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THE VALIDATION OF THE CORNELL INDEX WITH
FRESHMAN STUDENTS AT MICHIGAN STATE COLLEGE

by

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CHAPTER I

INTRODUCTION AND STATEMENT OF PROBLEM

For a number of years many American Colleges have been requiring all new students to take mental ability, achievement, and health examinations, and recently, special hearing and speech tests have been added to some of these programs. Now, with the increasing awareness of the need for helping students with their individual problems, many colleges are establishing counseling centers, which are staffed by professional counselors, and organized specifically to assist students with their problems. The student difficulties extend over many problem areas such as: inability to meet academic standards, confusion in the selection of a suitable vocation, and failure in the solution of problems of personal adjustment.

A number of colleges have reported on the extent of these problems. Fry and Rostow¹ reporting on the program at Yale University show that during the ten year period the report covers, 1257 students were seen by the psychiatrists in the health center. Of this group 47 per cent were seen more than three times--some weekly for over a year's time. The types of problems presented included those relating to family, social, scholastic, and sexual adjustment.

¹ Clements C. Fry and Edna G. Rostow, Mental Health in College, Commonwealth Fund, New York, 1942, 365 pp.

President Seymour of Yale feels that the universities must help work out these problems. He writes:

The problems dealt with by psychiatrists are so widespread among students and so severe in individual cases that our institutions cannot safely ignore them.²

As further evidence of the presence of these problems the Counseling Center at Michigan State College reports that it handles over four hundred individual student interviews each week. Other universities also report that their centers, with limited personnel, cannot handle all student requests for help. The directors of counseling at the University of Michigan and at the University of Illinois, each with eight full-time counselors, state that their staffs are unable to meet student needs.³ Studies by Klohr⁴ at Syracuse, and Stone⁵ at State Teachers College, River Falls, Wisconsin, also point out the great extent and high frequency of student problems.

² Ibid., foreword.

³ Personal communications from Doctors E. Borden and W. A. Gilbert.

⁴ Mildred C. Klohr, "Personal Problems of College Students", Journal of Home Economics, 40:447-48, October, 1948.

⁵ Gordon L. Stone, "Student Problems in a Teachers College", Journal of Educational Psychology, 39:404-16, October, 1948.

Hampton⁶ has made an excellent statement describing the emotionally disturbed students who are the special task of the counseling center. He says:

The majority of problem cases in college are so-called "normal" students, who react only at times, according to the circumstances of their lives, in much the same way as those who are popularly considered "abnormal". These people have periods of anxiety and depression; they experience fears and compulsions, they are troubled by insomnia and fatigue, and by similar minor deviations of normal behavior. It is this group of students, constituting a cross-section of the university population that needs day-to-day psychiatric guidance, which can be provided by proper college mental health service.⁷

Use of screening devices by industry and armed forces. Other organizations, involving large numbers of people, have recognized the need for helping individuals with their personal problems, and business and industry are developing techniques for locating and assisting persons having problems centering around personal adjustment. Weider⁸, in writing about the induction of new workers at the Caterpillar Tractor Co. says:

It appears that the preventive aspects of mental hygiene are best served when employees with intellectual or with

⁶ Peter J. Hampton, "The Minnesota Multiphasic Personality Inventory as a Psychometric Tool for Diagnosing Personality Disorders Among College Students", Journal of Social Psychology, 26:99-108, August, 1947.

⁷ Ibid., p. 99.

⁸ Arthur Weider, "Mental Hygiene in Industry--A Clinical Psychologist's Contribution", Journal of Clinical Psychology, 3:309-20, October, 1947.

emotional handicaps are individually considered and selectively placed in industry. No less important for mental hygiene should be the counseling given to employees in order to prevent aggravation of existing emotional difficulties or to counsel employees early and so prevent such problems from getting started.⁹

The armed forces also found that the maladjusted individual was a serious problem. In discussing the entrance of inductees into the army in World War II, Grant states:

It became increasingly evident that an emotionally maladjusted individual, regardless of his physical stamina, intelligence and skill, was a handicap not only to himself but a burden and a bad influence on the group of which he became a part.¹⁰

The attempt to screen out individuals at the induction center proved to be a very difficult problem. Hunt and Stevenson¹¹ explain that with large numbers of men being inducted and with relatively few psychiatrists assigned to induction centers, time was not available for a satisfactory psychiatric interview. To alleviate this problem, the armed forces attempted to construct screening devices to select those men who needed longer interviews, and this attempt resulted in the development of some new tests. The Cornell Selectee Index and the Neu-

⁹ Ibid., p. 212.

¹⁰ Harry Grant, "A Rapid Personality Evaluation Based on the MMPI and Cornell Index", American Journal of Psychiatry, 103:33-41, July, 1946.

¹¹ W. A. Hunt and I. Stevenson, "Psychological Testing, in Military Clinical Practice, II, Personality Testing", Psychological Review, 53:107-15, March, 1946.

ropsychiatric Screening Adjunct appear to be the two most frequently used. These tests differed from the older type of personality inventories both in the kinds of questions used and in length of the test. The differences are explained by Hunt and Stevenson in the following statements:

Most of the older inventories were specifically aimed at the detection of emotional instability or neurotic tendency whereas the present military screening tests are aimed at the detection of all types of neuropsychiatric conditions ranging from the milder behavior disorders through the psychoneuroses and psychoses and including many primarily organic conditions such as epilepsy, encephalitis, and post traumatic disorders. While this goal may appear overly ambitious, these tests have proven remarkably successful in military selection.¹²

They state further:

The items on a screening test aim at the detection of symptomatological behavior such as headache, tachycardia, enuresis, and dizzy spells. They are not personality tests in the usual sense of the word but are printed psychiatric interviews.¹³

The wide use and efficiency of these tests in every branch of the service led Hunt and Stevenson to write: "The outstanding success of screening tests represents one of the most important testing contributions of World War II."¹⁴

Since colleges face a similar task of picking individuals having problems of personal adjustment from a large group, a screening device might well be used. Such an instrument would not be expected to differ-

¹² Ibid., p. 107.

¹³ Ibid., p. 108.

¹⁴ Ibid., p. 109.

entiate between various types of difficulties but merely to identify the persons needing help. In support of this type of inventory, Modlin says:

Under some existing situations, relatively large groups of potential or actual psychiatric cases may be advantageously surveyed in toto; but personal and individual relationships are inherent in the practice of psychiatry, and psychometric procedures profitable to the clinician must be adaptable to individual application and interpretation.¹⁵

Leavitt, in discussing how the characteristics of this type of test differs from the older ones, says:

In order for any neuropsychiatric screening test to be of value in an induction station, it is necessary that the test be rapidly administered, easily comprehended, quickly scored, and that the individual items in the test be easily scanned by the neuropsychiatrist. The test substance should indicate the presence of the commonest syndromes such as chronic anxiety states, neurasthenia, hypochondriasis, anti-social trends, and the more common psychosomatic illnesses as asthma, migraine, peptic ulcer, and vasomotor syndromes.¹⁶

A neuropsychiatric screening test could be added to the freshman placement battery, if the scores on these tests might enable the counselors to locate most of the students who need help. Leavitt¹⁷ found that the Cornell Index and the Neuropsychiatric Screening Adjunct screened 85 per cent of the inductees who were rejected after a psychiatric interview.

¹⁵ Herbert C. Modlin, "A Study of the Minnesota Multiphasic Personality Inventory in Clinical Practice: With Notes on the Cornell Index.", American Journal of Psychiatry, 103:758-69, May, 1947.

¹⁶ Harry C. Leavitt, "A Comparison Between the Neuropsychiatric Screening Adjunct (War Department) and the Cornell Selectee Index.", American Journal of Psychiatry, 103:353-7, November, 1946.

¹⁷ Ibid., p. 357.

The problems of identifying students needing help. Counseling Centers, at present, face three problems that can be lessened by the use of screening tests. The first of these is lack of knowledge as to the persons needing help. Many parents train their children to keep their troubles to themselves, and thus, even though the students they know that help is available, many of them feel reluctant to take the first step toward the solution of their problems by visiting a counselor for an interview. A second factor is the defensive mechanisms that individuals develop when they are unable to solve their difficulties. These mechanisms often make it difficult for the counselor to diagnose the student's real problem. Among the techniques which the students use are retreat from the problem, over-aggressive behavior, or compensation in some other activity. These defenses allow the individual to live rather peacefully with himself until some particular crisis presents a threat too great to allow the defense mechanism to function successfully. Many persons tend to operate in this semi-satisfactory way rather than to endure the emotional disturbance that results from some one else's or his own delving into the problem. The third factor is the increase in intensity of the emotional disturbance, due to a new crisis, which makes a visit to the Counseling Center necessary. The client and counselor must then work on the basic problem with the additional tensions caused by his academic probation status, threat of college disciplinary action, or inability to make a speech in English class. Therapy would be much simpler if undertaken before these new problems develop.

If students having problems of personal adjustment could be identified by means of a screening test, contact could be made and therapy begun before new problems arise to increase the complexity of the situation. The armed forces and industry report the successful use of this technique. Colleges, with a similar problem to solve, should be able to take advantage of these findings. It seems advisable to consider the addition of an instrument to the college placement battery which would help to locate students needing counseling help so that these personal factors would not reduce their chances for success.

STATEMENT OF THE PROBLEM

This research is concerned with the effectiveness of the Cornell Index, Form N-2, as a screening device to be used in the identification of college freshmen who have problems that deviate from those of the normal person. It will be concerned with the identification of these individuals rather than with the differential diagnosis of their deviations from the normal. The following information will be sought in this study:

1. The distribution, mean, and dispersion of scores on the Cornell Index for a college freshman population.
2. The sex differences that appear in the various statistical findings.
3. The degree of relationship between the scores on the Cornell Index and scores made by the same individuals on the Minnesota Multiphasic Personality Inventory.
4. The degree of relationship between scores on the Cornell Index and the judgments of counselors as to the emotional adjustment of the students included in this study.
5. An appraisal of the Cornell Index as a screening device to be used to differentiate between normal, borderline, and seriously disturbed persons.

Description of the Cornell Index. The original Cornell Index, known as the Cornell Selectee Index, was developed in 1942 to screen armed forces inductees so as to identify those men who might have serious

personality problems. These men were then interviewed by two psychologists and three psychiatrists working together to determine if the maladjustment was great enough to eliminate them from military service. A second form, the Cornell Service Index, was later developed for screening men in replacement centers, in hospitals, and for special assignments. The success of these tests has already been mentioned, and further evidence of success will be given in the next chapter.

Some of the questions used in these early forms were unsuited for civilian use; as a result a revised form, N-2¹⁸, was developed and published in 1948, in which additional questions which cover more areas, were added increasing the length from sixty-four to one hundred questions.

The authors make the following statement about the purpose and nature of the Index:

The need has been felt for an instrument for the rapid psychiatric and psychosomatic evaluation of large numbers of persons in a variety of situations. The Cornell Index was assembled as a series of questions referring to neuropsychiatric and psychosomatic symptoms which would serve as a standardized psychiatric history and a guide to the interview, and which, in addition, would statistically differentiate persons with serious personal and psychosomatic disturbances

¹⁸ Arthur Weider, et al, Cornell Index, Form N-2. The Psychological Corporation, New York, New York, 1948.

from the rest of the population. It was devised as an adjunct to the interview: not as a substitute unless an interview is impractical.¹⁹

For example, some of the questions in the Index are:

Do strange people or places make you afraid?

Are your emotions usually dead?

Do you make friends easily?

Do your enemies go to great lengths to annoy you?

The items presented in Table I as listed by Weider²⁰ are given in terms of nature and frequency of questions in each area.

TABLE I

GROUPING OF ITEMS ON THE CORNELL INDEX, FORM-N2

	Question Nos.
Introductory neutral question	1
Questions concerning	
defects in adjustment expressed as feelings of fear and inadequacy.	2- 19
pathological mood reactions, especially depression.	20- 26
nervousness and anxiety	27- 33
neurocirculatory psychosomatic symptoms	34- 38
pathological startle reactions.	39- 46
other psychosomatic symptoms.	47- 61
hypochondriasis and asthenia.	62- 68
gastrointestinal psychosomatic symptoms	69- 79
excessive sensitivity and suspiciousness.	80- 85
troublesome psychopathy	86-101

¹⁹ Arthur Weider, et al., Manual for Cornell Index, The Psychological Corporation, New York, New York, 1948, p. 7.

