

THE DEVELOPMENT OF A QUANTITATIVE METHOD FOR DIFFERENTIATING
NATURAL PSYCHOLOGICAL GROUPS WITH AN IQ TEST
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CURRICULUM STUDIORUM

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INTRODUCTION

The immediate inquiry was an attempt to determine the feasibility of establishing a quantitative method for the differential diagnosis of maladjusted, mentally diseased and character disordered subjects, through a combination of three validity scales and eight clinical variables of the Minnesota Multiphasic Personality Inventory, hereinafter referred to as the MMPI.

In the past, the MMPI has been used as a diagnostic tool in two ways. The first of these involved a molecular approach to the test data, wherein the analysis of a given case was largely based upon the significant deviation of one or more unit variables, the subject being labelled with the name of the most aberrant scale present in the record. In this context, standard scores of above 70 were considered to indicate the presence of abnormal amounts of the properties in question.

The second approach was of a global character, in which the diagnostic assessment was conducted in a configural manner which utilized the pattern of high and low scores within the graph. In this way, personality variations were read in terms of the particular configuration, and not so much by the height of any given score by itself.

Past experience with the MMPI has revealed that the global approach yielded a greater predictive accuracy than the molecular method.

An elaboration of the configural procedure was that of the quantitative ratio, wherein diagnostic assessment has been conducted with a variety of critical scores. With this approach some success has been observed, particularly in its easy applicability to clinical screening situations.

To this end, in consideration of the difficulties encountered with both the molecular approach and with pattern analysis, it was felt that there might be some considerable worth in the development of additional quantitative ratios with which MMPI protocols could be examined for the existence of pathological factors, but without the problematic findings which have been associated with the other methods.

It was anticipated that if this approach to the MMPI proved fruitful, it could be made to serve as a more effective mode of assessing pathological conditions in clinical and military centres. At the same time, it would be an important beginning for further inquiry into the possibility of establishing a wide range of critical scores through which most, if not all of the major psychopathological anomalies could be detected.

To conclude, this inquiry was not intended to serve as a terminal project, but rather as a further exploration into the feasibility of adapting the MMPI as a major screening tool for those situations where such an instrument would be of value.

CHAPTER I

THE MMPI AS A DIAGNOSTIC TOOL

In consideration of the large body of material relevant to the diagnostic implications of the MMPI, the prime requisite of any study of this nature must be an exhaustive description and localization of previous findings. To this end, the following outline will review the special characteristics of the instrument, suggesting nosological functions in a general way, but with particular emphasis on pattern or configural analysis. To conclude, the immediate inquiry was an attempt to construct a diagnostic index which would distinguish between three pathological groups.

According to its authors, the MMPI was designed to provide in a single psychometric test, pertinent clinical information on all important phases of personality¹. In addition, it was devised in such a way that its assessment of traits commonly characteristic of personality pathology would be meaningful to all professional clinicians dealing with psychological abnormality². Subsequent experimentation has shown that the MMPI was also adaptable to understanding the normal personality,

1 S. R. Hathaway and J. C. McKinley, The Minnesota Multiphasic Personality Inventory: The Manual, New York, Psychological Corporation, 1951, p. 7.

2 Loc. cit.

inasmuch as test findings were applicable to personality characteristics not having pathological implications³. In addition, it was anticipated that the instrument would clarify complex diagnoses and would be almost universal in its applicability to individual cases⁴. From the outset, the Inventory was found useful in clinical and military screening and in counseling and guidance work.

In a nosological capacity the MMPI has been generally scored for about fourteen variables, four of which are of a validating character and the remaining ten of clinical significance. In this regard, the findings have been commonly used in two different ways. The earliest of these involved an atomistic or molecular interpretation, wherein each scale was analyzed in terms of its variation from the mean, thus permitting a description of personality in terms of the deviant scales, but somewhat stepped down relative to pathological connotations⁵. More recently, the findings have been interpreted in a global or molar sense, wherein the scales are considered in their relationship with one another, although any given scale was not necessarily specific to the disorder upon which it was derived.

3 loc. cit.

4 loc. cit.

5 Wm. C. Cottle, The MMPI: A Review, in Kansas Studies in Education, Vol. 3, No. 2, issue of March 1953, p. 67.

A third approach to the use of the test in a diagnostic setting has been that of the quantitative ratio. First postulated by Modlin⁶, and later modified by Welsh⁷, Gough⁸ and Earle⁹, this method of using the MMPI may be considered a variation of the global or configural approach noted above, but has emphasized the possibilities of a variety of critical scores rather than the significance of high and low points in obtained profiles.

With respect to these three current uses of the MMPI which have been outlined, the following review will divide the large body of research outlined in the literature under three analogous headings.

1. The Atomistic Approach.

Since its inception about fourteen years ago, well over four hundred studies have been published on the MMPI. A good proportion of these have dealt with the role of the test

⁶ H. C. Modlin, A Study of the MMPI in Clinical Practice: with Notes on the Cornell Index, in the American Journal of Psychiatry, Vol. 103, No. 6, 1947, p. 768.

⁷ G. S. Welsh, An Anxiety Index and an Internalization Ratio for the MMPI, in the Journal of Consulting Psychology, Vol. 16, No. 1, 1952, p. 65ff.

⁸ H. G. Gough, The F minus K Dissimulation Index for the Minnesota Multiphasic Personality Inventory, in the Journal of Consulting Psychology, Vol. 14, No. 5, 1950, p. 408ff.

⁹ J. B. Earle, The Diagnosis of Three Pathological Groups with the L, F and K Scales of the MMPI, Unpublished Master's Thesis, University of Ottawa, 1953.

in a diagnostic setting, a fair survey of which has been provided by Cottle¹⁰ for the period up to 1951 inclusive, his outline being of considerable aid in orienting this review.

As observed previously, the analysis of MMPI data in an atomistic sense was the earliest approach to the use of the test for diagnostic purposes, and analysis of a given case was largely based upon the significant deviation of one or more unit variables, the patient being labelled with the name of the most aberrant scale present in the record. In this context, a standard score of 50 has been considered average, and every ten points above or below this has represented one unit of standard deviation in the general population. Standard scores of above 70 were considered to indicate the presence of abnormal amounts of the properties in question.

As a mode of assessing psychiatric or psychological abnormality, however, the ability of the MMPI to determine pathology in terms of the scale names was never particularly satisfactory, and a wide number of studies have tended to confirm this. Benton and Probst¹¹ attempted a comparison of psychiatric ratings versus personality trends, and observed a significant degree of agreement between the psychiatric rating and the test scores on Pd, Pa and Sc, but no significant

10 Wm. C. Cottle, op. cit., p. 1ff.

11 A. L. Benton and K. A. Probst, A Comparison of Psychiatric Ratings with MMPI Scores, in the Journal of Abnormal and Social Psychology, Vol. 41, No. 1, 1946, p. 78.

agreement relative to other scores. Differences, however, may have been largely due to the psychiatrists looking for one thing and the test another. Benton noted that the test was deficient in its assessment of pathological conditions represented by the names of the different scales¹². As in the Benton and Probst study, however, this weakness had been due in large part to an improper use of the MMPI, since it was implicit in the function of the instrument that pathological conditions rarely exist without a complex mixture of symptoms. Further, Hathaway and Meehl noted that the Inventory was not intended to diagnose directly with a large number of patients, since the test information was not adequate as a basis for analysis of symptom meaning in any given subject's environmental adjustment¹³. In addition, the same authors suggested that the MMPI was not intended for the measurement of pure traits in terms of the scale names¹⁴.

Despite the above considerations, many studies were conducted in this way, with the result that most such investigations denied the ability of the test in diagnosis. These

12 A. L. Benton, in Ouros, The Third Mental Measurements Yearbook, O. K. Ouros, Ed., New Brunswick, N. J., Rutgers University Press, 1949, p. 106.

13 S. R. Hathaway and Paul E. Meehl, The Minnesota Multiphasic Personality Inventory, in Military Clinical Psychology, TM 8-242, AFM 160-45, issue of July 1951, p. 72.

14 Id. cit.

approaches, however, had failed to consider that the primary task of the tool was to suggest constellations of symptoms and to represent these as such, without necessarily inferring one or more of the common psychiatric classification labels.

This factor notwithstanding, Cottle noted that much of the research up to 1952 had suggested that few of the scales were satisfactory when considered singly in the diagnosis of abnormals, although they were of use in suggesting general types of abnormality and in assessing difficult cases¹⁵.

At an early date, Michael and Buhler used the Inventory in a purely atomistic manner without specific reference to diagnostic labelling, and found that it provided much useful information relative to a neuropsychiatric hospital population, thus suggesting a new area of emphasis¹⁶.

From about this time it was ascertained that the problem of clinical diagnosis was too complex a situation to permit interpretation of the MMPI in terms of specific scales, although an atomistic interpretation of the normal personality may be conducted, but in terms stepped down from the pathological¹⁷.

15 Wm. C. Cottle, op. cit., p. 23.

16 Ibid., p. 36, citing J. C. Michael and C. Buhler, Experiences with Personality Testing in a Neuropsychiatric Department of a Public General Hospital, in Diseases of the Nervous System, Vol. 6, No. (not given), 1945, p. (not given).

17 Ibid., p. 67.

In consideration of this factor, the foregoing will consider each of the separate scales, together with a review of their more cogent studies.

(L) The Lie Scale

This variable was devised to determine deliberate distortions in a given protocol. Each of the items included in the scale were structured to represent a socially desirable situation, though one which was seldom true of the individual. Scattered at random throughout the Inventory, these items provided a subtle trap for anyone wishing to present too good an impression of themselves to the clinician. Thus, when normal-appearing profiles have been faked, the L score tends to become sharply raised.

Both Gough¹⁸ and Carp¹⁹ observed that the L score had important diagnostic implications apart from its validity function, and, as a result of Gough's study, an "L" type has been suggested.

To conclude, L has been ascertained to have some significance in the interpretation of personality trends apart from its intended role as a validity indicator.

¹⁸ H. G. Gough, Simulated Patterns on the MMPI, in the Journal of Abnormal and Social Psychology, Vol. 42, No. 2, 1947, p. 224.

¹⁹ A. Carp, MMPI Performance and Insulin Shock Therapy, in the Journal of Abnormal and Social Psychology, Vol. 45, No. 4, 1950, p. 725.

(F) The Validity Scale

From the outset it was intended that this scale would be an indicator of whether the MMPI had been properly administered, scored and understood in the test situation. Although it was not specifically designed as a diagnostic indicator²⁰, a number of investigations have indicated its significance in this direction. Kazan and Sheinberg noted that an aberrant F score was only rarely an invalidating factor in the consideration of abnormal subjects. They found that it was of importance in suggesting the presence of significant and often severe psychiatric disease, thus establishing the psychopathological importance of the scale²¹. This conclusion was also supported by Hales and Simon²² and Brozek and Schiele²³.

Specifically, the F scale has been shown to rise with psychological illness of certain types, particularly in schizoid and depressive reactions²⁴. In this direction, Schmidt

20 S. R. Hathaway and J. C. McKinley, op. cit., p. 18.

21 A. T. Kazan and I. M. Sheinberg, Clinical Note on the Significance of the Validity Score (F) in the MMPI, in the American Journal of Psychiatry, Vol. 102, No. 2, 1945, p. 183.

22 W. M. Hales and W. Simon, MMPI Patterns Before and After Insulin Shock Therapy, in the American Journal of Psychiatry, Vol. 105, No. 4, 1948, p. 257.

23 J. Brozek and B. C. Schiele, Clinical Significance of the Minnesota Multiphasic F Scale Evaluated in Experimental Neurosis, in the American Journal of Psychiatry, Vol. 105, No. 4, 1948, p. 266.

24 S. R. Hathaway and Paul E. Meehl, op. cit., p. 76.

observed that F was elevated with psychotic involvement²⁵, and Cofer, et al, noted its importance in simulated emotional disorders²⁶. Gough suggested there was little question that F, when sharply deviant, reflected the existence of marked personality disturbances²⁷. To all of this, Hathaway and Meehl added that the validity scale was effective in determining those patients who put themselves in a bad light by saying psychiatrically bad things about themselves²⁸.

To conclude, these studies would suggest that F has some considerable use in determining personality characteristics and in aiding in the diagnosis of some psychotics and depressives.

(K) The Suppressor Variable

The function of this scale has been as a suppressor variable, devised to increase the discriminatory power of five of the clinical scales. In this regard, it raised the proportion of clinically diagnosed cases scoring above the

²⁵ H. O. Schmidt, Test Profiles as a Diagnostic Aid, in the Journal of Applied Psychology, Vol. 29, No. 2, 1945, p. 126.

²⁶ C. N. Cofer, J. Chance and A. J. Judson, A Study of Malingering on the MMPI, in the Journal of Psychology, Vol. 27, No. 2, 1949, p. 498.

²⁷ H. G. Gough, Diagnostic Patterns on the MMPI, in the Journal of Clinical Psychology, Vol. 2, No. 1, 1946, p. 27.

²⁸ S. R. Hathaway and Paul E. Meehl, op. cit., p. 77.

90th percentile of normals on Hs, Pd, Pt, Sc and Ma²⁹.

From a qualitative standpoint, K has denoted those attitudes influencing the reaction of a subject to personality test items. Thus, low K would indicate self-criticality and that tendency to portray oneself as somewhat more abnormal than may be the case, whereas high K has suggested the individual who may have attempted to conceal pathological characteristics and thus secure a normal profile on the Inventory³⁰.

One research has suggested that in a diagnostic vein, low K scores might be related to a kind of psychiatric hypochondriasis which could spuriously elevate some of the personality scales³¹.

To conclude, K has proved to be a measure of the test-taking set and thus related to the L and F attitudes, but somewhat more subtle and probably tapping a different group of distorting factors. Research would suggest that it has become an important diagnostic adjunct to the overall ability of the MMPI in the clinical setting.

29 Wm. C. Cottle, op. cit., p. 7ff., citing S. R. Hathaway, in the Supplementary Manual for the MMPI, Part I, The K Scale and Its Use, Part II, The Booklet Form of the MMPI, New York, Psychological Corporation, 1946, p. (not given).

30 Ibid., p. 8., citing P. E. Mechl and S. R. Hathaway, The K Factor as a Suppressor Variable in the MMPI, in the Journal of Applied Psychology, Vol. 30, No. 5, 1946, p. (not given).

