

**THE COMPETENCY OF  
FIFTY COLLEGE STUDENTS  
(A DIAGNOSTIC  
STUDY), A THESIS; PP.3-56**

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The Competency of Fifty College Students (a Diagnostic Study), a thesis; pp.3-56 by Karl Greenwood Miller

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UNIVERSITY OF PENNSYLVANIA

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THE COMPETENCY OF FIFTY COLLEGE  
STUDENTS  
(A DIAGNOSTIC STUDY)

BY  
KARL GREENWOOD MILLER

A THESIS  
PRESENTED TO THE FACULTY OF THE GRADUATE SCHOOL IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE  
OF DOCTOR OF PHILOSOPHY IN PSYCHOLOGY

PHILADELPHIA  
1922

## THE COMPETENCY OF FIFTY COLLEGE STUDENTS.

(A Diagnostic Study.)

### NOTE

This Thesis will be found reprinted as No. VIII of  
EXPERIMENTAL STUDIES IN PSYCHOLOGY AND PEDAGOGY

### INTRODUCTION.

No task more worthy of attention confronts the psychologist today than the scientific study of the college student by means of mental tests.

Psychological tests were first employed in the examination and segregation of the mentally feeble. A large number of clinics connected with modern school systems, hospitals, or juvenile courts have found these tests of service in detecting mental subnormality. It has only been in the last decade, however, that the possibilities of the psychological examination of "normal" individuals have been recognized, and rapid advances are now being made in this field. The success with which mental tests were used in the classification and stratification of the great mass of men who formed our National Army probably did more to bring about a general acceptance of the method and principles involved than would have resulted from many years of experimentation in peace times. Today, psychological tests are used not only in the field of education but also form an integral part of the selective and administrative machinery of many large industrial organizations. The present vogue of the mental test carries with it one real danger in that the uninitiated are likely to demand more of the psychologist than he can give.

Without doubt it is now possible to say, as a result of a psychological examination, that one individual possesses too little mentality to admit of his being a self-supporting member of society, that another can be trained to perform a simple task satisfactorily, that a third has ability which will enable him to fill a place in the great middle class, while still another has intellectual endowments which should lead him into the fields of higher education and professional activity. These broad classifications can be made through the employment of many and various tests which have been carefully devised and scientifically standardized. With the concept of differing levels of general intelligence fairly well developed the psychologist now faces the task of classifying individuals. When the attempt is made not only to ascertain the general performance level but also to determine for what occupation the specific abilities of the individual best fits him, the difficulty of the problem is tremendously increased. Shall the man of small competency be a ditch-digger or a stevedore?

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Is the citizen of mediocre ability best qualified to follow the vocation of motorman, mechanic or clerk? Should the college student be guided into industry, law or teaching?

These questions imply that the psychologist must also function as a vocational adviser, and while this obligation may not at present be generally accepted, the implication is nevertheless warranted. Mental tests, if they are to be of value to society, must lead to prognoses as well as to diagnoses and must at least offer to the individual tested some information which may be useful in the attainment of greater personal and social efficiency. In much the same manner as the employment manager of today places the applicant in some particular position in his organization, so the psychologist of the future may find it possible to direct each member of society to the one vocation which will best utilize his peculiar qualifications.

It is hardly necessary to point out that the problem of differentiation becomes increasingly complex as the higher levels of intellectual organization are approached. The idiot may be consigned to custodial care with but small probability of error. The stevedore, the scavenger, and the ditch-digger gravitate to their respective occupations without perceptible friction. The "common people" present a more difficult problem in view of their higher level of performance and greater complexity of response, but even here noteworthy advances have been made in recent years through the introduction of vocational guidance and the application of psychological principles to industrial management. Although investigation of this character has hardly passed beyond the experimental stage, a beginning has nevertheless been made, and remarkable developments during the next decade may be confidently anticipated.