²⁰ Weider, et al., op. cit., p. 5.

The reaction of the individual to twelve of the items are considered so important that they are labeled "stop" questions. Anyone answering these questions in the direction opposite to that listed by the authors should be investigated in an interview. For a complete listing of these questions refer to Chapter IV, Table IV.

The reliability coefficient of the Index is given by the authors²¹ as .95. This coefficient was obtained by the Kuder-Richardson technique for one thousand subjects tested at five induction stations, and its validity was tested on 600 males without personality disturbances and 600 males with disturbances. These men came from five different sections of the United States. A cut-off point of twenty-three deviate answers identified 50 per cent of the disturbed persons and identified 4 per cent of the ostensibly normal persons. A cut-off point of thirteen picked 74 per cent of the disturbed persons and 13 per cent of those considered normal. The cut-off level may be chosen to meet the particular situation in which the Index is used. If time for interviewing the individuals screened by the Index is quite limited, a high cut-off point should be selected. Almost all of the persons thus selected for interviewing will be found to be emotionally disturbed but all of the disturbed persons will not have scores above this cut-off point. If more time is available for interviewing, a lower cut-off score is used and larger percentage of both disturbed and normal people will be

²¹ Weider, et al., op. cit., p. 3.

selected. The cut-off points used by the authors were established for males. Comparable norms for females have not been established.²²

Other inventories considered for use in the study. Other personality tests were considered for use as screening devices. The Rorschach and the Thematic Apperception Tests are generally considered to be the most effective instruments used in the study of personality deviations. These tests administered individually, require from four to six hours to administer, to score, and to interpret, and therefore, are not suitable for screening large numbers of persons.

The Bernreuter, the California, and the Minnesota personality inventories require about forty-five minutes to administer and ten minutes to score. The Bell adjustment Inventory requires ten to twelve minutes to administer and two to four minutes to score. The time required for administering and scoring the first three of these is excessive for a screening device. Further, all four of these inventories give results in terms of neurotic tendencies or emotional disturbances rather than in psychosomatic symptoms and organic difficulties in which the psychological aspects are of considerable importance.²³

²² Ibid., P. 3.

²³ Hampton, op. cit., p. 104.

At the present time, the most frequently used structured personality inventory is the Minnesota Multiphasic Personality Inventory, hereafter referred to as the MMPI.²⁴ It consists of 555 questions dealing with psychosomatic symptoms, feelings, and certain organic difficulties, and it purports to measure the amount of deviation from the normal in terms²⁵ of hypochondriasis, depression, hysteria, psychopathic deviate, masculinity-femininity, psychasthenia, schizophrenia, paranoia, and hypomania.²⁶

Three validity scales are used to measure the test taking attitude of the client, and when the numerical value of any of these scores exceeds the limits, which were empirically determined, the inventory is considered void.

This inventory attempts to measure the kinds of symptoms in which we are interested, but it requires about forty-five minutes to administer and fifteen to twenty minutes to score and the test is further complicated so that when it is machine scored sixteen scoring stencils are used. The time required makes it impractical as a screening device.

²⁴ S. R. Hathaway and J. C. McKinley, "Minnesota Multiphasic Personality Inventory", The Psychological Corporation, New York City, New York, 1943, 14 pp.

²⁵ See Appendix C for definition of these terms.

²⁶ S. R. Hathaway and J. C. McKinley, Manual for the Minnesota Multiphasic Personality Inventory, The Psychological Corporation, New York City, New York, 1943, 16 pp.

Three short inventories of the printed psychiatric interview type²⁷ are discussed in the literature. Each can be administered in less than ten minutes and scored in less than one minute. Probably any one of the three would be suitable for screening purposes. The first of these inventories is the Neuropsychiatric Screening Adjunct²⁸ developed by the War Department for psychiatric screening in World War II. Made up of twenty-three questions this inventory has not been published for civilian use. The second of these tests is one developed by Grant²⁹ for use in screening admissions to Military Hospitals. It consists of questions selected from the MMPI and the Cornell Index. Its 110 questions are scored in terms of the nine phases of the MMPI and a validity score. Grant³⁰ found that it screened over 90 per cent of those persons who were judged by the psychiatrists, to be seriously disturbed. This inventory has not been printed for civilian use. The Cornell Index which has been revised and published for civilian use is the third of this type.

This study will investigate the effectiveness of the Cornell Index in detecting College students individuals who are emotionally disturbed, and will set up norms to be used in the interpretation of scores. Relationships between the scores on the Index, scores on a longer personality inventory, and ratings by counselors will be discussed.

²⁷ Hunt and Stevenson, op. cit., p. 108.

²⁸ Leavitt, op. cit., p. 353.

²⁹ Grant, op. cit., pp. 33-34.

³⁰ Ibid., p. 40.

CHAPTER II

RELATED RESEARCH

The research related to this study is reported here in five divisions. The first reports summaries of studies dealing with the validity of personality questionnaires. The second deals with evidence regarding the extent of personal problems among college students. The third is concerned with the effectiveness of personal maladjustment measuring devices in the military services. The fourth discusses personality problems and the use of screening devices in industry. The fifth reports on some miscellaneous related studies.

Validity of personality questionnaires. The research on the validity of personality questionnaires has been summarized by Ellis¹⁻² in two studies. The first of these covered the period up to 1946, and the second, the three-year period preceding 1947. His general conclusion is that these questionnaires are not suitable for individual diagnosis. He also concludes that they seem to have some validity in differentiating between groups of normals and abnormals. He reports that interest has shifted in the last three years from the older type to the newer inventories³ such as the Guilford-Martin, the Humm-Wadsworth, the Cornell Index, and the MMPI. This study goes on to show

¹ A. Ellis, "The Validity of Personality Questionnaires." Psychological Bulletin, 43:385-440, September, 1946.

² A. Ellis, "Personality Questionnaires," Review of Educational Research, 17:53-63, February, 1947.

³ Ibid., p. 4.

a summary of seventy-five attempts to validate all kinds of personality questionnaires against clinical findings. It found thirty-six positive results: nine that were questionably positive, and thirty that were negative. The conditions in which the inventories are used seems to be an important factor in determining their validity. The research seems to indicate that in certain situations and with certain inventories good results were obtained. Ellis says " "In occupational situations and in military screening, it seems on the basis of the most recent reports, that the inventories give fairly satisfactory results."⁴

Ellis and Conrad⁵ reviewed seventy-six studies of the validity of personality inventories in military practice, and they found that a much higher percentage of these studies indicated successful use of the inventories than did studies made in civilian situations. Two general groups of reasons were presented for these results: The first group included errors in research techniques such as unsatisfactory criteria and incorrect use of statistical analyses, both giving spuriously high relationships. The second group included the construction of the inventories for very specific jobs, and the use of external criteria

⁴ Ibid., p. 62.

⁵ Albert Ellis and Herbert S. Conrad, "The Validity of Personality Inventories in Military Practice," Psychological Bulletin, 45:385-426, September, 1948.

of more exact nature. These factors increased the effectiveness of the instruments. They add that even these criteria have weaknesses.⁶

Personal Problems of college students. Hampton⁷ had the MMPI administered to 407 women students at Western Reserve University in an attempt to screen out those having emotional disturbances. He found ninety-six students who obtained T-scores of seventy or above on one or more of the scales. Seventy of these students showed a deviation in one area only. The most frequent areas of deviation for this group, were on the masculinity-femininity scale and the hypomania scale. Of the remaining twenty-six students, who obtained high scores, thirteen deviated in two areas, six deviated in three, three deviated in four, three deviated in four, three deviated in five, and one deviated in all nine areas. The number of deviations in each area were: hypochondriasis, two; depression, nine; hysteria, eleven; psychopathic deviate, eighteen; masculinity-femininity, thirty-seven; paranoia, ten; psychasthenia, thirteen; schizophrenia, seventeen; and hypomania, thirty-two. He considers the MMPI very helpful in determining the areas of student deviations.⁸

⁶ Ibid., pp. 387-410.

⁷ Hampton, op. cit. pp. 100-08.

⁸ Ibid., p. 107.

Portenier⁹ used the Bernreuter Personality Inventory in a study at the University of Wyoming and found it useless if the students did not answer the questions honestly. In some cases, even an attempt to answer honestly was not successful, since the student did not have an objective understanding of himself. She says:

As mentioned earlier, questionnaires are unsuccessful without a reasonable degree of cooperation, since an able student will have little difficulty in concealing personality patterns which he hesitates to acknowledge. Censorship is readily exercised. Conscious or unconscious repression may result in a student giving honest answers which are incorrect. Questionnaires measure what the person looks like to himself; repression may prevent him from recognizing some of his undesirable characteristics.¹⁰

Klohr¹¹ used the Mooney Problem Check List with 117 girls in an introductory course in home economics at the University of Illinois, and found a range in the number of problem checked from four to sixty-two, with a mean of twenty-two. The problems causing greatest concern were adjustment to college work, personal-psychological relations, and social and recreational activities. In speaking of the need for services dealing with the personal adjustment of students, she says:

. . . the services grew primarily from the recognition that learning can be furthered and individual growth and development advanced by helping students solve personal problems. Such problems, it is believed, often block effective learning and interfere with satisfactory maturation.¹²

⁹ Lillian G. Portenier, "Personality Tests in a University Guidance Program," Journal of Educational Psychology, 39:478-87, December, 1948.

¹⁰ Ibid., p. 486.

¹¹ Klohr, op. cit., pp.447-48.

¹² Ibid., p. 447.

Stone¹³ investigated the problems of students in a Teacher's College, using the Mooney Problem Check List. His 578 students underlined, on the average, twenty-seven problems. The average number of problems circled, indicating considerable concern about them, was five and eight-tenths. The problems, occurring most frequently, were adjustment to college work, social and recreational activities, curriculum and teaching procedures, and personal-psychological relations.

In discussing the difficulty of identifying students, who have personal problems, he says:

But students are often on the defensive and will therefore 'cover-up' about these problems. The task becomes, then, one of bringing to light concealed problems--problems that frustrate, that thwart adjustment, that interfere with efficient study, etc. It may be that in many cases students do not even recognize their real underlying conflicts.¹⁴

Stone believes that if teachers realized the frequency and seriousness of student problems, the attitude of individual faculty members toward students would be changed and become more sympathetic to the student, and a more personal interest would result in more opportunities for students to get help with these problems.

¹³ Stone, op. cit., pp. 404-16.

¹⁴ Ibid., p. 404.

Personality problems and screening devices in industry. A third area in which personal adjustment is receiving increased attention is in industry where a number of companies are attempting to reduce labor turnover and to increase efficiency of production by identifying and giving help to individuals who have personal problems.

One of the most extensive programs is being developed by Dickson of the Hawthorne Plant of Western Electric Company. In their book, Management and The Worker,¹⁵ Roethlisberger and Dickson discuss problems of personal adjustment and morale at considerable length. Their research indicates that persons with these problems work at reduced efficiency. They also find that when the causes of these problems are removed or when the workers are helped to understand the nature of their difficulties, both efficiency and morale rise.

The Caterpillar Tractor Company of Peoria, Illinois, is developing a more comprehensive program of personal counseling and careful placement. Vonachen¹⁶ reports that all new employees are given the Cornell Index and the Cornell Word Form, and those who

¹⁵ F. J. Roethlisberger and W. J. Dickson, Management and the Worker, Harvard University Press, Cambridge, Massachusetts, 1946. p. 180.

¹⁶ Vonachen, H. A. et al., "A Comprehensive Mental Hygiene Program at Caterpillar Tractor Company." Industrial Medicine, 15:179-184, March, 1946.

have poor scores are interviewed by a clinical psychologist. Preventive psychotherapy is used to help in adjustment to the employees' work. He suggests that the Index and the Work Form be given periodically as Wassermann's and x-rays are given. Psychiatric examinations revealing the symptoms, resulting in requests for transfer, were caused by anxiety states in 86 per cent of the cases. In discussing the use of the Cornell Index, Vonachen says:

It is an effective time saving device in placing before the interviewing examiner a clinical profile of the subjects personality defects. By bringing to the examiner a body of data assembled according to symptom complexes, it should improve the accuracy of his judgment. It is the brevity of the Index, its simplicity of administration and scoring, its focus on special personality problems, and its easily understood language that recommend its use in the industrial situation.¹⁷

Weider,¹⁸ who acted as a consultant in this program refers to the Cornell Index as a, "quick, reliable method for measuring emotional adjustment and facilitating diagnosis".¹⁹ He believes that the mental hygiene of the employees is of great importance. He writes:

It appears that the preventative aspects of mental hygiene are best served when employees with intellectual or with emotional handicaps are individually considered and selectively placed in industry. No less important for mental hygiene should be the counseling given to employees in order

¹⁷ Ibid., p. 180.