31 H. F. Hunt, A. Carp, Wm. A. Cass, Jr., C. L. Winder, and Robert E. Kantor, A Study of the Differential Diagnostic Efficiency of the MMPI, in the Journal of Consulting Psychology, Vol. 12, No. 5, 1948, p. 336.

(Hs) The Hypochondriasis Scale.

This variable was devised to assess the degree of abnormal preoccupation with somatic processes³², and subjects obtaining sharp elevations on Hs tend to betray symptoms suggestive of physical involvement but without objective basis. In addition, it has been ascertained that such high-scoring persons have tended to be immature, lacking in insight and having vague complaints over a long period of time.

The Hypochondriasis Scale was purportedly able to determine differences between those suffering from a true organic syndrome and those whose complaints were of a functional character³³. Wiener noted that certain organic complaints such as arthritis, asthma, ulcers and gun shot wounds resulted in higher Hs scores than did cases suffering from malaria³⁴, thus tending to corroborate the authors' contention. In another favourable report of research with Hs, Hovey found that abnormal hypochondriacal scores were related to certain neurotic reactions, these

³² S. R. Hathaway and J. C. McKinley, op. cit., p. 19.

³³ J. C. McKinley and S. R. Hathaway, A Multiphasic Personality Schedule (Minnesota): II. A Differential Study of Hypochondriasis, in the Journal of Psychology, Vol. 10, No. 2, 1940, p. 267.

³⁴ D. N. Wiener, Personality Characteristics of Selected Disability Groups, in the Journal of Clinical Psychology, Vol. 4, No. 3, 1948, p. 209.

including somatization reaction, dissociative-conversion reaction and anxiety³⁵.

On the other hand, Benton and Probst stated that the Hs scale rendered too many false positives to be satisfactory³⁶, and, despite Hatheway and McKinley's claim to the contrary, the scale tended to become elevated with organic involvement as well as with those anomalies of a hypochondriacal character.

To conclude, Cottle in his summary suggested that the scale has dubious value in the diagnostic setting unless its findings are considered in terms of its place in the overall MMPI configuration³⁷. From this it would seem that Hs has tended to increase in height from normal through somatic illnesses to frank psychosomatic conditions.

(D) The Depression Scale

The intended purpose of this variable was to measure poor emotional morale with concomitant feelings of pessimism, uselessness and general dissatisfaction. Peak scores on the scale have delineated a basic personality type having a depressive form of stress reaction, lack of self-confidence,

³⁵ H. B. Hovey, Somatization and Other Neurotic Reaction and MMPI Profiles, in the Journal of Clinical Psychology, Vol. 5, No. 2, 1949, p. 156.

³⁶ A. L. Benton and K. A. Probst, op. cit., p. 77.

³⁷ Wm. C. Cottle, op. cit., p. 14.

narrow interests and introversion³⁸.

In another direction, Hathaway and McKinley noted that peak D scores were closely associated with economic or vocational frustrations, personal problems, or the depressive phase of a manic-depressive situation³⁹. In support of this contention, Schiele, et al, found that the D score was definitely raised in depressive reactions and was also high with psychopaths after their identification as such⁴⁰. This latter factor would imply a fear of reprisal or of confinement for anti-social activity.

In another research, Schmidt suggested that the elevated D indicated the severity of a given disorder and that it ranged higher than Hs and Hy in psychotic and psychoneurotic groups and lower in normals and constitutional psychopaths⁴¹. Gough noted that it was the peak score of the neurotic triad with psychotics⁴², and Meehl found that it was the most

³⁸ S. R. Hathaway and J. C. McKinley, op. cit., p. 19.

³⁹ S. R. Hathaway and J. C. McKinley, A Multidimensional Personality Schedule (Minnesota): III. The Measurement of Symptomatic Depression, in the Journal of Psychology, Vol. 14, No. 1, 1942, p. 31ff.

⁴⁰ Wm. C. Cottle, op. cit., p. 12, citing B. C. Schiele, A. B. Baker and S. R. Hathaway, The MMPI, in Lancet, Vol. 63, No. (not given), 1943, p. (not given).

⁴¹ H. O. Schmidt, op. cit., p. 127ff.

⁴² H. G. Gough, op. cit., p. 33.

commonly seen top score in all abnormal reactions⁴³. As an adjunct to this, Morris found that D ranged higher than a T score of 70 for every pathological group except hysterics⁴⁴, and Modlin suggested that cases of depressive reaction were best diagnosed by means of D⁴⁵, although Pacella observed that the scale could not be used alone in the delineation of manic-depressives⁴⁶.

To sum up, Cottle, in his review of research found that the D score was one of the more useful factors in the MMPI, and that its meaning varied according to whether it was the single high score on the test, or as an elevated variable in combination with other scales on the test⁴⁷.

(Hy) The Hysteria Scale.

The function of this variable was to indicate the degree of agreement between the subject and persons who had developed a conversion-reaction formation of either a general or specific

⁴³ P. E. Meehl, Profile Analysis of the MMPI in Differential Diagnosis, in the Journal of Applied Psychology, Vol. 30, No. 5, 1946, p. 518.

⁴⁴ W. W. Morris, A Preliminary Evaluation of the MMPI, in the Journal of Clinical Psychology, Vol. 3, No. 4, 1947, p. 373.

⁴⁵ H. C. Modlin, op. cit., p. 760.

⁴⁶ B. L. Pacella, et al, The Effects of Electric Convulsive Therapy on Certain Personality Traits in Psychiatric Patients, in the American Journal of Psychiatry, Vol. 104, No. 2, 1947, p. 896

⁴⁷ Wm. C. Cottle, op. cit., p. 13ff.

character. Such identified individuals may or may not have true organic pathology of a primary or secondary nature, the latter as a result of long-term psychological illness⁴⁸.

Cottle noted that much of the research which he had reviewed would suggest that the scale had definitely portrayed the psychiatrically diagnosed hysteric, but suggested that Hy would be more significant in terms of overall configural analysis with the MMPI⁴⁹. Hovey found that Hy showed marked deviations with dissociative-conversion cases⁵⁰, and Hathaway and Meehl pointed out that the scale showed two dominant components. The first being closely associated to hypochondriasis and the second representing an over-compensatory rejection of the possibility that the subject should be neurotic⁵¹.

In summary, this variable has been found useful in diagnosis, but should probably be utilized only in terms of its placement within the total MMPI configuration.

(Pd) The Psychopathic Deviate Scale.

The authors have stated that the Pd scale was designed to determine the similarity of the patient to those lacking

48 S. R. Hathaway and J. C. McKinley, The MMPI: The Manual, New York, Psychological Corporation, 1951, p. 19.

49 Wm. C. Cottle, op. cit., p. 14ff.

50 H. B. Hovey, op. cit., p. 156.

51 S. R. Hathaway and Paul E. Meehl, op. cit., p. 79.

deep emotional response, who ignore the chance to profit from experience and who have a disregard for social customs and accepted mores. In most cases their digressions from conventional behaviour have included lying, stealing, alcohol and/or drug addiction and sexual immorality⁵².

In connection with the scale's ability in diagnosis, Meehl has said that persons suffering from conduct disorder have rated high on the Pd scale⁵³. Schiele, et al, reported that in a group of federal reformatory inmates, a prominent Pd elevation was one of the more significant findings⁵⁴, and Capwell found that delinquents were differentiated from non-delinquents on Pd as well as on the Pa scale⁵⁵. Benton and Probst noted that about 4/5 of a group of psychopathic delinquents made high scores on Pd⁵⁶, while Manson found that in a study of alcoholics versus non-alcoholics, 39 items from the scale were diagnostic at the 5% level or better⁵⁷. On the other hand, Van Vorst stated that the MMPI did not present

52 Ibid., p. 19ff.

53 P. E. Meehl, op. cit., p. 520.

54 Wm. C. Cottle, op. cit., p. 15, citing D. C. Schiele, A. B. Baker and S. R. Hathaway, op. cit., p. (not given).

55 D. F. Capwell, Personality Patterns of Adolescent Girls: II. Delinquents and Non-delinquents, in the Journal of Applied Psychology, Vol. 29, No. 4, 1945, p. 291.

56 A. L. Benton and K. A. Probst, op. cit., p. 77.

57 M. P. Manson, A Psychometric Analysis of Psychopathic Characteristics of Alcoholics, in the Journal of Consulting Psychology, Vol. 13, No. 2, 1949, p. 117.

any characteristic response pattern with a group of psychopathic boys⁵⁸.

To summarize, the psychopathic variable would seem to be able to assess character disorder with a better-than-average possibility of success and hence has been found useful in the diagnostic setting, particularly at picking out alcoholics and delinquent girls.

(Pa) The Paranoia Scale

The Pa scale had been added to the MMPI as a mode of measuring those persons characterized by suspiciousness, oversensitivity and delusions of persecution with or without expansive egotism⁵⁹. Unfortunately, the authors observed that the scale can be held within normal limits by those not wishing to give themselves away⁶⁰.

There has been very little research with which to effectively determine the overall ability of this scale in a diagnostic situation, apart from the fact that it was related to the Pd scale and that some delinquents have tended to score

⁵⁸ R. B. Van Vorst, An Evaluation of Test Performances of a Group of Psychopathic Delinquents, in the Psychological Bulletin, Vol. 40, No. 8, 1943, p. 533.

⁵⁹ S. R. Hathaway and J. C. McKinley, op. cit., p. 20.

⁶⁰ S. R. Hathaway and Paul E. Meehl, op. cit., p. 82.

high on the scale⁶¹.

(Pt) The Psychasthenia Scale.

This variable was designed to measure the similarity of patients to those individuals suffering from phobias and/or compulsive behaviour of an explicit character, as represented by hand-washing, vacillation or other ineffectual activity, or, implicitly, as in the inability to escape useless thinking or obsessive ideation. The phobias have included all manner of unreasonable fears as well as over-reactions to more reasonable stimuli.

The authors have stated that psychasthenic tendencies are usually manifested in mild depression, excessive worry, lack of confidence or an inability to concentrate⁶². In this regard, McKinley and Hathaway observed that many persons tend to display psychasthenic fears as their morale lowers⁶³.

In a diagnostic vein, Jensen and Rotter attempted to determine emotional stability with the scale, but did not achieve significant results⁶⁴. Monachesi found that delinquent

61 Wm. C. Cottle, op. cit., p. 10.

62 S. R. Hathaway and J. C. McKinley, op. cit., p. 20.

63 J. C. McKinley and S. R. Hathaway, A Multiphasic Personality Schedule (Minnesota): IV. Psychasthenia, in the Journal of Applied Psychology, Vol. 26, No. 5, 1942, p. 624.

64 M. B. Jensen and J. B. Rotter, The Value of Thirteen Psychological Tests in Officer Candidate Screening, in the Journal of Applied Psychology, Vol. 31, No. 3, 1947, p. 317.

boys tended to score higher on Pt than non-colloquial children⁶⁵.

Hathaway and Meehl have stated that relatively few persons with a dominant Pt score in their profile would be sufficiently ill for hospitalization, although they might not be able to carry on with their normal occupations. The same observers noted that the most disabled type of psychasthenic has been that individual characterized by a compulsive introspective attitude, unable to let himself alone psychologically⁶⁶.

To conclude, it would appear to have little meaning by itself, the scale tending to work best in relation with other MMPI scales in a configural sense⁶⁷. Basically, it has reflected stress involvement and when considered in conjunction with D, suggests suicidal preoccupation.

(Sc) The Schizophrenia Scale.

The fundamental purpose of this variable has been to indicate the similarity of the subject to those patients characterized by unusual or bizarre thoughts and behaviour. Despite its ability to identify about 60% of cases diagnosed as

65 S. R. Hathaway and H. D. Monachosi, Analyzing and Predicting Juvenile Delinquency with the MMPI, Minneapolis, University of Minnesota Press, 1953, p. 43.

66 S. R. Hathaway and Paul E. Meehl, op. cit., p. 82ff.

67 Wm. C. Cottle, op. cit., p. 19.

schizophrenic, it has not, however, identified some paranoid types of schizophrenia as well as some purely schizoid types⁶⁸. On the other hand, Gough pointed out that Sc ranged high with paranoid reaction types and some schizophrenics⁶⁹.

Hathaway and Meehl have indicated that it was not possible to develop the scale beyond that point wherein more than 55% of clearly schizophrenic subjects would reveal themselves⁷⁰.

To summarize, research would seem to indicate that the scale was raised with some psychotics, has been able to diagnose between 55 -65% of schizophrenics, but was not found to operate very well outside the context of configural analysis.

(Ma) The Hypomanic Scale.

The function of this scale has been to measure such tendencies as marked over-productivity in thought and action, a lesser state of mania which involves such difficulties as undertaking too many things at once, disregard of social convention and the like. Some cases have also manifested milder degrees of excitement together with unstable mood and flight of ideas⁷¹. The scale has been purported to identify about

68 S. R. Hathaway and J. C. McKinley, op. cit., p. 20ff.

69 H. G. Gough, op. cit., p. 29ff.

70 S. R. Hathaway and Paul E. Meehl, op. cit., p. 83.

71 S. R. Hathaway and J. C. McKinley, op. cit., p. 21.

60% of diagnosed cases and yielded a score between 60-70 for the remaining ones⁷².

McKinley and Hathaway stated that the Ma scale has shown a tendency to pick up some psychopathic cases as well as some patients with organic cranial pathology⁷³. In this context, Schneck reported a raised Pd-Ma pattern for certain inmates from an army disciplinary barracks⁷⁴, but as yet there has been no research to further elaborate the possibilities of the variable in the identification of cortical injury.

The scale has thus been shown to have some relationship to character disorder, reflects manic-depressive involvement and possibly poor or inadequate performance. In comparison with some of the other scales, it appeared to operate fairly effectively in molecular usage, but is most effective when considered in the context of the overall MMPI configuration.

Summary of Research Relative to Molecular Usage.

Of what use are the MMPI scales in a diagnostic setting when their interpretation has been based on atomistic data? Few studies among those outlined have suggested favourable

72 J. C. McKinley and E. R. Hathaway, The MMPI: V. Hysteria, Hypomania and Psychopathic Deviate, in the Journal of Applied Psychology, Vol. 28, No. 2, 1944, p. 165ff.

73 loc. cit.