The task of differentiating the particular abilities required of the successful plumber, mechanic, clerk, motorman, and telephone operator—to mention only a few of the almost countless range of occupations—is doubtless a difficult one, but it hardly approaches the complexity of the problem presented in the guidance of individuals of greater intelligence and higher intellectual organization to the one vocation for which each is best fitted. While interest, personality, and various external circumstances can not be disregarded as important factors in the selection of the life work, the concern of the psychologist lies primarily in the determination of the specific abilities requisite to each type of professional activity, and in the scientific evaluation of the particular abilities possessed by each individual. It is with the latter phase of the problem that this investigation will deal, the interest being centered on the college student, who, despite his many shortcomings, must be regarded as representative of the highest intellectual type of young manhood in the country.

## HISTORICAL.

The attempt to appraise the undergraduate by means of mental tests must not be considered a new departure in the field of psychology. The credit for the first scientific study of the American college student goes to J. McKean Cattell. Stimulated by his researches in the anthropometric laboratory of Francis Galton, he inaugurated in 1887 a series of experiments with undergraduates at Harvard University, which investigation he continued at the University of Pennsylvania and Bryn Mawr College in 1888 and 1889, and in the following years at Columbia University. The report entitled, "Physical and Mental Measurements of the Students of Columbia University", which appeared in the *Psychological Review* for November, 1896, and in which Professor Cattell collaborated with Dr. Livingston Farrand, was probably the first publication of the results of a systematic study of the mental status of the college student. This report is of peculiar interest today not only because of its scope, but also in view of the surprising number of mental and physical tests actually employed or suggested at that time which now constitute the accepted instruments of every clinical psychologist. While the purpose of the investigation was necessarily the establishment of norms by the statistical treatment of the test results of one hundred students, and the aim of the present study is rather the observation of individual variation, it will nevertheless be of interest to indicate, briefly the character of the information recorded by Cattell. Anthropometric measurements such as height, weight, and cephalic diameters were noted, and in addition such physiognomic characters as the color of hair and eyes, and the size and shape of ears. In addition, psychophysical determinations of visual and auditory acuity, sensitivity to pain, and various types of reaction time were made, as well as tests of a more strictly psychological nature which included memory of drawn lines, memory of numbers heard, cancellation test, color preference, types of imagery, and others.

The investigation under consideration was carried on during the academic years of 1894-95 and 1895-96, and it is of interest to note that the results were published so as to be of assistance to a committee appointed at the annual meeting of the American Psychological Association held at Philadelphia in December, 1895, to consider the feasibility of co-operation among the various psychological laboratories in the collection of mental and physical statistics. This "Committee on Mental and Physical Tests", which consisted of Professors Cattell, Baldwin, Jastrow, Sanford, and Witmer, may well be said to have laid the foundation for all subsequent develop-



ments in the realm of psychological tests in its report to the Psychological Association at the meeting held in Boston in 1896. This report may be found in the *Psychological Review* of March of the following year.

Having thus briefly indicated the inception of the present field of investigation, it would be a thankless task to trace its history down to the present moment in any adequate manner. Studies of this character have been carried on in every psychological laboratory connected with a college or university, and a complete bibliography of the reports on the subject would cover many pages. It will be well, however, to mention a few of the more important investigations which have a direct bearing on the present problem, in so far as it concerns the correlation of test results with academic standing. Wisler (1) correlated the results published by Cattell and Farrand, to which reference has been made above, with the university grades assigned to the hundred students under consideration. Calfee (2) has reported on "Four General Intelligence Tests" given to approximately one hundred students at the University of Texas. Similar investigations have been made by Rowland and Lowden (3) at Reed College, Waugh (4) at Beloit College, and by Kitson (5) at the University of Chicago. The latter study is particularly worthy of note in that a very careful and intensive examination of forty students was made. King and McCrory (6) report the results of tests on five hundred freshmen at the University of Iowa, Caldwell (7) has correlated the Intelligence Quotient of approximately one hundred students at Randolph-Macon Woman's College, as determined by the Adult Tests of the Stanford Revision, with college grades, and Rogers (8) gives interesting results of her investigation at Goucher College. In the reports mentioned above, Kitson and Caldwell also record correlations between test results and estimated intelligence, which will be referred to later in this discussion. Incomplete as is the preceding sketch, it nevertheless gives some indication of the wide-spread interest in the application of mental tests to the college student. In this connection it will likewise be well to refer to the comparatively recent development in the field of psychological entrance examinations, which are now demonstrating their practicability in a number of the larger universities, and which constitute a further ramification of the same problem.