¹⁸ A. Weider, "Mental Hygiene in Industry--A Clinical Psychologist's Contribution," Journal of Clinical Psychology, 3:309-20, October, 1947.

¹⁹ Ibid., p. 314.

to prevent aggravation of existing emotional difficulties or to counsel employees early and so prevent such problems from getting started.²⁰

Another study at the Caterpillar Tractor Company is reported by Mittelmann and a group of his co-workers.²¹ The number of disturbed persons being hired by the company was higher than usual due to the availability of veterans who had received medical discharges from the services (1945). A study was made of 213 normal or insignificantly disturbed persons and sixty-six persons in which the disturbance was moderately severe or severe. The Cornell Selectee Index was used to determine its effectiveness as a screening device. A critical score of fifteen significant answers or one 'stop' question was used. The Index detected 73 per cent of the disturbed persons and included 7 per cent of the ostensibly healthy persons. The writers say in referring to the Cornell Selectee Index: "It is a questionnaire in which responses represent a standardized psychiatric history and preliminary interview."²² In discussing the effect of personality problems on job efficiency they say: "Should serious personality conflicts arise because of maladjustment either to work conditions or to life situations,

²⁰ Ibid., p. 314.

²¹ Bela Mittelmann, et al., "Detection and Management of Personality and Psychosomatic Disorders among Industrial Personnel," Psychosomatic Medicine, 7:359-67, November, 1945.

²² Ibid., p. 360.

absenteeism, high accident rate, grievances and lowered working efficiency or complete failure at work may result."²³

Their conclusion is that the Index is an effective device to detect the people having problems, when they are already employed by the company. The employees are assured that the results will be used only to help them and will not be used as cause for dismissal from the company. The authors concede that if the Index were used before employment many persons would not answer the questionnaire honestly.

Personality problems and screening devices in the armed forces in World War II. The problem of identifying individuals in the armed forces with personality maladjustments has been introduced earlier.²⁴ Further research in this area will be discussed in this section.

Warner and Gallico²⁵ administered the Cornell Index to 225 men in a naval hospital, all of whom were patients in the neurosychiatric wards or had been referred for psychological consultation. The psychiatrists then classified the men into three groups: The first group was made up of those who were

²³ Ibid., p. 359.

²⁴ Supra, p. 3.

²⁵ N. Warner, and M. W. Gallico, "The Use of the Cornell Service Index in the Evaluation of Psychiatric Problems in a Naval Hospital," War Medicine, 7:214-17, April, 1945.

disqualified from further service because of Psychiatric disability. The second group was composed of those with impaired mental or emotional functions, but who were not serious enough to be discharged. The third group included those who gave no evidence of psychiatric disability. The psychiatrists placed 173 in group one, twenty-five in group two, and twenty-seven in group three. The median scores on the Index were 39 for group one, 21.5 for group two, and 7 for group three. A cutting or critical score of fifteen picked 92 per cent of group one, 71 per cent of group two, and 11 per cent of group three. A cutting score of thirty selected 63 per cent of group one, 17 per cent of group two, and one of group three. The cutting score may be adjusted empirically, to select the number of individuals that can be interviewed. If interviewing time is strictly limited, a high cutting score that will pick a small percentage of the individuals is used and most of the group thus picked will possess personality problems. If considerable interviewing time is available, a lower cutting score can be used. In this way a larger percentage of the maladjusted individuals and a few more normal persons are included. Since this type of inventory can be easily falsified, the question of the attitude of these individuals toward the Index was considered.

Warner²⁶ interviewed approximately two hundred of the men in an attempt to answer this question. He found that less than 2 per cent replied to the questions falsely in order to create an impression of the absence of nervousness.

Mittelmann and his associates made a study of 450 admissions to a general hospital.²⁷ These admissions were all for medical or surgical treatment, and none was admitted for psychiatric reasons. A psychiatric interview with each of these patients disclosed forty-five, or 10 per cent with severe or moderately severe personality disturbances, while ninety patients, or 20 per cent had mild personality disorders. These writers report that the personality disturbances were, in a large measure, unrecognized by the physician in charge as factors complicating illness and convalescence.

A screening device, such as the Cornell Index, is recommended by Mittelmann and his associates because they believe it can detect patients with personality and psychosomatic disturbances serious enough to modify the course of illness.

²⁶ Ibid., p. 214.

²⁷ Bela Mittelmann, et al., "Personality and Psychosomatic Disturbances in Patients on Medical and Surgical Wards: A Survey of 450 Admissions.", Psychosomatic Medicine, 7:220-23, July, 1945.

Miscellaneous studies of screening devices. Manson²⁸

studied 404 alcoholics and 474 non-alcoholics to determine the effectiveness of two psychometric instruments in the detection of alcoholic personalities. These instruments were the Cornell Selectee Index, Form N, and the Manson Evaluation²⁹, a questionnaire he developed for the differentiation of alcoholics from non-alcoholics. The mean Cornell Index score of the alcoholic men was eighteen and one-tenth, and for the non-alcoholic men eight and four-tenths. The women had slightly higher scores, with twenty and five-tenths for the alcoholics and eight and nine-tenths for the non-alcoholic. Sixty-two and three-tenths per cent of the alcoholic men and 71.2 per cent of the alcoholic women scored fifteen or higher on the Cornell Index. Forty-six of the sixty-four questions were shown, by item analysis, to differentiate significantly at the five per cent or better level of confidence.³⁰ His own evaluation instrument was slightly more efficient in separating the two groups. Social drinkers and

²⁸ Morse P. Manson, "A Psychometric Analysis of Psychoneurotic and Psychosomatic Characteristics of Alcoholics.", Journal of Clinical Psychology, 5:77-83, January, 1949.

²⁹ M. P. Manson, The Manson Evaluation, Western Psychological Services, Beverly Hills, California, 1948.

³⁰ Manson, loc. cit., p. 82.

abstainers varied little on their scores with either instrument.

One hundred and thirty-seven student nurses were studied by Rabin and Geiser³¹ to determine if persons who receive a relatively high score on the Index, and yet appear well adjusted, are as normal as they seem to be. Using a cutting score of twenty-three, three students were identified as maladjusted. If the cutting score had been reduced to thirteen, twelve of the girls would have been selected as being emotionally disturbed. The responses of these girls to the Rorschach ink spots did not differ significantly from those made by others who scored zero on the Index. These writers conclude that, at least with their sample, the "false positives" called, "ostensibly healthy" by the authors of the Index, were actually healthy persons and had been mis-identified as problem cases by the Index score.³² They do not comment on the possibility that these normal girls, who had expressed anxieties and dissatisfactions with themselves in answer to from thirteen to twenty-five questions on the Index, might profit from some personal counseling.

³¹ Albert Rabin and Eugene Geiser, Rorschach Checks on 'False Positives' of the Cornell Selectee Index Records of Student Nurses.", Journal of General Psychology, 40:59-62, January, 1949.

³² Ibid., p. 61.

Emotional reaction to answering the Cornell Index questions.

When the use of a screening test, such as the Cornell Index, is being considered, the possibility of producing an emotional disturbance in unstable individuals must receive some attention. The writer has discussed this problem with a considerable number of emotionally disturbed clients after they have taken a personality inventory. All report that no increase of tension was produced.

Other writers report positive effects from answering the questions in these tests. Hunt and Stevenson write:

Mention should be made of the therapeutic possibilities of the testing situation. Even the filling out of a simple screening inventory like the Shipley Personal Inventory or the Cornell Selectee Index offers the subject a chance to become aware of and assess certain areas of personal difficulties. When the results are discussed with the patient, it is often possible to direct the interview more easily into productive channels and to hasten the acquisition of insight.³³

The MMPI uses similar questions and thus presents the same possibilities. McKinley and Hathaway³⁴ considered this problem when they first introduced the MMPI. They soon found that it was a rare client who expressed more than a mild

³³ Hunt and Stevenson, op. cit., p. 113.

³⁴ McKinley and Hathaway, "The Identification and Measurement of the Psychoneuroses in Medical Practice.", Journal of the American Medical Association, 122:161-67, May, 1943.

curiosity about the test. They say, further:

As a matter of fact, some patients with psychoneurotic tensions expressed relief after responding to the items because they feel that they have reported on many points to the physician about which they otherwise might not have told him. In these cases the inventory acts in similar fashion to the conventional mental catharsis so often made use of by the psychotherapist.³⁵

Summary. Studies of personality inventories indicate that they are sometimes successful and sometimes unsuccessful in the selection of persons who have serious problems of emotional adjustments. The inventories developed for military service appear to have been used more successfully than in civilian life. The research indicates that one of these inventories the Cornell Selectee Index, has been used successfully by the armed forces, by industry, and by psychologists in general hospital situations. These studies indicate that the above groups and institutions of higher learning have many persons with problems of personal adjustment.

³⁵ Ibid., p. 166.

CHAPTER III

PROCEDURES AND TECHNIQUES

In the preceding chapters the need was presented for identifying students with problems of personal maladjustment, and research indicating the presence and extent of these problems was cited. A discussion of various possible instruments was followed by the selection of one, the Cornell Index, which appears to satisfy the criteria set up for that purpose. Studies were then quoted to show the successes and limitations of this instrument in working out similar problems in comparable situations.

It is the purpose of this chapter to present the procedures followed in attempting to standardize the Cornell Index for a college freshman class. A pilot study which was made to discover some of the difficulties that might be encountered will be described. The plan followed in the main study will be discussed, and the factors outlined, that were considered in determining each choice of procedures in conducting the study.

The pilot study. Before the main study began the Index was administered to a group of students to identify possible problems that might arise in the study. The questions, for which an answer was desired, were:

1. Can the instructor present the inventory as effectively as a psychometrist?
2. Will the students cooperate by answering the questions willingly and truthfully?

3. Will the students have difficulty in understanding the questions in the inventory?

4. How much time will the students need to complete the inventory if separate answer sheets are used?

5. Will the scores spread over a range broad enough to differentiate degrees of maladjustment?

6. Will the students be interested enough in the results to go to the counseling center to discuss them?

7. Will the findings of the interviews between the counselors and students support the ratings obtained from the Index to such a degree as to warrant continuation of the study?

The Index was administered to 106 students in four sections of freshman classes. The students were told that the Index was part of a research study, that the results were confidential, and that they might discuss their scores with their counselors. The students displayed a cooperative attitude and expressed an interest in finding how their scores compared to the entire group. No noticeable difference appeared when the instructor, instead of the psychometrist presented the inventory. The students made no queries as to the meaning of the questions and completed the inventory in eighteen minutes.

Scores on the inventory ranged from zero to thirty-five with a median of seven. The research of the authors¹ of the inventory had

¹ Weider, et al., op. cit., p. 3.

indicated that persons scoring above twenty-three were apt to have problems of considerable severity. Five members of the sample group had scores above this point. Fifteen students had scores between thirteen and twenty-three, the area defined by the authors² as indicating borderline difficulty. A few of the students went to the counseling center to discuss the results of the inventory as it pertained to them. Cards were then sent to the twenty students whose score indicated some degree of difficulty, inviting them in for an interview. In the interview sixteen of these students presented problems ranging from moderate to rather severe disturbances, and of the remaining four persons in this group two felt that they had no problems worth working on and two did not report to the center. Persons scoring thirteen or below were invited in as soon as those scoring in the upper groups had been interviewed. After talking to about one-half of those having low scores, the counselors were convinced that most of these individuals were fairly well adjusted. So no further invitations were sent.

Some of the results from the pilot study indicate that further investigation is required:

1. Is the range of scores on the Cornell Index broad enough to discriminate accurately between adjusted and maladjusted persons and to indicate a borderline group?

2. Will interview findings and inventory scores show a sufficiently high degree of relationship to warrant the use of the Index as a screening device?

² Weider, et al., loc. cit., p. 4.

The questions raised in relation to the general testing situation were answered favorably. The students cooperated very well in taking the inventory and in reporting to the counseling center for interviews. They raised no questions as to the wording of the inventory and tended to be truthful in answering it. It can be assumed that the instructor was able to present the inventory as well as the psychometrist, since the distributions of scores were about the same for both groups.