74 J. M. Schneck, The Double-spike Pattern on the MMPI, in the American Journal of Psychiatry, Vol. 104, No. 7, 1948, p. 443ff.

findings in this regard. Two of the variables, Pd and Ha, were demonstrated to have some ability to detect the aberrations for which they were named. The remaining scales, with the possible exception of D, have been disappointing in that they were not able to ^{accurately} diagnose abnormals in their own right.

It has been suggested that the molecular use of the MMPI was satisfactory in the interpretation of the normal personality, wherein each variable is used in terms of its variation from the "norm". This has permitted a description of the normal individual, but in terms stepped down from any pathological implications. Apart from this, however, atomistic data were not found to be consistently useful.

Relative to the differentiation between psychoneurosis, psychosis and conduct disorder, most observers have found that the MMPI scales were not satisfactory, excepting that Pd has provided a useful check in suspected cases of psychopathic personality and Sc has been stated to identify about 60% of cases diagnosed as schizophrenia.

2. The Configural Approach.

Whereas earlier studies of the MMPI emphasized diagnosis by means of each specific variable in terms of its deviation from the normal, more recent work has suggested that diagnosis be conducted in a configural manner. In this regard, Hathaway and Meehl have noted that to obtain the best possible results

with the Inventory, the data should be treated in a molar rather than an atomistic sense⁷⁵. In general, this configural method has been based upon the pattern of high and low scores within the graph.

The reasoning behind this so-called global analysis is that a large proportion of clinical syndromes are too complex to favour interpretation in terms of any specific variable, the pathological implications of any given case generally cutting across two or more MMPI scales. To this end, it has been considered that a global description of the personality will more nearly approximate a patient's true condition than will the selection of that scale name which most closely approaches it.

For purposes of configural analysis, the scales have been divided into three main areas designated as the neurotic, psychotic and conduct disorder configurations. Another arrangement has grouped the variables into mood or feeling, and character constellations. In a diagnostic vein, the former have become associated with less stable traits and their height has been deduced to determine the relative severity of any given problem. On the other hand, the character variables have been found to be far more indicative of habitual and

75 S. R. Hathaway and Paul E. Meehl, op. cit., p. 90.

hence more permanent forms of reaction⁷⁶.

Classically, personality problems must be read in terms of the particular pattern and not so much by the height of any given score by itself⁷⁷. Thus, the highest and lowest points on the graph are noted, rather than to attend the absolute standing of any particular variable. Past experience using the MMPI in this way has revealed that the molar approach yielded greater predictive accuracy than the molecular method⁷⁸, the reasoning behind this being that most patients present a rather complex mass of abnormality which the technique better represents in this way⁷⁹.

In the description of overall patterns, low scores on the test have usually been emphasized by their falling out of the high score pattern, and in characterizing a profile, it has therefore been necessary to consider only the high points in the order of their height⁸⁰. In general, the analysis of high scores on the test has been modified by the fact that

76 Wa. C. Cottle, op. cit., p. 68.

77 B. S. Aaronson and G. S. Walsh, The MMPI as Diagnostic Differentiator: A Reply to Rubin, in the Journal of Consulting Psychology, Vol. 14, No. 4, 1950, p. 325.

78 P. L. Sullivan and G. S. Walsh, A Technique for Objective Configurational Analysis of MMPI Profiles, in the Journal of Consulting Psychology, Vol. 16, No. 5, 1952, p. 383ff.

79 S. R. Hathaway and J. C. McKinley, op. cit., p. 24.

80 S. R. Hathaway and J. C. Monachesi, op. cit., p. 19.

statistical deviation on one variable has not necessarily been validated against a similar deviation on other variables. Actually, both the clinical import of the deviations as well as the validity of the variables has affected thinking in this area⁸¹.

The actual process of configural analysis has most generally involved the consideration of three characteristics respecting profiles, these being as follows: (1) the phases or peaks in a pattern. (2) The slope of the profile, whether positive or negative. (3) The relative height of the total pattern as an indicator of severity⁸².

In consideration of the development of pattern analysis along three general lines, the foregoing review has been oriented in a similar direction, the areas thus represented roughly corresponding to the three pathological groups with which this study has been concerned.

Neurotic Configurations.

Whereas most earlier studies conducted with the MMPI emphasized the interpretation of specific clinical scales, it was later found that the problem of clinical diagnosis

⁸¹ S. R. Hathaway and J. C. McKinley, op. cit., p. 24ff.

⁸² H. G. Gough, op. cit., p. 26ff.

was too complex a situation to warrant interpretation upon the basis of specific scales⁸³. This therefore resulted in the attempt to use the variables in a molar way through which it was anticipated that greater consistency and accuracy would be obtained.

One of the three basic configurations was the neurotic triad, this being composed of Hs, D and Hy. A number of studies have dealt with the value of this pattern as a diagnostic aid. Schiele, et al, found that D in combination with higher Hs and Hy scores was characteristic of severe neurosis⁸⁴, and Schmidt suggested that not only was this true of his neurotic group, but that the triad tended to lower and flatten out with normal subjects⁸⁵. Hovey noted that 3 $\frac{1}{2}$ dissociative-conversion cases were deviate on Hs and Hy and near deviate on D, the implication being that the triad becomes inverted with the development of conversion reaction⁸⁶.

Apart from the above, at least three additional observers have reported the existence of significant neurotic

83 Wm. C. Cottle, op. cit., p. 25

84 Ibid., p. 12, citing B. C. Schiele, A. L. Baker and S. R. Hathaway, op. cit., p. (not given).

85 H. O. Schmidt, op. cit., p. 120.

86 H. B. Hovey, op. cit., p. 156.

triad patterns in a wide number of cases. Among those have been Meehl⁸⁷, Gough⁸⁸ and Guthrie⁸⁹. All have stated that the triad was a marked feature in cases of psychoneurosis. Schmidt corroborated their findings, but further elaborated that the position of D was an index of the severity of the difficulty and that it tended to range considerably higher than Hs and Hy in the severely neurotic⁹⁰.

With respect to the problem of distinguishing neurotic subjects from those with other pathology, Gough suggested that the neurotic triad was always higher than the psychotic configuration of Pa, Pt and Sc with psychoneurotics, and further elaborated that the peak D score tended to increase with the developing severity of the condition⁹¹. This indication was also ascertained by Meehl, but he further noted that D was the most frequent peak score with all abnormal conditions as well as the neuroses⁹².

Other diagnostic findings involving the neurotic triad, but also including other MMPI scales have been reported upon in

87 P. E. Meehl, op. cit., p. 518ff.

88 H. G. Gough, op. cit., p. 23ff.

89 G. M. Guthrie, Six MMPI Diagnostic Profile Patterns, in the Journal of Psychology, Vol. 28, No. 4, 1950, p. 317ff.

90 H. O. Schmidt, op. cit., p. 116ff.

91 H. G. Gough, op. cit., p. 23ff.

92 P. E. Meehl, op. cit., p. 518.

the literature. Among these, Simon and Hales found that suicidal preoccupation was characterized by a consistent but moderate elevation on D and Pt⁹³. Further, Hovey stated that cases of anxiety reaction had mean deviate scores on D, Hs and Pt, and near deviate on all other scales⁹⁴. Meehl noted that profiles with a sharply elevated Pt and Sc and with marked elevation of the neurotic triad, identified cases of severe neurosis with poor prognostic possibilities⁹⁵.

To conclude, the substantial agreement apparent in the various studies conducted with the neurotic triad, would suggest the existence of such a profile. With respect to its diagnostic value, Meehl found that the triad has been able to diagnose about 50-66% of his psychoneurotic group⁹⁶. In the same direction, Schmidt noted the configuration to be in agreement with psychiatric judgement and having about 62-63% of diagnostic success⁹⁷.

93 W. Simon and W. M. Hales, Note on a Suicide Key in the Minnesota Multiphasic Personality Inventory, in the American Journal of Psychiatry, Vol. 106, No. 3, 1949, p. 222.

94 H. B. Hovey, op. cit., p. 156.

95 P. E. Meehl, op. cit., p. 518.

96 Ibid., p. 522ff.

97 H. O. Schmidt, op. cit., p. 128.

Psychotic Configurations.

The second basic pattern on the MMPI has dealt with the problem of psychosis, this being suggested by the three scales Pa, Pt and Sc.

A number of observers have reported on the significance of this triad in the diagnosis of mental disease. Among these, Meehl described it as a markedly elevated profile with Sc greater than Pt⁹⁸. Gough pointed out that Pa and Sc were usually higher than Pt with paranoid cases, but that Pt and Sc were elevated in schizophrenia⁹⁹. In the same direction, though more specifically, Guthrie divided his psychotics into three groups, the first composed of 15 paranoid reaction types had peak scores on Pa and Sc. The second group made up of 7 psychotic depressives obtained a D peak with a secondary spike at Pt. His third group was composed of 11 manic reaction types, these having a peak Ma with secondary elevations at F, Sc and Pd¹⁰⁰. To conclude, Wauck found that in a population of 80 schizophrenics, Sc was a clear elevation, secondary peaks appearing in random order on a variety of other scales¹⁰¹.

98 P. E. Meehl, op. cit., p. 520.

99 H. G. Gough, op. cit., p. 29ff.

100 G. M. Guthrie, op. cit., p. 320ff.

101 L. A. Wauck, Schizophrenia and the MMPI, in the Journal of Clinical Psychology, Vol. 6, No. 3, 1950, p. 280.

In summary, it may be stated that there would appear to be substantial agreement as to the value of a psychotic configuration, and that its components have involved Pa, Pt and Sc, together with minor variations in the remaining test scales. With respect to its diagnostic worth, Meehl found that the triad would identify from 50-66% of his abnormal population¹⁰², whereas with Schmidt, the figure was somewhat less¹⁰³.

Character Disorder Configurations.

MMPI patterns suggestive of psychopathic personality have been elaborated by various observers. Among these have been Schneck, who suggested a "double-spike" configuration with elevations on Pd and Ma¹⁰⁴, and Meehl, who stated that the psychopathic curve had an elevated Pd and Ma with lowered neurotic and psychotic triads¹⁰⁵. Somewhat similar findings were reported by Gough¹⁰⁶ and by Guthrie¹⁰⁷, excepting that in the latter case Pa was often a secondary peak, this

102 P. E. Meehl, op. cit., p. 522ff.

103 H. O. Schmidt, op. cit., p. 128.

104 J. M. Schneck, op. cit., p. 443ff.

105 P. E. Meehl, op. cit., p. 520.

106 H. G. Gough, op. cit., p. 27.

107 G. M. Guthrie, op. cit., p. 320.

feature usually reflecting reaction to restrictions of freedom.

Other studies of a similar character have examined the MMPI with respect to alcoholism and juvenile delinquency. In this regard, Brown ascertained that alcoholics could be divided into two groups on the basis of test findings, one revealing a substantially neurotic profile with a D spike, and the other manifesting the typical psychopathic pattern with Pd raised¹⁰⁸. On the other hand, Aaronson and Welsh suggested that alcoholics tended to follow a general neurotic structure on the Inventory, though having a somewhat higher Pd score than other neurotics¹⁰⁹. Respecting the problem of delinquency, Capwell found that Pd and Pa effected the most satisfactory distinction between delinquent and non-delinquent girls¹¹⁰.

To summarize the available findings with respect to character disorder, it may be stated that there was considerable agreement as to the basic MMPI configuration in this area of pathology. Regarding its diagnostic value, McKinley and Hathaway indicated that the psychopathic deviate pattern identified 59% of a group of 100 reformatory prisoners, and 45% of 78

108 M. A. Brown, Alcoholics Profiles on the Minnesota Multiphasic, in the Journal of Clinical Psychology, Vol. 6, No. 3, 1950, p. 268.

109 B. S. Aaronson and G. S. Welsh, op. cit., p. 324.

110 D. F. Capwell, op. cit., p. 294.

diagnosed cases of conduct disorder¹¹¹.

Summary of Research Relative to Configural Usage.

The use of the MMPI in a configural manner has depended upon varying elevations of the scales being formulated into diagnostic profiles along four general lines, these being psychoneurosis, psychosis, conduct disorder and suicidal tendencies. The latter configuration was not dealt with at any length in this review.

The fundamental purpose behind this elaboration of profiles for diagnostic purposes, was due to the contention that MMPI data must be treated in a configural manner rather than in an atomistic way, since such practice would seem to be more fruitful and more in harmony with actual clinical experience than the earlier methods of treating the test data.

Used in this manner, several observers have noted that the tool was an effective diagnostic aid. Leverenz found it helpful in giving direction and inquiry in estimating psychiatric disorders, in categorizing personality disturbances and in gauging the severity of a given case¹¹². He thought it useful

111 J. C. McKinley and S. R. Hathaway, op. cit., p. 171.

112 Wm. C. Cottle, op. cit., p. 36, citing C. W. Leverenz, The Minnesota Multiphasic Personality Inventory: An Evaluation of its Usefulness in the Psychiatric Service of a Station Hospital, in War Medicine, Vol. 4, No. (not given), 1943, p. (not given).

in the evaluation of borderline conditions, in mixtures of psychiatric symptoms and in the assessment of individuals subject to dismissal from the services due to personality disorders. Michael and Buhler also reported favourably on the MMPI, and found it helpful in providing supplementary information relative to problematic cases or to suggest a new emphasis. They listed its disadvantages as a limited range of successful diagnoses, lack of reliability in the discrimination between neuroses and psychoses, and its limited clinical definition which will not provide structure such as does the Rorschach Test¹¹³.

To conclude, most users of the technique thought it to be a sensitive test, though lacking the fine discrimination of the Rorschach. To this end, it was found to be excellent in evaluating such conditions where the emphasis may be more psychic or somatic¹¹⁴, but nonetheless lacking in discriminatory reliability.

From the foregoing, it would appear that the MMPI was less useful in providing personality structure than other psychological tools, and, in its present state was not found to provide results which could be accepted at face value by the

¹¹³ Wa. C. Cottle, op. cit., p. 36, citing J. C. Michael and C. Buhler, op. cit., p. (not given).

¹¹⁴ Ibid., p. 36ff.

clinicism. In addition, the profiles of severe neurotics and psychotics were shown to be nearly identical¹¹⁵, and have provided little aid in differentiating pathological groups¹¹⁶. Further to this, it has been said that the MMPI scales have not appeared to measure different things, in spite of the differentiating functions imputed to them¹¹⁷. This, of course, might imply that the scales should always be grouped together for diagnostic purposes, since most clinical syndromes are not necessarily separate entities, but rather a group of heterogeneous conditions.