#### *Experimental Conditions.*

Stated briefly, the aim of the present study is to examine certain data which have been collected relative to each member of the class in elementary psychology at the University of Pennsylvania during

the academic year 1919-20. This information consists of the score obtained in a "general intelligence examination", the results of a series of psychological tests, a rating on estimated competency, and a rating based on the academic standing of the individual as determined by the final grades received in all courses completed at the University. The treatment of results will be concerned with the examination of correlations existing between the various ratings under consideration, and with the scrutiny of the individual record with a view to reaching, if possible, some conclusions which might be of assistance to the student in the direction of his intellectual development.

The investigation differs from many which have preceded it, in that the psychological tests, with one exception, were given as a part of the ordinary class instruction and therefore not primarily as tests. The elementary work in psychology consists of two courses known as Psychology 1 and 2, each requiring five hours of class attendance and continuing throughout one semester. Since credit in Psychology 1 is prerequisite to admission into Psychology 2, the two courses may be considered as a single introductory course lasting through the full academic year. Of the five hours of class attendance per week, only one hour is occupied by a formal lecture, the remaining four hours being devoted to laboratory work. During the first semester a number of mental tests are given as a part of the laboratory work and with the purpose of graphically demonstrating the various factors which function in the formation and development of the intellect. It is believed that this method enables the student better to understand and appreciate the particular ability or mental process under discussion. It is not claimed, therefore, that the series of tests employed would necessarily have been chosen had the purpose been the psychological examination and diagnosis of the individual to the exclusion of other considerations. However, the tests unquestionably provide a very satisfactory framework upon which to build a logical presentation of systematic psychology as well as offering a medium for the demonstration of fundamental psychological processes. In addition, the tests are extremely valuable to the student, in that they enable him to determine his peculiar mental assets and liabilities through a comparison of his individual results with accepted standards or class distributions.

Since the tests under consideration were given as a part of the usual classroom procedure, the scientifically controlled conditions which are generally regarded as indispensable to a psychological investigation of this character were for the most part lacking. As the class in Psychology 1 numbered more than two hundred students,

the laboratory work was conducted in three sections with an average enrollment of approximately seventy. These three sections all met in the same room, one being held at eight-thirty o'clock in the morning, another at two in the afternoon, and the third at three o'clock on a different afternoon. While the time of meeting was constant for each section, the variation in hour possibly affected the comparability of section results. With such a large number of students in a laboratory class, some were necessarily seated at a greater distance from the instructor than others and in addition a few were near windows which may have provided distraction of one kind or another. In some cases, the same test was given to the three sections by different experimenters, and although the attempt was made to adhere as closely as conditions would permit to the standard procedure, this variant may have affected the results to some extent. In summary, lack of uniformity in the time of meeting of the different sections, in the seating arrangement of the classroom, and in the identity of the experimenter may be considered factors which expose this investigation to criticism as being unscientifically conceived and prosecuted.

The comparative absence of controlled experimental conditions, however, cannot be said to invalidate the results. It is an open question whether the environment imposed upon a subject by scientifically controlled conditions elicits a more representative sample of behavior than that produced under less artificial circumstances. Is the psychologist more interested in the reaction of a subject who has been isolated in a sound-proof cabinet with a screen before his eyes to eliminate distracting visual stimuli, or in the behavior of the same individual as displayed in natural association with his fellows? For some, the classroom would provide as unnatural an environment as any that the experimentalist might impose, but for a group of university students no more satisfactory and less distracting atmosphere could be selected than that of the recitation hall or laboratory. It is contended, therefore, that the experimental results here presented provide an index of the mental status of the college student as reliable as any that might have been obtained under other conditions.

Having thus disposed in a somewhat arbitrary manner of any criticisms which might be voiced against the general procedure followed in this investigation, it will be well to consider the treatment of the data collected before undertaking a description of the specific tests employed. As has been indicated, the information available concerning each member of the group here studied consists chiefly of the results of a series of mental tests and the academic record of