Two changes were decided upon after the pilot study was completed. First, the subjects for the study must come from a class required of all freshman. Since the classes used were not required of all freshman some undetermined selective factor might prevent the group, used in the research, from being representative of the entire freshman class. The second change was to write out the directions for administration so that all of those presenting the test would administer it in the same manner. The authors state that the Index is self explanatory and needs no verbal directions.³ An explanation of the purpose of the inventory and a promise of a personal conference for those requesting it was given to the students in an attempt to secure a favorable attitude toward answering the questions.

³ Weider, et al., loc. cit.

PROCEDURE FOR THE STUDY

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Selection of participants. The Cornell Index was to be administered to approximately twelve hundred, unselected freshman. This number was considered large enough to give a reliable distribution of scores typical of the entire class. It was considered small enough so that the counseling center could accommodate all students requesting interviews for the purpose of discussing their scores made on the Index. The administration of the Index in the classes of the Written and Spoken English Department of Michigan State College was proposed since this subject is the only one required of all freshmen. The use of classes in an elective course might allow uncontrolled, selective factors to present a group which would not be a true cross section of the entire class.

Representativeness of the sample. To get a representative sample of the freshman class fifty-five sections of Written and Spoken English, a class required of all freshmen, were used. These sections furnished 1298 students or approximately 45 per cent of the entire class. The sections were selected from all periods of the school day and from twenty different instructors to insure a fair sample.

Further evidence was then sought to check on the representative nature of the sample. As the scores were tabulated, the median score was computed as each one hundred additional scores were reached. This median varied less than three-tenths of one point after the first hundred was tabulated, and change in median occurred with the last

fifteen sections to be added. This was true for both male and female. A second check was made by comparing the ratio of the number of men to women in the sample to a similar ratio for the entire class. The ratio in the sample was one and eighty-one hundredths to one. The ratio for the entire freshman class was one and seventy eight hundredths to one. The average score in deciles on the American Council on Education Psychological Examination was used for the third check. The entire class had an average of five and twenty hundredths deciles, the subject group averaged five and nineteen hundredths. These data indicate that the sample used is representative of the entire group.

Administration and scoring of the Index. The proposed study was presented at a regular staff meeting of the Written and Spoken English Department, and the members of the staff readily agreed to administer the Index to their classes. Complete cooperation was received from these instructors throughout the study. The Index was then administered to the students in fifty-five sections of freshman English by twenty instructors. The inventories were presented to the classes either by their own instructor or by a psychometrist, with the following instructions:

The Written and Spoken English Department and the Counseling Center are interested in learning more about students. Your answers to the questions in this inventory will be confidential. If you wish to talk over your answers, you may do so by making an appointment with your counselor. There is no time limit for answering this inventory, but best results will be obtained if you go through it rather quickly.

Eighty students were absent from classes on the days when the inventory was given. It was thought probable that personality problems

would be more frequent among these absentees than among those who were attending class regularly. Cards were, therefore, sent to these individuals explaining the study and inviting them to write the inventory at the Counseling Center. Forty students responded to this request. Two weeks later a second card was sent to the remainder of the group, and nineteen more individuals came in to take the Index.

The median score for this group of fifty-nine absentees, was approximately fifty per cent higher than the median for the entire group. The total number of students answering the Index questions was twelve hundred and ninety-eight of whom there were 836 males and 462 females.

The inventories were scored and divided into male and female groups. The scores were tabulated in a frequency distribution table which was followed by the determination of the ranges, means, standard deviations, and quartile positions. The "stop" questions, which had been included in the first scoring, were then checked. This score was placed next to the total score on the answer sheet and encircled. The number of persons who scored on each of these questions was tabulated, and a table showing these results was constructed.

Selection of criteria for validation. The next step in the standardization of the Index was to compare the results obtained by using the Index, with some other criteria.

The selection of criteria for validation presents some particularly difficult problems. In a report of the Personnel Research

Section⁴ of the army, the military psychologists write:

Even a cursory examination of recent and current research discloses that nearly all army, like civilian, test construction and evaluation in the field of personality has rested upon criteria of unknown validity. With very few exceptions, already hospitalized neuropsychiatric patients have been used as criterion groups both for construction and "validation" studies, or the experiments have stopped with an analysis of relationships between test scores and the brief psychiatric examination.⁵

In a study of the construction and validation of the MMPI, an examination of the source of "normal" scores used discloses the following statement:

The general normative data are derived from a sample of about seven hundred individuals representing a cross section of the Minnesota population as obtained from visitors to the University Hospitals. The sampling is fairly adequate for the ages 16 to 55 and for both sexes. In addition to these data on normal individuals, data are available on 250 precollege and college students who as a group represent a reasonably good cross section of college entrance applicants.⁶

In an examination of these "normal" persons it might be pointed out the normal people are emotionally stable only in the sense that they have not been hospitalized. Certainly many of the individuals who are visitors in the neuropsychiatric wards come from the same environment that produced the neuropsychiatric patients and may have faced the same strains that produced the breakdown in the patient. Since many of the persons visiting the surgical and medical wards have either a relative or a close friend who is seriously ill, their emotional adjustment

⁴ Personnel Research Section, Adjutant General's Office, "Measurement of Personality Characteristics of War Department Personnel, United States Army, PRS No. 669 26 July, 1944, p. 13.

⁵ Ibid., pp. 1-2.

⁶ Hathaway and McKinley, op cit., p. 3.

might well be affected by the danger of losing some one who is important to them. Quite possibly, normal home life may have been seriously disturbed by the illness of the mother or the loss of income due to a father's hospitalization. The scores of the "normal" college students used to obtain additional normal scores were made by the same type of person that reported all the problems in studies like those of Klohr⁷ and Stone.⁸ Thus, the "normal" persons used in the construction of the test are at best a cross section of a population that includes many maladjusted persons.

The abnormals used in constructing the inventories are persons so diagnosed by psychiatrists, psychologists, or interviewers, and the degree and area of their deviation is arrived at subjectively. The reliability and validity of these judgments will be discussed further in the next section.

Since better criteria are not available, and with some understanding of the limitations of such criteria, the MMPI and counselor judgments were chosen for use in making comparisons in this study.

It was stated earlier⁹ that the MMPI was the most frequently used of the new personality inventories. A number of recent studies have indicated that while the MMPI does not differentiate significantly between the various personality deviations it attempts to measure, it

⁷ Klohr, op. cit.,

⁸ Stone, op. cit.

⁹ Supra., p. 11.

does differentiate between the abnormal, the borderline normals, and the normals, fairly well. Morris¹⁰ used the MMPI with three hundred and twenty men in a naval hospital, and found that although it did not differentiate pathological conditions, it did separate borderline normals from serious pathological groups. All of the seriously abnormal patients in this group were above the T-score of seventy on the depression scale.

A study using both the MMPI and the Cornell Selectee Index was made by Modlin¹¹ who found that the MMPI detected eighty-five per cent of the abnormals in the group which he studied. In the evaluation of a single individual the MMPI with its greater number of questions seemed to be more helpful than the Cornell Selectee Index. Hunt¹² and Rubin¹³ both found that the MMPI was not a good diagnostic instrument; however, Rubin does point out that some of the scales have some differentiating value.

¹⁰ Woodward Morris, "A Preliminary Evaluation of the Minnesota Multiphasic Personality Inventory," Journal of Clinical Psychology, 3:370-74, October, 1947.

¹¹ Modlin, op. cit., p. 760.

¹² Howard F. Hunt, et al., "A Study of the Diagnostic Utility of the Minnesota Multiphasic Personality Inventory." American Psychologist, 2:417, October, 1947.

¹³ Harold Rubin, "The Minnesota Multiphasic Personality Inventory as a Diagnostic Aid in a Veterans Hospital." Journal of Consulting Psychology, 12:251-54, July, August, 1948.

Schmidt¹⁴ used the MMPI at the consultation service of an army force replacement pool for a period of nine months in which ninety-eight men, who showed no evidence of personality disorder, scored close to the normal profile, with T-scores around fifty, in all cases. The one hundred and twenty-one men who were diagnosed as definitely abnormal consistently had profiles which were elevated in some area.

Meehl¹⁵ in an experiment at the University of Minnesota attempted to separate a group of normals from abnormal and to pick the exact area of deviation by means of a study of MMPI profiles. He was successful in selecting the area of deviation of 90 per cent of the abnormal correctly. Since his normal group was defined merely as non-institutional persons, some moderately disturbed persons may have been included in the ten per cent of the normals that he called abnormal.

Three studies made at the University of California indicate that scores on the MMPI show a strong relationship to findings on the Rorschach. Altus¹⁶ compared the scores on the schizophrenia scale of

¹⁴ H. O. Schmidt, "Test Profiles as a Diagnostic Aid: The Minnesota Multiphasic Personality Inventory." Journal of Applied Psychology, 29:115-31, April, 1945.

¹⁵ Paul E. Meehl, "Profile Analysis of the Minnesota Multiphasic Personality Inventory in Differential Diagnosis." Journal of Applied Psychology, 30:517-24, October, 1946.

¹⁶ W. D. Altus, "Some Correlates of the Group Rorschach and the Schizophrenic Scale of the Group MMPI Among Two Groups of "Normal College Students", Journal of Consulting Psychology, 12:375-78, November-December, 1948.

the MMPI with ten Rorschach items and found a high correlation. Clark¹⁷ analyzed the responses to the items of the hypochondriasis scale in comparison to color responses on the Rorschach and found that they were largely in accord with traditional Rorschach interpretations. The relationship of movement responses in the Rorschach, to selected items in the MMPI was studied by Thompson¹⁸ in which he showed that deviant movements, both animal and people, correlated well with the maladjustment indicated on the MMPI.

An unusual characteristic of the MMPI is its attempt to get at the test taking attitude of the individual answering the question. The scores on personality inventories are sometimes affected by a conscious or unconscious attempt by the individual to make the test result in a pre-determined direction. A very insecure person, who does not trust the examiner, may not admit true statements about himself, while strongly defensive persons may be so in the habit of rationalizing their feelings and behavior that they cannot regard these feelings and behavior objectively enough to give an accurate answer.

Three validating scales¹⁹ are used in this inventory to measure

¹⁷ Jerry H. Clark, "Some MMPI Correlates of Color Responses in the Group Rorschach," Journal of Consulting Psychology, 12:384-86, November-December, 1948.

¹⁸ Grace M. Thompson, "MMPI Correlates of Certain Movement Responses in the Group Rorschachs of two College Groups." Journal of Consulting Psychology, 12:379-83, November-December, 1948.

¹⁹ Hathaway and McKinley, op. cit., p. 4.

these test taking attitudes. The "question" score, the number of times the client has answered a question by placing it in the "cannot say" category, is a check to determine if enough questions were answered to make the test effective. The "lie" score measures the degree of falsification by using statements that are true about most of us but which we tend not to admit. The "validity" score is a measure of accuracy, and it usually rises if the client is being careless, if he does not understand the question, or if gross errors are made in scoring. Extreme deviates in the schizophrenic area frequently give irrational answers that show up in this scale.

If the "question" score or "lie" score goes above a T-score of seventy, or if the validity score goes above a T-score of eighty, the results on the entire inventory are considered invalid. One exception to this standard does seem to exist: If the client scores high on the schizophrenic scale he may also go high on the validity scale without voiding the results.

A study was made by Hunt²⁰ to determine the effect of deliberate deception. He found that the corrective factor K cannot overcome this deception. Further study indicated that the raw validity score F minus the raw K score did correctly identify a substantial proportion of the malingered profiles without including too many of

²⁰ Howard F. Hunt, "The Effect of Deliberate Deception on MMPI Performance" Journal of Consulting Psychology, 12:396-402, November-December, 1948.

the honest profiles.

Since these studies have indicated that the MMPI has considerable validity in separating normals from abnormals, it was decided to compare scores made on this inventory with the scores on the Cornell Index. The Effective Living Department of Michigan State College had administered the MMPI to all of its first term students three weeks before the Cornell Index was used in the freshman English classes. As a result MMPI profiles were available for about eighteen hundred freshmen and sophomores. The names of the students, who had taken the Cornell Index, were checked against the list of those who had taken the MMPI, and two hundred twelve men and 185 women were found to have taken both inventories.

Comparisons with MMPI. Several individual scores and combinations of scores of the MMPI appear suitable for comparison with the Cornell Index. The authors point out that it is the shape of the profile²¹ rather than the total elevation, that is important. For example, if scores in seven of the areas measured were around a T-score of fifty and the other two areas reached a T-score of seventy, abnormality is indicated. If all scores were close to a T-score of sixty, no abnormality appears. The average of all scores of the abnormal person is less than fifty-six, and the average of all scores of the normal person is sixty. Thus, a comparison of the average of all scores does not give a true picture and was not used in this study.