Much of the difficulty in the diagnostic setting may be laid to the test's seeming inability to clearly demarcate neurosis and psychosis with any degree of reliability, the variability of each pattern resulting in a fusion of configurations, with the result that it has become difficult to determine the dimensions of any particular case. Further, the identified profiles, four in number, have been found confusing and having little sensitive accuracy for rapid analysis. This has led to a recent development wherein there has been a tendency to apply the Inventory as a convenient method of

115 A. L. Benton, op. cit., p. 60.

116 W. W. Morris, op. cit., p. 374.

117 Wm. M. Wheeler, K. B. Little and G. F. Lehner, The Internal Structure of the MMPI, in the Journal of Consulting Psychology, Vol. 15, No. 2, 1951, p. 140.

sorting or arranging patients on the basis of test results for additional diagnostic testing where necessary¹¹⁸. This would suggest a screening operation, which, because of its availability to large numbers of subjects at one time, the MMPI can perform rather effectively.

As observed, however, in its present form the test has been found less useful than might otherwise have been the case, since the problem of configural analysis can be confusing, with much clinical experience being required on the part of the clinician in order to properly differentiate the various profiles which he sees. In addition, the procedure was found to be a slow one, not being readily applicable to large numbers of subjects for quick and accurate diagnostic assessment.

To conclude, the degree of assurance with which the clinician has been able to differentiate pathological cases was not found to rise above 66%, and, as reported by two observers¹¹⁹, has dropped as low as 45%.

From this, it may be seen that the configural method has left something to be desired in clinical diagnosis with the MMPI.

118 S. R. Hathaway and Paul E. Meehl, op. cit., p. 90.

119 Wm. C. Cottle, op. cit., p. 36, citing J. C. Michael and C. Buhler, op. cit., p. (not given).

3. The Quantitative Approach.

There has been little material reported in the literature concerning the development and use of quantitative scores in the diagnostic and prognostic field, with the MMPI, although there has been some implication that this method of applying the data might be fruitful, particularly so when it is considered that the Inventory was found to have its greatest applicability in military and clinical screening.

Apart from the above, however, there would seem to be a trend toward the development of more accurate and consistent methods of handling the test, this factor being posited on the inconsistencies and difficulties encountered with both molecular and configural approaches to diagnosis.

From this standpoint, Ruesch was possibly the first to suggest the use of an index as a differentiator between neurotic and psychotic symptoms portrayed by the MMPI¹²⁰. About two years later, Modlin indicated the possibility of adapting ratios to the test in terms of an anxiety index based on an averaging of the neurotic triad¹²¹. It was not until 1950, however, that Gough postulated his F-K dissimulation index, this being the first developed ratio

¹²⁰ J. Ruesch, Personality Structure, Lactic Acid Production, and Work Performance in Psychiatric Patients, quoted by Cottle, p. 25.

¹²¹ H. C. Modlin, op. cit., p. 769.

to be used with any success in the diagnostic field¹²². In brief, F-K was specifically designed to determine a faked abnormal profile on the MMPI. It may be concluded that inasmuch as such simulated records represent an important personality component, F-K was able to satisfactorily designate such malingerers with some success.

In a more diagnostic vein, Welsh developed two ratios, an anxiety index and an internalization ratio, both being attempts to quantify a measure of readiness for treatment and as indicators of prognosis for therapeutic purposes¹²³. Briefly, the interpretation of the anxiety index was based upon a value of 50 for normal individuals. The higher the score above 50, the greater the degree of anxiety. Relative to the internalization ratio, this was made up of the ratio of mood to character scales, the value for the normal subject being 1.00. The higher the value above 1.00 the greater the internalization of conflicts, whereas values less than unity would represent the acting out of conflicts suggested by the psychopathic deviate.

In 1953 an attempt was made to utilize the validity scales as diagnostic differentiators with psychoneurotics,

122 H. G. Gough, The F Minus K Dissimulation Index for the MMPI, in the Journal of Consulting Psychology, Vol. 14, No. 5, 1950, p. 410ff.

123 G. S. Welsh, An Anxiety Index and an Internalization Ratio for the MMPI, in the Journal of Consulting Psychology, Vol. 16, No. 1, 1952, p. 65ff.

psychotics and psychopaths¹²⁴. This research revealed that L and F significantly distinguished between the three groups, but could not be made to operate successfully as a diagnostic quantitative ratio, since it was only able to differentiate between a few neurotics and psychopaths lying at either extreme of the distribution.

To conclude, it may be ascertained that some success has been obtained when MMPI data were treated in a quantitative manner. It should be noted, however, that this approach, while providing a new emphasis on the use of the test, has not been able to render as much meaningful background material as the qualitative configural method.

4. The Hypothesis.

Throughout the survey, it was ascertained that few of the scales can be used by themselves in the diagnosis of abnormal conditions as represented by the scale names. Rather, they have been found more useful in patterns for the identification of general types of abnormality and to aid in the clarification of complex conditions.

In the evaluation of minor deviations from the normal, the scales by themselves were found to be of value. In this context they have usually been interpreted in terms which are

¹²⁴ J. B. Earle, op. cit., 12ff.

stepped-down from the psychological explanations characterizing the scales. However, when used in a configural manner as in the localization of pathological conditions, the similarity between patterns which are representative of different syndromes, has been found rather confusing and problematic, and has not provided the possibility of quick and accurate assessment. To this end, therefore, it was anticipated that a quantitative approach to the test data would be more in keeping with the Inventory's expressed purpose as a screening tool in the military and clinical settings, the assumption being that an extensive battery of ratios and quantified scores would eliminate the elaboration of questionable MMPI patterns without reducing their value as indicators of personality dynamics.

The aforementioned, therefore, has suggested the basic hypothesis that the molecular and qualitative molar approaches to the MMPI have serious limitations in the diagnosis of abnormal conditions, and that these weaknesses may be eliminated through the use of quantitative ratios. To this end, it has been the purpose of this research to prove that a quantitative emphasis to test findings has more value in military and clinical screening situations than either of the two commonly used techniques of analysis.

CHAPTER II

THE EXPERIMENTAL DESIGN

The aim of the following chapter was to provide the reader with a brief outline of the MMPI, this being followed by a discussion of the population with which this survey was conducted. The statistical procedures employed have also been reviewed, with a brief analysis of the techniques employed therein. The chapter, therefore, has been divided into three sections thus providing convenient access to the material.

1. The Tool

Construction of the MMPI was begun in 1937, the test being ready for professional purposes by about 1943. Hathaway and McKinley intended the Inventory as a clinical screening tool with which it was anticipated to be relatively universal in its applicability to psychiatric cases, and would aid in lessening the existing confusion brought about by complex and conflicting pathological designations¹. To this end, the terminology characteristically employed in analyzing test material has been of a Kraepelinian quality, though somewhat modified to conform to modern clinical practice².

1 S. R. Hathaway and J. C. McKinley, op. cit., p. 7.

2 S. R. Hathaway and Paul E. Meehl, op. cit., p. 72.

It has been suggested that the MMPI was the first personality inventory specifically intended to determine discrete clinical syndromes³, thus permitting the test to be used by psychologists, psychiatrists and other physicians to aid in the identification and elaboration of abnormal emotional conditions, particularly the various psychoneuroses⁴.

In its original state, the MMPI was made up of 504 items obtained from various sources such as medical texts, psychiatric examination forms and other personality inventories including the Bell Adjustment Inventory, the Hunt-Wadsworth Temperament Scale and the Bernreuter Personality Inventory⁵. In its present format, the test has been expanded to include 550 items provided in two forms with which to assess similar components of personality. These two forms include a card type inventory for use with individual cases and a booklet for group administration. Both test forms are largely identical, the major difference being the addition of 16 duplicate statements in the booklet to permit machine

³ Wm. C. Cottle, op. cit., p. 3, citing B. C. Schiele, A. B. Baker and S. R. Hathaway, op. cit., p. (not given).

⁴ loc. cit.

⁵ S. R. Hathaway and J. C. McKinley, A Multiphasic Personality Schedule (Minnesota): I. Construction of the Schedule, in the Journal of Psychology, Vol. 10, No. 4, 1940, p. 249.

scoring. However, Hathaway and McKinley have indicated that all findings obtained with the group form should be treated cautiously, since all validation and data had been obtained with the individual form. In addition, they have suggested that whenever possible, the individual form should be employed, particularly in dealing with the sick or disturbed, or with older patients⁶.

In taking the test, the subject has been required to sort the statements as true, false, or cannot say, either by marking his selected response on the IBM answer sheet, or by sorting the cards if the individual form is being used.

Upon completion of this phase of the procedure, the responses are tallied and scores are derived for four validity scales and upwards of ten clinical scales. In the presentation of these raw scores, the customary procedure has been to plot the findings on a psychograph usually employed with the MMPI and to interpret the results on the basis of T-scores. In this context, a standard score of 50 is average and every ten points above or below this represents one unit of standard deviation in the general population. Standard scores of above 70 are considered to indicate the presence of abnormal amounts of the properties in question.

⁶ S. R. Hathaway and J. C. McKinley, The Minnesota Multiphasic Personality Inventory: The Manual, New York, Psychological Corporation, 1951, p. 9.

Thus, the administrator is able to determine the relative strengths of the various phases of the test, in which context the total pattern or configuration of scores is of greater implication than the presence of any single clinical variable to an abnormal degree. In addition, it has been customary to buttress the suggested constellations of pathology by means of an item analysis, with which it is usually possible to determine specific factors in the individual's environmental and personal adjustment.

To conclude, the administration procedure has usually required from 60 to 90 minutes, the time varying considerably with the circumstances. To this must be added the time necessary to interpret the findings, a situation generally requiring from 45 minutes to an hour, this again depending upon the quality of the protocol.

Hathaway and McKinley have indicated that the MMPI was the first personality inventory which measured differentiated pathological syndromes. In this direction, the test items were selected on the basis of their ability to distinguish between a normal group and a criterion group made up of diagnosed abnormals having relatively pure psychiatric pathology⁷. The normal group of 724 persons included 265 individuals from the University of Minnesota Testing Bureau who were largely high school

7 S. R. Hathaway and J. C. McKinley, op. cit., p. 6.

graduates; 265 skilled W.P.A., workers, and 254 hospitalized patients suffering from physical illness, all having been examined to rule out the possibility of psychiatric involvement⁸. Sampling of the population extended through an age range of 16-55 years and for both sexes⁹.

As observed, the MMPI was introduced by its authors as a diagnostic aid in the clinical setting. In this regard, the test tells what but not necessarily why! It has been stated that in order to fully comprehend the underlying psychological forces which have induced a particular pattern, a complete investigation of the individual's total life situation must be accomplished in order to reveal all possible information¹⁰.

It has also been implicit in the construction of the MMPI that the individual will provide himself with a valid self-rating when compared to a similar rating by others, that the individual will answer the items with honesty and that his final score will have some measure of reliability¹¹.

With respect to this problem of self-rating on the Inventory, Meehl has suggested that scoring of the test has

8 Wm. C. Cottle, op. cit., p. 1ff

9 E. R. Hathaway and J. C. McKinley, op. cit., p. 5.

10 Wm. C. Cottle, op. cit., p. 3ff.

11 Ibid., p. 4

not necessarily assumed a valid self-rating, since the questions on the MMPI are not particularly important as facts in themselves, but are, instead, fairly reliable pointers as to how the subject feels toward them as indicators of his assumed condition, whether normal or pathological¹².

With particular emphasis on the problem of sincerity or honesty in answering the items on the MMPI, the previously noted validating scales have been included to assess this factor. However, little evidence exists to suggest that individuals who have voluntarily sought professional skill in the solution of their problems would deliberately falsify their answers on the test¹³.

Respecting the validity and clinical scales of the test, these have not been specifically named in accordance with the symptom complex suggested by their names, since they have also been demonstrated to have considerable meaning within the normal range¹⁴. To provide the reader with a brief description of the scales which form the test, a resumé has been included in Table I.

12 Paul E. Meehl, The Dynamics of 'Structured' Personality Tests, in the Journal of Clinical Psychology, Vol. 1, No. 4, 1945, p. 299ff.

13 Wm. C. Cottle, op. cit., p. 4.

14 S. R. Hathaway and J. C. McKinley, op. cit., p. 6.

TABLE I.- The MMPI scales organized according to their title and the authors' description of them¹.

Title	Authors' Description
? Cannot say category	Includes items the subject is unable to answer true or false.
L Lie scale	Shows falsification of the test in a socially approved direction.
F Validity scale	Checks test-rationale and whether subject understood the items.
K Suppressor variable	Increases the discriminatory power of five clinical scales.
Hs Hypochondriasis	Indicates the amount of abnormal concern about bodily functions.
D Depression	Checks the presence and depth of stress factors and depression.
H _y Hysteria	Indicates the type and direction of conversion-type symptoms.
Pd Psychopathic deviate	Checks lack of emotional response, disregard of social mores and the inability to profit from experience.
Mf Masculinity-femininity	Measures tendencies toward masculine or feminine interests.
Pa Paranoia	Shows suspiciousness, delusions of persecution and over-sensitivity.
Pt Psychasthenia	Checks the presence of phobias or compulsive behaviour.
Sc Schizophrenia	Shows the presence of bizarre thoughts and unusual behaviour.
Ma Hypomania	Measures overproductivity in thought and action.
Si Social introversion	Indicates tendencies toward introversion or extroversion.

The 550 statements which form the structure of the MMPI have been found to cover a wide range of subject matter from physical illness to the social attitudes and morale of the subject. The material was classified under 26 main headings, although it was not necessarily taken for granted that each item was properly classified merely because it had been placed in a given category¹⁶. An illustration of these 26 headings has been provided in Table II.

With respect to the validity of the MMPI, Hathaway and McKinley have stated that a high score on any variable has been found to predict positively the corresponding final clinical diagnosis in more than 60% of new psychiatric admissions¹⁷. This percentage was obtained through a wide variety of cases, which the authors have considered to be a more difficult validating test than simple differentiation between normal and abnormal groups. In addition, they have observed that even in those cases wherein a high score has not been followed by a corresponding diagnosis, the presence of the trait to an abnormal degree in the symptomatic picture will usually be observed¹⁸.

