argument is of doubtful validity in view of the small number of rural whites used. In fact, all of Klineberg's work is based upon samplings which do not appear very satisfactory to me.

EXPERIMENTAL RESULTS

There is no doubt that the results reported by Klineberg are important, if for no other reason than that they suggest further work on the question. I shall report now such facts as have come to light in my own work on the problem. In a monograph which is now in press the results of some five years of intermittent study of various white and negro groups are reported. Adult college students and twelve-year-old children in each race were used as subjects.

Not a great deal of importance can be attached to the results with adult subjects for the reason that all of the tests were so-called "group" tests, and such tests admit of no control of the speed factor. The subjects were taken from white and from negro normal schools and were as fairly comparable on the basis of educational opportunity as any two groups of adults we could secure. Comparisons of the scores of the two races reveals one fact of interest in our present discussion. Four so-called "general intelligence tests," six tests of musical talent, two tests of mechanical aptitude and four simple

speed tests were given. The number of white subjects equalling or surpassing the average negro score in each of these four types of tests (the several tests of each sort being averaged) were (1) intelligence tests 81 per cent, (2) music tests 69 per cent, (3) mechanical aptitude tests 67 per cent, (4) speed tests 62 per cent. The whites excel in all of the tests, but their smallest margin of superiority is in the simple speed tests, their greatest in the intelligence tests. This may not mean a great deal in relation to Klineberg's results; a number of psychologists have found little or no relationship between speed in simple and speed in complex reactions. Nevertheless, these facts would seem to indicate that even if the group intelligence tests measure speed to a great extent it is in speed of these more complex operations rather than in simpler processes that the white advantage is greatest. These results with adults should not be stressed too much, however, not only because of the methods used in the examinations but also because it is much more difficult to equalize environmental factors for adult groups than for children.

In the study of white and negro children some two hundred of the former and over three hundred of the latter were examined. These subjects came from Nashville, from Chicago and from New York City. The children from Nashville and from New York were selected with a great deal of care; the attempt was made to secure representative samplings of children between twelve and thirteen years of age. In Chicago the selection was not as complete, due to the fact that the work was done in the summer when the public schools were not in session.

Both group tests and individuals were given to the Nashville children. Comparison of the races on the basis of these two types of tests seems to substantiate somewhat the claim that the group tests measure things other than the capacity for making the type of reaction called for in the test. Averaging three group tests, where the amount done within given time limits is the score, we find that 90 per cent of the whites equal or excel the negro average. On the individual tests, however, only 67 per cent of the whites surpass the average negro score. These individual tests are so-called ingenuity tests in which the subject is constantly stimulated throughout the test, while in the group tests every subject was left to his own devices during the time limits allowed for any given part of a test. If subsequent experimentation confirms this result it would seem that the average negro approaches the performance of the average white child much more closely when not left to himself to do as he pleases. The white seems to have a set for speed and perseverance in these thinking processes which the negro lacks to a great extent.

Comparing the race groups in the three cities, respectively, with reference to total efficiency as judged by all of the criteria involved, we find that in Nashville the whites excel the negroes considerably, that the difference in Chicago also favors the white group although it is much less than in Nashville, and that in New York there are

no differences that satisfy statistical reliability requirements. The New York whites excel the negroes slightly on the basis of two of the tests given there, while the negroes are superior on one test. I do not know just what these results mean. It might appear that the better opportunities of the negroes in Chicago and in New York in the way of education would account for their relatively better showing. On the other hand, the selection of negroes in New York and in Chicago may be superior to that in Nashville. Possibly both factors are involved. Much more extensive work will be necessary to secure a representative sampling of American negroes.

The individual ingenuity tests used in the present study were of such a nature that the rates of response of the subjects could be calculated. The method was the same as that of Klineberg. Comparing the races in the several cities on the basis of average time per response we find that the whites excel the negroes markedly in all three cities. Furthermore the Nashville negroes were somewhat faster than the same race in New York. This is interesting in view of Klineberg's assertion that this speed difference is due to environment. If this were true it would seem that the reputed accelerated tempo of Northern cities would affect the negroes there so as to produce quicker reactions than we found in those in the South. This was not the case with our subjects. In performances where the efficiency of the negro's reactions by criteria other than time practically equalled or even surpassed that of the whites in the same locality we find that *the rate of response in the negro is very much slower.*

These results cannot be said to *prove* that speed has some fundamental organic basis which produces these differences irrespective of environmental factors, but they do seem to incline somewhat toward this view. There is a good bit of evidence in support of the opposite view, as Klineberg shows, especially in the case of the Indian. His argument runs something like this: "Speed seems to have a place in a competitive society, but there is little or no competition among the Indians. . . . Not more than 15% of the able-bodied men earn their living. . . . Most of the others live on the rent the white men pay them for the use of their land. Fishing and berry-picking supply them with the greater part of the food they require. For the rest they do as they wish—but slowly. They have no need for speed." This argument sounds well, until we ask how they happened to get that way in the first place. This is a problem which we cannot settle, but the factor of heredity cannot be ignored as many of the protagonists of "environmental" explanations seem to think.

We may mention a possible explanation of the speed difference which has been suggested by the work of certain physiologists, namely the rate of body metabolism is associated with speed of reaction. One study (MacLeod, Crofts and Benedict) found that the basal metabolism of nine normal Oriental women was strikingly low as compared with that of normal American women. A thorough

study of this factor in both negroes and Indians would probably yield interesting results; correlations between speed in various sorts of activities and measurements of such physiological processes as blood-pressure, metabolic rate, etc., might easily be worked out.