²¹ Hathaway and McKinley, op. cit., p. 9.

The average of the highest three T-scores of the profile was used to represent the entire MMPI in the first comparison with the Index. Pearsons' product-moment correlation formula was used in this comparison, and throughout the study, to show the degree of the relationship between the scores on the two inventories. The average of the T-scores for the neurotic syndrome²² including hysteria, depression and hypochondriasis, was used to show the comparison in this area. Modlin²³ calls the average of these three scores the "anxiety" score. Another correlation was made between the Index and the average of the T-scores of the psychotic syndrome²⁴ composed of schizophrenia, psychasthenia, and paranoia. It is expected that a comparison of these two correlations will give some evidence as to the relative effectiveness of the Index in detecting persons who are deviant in the neurotic area and those who are deviant in the psychotic area.

Further correlations were calculated between the Index and some of the individual areas of the MMPI. The scores for psychopathic deviate and hypomania were used individually since neither was included in neurotic or psychotic syndromes. One of the three scores for the

²² H. G. Gough, "Simulated Patterns on the Minnesota Personality Inventory," Journal of Abnormal and Social Psychology, 42:215-25, April, 1947.

²³ Modlin, op. cit., p. 760.

²⁴ Gough, op. cit., p. 220.

neurotic group depression, and two of the three scores for the psychotic group, paranoia and psyasthenia, were correlated separately with the Index. These scores should indicate the degree of relationship of the Index with more limited areas.

Comparisons with counselors ratings. The second criterion used in determining the effectiveness of the Index was the counselors' judgment as to the degree of personal maladjustment. The counseling center is staffed by twelve professionally-trained counselors eight men and four women, who are assigned full-time to this work. Their major training is in education with special emphasis in the field of counseling, their minor training area is in psychology or in psychology and sociology, and the amount of their training varies from a year beyond the masters degree to the doctorate. All of them have had experience in teaching. Their experience in counseling varies from three to ten years. The counselors work with students on all kinds of problems and they interview a total of approximately four hundred students each week.

Students are assigned to counselors alphabetically, for administrative convenience, so that each student has an individual counselor. If a student requests a different counselor, the change is immediately made.

The validity of the subjective judgments of counselors is open to question. This problem is presented by Schmidt in his study of the MMPI, who says:

The value of the Multiphasic Inventory as a predictive instrument

and clinical tool depends upon its agreement with the clinical diagnoses. This is, of course, open to many pitfalls: the lack of a common psychiatric language; the lack of clear-cut clinical criteria for identifying personality abnormalities; the failure of an individual under study to present uncomplicated symptoms or to present crystallized behavior patterns; the lack of time for making a prolonged study of the individual.²⁵

The counselors do have some aids in identifying the existence and severity of personal maladjustments beyond the information gained in the interview. Reports from dormitories, from other staff members, and from other students are very helpful. Discrepancies between the student's ability to do college work and his academic performance often draws the counselors' attention to an unsatisfactory situation. Excessive absences from classes and reports from high school counselors are two other clues which help the counselor discover the existence of personal problem. Various personality inventories are also used in connection with vocational aptitude testing. These sometimes show unexpected results that require further attention in the interview.

One major difficulty reduces the effectiveness of the counselors' findings: If the student is not ready to talk about his problems, he may cover them skillfully enough to prevent their detection. Some individuals may contact the counselors to get help in educational or vocational choices without giving the counselor a clue to the existence of more personal problems.

With these limitations in mind, an attempt was made to get

²⁵ Schmidt, op. cit., p. 127.

enough ratings by counselors to make a comparison of their ratings with the scores on the Cornell Index. The counselors' folders for all students who had taken the Index were examined for interview notes, and many cases these indicated the presence or absence of personal problems. If the interview notes did not give enough information to determine the rating, the counselor was asked to make one. The number of students included in this manner was increased by taking additional names from the list of those who had taken the Index and submitting them to the proper counselor with a request for a judgment as to the presence or absence of emotional disturbances. All of the high scores and a sampling of the entire range were included in this phase of the study. The scores on both the Cornell Index and the MMPI were kept from the counselor until after he had submitted his judgment on each case.

The counselors were asked to rate each student listed in one of three groups: The first group consisted of those who had little or no emotional disturbances, the second, those who had moderate disturbances, and the third, those who were severely disturbed. While no objective limits can be set to such groupings, it is believed that the counselors can be reasonably accurate in the placement of most individuals with whom they have had a number of contacts. This division is one with which the counselors are quite familiar. The routine classifications of students in the personal problem area, are: one, students with little or no disturbance: two, those with moderate disturbance who can be treated by psychotherapy at the center; and three, those with

severe disturbance who are referred to the health center for psychiatric assistance or hospitalization. Considerable agreement has been reached on the limits of these classes through daily conferences among the counselors, and through staff meetings devoted to case analyses.

Scores on the Cornell Index were converted to the same classifications after a study of the manual for the Index and a survey of the data. The limits were set with scores from zero through fifteen representing little or no problems, sixteen through twenty-two representing moderate problems, and twenty-three and higher as severe problems. Next the scores on the MMPI were equated to this classification according to the authors statements.²⁶ Those who had profiles with no elevations and all scores below sixty-five were placed in the little or no problem category, those whose profiles had peaks in the sixty-five to seventy area were placed in the moderate disturbance group, and those whose profile had one or more scores above seventy were placed in the severe disturbance group. Comparisons were then made to find the extent of agreement between each pair of measurements and for all three together.

Determination of "pick-up" rate. A third method of checking on the effectiveness of the Cornell Index in detecting persons with emotional disturbances is that suggested by Hunt and Stevenson.²⁷ They

²⁶ Hathaway and McKinley, op. cit., p. 9.

²⁷ Hunt and Stevenson, op. cit., p. 108.

point out that the function of a screening test is to "pick-up" emotionally disturbed persons. Since those who are selected by high scores on the test will be clinically interviewed, the inclusion of some well-balanced individuals, called "false positives", will cause no harm. The only loss will be in interviewing time and this loss will be much less than it might well be if no screening device were used and all of the normals were interviewed. These writers state:

As used in the military service, such tests are never the criterion for discharge, but are always supplemented by a personal psychiatric interview. The test merely acts as a coarse screening device, directing psychiatric attention where it is most needed.²⁸

They say further:

The coefficient of correlation has dubious value since it conceals in a single expression two independent variables, the pick-up rate and the false positive rate. The pick-up rate is the more important in screening.²⁹

In using this method in the study, the Index scores of all persons classified by the counselors as moderately or severely disturbed were tabulated, and the percentage of those who scored above the cutting score on the Index was calculated. This is the "pick-up" rate. To find the "false positive" rate,

²⁸ Ibid., p. 108.

²⁹ Ibid., p. 109.

the scores of all persons classified by the counselors as having little or no problem were tabulated. The number of scores in this group, which were above the cutting score on the Index, was divided by the total number of persons in the group. This is the percentage of "false positives", or persons who were incorrectly chosen.

Summary The procedures, described in this chapter, for the validation of the Cornell Index, include:

1. Selection of the subject group representing a college freshman class.
2. Techniques used to insure that the sample used was a true sample of the entire freshman class.
3. Administering the Index to the sample group.
4. Scoring the Index and calculating ranges, means, quartiles, and standard deviations for the resulting scores for both male and female.
5. Obtaining MMPI scores for part of the group.
6. Determining the degree of relationship between scores on the Cornell Index and the MMPI by means of Pearson's, product-moment correlation formula.
7. Obtaining ratings, from counselors who interviewed the students as to whether the student had little or no problem, moderate emotional disturbance, or was severely disturbed.

8. Reclassifying Index and MMPI scores into the classification used by the counselors.

9. Making comparisons of relative ratings by the Index, the MMPI, and the counselors.

10. Calculating "pick-up" and "false positive" rates for the Index.

CHAPTER IV

THE FINDINGS OF THE STUDY

This chapter will report the findings that resulted from following the procedures described in the preceding chapter. The data are treated separately for men and women as some differences appear in all of the findings.

Distribution of scores. The frequency distribution of the scores made by the 836 males and 462 females is shown in Table II. The greatest number of scores are grouped in the lower part of the scale with a comparatively few scores in the higher areas. Table III summarizes the average and the dispersions of the scores. The range of scores for the men was zero to forty-four; for the women, zero to fifty-two; and a total range for both men and women from zero to fifty-two. The arithmetic mean for the men was 7.349, for the women 8.418, and for both 7.729. The standard errors of these means, obtained by using the formula $\sigma_{\bar{x}} = \frac{\sigma_k}{\sqrt{N}}$ ¹ are .23 and .34

¹ Elmer B. Mode, The Elements of Statistics, Prentice-hall, Inc. New York, 1942, p. 351.

TABLE II

FREQUENCY DISTRIBUTION OF SCORES FOR CORNELL INDEX
FOR 836 MALE AND 462 FEMALE MEMBERS
OF FRESHMAN ENGLISH CLASSES

Score	Male	Female	Total
52	0	1	1
48	0	1	1
44	1	0	1
39	1	0	1
38	2	1	3
35	0	1	1
34	1	2	3
33	0	1	1
32	0	0	0
31	1	0	1
30	0	2	2
29	3	2	5
28	1	3	4
27	1	1	2
26	8	3	11
25	3	2	5
24	4	1	5
23	7	0	7
22	3	4	7
21	8	2	10
20	10	6	16
19	11	4	15
18	6	8	14
17	15	12	27
16	20	12	32
15	13	8	21
14	18	11	29
13	25	17	42
12	20	17	37
11	28	16	44
10	27	19	46
9	43	24	67
8	34	17	51
7	49	27	76
6	59	40	99
5	59	37	96
4	58	34	92
3	71	36	107
2	75	29	104
1	76	35	111
0	75	26	101
Total	836	462	1298

TABLE III

DISTRIBUTION OF SCORES FOR CORNELL INDEX
FOR 836 MALE AND 462 FEMALE MEMBERS
OF FRESHMAN ENGLISH CLASSES

Number	Male 836	Female 462	Total 1298
Range	0-44	0-52	0-52
Mean	7.349	8.418	7.729
Standard Deviation	6.763	7.483	7.015
Q3	11.	12.	11.
Q2	6.	6.	6.
Q1	2.	3.	3.

respectively. Since the difference of the means is 1.069, this difference appears significant.

The standard deviations are 6.763 for the men and 7.483 for the women.

Selection of cutting scores. If a cutting score two standard deviations above the mean is used as recommended by Hathaway and McKinley,² all scores above twenty and nine-tenths for men and twenty-three and four-tenths for the women would indicate considerable

² Hathaway and McKinley, op. cit., p. 8.

emotional disturbance. Scores of twenty-eight and above for men, and thirty-one and above for women are three standard deviations above the mean. This difference in norms for men and women is in accordance with the findings of Hathaway and McKinley³ who found that they needed different T-score equivalents for the raw scores of the two sexes.

Using a cutting score of twenty-one for the men and twenty-four for the women, and referring to the frequency distribution in Table II, scores for forty-four men and twenty-one women are found who give strong indication of emotional disturbance. Ten men and seven women show enough disturbance on the Index to be three or more standard deviations above the mean. It is interesting to note that of the sixty-five persons scoring two or more standard deviations above the mean, approximate one-half were already working with counselors on problems.

Quartiles. Quartile positions were computed as an aid in the interpretation of the scores on the inventory. The first quartile reached a score of two for the men and three for the women; the second, a score of six for both sexes; and the third, a score of eleven for the men and twelve for the women.

Stop questions. The "stop questions" in the Cornell Index

³ Hathaway and McKinley, Supplement to the Manual for the Minnesota Multiphasic Personality Inventory, Psychological Corporation, New York, 1946, 7 pp.

were identified, by the authors, as those questions which were so important that a score on any one, regardless of total score, would require an interview.⁴ The tabulation of these scores is shown in Table IV. Forty-six, or 10.0 per cent, of the women answered one or more "stop questions" in the undesirable direction. Eighty-seven, or 10.4 per cent, of the men also scored on one or more of these questions. Of the twenty-six men for whom we have another measure of adjustment, twenty-four, or 92.3 per cent, were rated as having personal problems by either the MMPI or the counselor. Similarly, sixteen, or 76.2 per cent of the twenty-one women were rated as disturbed by one or the other of the criteria.