16 S. R. Hathaway and J. C. McKinley, op. cit., p. 5.

17 Ibid., p. 6.

18 Loc. cit.

TABLE II.- The 550 MMPI statements organized according to subject matter and number of items¹⁹.

Subject Matter	Number of Items
General health	9
General neurologic	19
Cranial nerves	11
Motility and co-ordination	6
Sensibility	5
Vasomotor, trophic, speech, secretory	10
Cardiorespiratory system	5
Gastrointestinal system	11
Genitourinary system	5
Habits	19
Family and marital	26
Occupational	18
Educational	12
Sexual attitudes	16
Religious attitudes	10
Political attitudes - law and order	46
Social attitudes	72
Affect - depressive	32
Affect - manic	24
Obsessive and compulsive states	15
Delusions, hallucinations, illusions	31
Phobias	29
Sadistic-masochistic trends	7
Morale	33
Masculinity-femininity	55
Improbably acceptable light	15

¹⁹ S. R. Hathaway and J. C. McKinley, *op. cit.*, p. 5.

In a study of the validity of personality inventories, Ellis noted that out of 13 clinical validation studies of the MMPI, only eight provided evidence of validity acceptable to his standards²⁰. It should be pointed out, however, that only two of the 13 studies showed findings below those usually acceptable in psychology.

In a later study, Ellis noted that a considerable number of validity studies on the MMPI had appeared in the literature, of which about half suggested a positive finding and the other half indicated either weak validity or a complete lack of it²¹.

In a review of inventory type tests, Ellis and Conrad suggested that questionnaires which had been validated against a psychiatric criterion provided a consistently higher validity than similar studies conducted in a civilian milieu²².

Respecting the problem of reliability, Hathaway and McKinley have reported reliability coefficients for the MMPI ranging between .71 and .83, these being for scales developed

²⁰ A. Ellis, The Validity of Personality Questionnaires, in the Psychological Bulletin, Vol. 43, No. 5, 1946, p. 420ff.

²¹ _____, Personality Questionnaires, in the Review of Educational Research, Vol. 17, No. 1, 1947, p. 54.

²² _____ and H. S. Conrad, The Validity of Personality Questionnaires in Military Practice, in the Psychological Bulletin, Vol. 45, No. 5, 1948, p. 385ff.

in their final state. They used the individual form for both test and retest, with intervals of from three days to more than one year between testings²³.

In another study of reliability, Holzberg and Allessi secured coefficients for the shortened MMPI. Their population was tested on the full form and on the abbreviated one within a few days. They found that reliability coefficients for the clinical scales ranged between .719 and .927²⁴.

Cottle obtained reliability coefficients varying between .72 and .91 for the individual and group forms, both being administered to his population within a week²⁵.

A resumé of the above findings has been provided in Table III. However, it should be pointed out that variations between testings may not necessarily reflect a defect of the MMPI, but rather the action of personality changes during the period²⁶.

A number of reviews have considered the use of structured personality inventories in the clinical setting,

23 S. R. Hathaway and J. C. McKinley, op. cit., p. 6ff.

24 J. D. Holzberg and S. Allessi, Reliability of the Shortened MMPI, in the Journal of Consulting Psychology, Vol. 13, No. 4, 1949, p. 292.

25 Wm. C. Cottle, Card Versus Booklet Forms of the MMPI, in the Journal of Applied Psychology, Vol. 34, No. 4, 1950, p. 258.

26 _____, The MMPI: A Review, in Kansas Studies in Education, Vol. 3, No. 2, issue of March 1953, p. 4.

TABLE III.- Reliability coefficients reported for MMPI scales.

MMPI Scale	Hathaway and McKinley	Holzberg and Allison	Cottle
S	-	.745	-
L	-	.846	.76
P	-	.927	.75
K	-	-	.76
Hs	.80	.669	.81
D	.77	.603	.66
Hy	.57/.47	.874	.72
Pd	.71	.519	.80
MF	.70	.756	.83m/.79f
Pa	-	.783	.56
Pt	.74/.61	.720	.90
Sc	-	.891	.86
Ma	.83	.585	.76

and a number of these have shown the MMPI to be one of the more popular instruments in general usage. A survey by Berkshire and others, which included data from surveys made in 1945, 1946 and 1947, showed that the Boll Adjustment Inventory and the MMPI had the most frequent use of all personality questionnaires in counseling centers. The same review indicated that these inventories were the only ones listed among the thirty tests used most frequently in 310 Veterans Administration Guidance Centers and in the Jewish Vocational Service Centers²⁷.

To further substantiate the above, Burton found that the MMPI ranked about fifth in number of administrations per test in clinical situations, and that it was the most widely used of the structured personality inventories. In frequency of use, however, he noted that it deferred to the Rorschach, the Wechsler-Bellevue and the Thematic Apperception Test²⁸. Possibly one major reason for its popularity was stated by Ellis and Conrad, who suggested that it had provided definite contributions in the clinical setting²⁹.

²⁷ J. R. Berkshire, et al, Test Preferences in Guidance Centers, in Occupations, Vol. 26, No. 6, 1948, p. 337ff.

²⁸ A. Burton, The Use of Psychometric and Projective Tests in Clinical Psychology, in the Journal of Psychology, Vol. 28, No. 2, 1949, p. 452ff.

²⁹ A. Ellis and H. S. Conrad, op. cit., p. 426.

In actual usage, the MMPI has been found to be one of the more satisfactory tools with which to pick up groupings or constellations of symptoms, and to provide significant observations concerning the dynamics of a given patient's personality³⁰. Michael and Buhler found the test to be useful in providing supplementary evidence in problematic cases, as well as in the bringing out of new material or of suggesting a new emphasis in difficult situations³¹. They found the test easy to administer and score and obtained objective results with it. Kamman noted that the MMPI was of considerable use in evaluating borderline conditions and in assessing both psychotic and psychoneurotic elements³².

Relative to the military sphere, both Blair³³ and Morton³⁴ found possibilities for its use, and Leverenz suggested that it was effective in providing direction to inquiry in the evaluation of psychiatric disorders and in categorizing personality disturbances. He found the test to

30 Wm. C. Cottle, op. cit., p. 23.

31 Ibid., p. 36, citing J. C. Michael and C. Buhler, op. cit., p. (not given).

32 Ibid., p. 37, citing G. R. Kamman, Psychosomatic Diagnosis, in Lancet, Vol. 67, No. (not given), 1947, p. (not given).

33 W. R. N. Blair, A Comparative Study of Disciplinary Offenders and Non-offenders in the Canadian Army, in the Canadian Journal of Psychology, Vol. 4, No. 2, 1950, p. 61ff.

34 M. A. Morton, The Army Adaptation of the MMPI, in the American Psychologist, Vol. 3, No. 7, 1948, p. 272.

be helpful in the handling of men subject to dismissal from the armed forces, and in gauging the severity of problematic cases³⁵.

The MMPI has been criticized for its inability to provide significant information concerning personality structure such as has been possible with the Rorschach Test and others³⁶. Further, Benton observed the test to be somewhat deficient in its assessment of conditions represented by the names of the different scales³⁷.

It may be suggested that a proportion of these weaknesses were largely due to the improper use of the MMPI, wherein atomistic rather than configural data had been employed. That such a procedure would lead to negative or weak diagnostic findings is implicit in the observation that rarely, if ever, is a patient seen in the clinic without a mixture of symptoms, as opposed to the existence of a single symptom without such complication. However, this argument notwithstanding, the MMPI has tended to be rather inadequate in that its configurations have not diagnosed

³⁵ Wm. C. Cottle, op. cit., p. 36, citing C. W. Leverenz, op. cit., p. (not given).

³⁶ Ibid., p. 37.

³⁷ A. L. Benton, op. cit., p. 106.

directly with a large number of patients³⁸.

In consideration of the above, the use of the Inventory has been encouraged as a diagnostic screening tool, wherein the sorting of patients on the basis of test patterns was found to be the most reliable procedure, rather than using the test findings to substantiate previously formulated diagnostic opinion³⁹.

As an adjunct to the above, Cottle stated that most of the research which he had examined suggested that few of the scales could designate pathology according to their names, but that the test was excellent in its assessment of general abnormality⁴⁰, a view which fitted in rather well with the concepts laid down by the test authors, who observed that the MMPI was never intended to portray etiological or prognostic entities, but was primarily designed to suggest constellations of pathology and to represent these as such and nothing more⁴¹.

With respect to the time element involved in test administration, it has been stated that when inventories

38 S. R. Hathaway and Paul E. Meehl, op. cit., p. 72.

39 Ibid., p. 90.

40 Wm. C. Cottle, op. cit., p. 23.

41 S. R. Hathaway and Paul E. Meehl, op. cit., p. 72.

are effectively used, they have tended to become equally time-consuming as alternative diagnostic procedures⁴². On the surface this would appear to be true, since competent use of the test has required the careful analysis of each profile in terms of all possible evaluative knowledge. However, the elimination of the need for direct test-taking supervision and the ease of scoring would favour the MMPI, particularly where screening information is required as quickly as possible upon the admission of a patient to the hospital.

2. The Population.

The population used in this inquiry was obtained from the University of Minnesota, and was part of the group of 968 cases making up the Atlas⁴² from which the original selection was made.

The choice of cases presented an interesting problem, since the criterion of selection was necessarily based upon the diagnostic categories employed by the authors of the Atlas. There was some possibility that the selected group might not adequately represent the desired diagnostic entities decided upon for inclusion in this inquiry, since, as Hathaway and

⁴² E. R. Hathaway and Paul M. Neehl, An Atlas for the Clinical Use of the MMPI, Minneapolis, University of Minnesota Press, 1950, p. xlv-799.

Meehl observed, the diagnostic labels with which each patient had been identified might vary with those individuals who had been seen over a long period of time⁴³. On the other hand, it was noted that those histories which had been selected for inclusion in the Atlas had been chosen with considerable care on the basis of completeness of clinical records, representativeness in frequency of diagnostic categories, and several other criteria not too closely linked with MMPI profiles. The authors rejected no case on the grounds that the profile of a given individual did not fit the diagnosis.

To this end, it might be argued that the selection of cases employed for this research may be criticized due to the rather complex symptomatology of a large number of them, there being some possible dispute as to the final, accurate diagnosis of some of them. At best, however, this factor was considered to be a difficult one to control, since the variation in diagnostic labeling from one centre to another has always been a notoriously weak aspect of clinical diagnosis in the psychological and psychiatric fields.

With this weakness in classification of the population being apparent from the outset, it was felt that the possibility of serious error in the selection of the three groups would be somewhat obviated by only choosing those cases wherein there

⁴³ Ebid., p. vi.

was a reasonable justification that the diagnostic label would be substantially accurate. To this end, the final choice of the total group was made on the basis of the primary nosological label with which each case had been identified in the Atlas. Those cases which suggested a cross-section of pathology of both neurotic and psychotic dimensions were eliminated from the outset, since there was a reasonable doubt as to which prognostic entity best exemplified the case.

This method of selection helped to minimize any errors as to diagnosis within each of the three groups, since it was reasonably certain that a given neurotic was not also schizophrenic or psychopathic, or that a given psychopath did not encompass some psychotic pathology. Thus, if errors existed they would be localized to a variation of reaction types within the same general group. Further, this inquiry was not concerned with the identification of phenotypical problems, hence errors of this nature were not considered to be of particular importance, provided the phenotypic entity did not transcend two or more of the three groups.

In summary, the three large groups of pathology of importance to this research have been designated as maladjustment, mental disease and character disorder, these corresponding to psychoneurosis, psychosis and psychopathic personality respectively, their description selected in this manner

being in accord with present trends in psychopathology.

Respecting the problem of validity of the cases as determined by the L, F and K scales, no subjects with suspected profiles were used in the population, despite Hathaway and Meehl's contention that such invalidity was of little consequence in a research group⁴⁴. In this matter, it was felt that such invalid profiles might only serve to extend the possibility of error in diagnostic classification.

The final sample included 300 cases in all, these being composed of 100 maladjusted, 100 mentally disordered and 100 character disordered.

This relatively hard core representing the "final" selection, was a sharp reduction from the total of 968 cases provided in the Atlas. However, most of these had been rejected on the basis of three factors: (1) Cases with incomplete L, F or K scores could not be utilized for obvious reasons. (2) The diagnosis represented by the clinical description provided by the authors of the Atlas, could not in many cases, be considered representative of one or more of the three pathological groups used in this research. As an example, there were a variety of patients with histories involving organic disease, mutilative tendencies and the like, none of which could be described as

⁴⁴ Ibid., p. x.

reflecting one of the three conditions which were of interest.

(3) The diagnosis in some cases was too complex to warrant inclusion in one of the three categories. This latter problem was responsible for the omission of the largest number of cases.

Respecting age range and sex in the sample, little or no effort was made to control these factors, since it was contended that in diagnosis, if a syndrome formation existed for a particular disorder, it should be necessarily independent of age and sex, provided such designation was postulated to exist for the world-at-large.

It will be observed that the population used herein, was described by a number of terms suggestive of varying pathology, and it was felt that this should be clarified by brief definition. To this end, the maladjusted group consisted of psychoneurotics, including cases of minor as well as of major maladjustment. The mentally diseased subjects were of a more malignant personality involvement such as is usually found in severe psychosis. The character disordered population were essentially intact as to mentation, but were characterized by lack of responsibility, inability to make social or moral adjustments and unable to profit from their mistakes.

These three groups may each be divided into a series of related syndrome-classes, and though these have played an important role in the development of the case history material contained in the Atlas, their exact definition has not been included here, the reader being referred to any of the

conventional outlines. However, in order to clarify the structure of the three groups, Table IV., lists the organization of the population in this respect.

To conclude, only those patients with relatively clear-cut symptomatology were acceptable for purposes of this survey. Thus, if any case exhibited marked fluctuations between one syndrome and another, it was omitted from the sample. In addition, no subjects selected as representative of a particular disorder, were so selected on the basis of MMPI patterns or scores.

3. The Method.

The method of evaluating the hypothesis involved a conventional statistical procedure with which the differential diagnostic implications of the MMPI scales could be assessed from a quantitative standpoint. Thus, all of the scales were inter-correlated to determine the precise relationship of each factor to all of the others, the inquiry being concluded with the regression equation.

It was then possible to establish a quantitative diagnostic analysis of the population, and to compare the findings with those obtained through molecular and configural methods, respectively, as outlined in an earlier chapter.