Four men and seven women stated that they had had nervous breakdowns. This number projected from the sample to the entire class would seem to indicate that twenty-four freshman have had nervous breakdowns. Three men and one woman had been in mental hospitals. Only one person out of 1298 indicated trouble with enuresis. Eleven men and eight women are bothered by sleep-walking. Six men and seven women have had a fit or convulsion. Five men and five women are troubled frequently by loose bowels. A doctor had diagnosed ulcers for eight men and one woman. Fifteen men and fourteen women state that they go to pieces easily; which projected to the entire class would indicate that sixty-four freshman have trouble maintaining their composure. Fourteen men and three women have been in trouble because of drinking. Four men

⁴ Supra, p. 14.

TABLE IV

NUMBER OF THE 836 MALE AND 462 FEMALE STUDENTS
WHO REPLIED "YES" TO THE STOP QUESTIONS
IN THE CORNELL INDEX

Number	Question	Male	Female	Total
32	Had nervous breakdown	4	7	11
33	Been patient in mental hospital	3	1	4
55	Now a bed-wetter	1	0	1
56	Now a sleep-walker	11	8	19
57	Had a fit or convulsion	6	7	13
78	Frequently troubled by loose bowels	5	5	10
79	Doctor has diagnosed ulcers	8	1	9
88	Go to pieces easily	15	14	29
90	Been in trouble because of drinking	14	3	17
91	Arrested more than three times	4	0	4
93	Enemies bother them	6	11	17
95	Drown sorrows in drink	23	3	26

have been arrested more than three times. Six men and eleven women say that their enemies go to great lengths to annoy them, which number projected to the entire class shows thirty-seven people who agree to this paranoic statement. Twenty-three men and three women often drown their sorrows in drink, and projection of this number indicates that fifty-seven freshmen attempt to solve their problems in this manner.

A further projection of these figures to cover the entire college population would be extremely interesting. However, the sample is representative only of the freshman class, and may differ considerably from the upper classmen. Further projection would, therefore, be statistically unreliable.

Questions answered most frequently and least frequently in the undesirable direction. The ten questions answered most frequently in the undesirable direction are shown in Table V. The men and women varied little in the questions listed. "Do you frequently get up tired in the morning?" was answered yes by 50.7 per cent of the men and 52.2 per cent of the women. "Do you have to do things very slowly in order to be sure you are doing them right?" was answered yes by 27.6 per cent of the men, and 23.2 per cent of the women. "Are you considered a nervous person?", brought affirmative replies from 20.3 per cent of the men, and 22.9 per cent of the women. Similarly, most of the other questions in this group

vary little between the two sexes. Six of the questions appear among the top ten responses for both men and women. The remaining four in each group, with one exception, are near the top ten in the

TABLE V

THE CORNELL INDEX QUESTIONS ANSWERED MOST
FREQUENTLY IN THE UNDESIRABLE
DIRECTION

836 MALES

Order Number	Question	Frequency	Per Cent
1. 65	Frequently get up tired in the morning	424	50.7
2. 16	Do things slowly in order to do them right	231	27.6
3. 20	Usually feel cheerful and happy	179	21.4
4. 27	Considered a nervous person	170	20.3
5. 87	Make friends easily	169	20.2
6. 29	Have difficulty in falling asleep	165	19.7
7. 48	Sweat a great deal even in cold weather	164	19.6
8. 51	Twitching of face, head, shoulders	149	17.8
9. 94	Made angry when told what to do	149	17.8
10. 82	Usually been treated fairly	148	17.7

TABLE V (cont.)

462 FEMALES

Order Number	Question	Frequency	Per Cent
1. 65	Frequently get up tired in the morning	241	52.2
2. 62	Spells of exhaustion and fatigue	173	37.4
3. 16	Do things slowly in order to do them right	107	23.2
4. 27	Considered a nervous person	106	22.9
5. 94	Made angry when told what to do	101	21.9
6. 29	Have difficulty in falling asleep	89	19.3
7. 42	Become scared at sudden noise or movement at night	88	19.0
8. 9	Work falls to pieces if boss watches	87	18.8
9. 46	Disturbing thoughts come back	86	18.6
10. 87	Make friends easily	77	16.7

other group. The one question that differed considerably between the two groups was "Do you always become scared at sudden movements or noises at night?" This was answered yes by 19.0 per cent of the women and by 5.8 per cent of the men. This difference can

probably be explained in terms of the variation in the ability of the two sexes to protect themselves.

Eight of the ten questions answered least frequently in the undesirable direction are common to both men and women. These questions are listed in Table VI. The two questions in each group which do not appear in the other are found to have low frequency for the other sex also. Although the frequency with which these questions were answered in the deviate direction differed little for the two sexes, the limited numbers in these groups prevent generalized conclusions as to differences between the sexes.

The questions included in this group represent important factors in personality adjustment: Three men and one woman had been patients in a mental hospital. Four men had been arrested more than three times. Four men and one woman had been in a reform school. Three men and one woman had used narcotics regularly. Three men and two women felt that people always lied to them. Four men and three women said that their body was always in bad condition. Although undesirable answers to these questions did not appear often, they are very important clinically when they do appear.

Relationships between the scores on the Cornell Index and on the MMPI. Since all of the students who answered the questions in the Cornell Index did not take the MMPI, a smaller number will

TABLE VI

THE CORNELL INDEX QUESTIONS ANSWERED LEAST
FREQUENTLY IN THE UNDESIRABLE DIRECTION

836 MALES

Order Number	Question	Frequency	Per Cent
1. 55	Are you a bed wetter?	1	0.1
2. 76	Pains in stomach after every meal	2	0.2
3. 92	Taken dope regularly	3	0.4
4. 97	People always lie to you	3	0.4
5. 33	Ever a patient in a mental hospital	3	0.4
6. 60	Body always in bad condition	4	0.5
7. 67	Always in poor health and unhappy	4	0.5
8. 89	Ever sent to a reform school	4	0.5
9. 91	Arrested more than three times	4	0.5
10. 32	Ever had a nervous breakdown	4	0.5

TABLE VI (cont.)

462 FEMALES

Order Number	Question	Frequency	Per Cent
1. 21	Always a bad time no matter what doing	0	0.0
2. 55	Are you a bed wetter?	0	0.0
3. 91	Arrested more than three times	0	0.0
4. 33	Ever a patient in a mental hospital	0	0.2
5. 89	Ever sent to a reform school	1	0.2
6. 92	Taken dope regularly	1	0.2
7. 76	Pains in stomach after every meal	2	0.4
8. 97	People always lie to you	2	0.4
9. 60	Body always in bad condition	3	0.6
10. 63	Wear self out worrying about health	3	0.6

be found in comparing the scores on these two instruments. As explained earlier, a considerable number of these students had previously taken the MMPI in their Effective Living Classes. This number was reduced by withdrawing the cards for those students whose counselor had seen their MMPI profiles before making a judgment. The number was increased by giving the MMPI to some of the students who were interviewed and withholding the results

from the counselor until a judgment was made. The number of students who took both tests, and whose counselor had not seen the scores on the inventories, was 212 males and 185 females. A summary of the relationships is presented in Tables VII and VIII.

The first comparison was made between the scores on the Index and the scores on the neurotic triad of the MMPI. The scores on the neurotic triad⁵ were found by averaging the T-scores for hypochondriasis, depression, and hysteria. A correlation of .602 for the females and .469 for the males indicates that a considerable degree of relationship exists between the scores on the two inventories. The second comparison which was made was between the Index and the psychotic triad⁶ of the MMPI. The score for the triad was found by averaging the T-scores for paranoia, psychasthenia, and schizophrenia. The correlation for the females was .629 and for the males .556. This, again, shows a considerable amount of relationship. Modlin,⁷ using the Cornell Selectee Index found "a considerable degree of relationship"⁸ between the Index and the neurotic triad, but little relationship

⁵ Supra., p. 50.

⁶ Supra., p. 50.

⁷ Modlin, p. 762.

⁸ Ibid., p. 763.

TABLE VII

RELATIONSHIPS BETWEEN THE CORNELL INDEX
AND THE MMPI, 212 MALES

	X	Y	SD _x	SD _y	r	SE
Neurotic Triad	7.970	53.307	7.288	8.079	.469	.054
Psychotic Triad	7.970	56.735	7.288	8.916	.556	.048
Average Top Three	7.970	65.240	7.288	8.373	.593	.045
Hypomania	7.970	60.877	7.288	11.030	.066	.068
Psychasthenia	7.970	59.236	7.288	12.242	.465	.054
Paranoia	7.970	52.860	7.288	10.686	.351	.060
Psychopathic Deviate	7.970	58.010	7.288	11.136	.317	.062
Depression	7.970	55.590	7.288	13.092	.470	.053

TABLE VIII

RELATIONSHIPS BETWEEN THE CORNELL INDEX
AND THE MMPI, 185 FEMALES

	X	Y	SD _x	SD _y	r	SE
Neurotic Triad	9.780	52.476	8.564	7.653	.602	.047
Psychotic Triad	9.780	56.823	8.564	8.055	.629	.044
Average Top Three	9.780	61.704	8.564	8.301	.688	.039
Hypomania	9.780	57.840	8.564	10.616	.421	.061
Psychasthenia	9.780	57.408	8.564	10.399	.491	.056
Paranoia	9.780	54.556	8.564	8.202	.361	.064
Psychopathic Deviate	9.780	51.635	8.564	10.209	.320	.066
Depression	9.780	51.895	8.564	10.143	.536	.052

All significant at one per cent level except hypomania for males.

with the psychotic triad. A study of the questions in the Selectee Index explains these findings as many of the questions refer to symptoms in the neurotic area but few refer to those in the psychotic area. The new Cornell Index, Form N-2, has a number of questions in the psychotic phases.

The highest degree of relationship was found between the Index and the average of the three highest T-scores on the MMPI. This might have been hypothesized as this correlation is concerned with both inventories in their entireties. Since, according to Modlin,⁹ both devices measure the same thing, a high correlation should be found. This correlation was .688 for the women and .593 for the men.

The degrees of relationship were computed between the Index and representative single phases of each of the major triads and the independent phases of hypomania and psychopathic deviate. The coefficient for psychasthenia was .465 for the men and .491 for the women; for paranoia, .351 for the men and .361 for the women. Neither of these single members of the psychotic triad showed as high a relationship as the whole triad. Depression, one of the phases of the neurotic triad, gave the highest degree of relationship of any single phase. This is not surprising as depression

⁹ Ibid., p. 763.

often appears in conjunction with the areas of psychotic behavior as well as with the neurotic group. The correlation with depression for men was .470 and for women .536.

The relationship between the Index and the psychopathic deviate scale was .317 for men and .321 for women. These coefficients are somewhat lower than the previous ones, since persons who deviate in this area are usually quite satisfied with themselves, most of the symptoms recorded on the Index would not be present. The hypomania scale gave the most unexpected results with a coefficient of .066 for the men and .421 for the women. The Index includes few questions related to this deviation and as a result a low correlation could be expected unless other symptoms accompanied the hypomania. And, the hypomanic person is usually too busy to develop depression or some of the other symptoms. The authors of the MMPI state¹⁰ that one of the greatest difficulties in developing this scale was to differentiate between the true hypomanic individual and a normal person who was ambitious and energetic. A study of the MMPI profiles used in this study indicates that an elevation in the hypomania area for the women was accompanied by elevations in other areas. This was not true for many of the men who showed

¹⁰ Hathaway and McKinley, op. cit., p. 6.

an elevation in the one scale only. It is probable that a number of the men who scored high in the hypomania area were not true deviates but ambitious persons. Further investigation of this point is beyond the scope of this study.

All of the correlations reported, with the exception of hypomania for men, are significant at the one per cent level.¹¹ The correlations, with the one exception, range from eight to twenty-five times their probable error. The women appeared to be much more consistent on the two inventories than were the men; the correlations being higher in every phase.

Comparisons in terms of three levels of adjustment.

As explained in the last chapter,¹² the counselors were asked to state that each student interviewed had little or no emotional disturbance, moderate disturbance, or severe disturbance. Scores for the men on the Index were converted to these same three categories by placing scores from zero through fourteen in the first group, fifteen through twenty-one in the second group, and twenty-two and higher in the

¹¹ J. P. Guilford, Psychometric Methods, McGraw-Hill Book Company, Inc., New York, 1936. p. 540.