The first problem involved in the development of the diagnostic index was a comparison of the scales in their inter-relationship, this being accomplished through a Pearsonian product-moment coefficient, possibly the most customary method

TABLE IV.- The population organized according to differential diagnosis and number of cases.

Differential Diagnosis	N
Maladjusted group	
Hysteria	25
Hypochondriasis	20
Anxiety state	3
Psychasthenia	7
Reactive depression	19
Mixed reaction	7
Total	100
Mentally diseased group	
Schizophrenia	41
Paranoia	24
Manic-depression	28
Involuntal melancholia	7
Total	100
Character disordered group	
Pathologic sexuality	14
Pathologic emotionality	20
Asocial reaction	40
Mixed reaction	10
Total	100

of obtaining correlations. The raw score formula was as follows:

$$r_{XY} = \frac{XY - \frac{(\sum X)(\sum Y)}{N_t}}{\sqrt{\left[X^2 - \frac{(\sum X)^2}{N_1} \right] \left[Y^2 - \frac{(\sum Y)^2}{N_2} \right]}} \quad (1)$$

X and Y are representative, in turn, of the three pathological groups being studied in this inquiry. N_t illustrates the total experimental population, and N_1 and N_2 represent the experimental groups treated singly.

The method through which the differential value of the variables was ascertained was by means of a regression equation. This also allowed the pattern of scores to be incorporated into a diagnostic ratio or index with which any given MMPI profile could be examined. To this end, criterion scores of 1, 3 and 5 were arbitrarily selected for the maladjusted, mentally diseased and character disordered groups, respectively. A multiple coefficient of correlation using the Doolittle method was then computed. From this stage, beta weights were obtained through the Doolittle solution, it then being possible to compute the regression equation.

From these findings it was then possible to obtain certain assumptions pertaining to differential diagnosis based on the prediction formula, its value being predicated upon its capacity to differentiate between the three pathological groups which represented the experimental group. This complete equation has

been stated as follows:

$$a = M_1 - b_{12}M_2 - b_{13}M_3 - b_{14}M_4 \dots\dots b_{22}M_{12} \quad (2)$$

Thus, the regression coefficient 'a', a constant, was found, this leading to formula (3), the second phase:

$$X_1 = a + b_{12}x_2 + b_{13}x_3 + b_{14}x_4 \dots\dots b_{22}x_{12} \quad (3)$$

Following the computation of the regression equation, the error of estimate was calculated by means of formula (4), as follows:

$$\sigma^1 \sqrt{1 - R^2} \quad (4)$$

This step completed the preliminary statistical procedures.

From this point it was possible to assess the diagnostic ability of the quantitative approach, the results being compared with molecular and configural findings obtained with the same population. To provide a more accurate comparison between the three methods of test analysis, the significance of the difference between percentages was obtained through formula (5):

$$D/\sigma_d = \frac{p_1 - p_2}{\sqrt{100 \sqrt{\frac{p_1 q_1}{N_1}}^2 + 100 \sqrt{\frac{p_2 q_2}{N_2}}^2}} \quad (5)$$

A survey of the findings obtained with the three methods of treating MMPI data has been provided in the following chapter.

CHAPTER III

SUMMARY OF THE FINDINGS

This research was an attempt to determine the degree to which the three validity scales and eight of the ten clinical variables of the MMPI could act as differential diagnostic indicators when combined. To this end, a regression equation was computed in order to permit the examination of MMPI protocols in this way.

This chapter is a description of the obtained results together with such other data as are necessary for a complete understanding of the statistical material.

The preliminary approach to the problem involved a comparison of the interrelationship of all the MMPI variables through a Pearsonian product-moment series. The results obtained suggested that two of the validity scales and all eight clinical variables might be of value in the elaboration of a regression equation. However, an extremely low correlation between the K scale and the criterion resulted in the elimination of that variable from the regression equation, since it was observed that K would add nothing to the final ratio. All intercorrelations for the full population have been provided in Appendix 3.

The final statistical problem, that of the regression equation, permitted the remaining scales to be grouped

together in a diagnostic index with which it was possible to examine the population. This quantitative index was obtained by using formula (3) (cf), the result being as follows:

$$\begin{aligned}
 & -29.6037 + (-.0301)(L) + (-.3356)(P) + (-.1515)(HS) + \\
 & (-.1579)(D) + (.3227)(Hy) + (.2878)(PA) + (.3227)(E) + \\
 & (.4611)(Pt) + (.2110)(Sc) + (.4129)(Ma)
 \end{aligned}$$

In anticipation of its use, all possible combinations of the MMPI variables were worked out, and the results transcribed to a table of scores. An example of this table has been provided in Appendix 5.

With respect to the two current uses of the MMPI which have been outlined in Chapter I., the following summary will provide a comparison between these and the method dealt with in this research. To this end, the findings have been placed under two analogous headings.

1. The Relationship Between Molecular and Quantitative Analysis.

As observed, the analysis of MMPI data in a molecular manner was the most fundamental approach to the use of the Inventory for diagnostic purposes, all results respecting a given case being largely based upon significant deviations of one or more scales, the patient being labelled with the name of the most deviant variable in the protocol. In this regard, a

a standard score of 50 has been considered average, with ten points above or below this representing one unit of standard deviation. In practice, scores of above 70 indicate the existence of abnormal amounts of the properties in question.

It has been noted that the ability of the MMPI to determine pathological conditions in terms of the variables intended for this purpose has not been altogether satisfactory, the major difficulty being that pathological conditions have usually been composed of a complex mixture of symptoms rather than any single symptom without complication.

Despite this problem, two of the variables, Pd and Ma, were demonstrated to have some capacity to detect the pathologies for which they were named, and the D scale has been an effective indicator of stress reaction in the individual.

With respect to the distinction between maladjustment, mental disease and character disorder, the molecular application of the MMPI has not been satisfactory. To this end, a comparison between the atomistic approach and the quantitative method suggested by this research, has been provided in Table V.

It will be observed that the differentiating ability of the quantitative approach was more effective than atomistic analysis except with the mentally diseased group. In this regard, it should be noted that the criterion of selection for molecular appraisal was in all cases confined to an

TABLE V.- Significance of the difference between molecular and quantitative analysis for maladjusted, mentally diseased and character disordered groups.

Group	Molecular Analysis (%)	Quantitative Analysis (%)	χ^2
Maladjusted (N=100)	50	21	2.319
Mentally diseased (N=100)	7	1	0.000
Character disordered (N=100)	21	21	0.000

application of those MMPI variables which were appropriate. For example, with the maladjusted group only those scales forming the neurotic triad were utilized, interpretation of the cases being limited to those having one or more of the variables raised over a standard score of 70. In this situation it could be argued that the It scale might be added, inasmuch as it was intended to reflect the presence of psychasthenia. However, in line with current usage this scale was considered as a component of the psychotic triad and hence not applicable to the maladjusted group.

In the case of the mentally diseased, three MMPI variables were used, these being Pa, Pt and Sc, the three components of the psychotic triad. Again, in this case interpretation was limited to one or more clear spikes above a T-score of 70 for all three variables.

With the character disordered, Pd and Ma were used, though not in a configural sense. In this situation, justification for using the Ma scale in a molecular interpretation of psychopathy was obtained through the implication of its worth in such a situation, this being outlined in an earlier chapter.

It should be noted that the molecular interpretation of any given variable fails to consider possible causes for its elevation other than the psychopathological. For example,

the D scale often becomes elevated as a result of exogenous factors or because of some transient stress reaction, rather than reflecting the existence of a neurotic or psychotic depression. What this was considered to be important may be depicted in the fact that D alone contributed 12% of the 50 cases diagnosed as maladjusted, through a molecular interpretation of the data.

Somewhat the same situation may apply to Pd, Ps, Pt and Ma, all of which can reflect the presence of transitory, non-pathological situations. The distinction as to whether the traits reflected in the rise of any given MMPI variable are of pathological importance or not, would require a configurational analysis of the data, an approach which is untenable with the concept of molecular differentiation.

From the above, it may be observed that any atomistic treatment of the MMPI is a risky procedure in diagnosis, and one which has not demonstrated itself to be particularly effective in the clinical setting.

In practice, wide variations exist between obtained results when the Inventory has been used in this way. By way of illustration, Table VI., contrasts two approaches in the molecular analysis of similar data. In the second method, the cases are created in a more liberal manner, with a clear hit being registered regardless of the number of elevated variables, and only requiring that one or more scales in the

protocol be above a score of 70. In this situation the percentage of successful diagnoses shows an appreciable rise over the first or more conservative method.

This would seem to suggest a dangerous situation in treating the MMPI from a molecular standpoint, indicating wide variations in what might be utilized for purposes of diagnostic assessment.

As opposed to this, a quantitative approach to the data has tended to remove such possibilities of error by eliminating the subjective element from interpretation, yet providing results which would appear to be as satisfactory as those obtained through atomistic interpretation.

In molecular differentiation of the three pathological groups used in this research, not all of the MMPI variables contributed in equal parts to the diagnosed population. With the maladjusted, the Hs scale proved to be the most discriminatory, providing a correct diagnosis in 22% of the cases. For the same group the next most important variable was D, this distinguishing 12% of the total. The Hy scale differentiated 7%, and in 9% of the cases there were co-equal peaks on two or more scales.

With the mentally diseased, Sc and Pa diagnosed 3% and 4% of the group, respectively. Relative to the character disordered, however, there was a wide discrepancy between the

TABLE VI.- Obtained differences between two forms of molecular analysis for maladjusted, mentally diseased and character disordered groups.

Group	Molecular Analysis (1) (%)	Molecular Analysis (2) (%)
Maladjusted (N=100)	50	50
Mentally diseased (N=100)	7	20
Character disordered (N=100)	21	15

two scales used, Pd accounting for 20% of the total and Ma, 1%.

To provide a clearer estimate of the degree to which each variable has contributed to the differentiation of the population, a summary has been provided in Table VII.

Respecting a comparison between molecular and quantitative analysis in terms of the sub-groups within the population, the quantitative approach was able to provide a more adequate diagnostic assessment in all cases excepting schizophrenia and paranoia. The reason for this latter failure is to be found in the overlapping of scores between the mentally diseased population and the two other groups, thus ruling out the establishment of a workable critical score which would accurately diagnose psychosis.

From the above, it would appear that quantitative analysis was able to distinguish between the various sub-groups, excepting those within the mentally diseased group. However, in practice this would not necessarily be the case, since there was no attempt to establish critical ratios with which these clinical entities could be differentially diagnosed. This notwithstanding, the implication stands that quantitative ratios have a potential value in the assessment of a variety of specific disorders, and which molecular methods of MMPI analysis are unable to pick out at the present.

To demonstrate this situation more fully, the differences between molecular and quantitative analysis for the major

SUMMARY OF THE FINDINGS

7a

TABLE VII.- Contribution of MMPI scales in molecular analysis of the experimental population.

Group	MMPI Scale	Contribution (%)
Maladjusted (N=100)	Hs	22
	D	12
	Hy	7
	Co-equal peaks	9
Mentally diseased (N=100)	Fa	4
	Sc	3
Character disordered (N=100)	Ma	20
	Ma	1

sub-pathologies of the experimental population, have been summarized in Tables VIII., IX and X.

In conclusion, it was noted that quantitative analysis differentiated the maladjusted and character disordered groups more successfully than was achieved through the molecular approach, differences between the two methods being at the .05 level of significance for the maladjusted population, and at the .01 level for the character disordered. However, with the mentally diseased neither method was satisfactory, only 7% of diagnostic success being obtained with each.

TABLE VIII.- Significance of the difference between molecular and quantitative analysis for pathological sub-groups within the maladjusted population.

Sub-group	Molecular Analysis (%)	Quantitative Analysis (%)	F/χ^2
Hysteria (N=25)	4	1	1.463
Hypochondriasis (N=39)	6	2	1.351
Reactive depression (N=19)	15	3	1.597

TABLE IX.- Significance of the difference between molecular and quantitative analysis for pathological sub-groups within the mentally diseased population.

Sub-group	Molecular Analysis (%)	Quantitative Analysis (%)	D/σ ^d
Schizophrenia (N=46)	12	3	-1.659
Paranoia (N=24)	1	3	0.585
Manic-depression (N=28)	3	3	0.000

TABLE X.- Significance of the difference between molecular and quantitative analysis for pathological sub-groups within the character disordered population.

Sub-group	Molecular Analysis (<i>n</i>)	Quantitative Analysis (<i>n</i>)	D/σ ^d
Pathologic emotionality (N=21)	15	62	3.574
Pathologic sexuality (N=14)	7	50	2.367
Asocial reaction (N=47)	38	66	2.831

1. The Relationship Between Configurational and Quantitative Analysis.

Whereas molecular analysis of MMPI data stressed diagnostic differentiation by means of specific variables, the more complete global approach has emphasized employment of the total pattern of high and low scores within the graph.

To this end, most MMPI scales have been divided into three main configurations, designated as the neurotic and psychotic triads and the conduct disorder pattern. Some of the remaining variables have become associated with one or more of these configurations, through which less stable traits and other, more obscure elements of personality, are assessed in their relationship to the major disorders.

With the maladjusted group, configurational analysis was accomplished through the neurotic triad, this being composed of Hs, D and Hy treated as a pattern, together with such other scales as reflected the disturbance. Respecting the mentally diseased population, Pa, Pt and Sc were used in conjunction with varying elevations of the neurotic triad and certain other variables. The character disordered group, on the other hand, were differentiated with a configuration based on combinations of Pd with Na, Pa and P.

A summary of the findings obtained through a configurational analysis of the population, as contrasted with the quantitative method, has been outlined in Table XI.

TABLE III.- Significance of the difference between configural and quantitative analysis for maladjusted, mentally diseased and character disordered groups.

Group	Configural Analysis (%)	Quantitative Analysis (%)	D/rd
Maladjusted (N=100)	62	64	0.147
Mentally diseased (N=100)	50	7	-7.661
Character disordered (N=100)	42	64	2.309

It will be noted that the differentiating capacity of the quantitative method, in comparison to configural analysis, was most effective with the character disordered. With the mentally diseased, however, it yielded much less satisfactory results. Findings relative to the maladjusted group were approximately the same for both methods.