¹² Supra, p. 54.

third group. Conversions for the women were zero through sixteen, seventeen through twenty-three, and twenty-four and higher, respectively. Since the T-scores on the MMPI have already taken care of the difference in raw scores for men and women, only one standard for conversion is necessary. These are: profiles with all T-scores below sixty-five are placed in the first group of little or no problem; top T-scores in sixty-five to seventy area, in the second group, with moderate disturbance; and if one or more T-scores passed seventy, the profile was placed in the third group. The masculinity-femininity interest scale was not included in this study as by itself the scale has little significance in measuring emotional disturbance. A summary of the findings of the comparisons of each pair of measuring devices is shown in Table IX.

The Cornell Index and the MMPI. Of the 212 men who wrote both inventories, 140 or 66 per cent were placed in the same class by both measures; that is; both the Index and the MMPI rated the man as having little disturbance, or moderate disturbance, or severe disturbance. The Index rated five men, or 2.4 per cent, one group higher than did the MMPI; that is, the Index rated them as moderately disturbed and the

MMPI as little disturbance, or the Index rated them as severely disturbed and the MMPI rated them as moderately disturbed.

The Index did not rate any as severely disturbed that the MMPI rated as little disturbed.

The Index rated fifty-seven men, or 26.9 per cent of the men, one group lower than the MMPI rated them; that is, the Index rated them little or no disturbance and the MMPI rated them moderately disturbed, or the Index rated

TABLE IX

COMPARISONS BETWEEN CORNELL INDEX AND MMPI
AND BETWEEN CORNELL INDEX AND COUNSELORS' JUDGMENTS
WITH RATINGS IN TERMS OF
LITTLE, MODERATE, OR SEVERE MALADJUSTMENT

	Male				Female			
	MMPI		Counselor		MMPI		Counselor	
	No.	%	No.	%	No.	%	No.	%
C.I. agrees	140	66.0	148	79.2	145	78.4	101	80.8
C.I. one higher	5	2.4	27	14.4	6	3.3	14	11.2
C.I. two higher	0	0.0	0	0.0	1	0.5	2	1.6
C.I. one lower	57	26.9	12	6.4	32	17.3	8	6.4
C.I. two lower	10	4.7	0	0.0	1	0.5	0	0.0
Total	212	100.0	187	100.0	185	100.0	125	100.0

them moderately disturbed and the MMPI rated them severely disturbed. The MMPI rated ten men, or 4.7 per cent as severely disturbed, who showed no disturbance on the Index.

Of the 185 women who took both inventories 145, or 78.4 per cent, were placed in the same class by both measures. Six, or 3.3 per cent, were placed one group higher, and one, or 0.5 per cent, was placed two groups higher by the Index. Thirty-two women, or 17.3 per cent were placed one group higher, and one, or 0.5 per cent, was placed two groups higher by the Index than they were by the MMPI. The greater consistency previously shown by women is again demonstrated here.

In this comparison, the MMPI rated more people in the disturbed area than did the Index. Most of the people who were rated in different groups by the two inventories were either "false positives" on the MMPI or "false negatives" on the Index. Probably some of each are included. It is also probable that the greater length and the use of the validating scores in the MMPI will result in a majority of these individuals being "false negatives" on the Index rather than "false positives" on the MMPI. That is, it is probable that the MMPI is a more accurate measuring instrument.

Relationships between the scores on the Cornell Index and counselors' judgments. A comparison of scores on the Cornell Index and counselor judgments, in Table VII, shows a somewhat higher degree of relationship than between the Cornell Index and the MMPI. This is particularly true of the men students. One hundred and forty-eight men, or 79.2 per cent, were rated in the same classification by the Index and the counselors, whereas only 66.0 per cent showed this agreement between the Index and the MMPI. The women students received the same rating from the Index and the counselors in 101 cases, or 80.8 per cent of their number. This is close to the 78.4 per cent shown between the Index and the MMPI. The Cornell Index rated twenty-seven men one class less adjusted and twelve men one class better adjusted than did the Counselors. None of the men differed more than one class when rated by the Index and the counselor. For the women, the Index rated fourteen, or 11.2 per cent one class less adjusted, and eight, or 6.4 per cent one class better adjusted. Two of the women were rated severely maladjusted by the Index and normal by the counselors.

It is interesting to note that the percentage of exact agreement between the Cornell Index and the counselors is 79.2 for the men and 80.8 for the women. The variations from exact

agreement were also similar. It may be surmised that the same factor or factors that reduced the extent of agreement between the Index and the MMPI did not operate between the Index and the counselors judgments.

Relationships between the scores on the MMPI and counselors' judgments. A comparison of the scores on the MMPI and counselor judgment, Table X, shows the least agreement of any of the three comparisons. The two ratings were in agreement for only sixty-three, or 58.9 per cent, for the men; and fifty, or 68.5 per cent, for the women. The MMPI rated thirty-four, or 31.8 per cent of the men, one class higher; and seven, or 6.5 per cent of the men, two classes higher. Eleven or 15.1 per cent, of the women were rated one class higher; and five, or 6.8 per cent of them, two classes higher by the MMPI. Three, or 2.8 per cent, of the men and six, or 8.2 per cent, of the women were rated one class better in adjustment by the MMPI than by the counselors. One woman was rated as severely disturbed by the counselor and normal by the MMPI.

Again, as in the comparison between the MMPI and the Index,¹³ the MMPI rates considerably more persons as showing

¹³ Cf. ante.

TABLE X
 COMPARISON BETWEEN COUNSELOR JUDGMENTS
 AND MMPI WITH RATINGS IN TERMS OF
 LITTLE, MODERATE, OR SEVERE MALADJUSTMENT

	Male		Female	
	No.	%	No.	%
MMPI agrees with counselor	63	58.9	50	68.5
MMPI one higher than counselor	34	31.8	11	15.1
MMPI two higher than counselor	7	6.5	5	6.8
MMPI one lower than counselor	3	2.8	6	8.2
MMPI two lower than counselor	0	0.0	1	1.4
Total	107	100.0	73	100.0

disturbance than do the counselors. This can be explained in terms of "false positives" from the MMPI scores, or "false negatives" from the counselors judgments. Since many of the interviews with counselors were for vocational counseling, the counselors may well have missed some of the students' emotional problems. This would seem to be particularly true if the student was not ready to talk about his personal problems and kept them hidden during the interview. The counselors possibly would have uncovered more personal adjustment

problems if they had had the inventory scores to direct the interview into the proper areas.

Determination of "pick-up" rate. The "pick-up" rate, described by Hunt and discussed in the last chapter¹⁴ is found by dividing the number of cases "picked up" by the Index by the total number indentified by the criterion. When the MMPI was used as the criterion, the Index "picked up" thirty-six, or 62.1 per cent, of the fifty-eight girls identified as maladjusted by the MMPI. It picked sixty-one, or 58.6 per cent, of the 104 men picked by the MMPI. When the counselors' judgments were used as the criterion, the Index "picked up" twenty-nine, or 88.0 per cent of the thirty-three girls identified by the counselors and forty-four or, 83.0 per cent, of the fifty-three men selected by the counselors.

The Index selected six women and three men as having difficulties that the MMPI identified as normal. It selected eight women and twenty-four men in the border-line area that the counselors reported as having no personality problems.

¹⁴ Supra, p. 46.

CHAPTER V

CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Conclusions

This study was set up to validate the Cornell Index for a college population. A survey of the research indicated that an earlier form, called the Cornell Selectee Index, had been successful in screening many persons with emotional disturbances from the large numbers of men reported to the armed forces induction centers. It also appears to have been used successfully for screening purposes in industry. If the revised form, N-2, is as effective in civilian use as the earlier forms were in military and industrial use, the personnel departments in colleges can identify many of the students who need help at the beginning of their freshman year.

The mean and dispersion of scores. The Index was administered to 1298 freshman English students who appeared to be a representative group of the freshman class at Michigan State College in the winter term of 1949. Scores ranged from zero to fifty-two: The mean score for men was 7.349 and for women 8.418: The standard deviation of the scores was 6.763 for men and 7.483 for women. These figures indicate that the dispersion of scores is large enough to differentiate between persons having emotional stability and those having borderline or serious emotional disturbances.

The "stop" questions. Approximately, 10 per cent of the total group answered one or more of the "stop" questions in the undesirable direction. The few members of this group who had either taken the

MMPI or had been interviewed by a counselor showed a high percentage of personality difficulties. The results tend to substantiate the findings of the writers who used the "stop" questions in the earlier form of the Index. The limited number of persons involved in this phase of the study does not allow a definite conclusion to be drawn.

Questions answered most frequently and least frequently in the deviate direction. A study of the questions most frequently answered in the direction indicating difficulty presents a list of problems faced by large numbers of freshman students. These questions, individually, do not indicate serious emotional disturbance; however, when many of them are added together or are added to other questions in the Index they have clinical importance. The questions least frequently answered in the deviate direction are among the more serious symptoms.

Correlations between Cornell Index and MMPI. The correlations between the Cornell Index and the MMPI show a fairly high degree of relationship between the findings of the two instruments. The women exhibited greater consistency throughout the study. The average of the top three scores on the MMPI gave the highest correlation coefficient when compared with the total score on the Cornell Index. This would seem to indicate that the two inventories measure the same types of deviations. Since the Cornell Index is primarily a screening device rather than a diagnostic tool subdivisions of the inventory were not studied.

A study of the relationships of several of the phases of the

phases of the MMPI and the Index was made to determine how well the Index covered these areas. Using the diagnostic syndromes of the neurotic and psychotic triads in comparison to the Index, the relationships were shown to be somewhat less than for the MMPI as a whole. This could be expected as many of the profiles of the MMPI show high in one or the other of these triads, independently of the other. Thus, while the top three scores on the MMPI might be high and compare closely to the Index findings, these scores might all be in the psychotic triad. Then, the comparison between the neurotic triad and the Index would show little relationship. The reverse of this might also be true if the neurotic triad were high, the psychotic triad low, and the comparison which was being made was between the Index and the psychotic triad.

The depression scale of the MMPI shows the highest relation of any single scale to the Index. This might be due to the depression being, not only an integral part of the neurotic triad, but also frequently showing as a symptom accompanying the psychotic disorders. Whatever the cause, the depression scale gives promise as the best single scale of the MMPI to be used if an attempt is being made to measure the same characteristics that the Index measures.

The psychasthenia scale also shows a fairly high degree of relationship to the Index. A number of questions in the Index relating to this area of deviation plus the frequency with which depression accompanies the disorder help establish the relationship.

The two areas showing the lowest relationship are hypomania and

psychopathic deviate and there are but few questions in the Index relating to these areas. Depression, except at rare intervals, is not characteristic of these deviations; anxiety is also usually not present so that many of the psychosomatic symptoms presented in the Index are of no use in identifying these areas. Many of the MMPI profiles that differed in degree of deviation from the Index were deviate in these two areas.

When the comparison between the findings on the Index and the MMPI are made in terms of three levels of adjustment a high level of relationship also appears. The two instruments agreed in their findings for 66 per cent of the men and 78 per cent of the women. In the cases of disagreement the Index was usually lower in its rating of deviation than was the MMPI. Two factors appear to be relevant to this difference: The first of these is the effect of the greater length and the corrective K-score of the MMPI. The longer instrument is more thorough in its investigation and compensates by means of the K-scale for defensive attitudes. The second factor is the possibility of a number of "false positives" mistakenly identified as deviates by the MMPI. Such persons are apparently well adjusted but make high scores in some phases of the MMPI. No study appears to have been made to determine the relative number of "false positives" on the two instruments.

Comparison between scores on the Cornell Index and counselors' judgments. The comparison between the scores on the Index and the

counselors' judgments shows a higher relationship than between the two inventories. This is particularly true for the men. The unidentified factor that produced a difference between the coefficients for men and women in the two inventories seems to have disappeared. This is probably due to the factor acting the same way with the Index and Counselor, while it acted differently for the Index and MMPI. Quite possibly this factor is defensiveness, or a lack of readiness to face the problem. The K-scale and the greater length of the MMPI may do better in overcoming the effect of this factor.

The Index identifies a few more individuals as being emotionally disturbed than do the counselors. This may be due to the counseling interview situation which may have been primarily for vocational counseling. If the student sought the interview to get assistance in making a vocational choice, but gave no evidence of nervousness or depression, the counselor may not have realized the presence of the personal problem. Since some of the counselors have less training in psychology than in vocational guidance they may miss many of the clues that indicate emotional disturbance. Also, many students may cover these emotional disturbances during the first interviews and then bring them out after gaining more assurance in the counseling situation. Several of the counselors reported the uncovering of disturbances during a later interview based on the Index questions which the student had answered in a deviate direction.

Comparison between MMPI scores and counselors' judgments. The

degree of relationship between MMPI scores and counselors' judgments was lower than either of the relationships discussed above. In terms of the three level classification of little, moderate, or severe maladjustments, these two ratings agreed on 58.9 per cent of the men and 68.5 per cent of the women. The MMPI was one level higher on 31.8 per cent of the men and 15.1 per cent of the women. The counselors were higher than the MMPI on 2.8 per cent of the men and 9.6 per cent of the women. This latter group are definitely "false negatives" on the MMPI. These results indicate that the present interpretation of MMPI profiles, as recommended by the authors, places too many persons in the maladjusted group; that is, the inventory results give too many "false positives."

Suggested cutting scores for the Cornell Index. The findings of this study indicate that the Cornell Index can be successfully used as a screening device for college freshman. Cutting scores of twenty-two for men and twenty-four for women, or one or more "stop" questions, will identify most of the persons who are seriously disturbed. Scores ranging from thirteen to twenty-one for men and fourteen to twenty-three for women will identify most of the borderline group.

Persons deviating in the hypomania or psychopathic deviate areas will not be detected as readily as other types of emotional disturbances. If, in addition to using the Index as a screening device for all freshmen, the inventory were added to all vocational aptitude testing batteries, some personality disturbances would be uncovered that might otherwise be missed.

Summary

In this study an attempt has been made to evaluate the Cornell Index as a screening device to locate freshman students who have problems of personal adjustment. Comparisons of the scores on the Cornell Index with scores on the MMPI and with counselor judgments indicate that it is very useful for this purpose. The distribution of scores of 1298 college freshmen on the Cornell Index was studied and various statistical techniques were applied. Suggested "cutting" scores for the selection of students to be interviewed were set. The study indicates that this instrument can be very helpful in locating college freshmen who have problems of personal adjustment.

Suggestions For Further Research

A problem suggested by a survey of the data obtained in this study is the comparative attitudes of men and women toward discussing emotional disturbances. The comparisons between the men's and women's scores on the two inventories and the counselors' ratings might be interpreted as showing greater defensiveness by the men. The K-scale on the MMPI, supposedly, corrects for this attitude and thereby gives a truer indication of the number of men having problems. Possibly, neither the Index nor the counselors were able to overcome this greater defensiveness on the part of the men. Thus it may be that the lower correlation coefficients for the men as compared to the women, who were less defensive, can be explained in terms of this attitude. Further evidence in support of this hypothesis might be taken from the tables

for the conversion of raw scores to T-scores on the MMPI. In several of the scales the raw scores for women must be several points higher than for men to be converted to the same T-score. This has been explained by saying that women are more easily emotionally disturbed than men. However, our cultural pattern encourages better control of emotions by men than by women. Therefore, the women may admit emotional disturbances more easily.

A second problem arises from the relatively fewer disturbances uncovered by the counselors as compared to the two inventories. Many students contact counselors for assistance in making vocational or academic choices of whom some have personal problems, which for some reason they do not plan to discuss. Many types of clues lead the counselor into exploring these areas and in identifying the problems. Some students however, successfully cover their personal difficulties so well that the counselor is convinced that they have none. Some of these problems were uncovered by one or the other of the inventories and later confirmed in a counseling interview after the counselor had the inventory findings to give direction to the interview. An extensive study might be set up to determine the number of personal problems missed by counselors who are in daily contact with these and other types of difficulties.

The significant difference that appeared between the men and women in the area of hypomania needs further investigation. The data used to show the degree of relationship of the hypomania scale of the

MMPI and the Index gave a correlation of .066 for the men and .421 for the women. As has already been stated the single areas of the MMPI that were associated with depression gave the highest correlation coefficients. Does the American culture present enough more problems to a woman, who is deviate in this area, than it does to a man so that other symptoms would tend to develop with the woman and not with the man?

Perhaps the most valuable follow-up of this study would be the selection of the persons who scored above the cutting score for further investigation. If approximate one-half of this group received intensive counseling and the remainder received none, the Cornell Index might be re-administered and the changes in scores calculated. If a control group was selected from persons whose score was at or close to the median score, three questions might be considered. First, did the scores of the control group change significantly? Second, did the scores of the counseled group indicate significant improvement? And third, did the scores of the persons who scored high the first time and who received no counseling show a significant change.

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APPENDICES

APPENDIX A

CORNELL INDEX FORM N-2

NAME _____

DATE _____

- | | <u>YES</u> | <u>NO</u> | | <u>YES</u> | <u>NO</u> |
|---|------------|-----------|---|------------|-----------|
| 1. Have you ever had a headache? | Y | N | 15. Do you wish that you always had someone at your side to advise you? | Y | N |
| 2. Do you frequently feel faint? | Y | N | 16. Do you have to do things slowly in order to be sure you are doing them right? | Y | N |
| 3. Do you have hot and cold spells? | Y | N | 17. Does it bother you to eat anywhere except in your home? | Y | N |
| 4. Have you fainted more than twice in your life? | Y | N | 18. Do you have an uncontrollable need to repeat the same disturbing actions? | Y | N |
| 5. Do strange people or places make you afraid? | Y | N | 19. Is it always difficult for you to make up your mind? | Y | N |
| 6. Do you often have spells of dizziness? | Y | N | 20. Do you usually feel cheerful and happy? | Y | N |
| 7. Do you get all nervous and shaky when approached by a superior? | Y | N | 21. Do you always have a bad time no matter what you are doing? | Y | N |
| 8. Does the sight of blood make you want to drop down in a faint? | Y | N | 22. Do you often feel miserable and blue? | Y | N |
| 9. Does your work fall to pieces when the boss or a superior is watching you? | Y | N | 23. Does life usually look entirely hopeless? | Y | N |
| 10. Are you scared to be alone with no friends near you? | Y | N | 24. Are your emotions usually dead? | Y | N |
| 11. Do you feel nervous or dizzy right at this moment? | Y | N | 25. Are you usually quiet and sad at a party? | Y | N |
| 12. Do you always get orders and directions wrong? | Y | N | 26. Do you often wish you were dead and away from it all? | Y | N |
| 13. Does your thinking become completely confused when you have to do things quickly? | Y | N | 27. Are you considered a nervous person? | Y | N |
| 14. Do you always sweat and tremble a lot during inspections or examinations? | Y | N | 28. Do you have any unusual fears? | Y | N |

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|---|---|---|---|---|---|
| 29. Do you often have difficulty falling asleep or staying asleep? | Y | N | 46. Do you have very disturbing or frightening thoughts that keep coming back in your mind? | Y | N |
| 30. Does every little thing get on your nerves and wear you out? | Y | N | 47. Do you suffer badly from frequent severe headaches? | Y | N |
| 31. Does worrying continually get you down? | Y | N | 48. Do you sweat a great deal even in cold weather? | Y | N |
| 32. Did you ever have a nervous breakdown? | Y | N | 49. Are you repeatedly bothered by severe itching? | Y | N |
| 33. Were you ever a patient in a mental hospital? | Y | N | 50. Are you troubled by stuttering? | Y | N |
| 34. Do you get out of breathe long before anyone else? | Y | N | 51. Have you at times had a twitching of the face, head, or shoulders? | Y | N |
| 35. Do you have pains in the heart or chest? | Y | N | 52. Were you a bed wetter between the ages of 8 and 14 years? | Y | N |
| 36. Does your heart often race like mad for no good reason? | Y | N | 53. Do cold hands or feet trouble you even in hot weather? | Y | N |
| 37. Do you often have difficulty in breathing? | Y | N | 54. Do you suffer from asthma? | Y | N |
| 38. Are you often bothered by thumping of the heart? | Y | N | 55. Are you a bed wetter? | Y | N |
| 39. Do you often suddenly become frightened while you are thinking? | Y | N | 56. Are you a sleep walker? | Y | N |
| 40. Do you often shake or tremble? | Y | N | 57. Have you ever had a fit or convulsion? | Y | N |
| 41. Are you often awakened out of your sleep by frightening dreams? | Y | N | 58. Do pains in the back make it hard for you to keep up with your work? | Y | N |
| 42. Do you always become scared at sudden movements or noises at night? | Y | N | 59. Do you sometimes find yourself unable to use your eyes because of pain? | Y | N |
| 43. Do sudden noises make you jump and shake badly? | Y | N | 60. Is your body always in very bad condition? | Y | N |
| 44. Do you tremble or feel weak every time someone shouts at you? | Y | N | 61. Do severe pains and aches make it impossible for you to perform your duties? | Y | N |
| 45. Are you keyed up and jittery every single moment? | Y | N | 62. Do you get spells of exhaustion or fatigue? | Y | N |
| | | | 63. Do you wear yourself out with worrying about your health? | Y | N |
| | | | 64. Do weak and painful feet make you miserable every single day? | Y | N |

- | | | | | | |
|--|---|---|--|---|---|
| 65. Do you frequently get up tired in the morning? | Y | N | 83. Do you have the feeling that people are watching or talking about you in the street? | Y | N |
| 66. Does pressure or pain in the head make it hard for you to perform your duties? | Y | N | 84. Do people usually pick on you? | Y | N |
| 67. Are you always in poor health and unhappy? | Y | N | 85. Are you extremely shy or sensitive? | Y | N |
| 68. Are you constantly too tired and exhausted even to eat? | Y | N | 86. Are you easily upset or irritated? | Y | N |
| 69. Is your appetite good? | Y | N | 87. Do you make friends easily? | Y | N |
| 70. Do you constantly suffer from bad constipation? | Y | N | 88. Do you go all to pieces if you don't constantly control yourself? | Y | N |
| 71. Do you often suffer from an upset stomach? | Y | N | 89. Were you ever sent to reform school? | Y | N |
| 72. Do you frequently get attacks of nausea (sick to your stomach)? | Y | N | 90. Have you ever gotten into serious trouble or lost your job because of drinking? | Y | N |
| 73. Do you suffer from indigestion? | Y | N | 91. Have you been arrested more than three times? | Y | N |
| 74. Do you always have stomach trouble? | Y | N | 92. Have you ever taken dope regularly (like morphine or "reefers")? | Y | N |
| 75. Do your stomach and intestines work badly? | Y | N | 93. Do your enemies go to great lengths to annoy you? | Y | N |
| 76. Do bad pains in the stomach double you up after every meal? | Y | N | 94. Does it make you angry to have anyone tell you what to do? | Y | N |
| 77. Do you usually have trouble in digesting your food? | Y | N | 95. Do you often drown your sorrows in drink? | Y | N |
| 78. Do you suffer badly from frequent loose bowel movements? | Y | N | 96. Do you always do things on sudden impulse? | Y | N |
| 79. Has any doctor ever told you that you had ulcers of the stomach? | Y | N | 97. Do people always lie to you? | Y | N |
| 80. Do people usually misunderstand you? | Y | N | 98. Do you flare up in anger if you cannot have the things that you want right away? | Y | N |
| 81. Do you have the feeling of being watched while you are at work? | Y | N | 99. Is the opposite sex unpleasant to you? | Y | N |
| 82. Have you usually been treated fairly? | Y | N | 100. Do you always have to be on guard with friends? | Y | N |
| | | | 101. Do you often get into a violent rage? | Y | N |

APPENDIX B

DEFINITIONS OF PSYCHIATRIC TERMS
USED IN MMPI AS GIVEN IN THE
MANUAL FOR THE INVENTORY

HYPOCHONDRIASIS is abnormal concern about bodily functions.

DEPRESSION indicates poor morale of the emotional type with a feeling of uselessness and inability to assume a normal optimism with regard to the future.

HYSTERIA may be shown in general systemic complaints or more specific complaints such as paralyses, contractures, gastric or intestinal complaints or cardiac symptoms.

PSYCHOPATHIC DEVIATE individual lacks deep emotional response, is unable to profit from experience, and disregards social mores.

PARANOIA is characterized by suspiciousness, over sensitivity, and delusions of persecution.

PSYCHASTHENIA persons are troubled by phobias or compulsive behavior.

SCHIZOPHRENIA is characterized by bizarre and unusual thoughts or behavior. There is a splitting of the subjective life from reality.

HYPOMANIA is marked with over productivity in thought and action, a lesser state of mania.