Despite the favourable comparison, it should be observed that the quantitative approach fails to pick out relevant personality data concerning the 'dynamics' of a given patient's adjustment, such as would be easily obtained through pattern analysis. On the other hand, a quantitative appraisal of the MMPI is much less difficult than the configural method, and should prove to be more adaptable in screening situations.

At this point it should be stated that all comparisons between the two methods were based on this reporter's approach to pattern analysis with the MMPI. In order that the reader may assess this approach, a summary has been provided in Table XII., which lists the percentage of diagnostic success obtained by this and other observers.

A study of this material would suggest that the basic method in each case was quite similar, though there is possibly some variation due to the nature of this highly subjective technique.

Respecting a comparison between configural analysis and the quantitative method in terms of the sub-groups within

TABLE XII.- Percentage of diagnostic success reported for pattern analysis with maladjusted, mentally diseased and character disordered groups.

Group	Schmidt (N-219)	Meehl (N-?)	Michael and Duhler (N-90)	Hathaway and McKinley (N-178)	Earle (N-300)
Maladjusted	62	50-66	45	-	63
Mentally diseased	63	50-66	45	-	50
Character disordered	-	-	45	45-59	48

the population, it would be difficult to provide an accurate differential diagnosis with patterns at the present time.

However, to some extent it may be accomplished with hysteria, hypochondriasis, schizophrenia and manic-depressive states, although the approach is somewhat subjective and the results rather suspect.

For purposes of this study, an attempt was made to diagnose each of the main sub-groups using a global approach where possible, and substituting molecular data whenever necessary.

Although this method might appear to invalidate the results, such is not the case, since any configural analysis of MMPI data has depended upon a designation of the condition by means of one or more significant variables, the remaining contour of the pattern merely providing adjacent data which aids in the final diagnosis.

In line with the above and fully considering the difficulties involved, a rather interesting differentiation of the sub-groups was completed, the results of which have been reported in Tables XIII., XIV., and XV., together with quantitative findings relevant to the same population.

Respecting the material presented in tabular form, it should not be inferred that the quantitative method has been advocated herein as a possible substitute for more traditional approaches to the diagnosis of such sub-groups. In its present

TABLE XIII.— Significance of the difference between configural and quantitative analysis for pathological sub-groups within the maladjusted population.

Sub-group	Configural Analysis (%)	Quantitative Analysis (%)	D/F
Hysteria (N=25)	48	68	1.463
Hypochondriasis (N=39)	69	62	1.351
Reactive depression (N=19)	47	37	-0.627

TABLE XIV.— Significance of the difference between configural and quantitative analysis for pathological sub-groups within the mentally diseased population.

Sub-group	Configural Analysis (%)	Quantitative Analysis (%)	Z/σ
Schizophrenia (N=46)	36	3	-4.393
Paranoia (N=24)	10	8	-0.463
Manic-depression (N=28)	32	3	-3.090

TABLE XV.- Significance of the difference between configural and quantitative analysis for pathological sub-groups within the character disordered population.

Sub-group	Configural Analysis (%)	Quantitative Analysis (%)	D/S'
Path. emotionality (N=21)	35	62	1.818
Path. sexuality (N=14)	14	50	2.212
Asocial reaction (N=17)	46	66	1.994

form, the quantitative method would be unable to provide such differentiation with any reliability, since critical ratios have not yet been elaborated for this purpose. However, the material presented might suggest that this approach to the use of the MMPI in diagnosis, has considerable merit as a mode of avoiding the inconsistencies of current differential analysis with the test.

3. Conclusions.

The use of quantitative ratios in the assessment of pathological conditions with the MMPI, was found to provide a potentially useful method of distinguishing between the three groups making up the experimental population for this research.

With the maladjusted and character disordered, the quantitative procedure accurately differentiated 64% of the cases. With the mentally diseased, however, only 7% were correctly designated, a finding of little or no value for purposes of military or clinical screening.

In comparison with the molecular approach, the quantitative method provided results which were consistently better except with the mentally diseased, where both procedures were poor. Additionally, neither method offered the clinician the important background material essential to a successful personality analysis. On the other hand, the use

of quantified scores was found to provide a simpler approach to diagnosis with the MMPI, having few of the inconsistencies which are a feature of molecular interpretation.

Respecting a comparison with the global treatment of MMPI data, the quantitative procedure provided an equally reliable diagnosis of the character disordered population, differences between the two methods being significant at the 5% level of confidence. For the maladjusted, there was little to choose between the two methods, both assessing about 64% of the total. However, in the case of the mentally diseased, a configural approach yielded 50% of successfully diagnosed abnormals, whereas the quantitative method was only able to differentiate about 7% of the group, differences between the two methods being significant at the 1% level of confidence.

Despite its palpable inability to provide a satisfactory diagnostic assessment of the mentally diseased population, the quantitative approach was found to be less time-consuming than pattern analysis, although it failed to offer 'dynamic' material with which the clinician is able to round out his knowledge of a given subject. This notwithstanding, the quantitative method is a promising one for purposes of MMPI interpretation, particularly where the requirement is for a rapid screening index for large groups of subjects. In this way, suspect or borderline cases may be sifted out, these being available for more profound analysis, if required.

SUMMARY OF THE FINDINGS

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In summary, it was felt that the possibility of elaborating an extensive battery of quantified scores, with which to effect differential diagnosis with the MMPI, might be of greater worth than the development of complex patterns, if only for purposes of rapid and accurate screening, a situation in which the quantitative method is unexcelled. In this direction, it would be of interest to develop a variety of ratios which would be able to differentiate any possible pathological condition, without the need for the highly subjective interpretation presently required with the MMPI.

BIBLIOGRAPHY

Aronson, B. S., and G. S. Welsh, The MMPI as Diagnostic Differentiator: A Reply to Rubin, in the Journal of Consulting Psychology, Vol. 14, No. 4, 1950, p. 324-326.

A report dealing with the diagnostic efficacy of the MMPI, with particular emphasis on configural analysis as opposed to molecular interpretation.

Benton, A. L., in The Third Mental Measurements Yearbook, O. K. Buros, Ed., New Brunswick, N. J., Rutgers University Press, 1949, p. 104-107.

A critical survey of the MMPI as a clinical tool. The author's opinions are valuable to those clinicians requiring unbiased information respecting the worth of the instrument.

-----, and K. A. Probst, A Comparison of Psychiatric Ratings with MMPI Scores, in the Journal of Abnormal and Social Psychology, Vol. 41, No. 1, 1946, p. 75-78.

An effort to determine the degree to which the MMPI agreed with psychiatric rating in the differentiation of pathology. The findings were consistent with the view that the test is faulty in its assessment of conditions represented by the scale names.

Blair, W. R. N., A Comparative Study of Disciplinary Offenders and Non-offenders in the Canadian Army, in the Canadian Journal of Psychology, Vol. 4, No. 2, 1950, p. 49-62.

This report of research suggests that the MMPI may be useful as a military screening tool, with particular emphasis on the delineation of undesirable military recruits.

Brown, M. A., Alcoholics Profiles on the Minnesota Multiphasic, in the Journal of Clinical Psychology, Vol. 6, No. 3, 1950, p. 266-269.

A study providing additional evidence on the distinction of two forms of alcoholism through pattern analysis. The findings are useful in prognostic assessment.

Brezek, J., and B. C. Schiele, Clinical Significance of the Minnesota Multiphasic F Scale Evaluated in Experimental Neurosis, in the American Journal of Psychiatry, Vol. 105, No. 4, 1948, p. 266.

This report suggests some useful concomitants of the F scale as a clinical differentiator in neurotic conditions.

Burton, A., The Use of Psychometric and Projective Tests in Clinical Psychology, in the Journal of Psychology, Vol. 28, No. 2, 1949, p. 451-456.

A survey indicating the relative popularity of a variety of the more commonly used psychometric tests. It provided some interesting information concerning the increasing use of the MMPI.

Capwell, D. F., Personality Patterns of Adolescent Girls: II, Delinquents and Non-delinquents, in the Journal of Applied Psychology, Vol. 29, No. 4, 1945, p. 289-297.

This research dealt with the implications of a personality test battery in the measurement of delinquency. It was of value in describing some personality patterns of delinquent girls as distinguished from the non-delinquent.

Carp, A., MMPI Performance and Insulin Shock Therapy, in the Journal of Abnormal and Social Psychology, Vol. 45, No. 4, 1950, p. 721-726.

A recent evaluation of the MMPI as a prognostic tool. The author was one of the first observers to suggest the diagnostic value of the L scale.

Cofer, C. N., J. Chance and A. J. Judson, A Study of Malingering on the Minnesota Multiphasic Personality Inventory, in the Journal of Psychology, Vol. 27, No. 2, 1949, p. 491-499.

A presentation of some MMPI correlates in malingering. One of two important studies which provide methods for the detection of simulation and dissimulation with the Inventory.

Cottle, Wm. C., Card Versus Booklet Forms of the MMPI, in the Journal of Applied Psychology, Vol. 34, No. 4, 1950, p. 255-259.

This research dealt with the relationship between the two forms of the test. It was of value in providing reliability coefficients in this regard.

-----, The MMPI: A Review, in Kansas Studies in Education, Vol. 3, No. 2, issue of March 1953, p. vi-82.

A valuable review of the MMPI literature up to 1951. This manual provided the basis for the review of research presented herein.

Earle, Jeffrey B., The Diagnosis of Three Pathological Groups with the L, F and K Scales of the MMPI, Unpublished Master's Thesis, University of Ottawa, 1953, p. vii-77.

A study defining the role of the L, F and K scales in differential diagnosis.

Ellis, A., The Validity of Personality Questionnaires, in the Psychological Bulletin, Vol. 43, No. 5, 1946, p. 385-400.

A comprehensive review of the literature dealing with the validity of inventory-type tests. Of interest to the clinician requiring such information.

-----, Personality Questionnaires, in the Review of Educational Research, Vol. 17, No. 1, 1947, p. 53-63.

This report was a continuation of the above review. The author is somewhat critical of inventories.

-----, and H. S. Conrad, The Validity of Personality Questionnaires in Military Practice, in the Psychological Bulletin, Vol. 45, No. 5, 1948, p. 385-426.

A study suggesting the more important questionnaires from a military viewpoint. Of value to the military clinician.

Gough, H. G., Diagnostic Patterns on the MMPI, in the Journal of Clinical Psychology, Vol. 2, No. 1, 1946, p. 23-37.

One of the most important reviews of basic MMPI patterns. It contains much that is of value to those interested in acquiring skill with the test.

-----, Simulated Patterns on the MMPI, in the Journal of Abnormal and Social Psychology, Vol. 42, No. 2, 1947, p. 215-225.

A study dealing with the detection of faking on the MMPI. It is of value to all clinicians wishing to use the test seriously.

-----, The F Minus K Dissimulation Index for the Minnesota Multiphasic Personality Inventory, in the Journal of Consulting Psychology, Vol. 14, No. 5, 1950, p. 408-413.

This research deals with an effective solution for the problem of faking on the MMPI.

Guthrie, G. M., Six MMPI Diagnostic Profile Patterns, in the Journal of Psychology, Vol. 30, No. 2, 1950, p. 317-323.

A most valuable study concerning diagnosis with the Inventory. It contains much useful material on the problem of configural analysis.

Hales, W. M., and W. Simon, Minnesota Multiphasic Personality Inventory Patterns Before and After Insulin Shock Therapy, in the American Journal of Psychiatry, Vol. 105, No. 4, 1948, p. 254-258.

This report contains material suggesting the prognostic use of the MMPI. It is oriented in the direction of the configural approach.

Hathaway, S. R., and J. C. McKinley, A Multiphasic Personality Schedule (Minnesota): I. Construction of the Schedule, in the Journal of Psychology, Vol. 10, No. 4, 1940, p. 249-254.

An outline of the basic research behind the development of the MMPI. Of considerable importance to the clinician desiring a complete background with the test.

-----, A Multiphasic Personality Schedule (Minnesota): III. The Measurement of Symptomatic Depression, in the Journal of Psychology, Vol. 14, No. 1, 1942, p. 73-84.

This survey of research is of considerable value, since it deals with the development of the D scale.

-----, Minnesota Multiphasic Personality Inventory: Manual, New York, Psychological Corporation, 1951, p. 31.

The 1951 revision of the scoring manual for the test. It proved useful for its assessment of various diagnostic factors.

-----, and Paul E. Meehl, Atlas for the Clinical Use of the MMPI, Minneapolis, University of Minnesota Press, 1950, p. xlii-799.

A monumental work providing case histories for over 900 patients, with much other information for the MMPI user. This text was the basic source for all cases used in this research.

-----, The Minnesota Multiphasic Inventory, in Military Clinical Psychology, TM 8-242 - AFM 160-45, issue of July 1951, p. 71-111.

A presentation of the test. Chiefly valuable as a clinical aid.

-----, and E. D. Monachesi, Analyzing and Predicting Juvenile Delinquency with the MMPI, Minneapolis, University of Minnesota Press, 1953, p. vi-153.

A recent compendium of 7 important studies dealing with the problem of delinquency. It was found to be of value in delineating some of the more important MMPI findings in this field of psychopathology.

Holzberg, J. D., and S. Alessi, Reliability of the Shortened MMPI, in the Journal of Consulting Psychology, Vol. 13, No. 4, 1949, p. 288-292.

A study with implications for users of the short or emergency version of the MMPI. The authors found this form of the test to be essentially reliable.

Hevey, H. B., Somatization and Other Neurotic Reaction and MMPI Profiles, in the Journal of Clinical Psychology, Vol. 5, No. 2, 1949, p. 153-157.

A presentation of patterns purported to differentiate between psychosomatic and purely functional reactions. Valuable in its suggestion of a new emphasis with the MMPI.

Hunt, H. F., A. Carp, Wm. A. Cass, Jr., C. L. Minder, and Robert E. Kantor, A Study of the Differential Diagnostic Efficiency of the MMPI, in the Journal of Consulting Psychology, Vol. 12, No. 5, 1948, p. 331-336.

An early report on the diagnostic possibilities of the Inventory. Valuable for its suggestions concerning the F scale.

Jensen, H. B., and J. B. Rotter, The Value of Thirteen Psychological Tests in Officer Candidate Screening, in the Journal of Applied Psychology, Vol. 31, No. 3, 1947, p. 312-322.

This review suggests the value of the MMPI as a personnel selection tool. Of interest for its attempt to assess emotional stability.

Kazan, A. T., and I. M. Sheinberg, Clinical Note on the Significance of the Validity Score (F) in the MMPI, in the American Journal of Psychiatry, Vol. 102, No. 2, 1945, p. 181-183.

An important study adding to the available information concerning the F scale.

Manson, M. P., A Psychometric Analysis of Psychopathic Characteristics of Alcoholics, in the Journal of Consulting Psychology, Vol. 13, No. 2, 1949, p. 111-118.

A survey of MMPI correlates in alcoholism, with some useful information concerning the role of Pd in this area.

McKinley, J. C., and S. R. Hathaway, A Multiphasic Personality Schedule (Minnesota): II. A Differential Study of Hypochondriasis, in the Journal of Psychology, Vol. 10, No. 2, 1940, p. 255-268.

One of the basic studies on the elaboration of the test. Required reading for all serious MMPI users.

-----, A Multiphasic Personality Schedule (Minnesota): IV. Psychasthenia, in the Journal of Applied Psychology, Vol. 26, No. 5, 1942, p. 614-624.

An additional study on the development of the MMPI. Required reading for all clinicians wishing to become familiar with the test.

McKinley, J. C., and S. R. Hathaway, The MMPI: V. Hysteria, Hypomania and Psychopathic Deviate, in the Journal of Applied Psychology, Vol. 28, No. 2, 1944, p. 153-174.

An interesting and important report on the construction of three of the more important scales. Of value for its elaboration of psychopathological connotations.

Meehl, Paul E., The Dynamics of 'Structured' Personality Tests, in the Journal of Clinical Psychology, Vol. 1, No. 4, 1945, p. 296-303.

This review represents one of the more important defences of the structured inventory type test. It is a highly interesting survey of the field.

-----, Profile Analysis of the MMPI in Differential Diagnosis, in the Journal of Applied Psychology, Vol. 30, No. 5, 1946, p. 517-524.

One of three fundamental studies dealing with the problem of profile analysis as a solution to diagnostic difficulties with the MMPI.

Modlin, H. C., A Study of the MMPI in Clinical Practice: With Notes on the Cornell Index, in the American Journal of Psychiatry, Vol. 103, No. 6, 1947, p. 758-769.

A report of research suggesting some uses for the MMPI in the clinical setting. The author was one of the first to suggest the possibility of establishing diagnostic ratios.

Morris, W. D., A Preliminary Evaluation of the MMPI, in the Journal of Clinical Psychology, Vol. 3, No. 4, 1947, p. 370-374.

An early evaluation of certain correlates of the MMPI. The author was mainly concerned with the establishment of reliable diagnostic signs.

Morton, M. A., The Army Adaptation of the MMPI, in the American Psychologist, Vol. 3, No. 7, 1948, p. 271-272.

Morton has indicated some uses for the test in a military setting. Her work is important in that it reiterates the uses of the Inventory as a screening tool.

Pacella, B. L., Z. Piotrowski, and H. D. C. Lewis, The Effects of Electric Convulsive Therapy on Certain Personality Traits in Psychiatric Patients, in the American Journal of Psychiatry, Vol. 104, No. 2, 1947, p. 83-91.

One of the first researches to deal with the MMPI as a prognostic tool. A somewhat critical but interesting appraisal of the instrument's efficiency.

Schmidt, H. O., Test Profiles as a Diagnostic Aid, in the Journal of Applied Psychology, Vol. 29, No. 2, 1945, p. 115-131.

This research has been regarded as one of the cornerstones in the elaboration of configural analysis. It is important in that it provides the reader with some of the more reliable diagnostic patterns.

Schneck, J. N., The Double-spike Pattern on the MMPI, in the American Journal of Psychiatry, Vol. 104, No. 7, 1948, p. 443-445.

A report of various configurations suggestive of character disorder. Of interest in that it has added a new dimension to the problem of psychopathy.

Simon, W., and W. M. Hales, Note on a Suicide Key in the Minnesota Multiphasic Personality Inventory, in the American Journal of Psychiatry, Vol. 106, No. 3, 1949, p. 222-223.

This report provided some interesting diagnostic patterns respecting the problem of suicide and its detection.

Sullivan, Patrick L., and G. S. Welsh, A Technique for Objective Configural Analysis of MMPI Profiles, in the Journal of Consulting Psychology, Vol. 16, No. 5, 1952, p. 383-388.

A study indicating the need for a holistic attitude when evaluating protocols. It was important for its emphasis of newer trends in the use of the test.

Van Vorst, R. B., An Evaluation of Test Performances of a Group of Psychopathic Delinquents, in the Psychological Bulletin, Vol. 40, No. 8, 1943, p. 583. (abstract).

A negative study suggesting that the MMPI was not able to diagnose psychopathic boys.

Mauck, L. A., Schizophrenia and the MMPI, in the Journal of Clinical Psychology, Vol. 6, No. 3, 1950, p. 279-282.

An evaluation of some configurations respecting the detection of schizophrenia with the MMPI. Important as a diagnostic aid.

Welsh, G. S., An Anxiety Index and an Internalization Ratio for the MMPI, in the Journal of Consulting Psychology, Vol. 16, No. 1, 1952, p. 65-72.

A recent elaboration of the use of quantitative ratios with the MMPI. Both approaches to the test are of considerable use in the clinical setting.

Wheeler, Wm. M., K. L. Little, and G. M. Lehner, The Internal Structure of the MMPI, in the Journal of Consulting Psychology, Vol. 14, No. 5, 1950, p. 134-141.

An important research which has cautioned against using the MMPI in any but a molar way. It was important in that it taught against accepting the scales as necessarily related to what they are presumed to represent.

Wiener, D. N., Personality Characteristics of Selected Disability Groups, in the Journal of Clinical Psychology, Vol. 4, No. 3, 1948, p. 265-290.

A review of the test's uses in dealing with a variety of psychosomatic conditions.

APPENDIX 1

**BOOKLET FOR THE MINNESOTA
MULTIPHASIC PERSONALITY INVENTORY**

DO NOT OPEN UNTIL TOLD TO DO SO

Booklet for the Minnesota

MULTIPHASIC PERSONALITY INVENTORY

STARKE R. HATHAWAY, Ph.D., and J. CHARNLEY MCKINLEY, M.D.

This inventory consists of numbered statements. Read each statement and decide whether it is true as applied to you or false as applied to you.

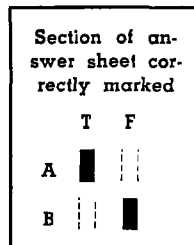
You are to mark your answers on the answer sheet you have. Look at the example of the answer sheet shown at the right. If a statement is TRUE or MOSTLY TRUE, as applied to you, blacken between the lines in the column headed T. (See A at the right.) If a statement is FALSE or NOT USUALLY TRUE, as applied to you, blacken between the lines in the column headed F. (See B at the right.) If a statement does not apply to you or if it is something that you don't know about, make no mark on the answer sheet.

Remember to give YOUR OWN opinion of yourself. Do not leave any blank spaces if you can avoid it.

In marking your answers on the answer sheet, be sure that the number of the statement agrees with the number on the answer sheet. Make your marks heavy and black. Erase completely any answer you wish to change. Do not make any marks on this booklet.

Remember, try to make some answer to every statement.

NOW OPEN THE BOOKLET AND GO AHEAD.



Published by THE PSYCHOLOGICAL CORPORATION, New York

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DO NOT MAKE ANY MARKS ON THIS BOOKLET

1. I like mechanics magazines.
2. I have a good appetite.
3. I wake up fresh and rested most mornings.
4. I think I would like the work of a librarian.
5. I am easily awakened by noise.
6. I like to read newspaper articles on crime.
7. My hands and feet are usually warm enough.
8. My daily life is full of things that keep me interested.
9. I am about as able to work as I ever was.
10. There seems to be a lump in my throat much of the time.
11. A person should try to understand his dreams and be guided by or take warning from them.
12. I enjoy detective or mystery stories.
13. I work under a great deal of tension.
14. I have diarrhea once a month or more.
15. Once in a while I think of things too bad to talk about.
16. I am sure I get a raw deal from life.
17. My father was a good man.
18. I am very seldom troubled by constipation.
19. When I take a new job, I like to be tipped off on who should be gotten next to.
20. My sex life is satisfactory.
21. At times I have very much wanted to leave home.
22. At times I have fits of laughing and crying that I cannot control.
23. I am troubled by attacks of nausea and vomiting.
24. No one seems to understand me.
25. I would like to be a singer.
26. I feel that it is certainly best to keep my mouth shut when I'm in trouble.
27. Evil spirits possess me at times.
28. When someone does me a wrong I feel I should pay him back if I can, just for the principle of the thing.
29. I am bothered by acid stomach several times a week.
30. At times I feel like swearing.
31. I have nightmares every few nights.
32. I find it hard to keep my mind on a task or job.
33. I have had very peculiar and strange experiences.
34. I have a cough most of the time.
35. If people had not had it in for me I would have been much more successful.
36. I seldom worry about my health.
37. I have never been in trouble because of my sex behavior.
38. During one period when I was a youngster I engaged in petty thievery.
39. At times I feel like smashing things.
40. Most any time I would rather sit and daydream than to do anything else.
41. I have had periods of days, weeks, or months when I couldn't take care of things because I couldn't "get going."
42. My family does not like the work I have chosen (or the work I intend to choose for my life work).
43. My sleep is fitful and disturbed.
44. Much of the time my head seems to hurt all over.
45. I do not always tell the truth.

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46. My judgment is better than it ever was.
47. Once a week or oftener I feel suddenly hot all over, without apparent cause.
48. When I am with people I am bothered by hearing very queer things.
49. It would be better if almost all laws were thrown away.
50. My soul sometimes leaves my body.
51. I am in just as good physical health as most of my friends.
52. I prefer to pass by school friends, or people I know but have not seen for a long time, unless they speak to me first.
53. A minister can cure disease by praying and putting his hand on your head.
54. I am liked by most people who know me.
55. I am almost never bothered by pains over the heart or in my chest.
56. As a youngster I was suspended from school one or more times for cutting up.
57. I am a good mixer.
58. Everything is turning out just like the prophets of the Bible said it would.
59. I have often had to take orders from someone who did not know as much as I did.
60. I do not read every editorial in the newspaper every day.
61. I have not lived the right kind of life.
62. Parts of my body often have feelings like burning, tingling, crawling, or like "going to sleep."
63. I have had no difficulty in starting or holding my bowel movement.
64. I sometimes keep on at a thing until others lose their patience with me.
65. I loved my father.
66. I see things or animals or people around me that others do not see.
67. I wish I could be as happy as others seem to be.
68. I hardly ever feel pain in the back of the neck.
69. I am very strongly attracted by members of my own sex.
70. I used to like drop-the-handkerchief.
71. I think a great many people exaggerate their misfortunes in order to gain the sympathy and help of others.
72. I am troubled by discomfort in the pit of my stomach every few days or oftener.
73. I am an important person.
74. I have often wished I were a girl. (Or if you are a girl) I have never been sorry that I am a girl.
75. I get angry sometimes.
76. Most of the time I feel blue.
77. I enjoy reading love stories.
78. I like poetry.
79. My feelings are not easily hurt.
80. I sometimes tease animals.
81. I think I would like the kind of work a forest ranger does.
82. I am easily downed in an argument.
83. Any man who is able and willing to work hard has a good chance of succeeding.
84. These days I find it hard not to give up hope of amounting to something.
85. Sometimes I am strongly attracted by the personal articles of others such as shoes, gloves, etc., so that I want to handle or steal them though I have no use for them.
86. I am certainly lacking in self-confidence.
87. I would like to be a florist.
88. I usually feel that life is worth while.
89. It takes a lot of argument to convince most people of the truth.

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90. Once in a while I put off until tomorrow what I ought to do today.
91. I do not mind being made fun of.
92. I would like to be a nurse.
93. I think most people would lie to get ahead.
94. I do many things which I regret afterwards (I regret things more or more often than others seem to).
95. I go to church almost every week.
96. I have very few quarrels with members of my family.
97. At times I have a strong urge to do something harmful or shocking.
98. I believe in the second coming of Christ.
99. I like to go to parties and other affairs where there is lots of loud fun.
100. I have met problems so full of possibilities that I have been unable to make up my mind about them.
101. I believe women ought to have as much sexual freedom as men.
102. My hardest battles are with myself.
103. I have little or no trouble with my muscles twitching or jumping.
104. I don't seem to care what happens to me.
105. Sometimes when I am not feeling well I am cross.
106. Much of the time I feel as if I have done something wrong or evil.
107. I am happy most of the time.
108. There seems to be a fullness in my head or nose most of the time.
109. Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right.
110. Someone has it in for me.
111. I have never done anything dangerous for the thrill of it.
112. I frequently find it necessary to stand up for what I think is right.
113. I believe in law enforcement.
114. Often I feel as if there were a tight band about my head.
115. I believe in a life hereafter.
116. I enjoy a race or game better when I bet on it.
117. Most people are honest chiefly through fear of being caught.
118. In school I was sometimes sent to the principal for cutting up.
119. My speech is the same as always (not faster or slower, or slurring; no hoarseness).
120. My table manners are not quite as good at home as when I am out in company.
121. I believe I am being plotted against.
122. I seem to be about as capable and smart as most others around me.
123. I believe I am being followed.
124. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it.
125. I have a great deal of stomach trouble.
126. I like dramatics.
127. I know who is responsible for most of my troubles.
128. The sight of blood neither frightens me nor makes me sick.
129. Often I can't understand why I have been so cross and grouchy.
130. I have never vomited blood or coughed up blood.
131. I do not worry about catching diseases.

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132. I like collecting flowers or growing house plants.
133. I have never indulged in any unusual sex practices.
134. At times my thoughts have raced ahead faster than I could speak them.
135. If I could get into a movie without paying and be sure I was not seen I would probably do it.
136. I commonly wonder what hidden reason another person may have for doing something nice for me.
137. I believe that my home life is as pleasant as that of most people I know.
138. Criticism or scolding hurts me terribly.
139. Sometimes I feel as if I must injure either myself or someone else.
140. I like to cook.
141. My conduct is largely controlled by the customs of those about me.
142. I certainly feel useless at times.
143. When I was a child, I belonged to a crowd or gang that tried to stick together through thick and thin.
144. I would like to be a soldier.
145. At times I feel like picking a fist fight with someone.
146. I have the wanderlust and am never happy unless I am roaming or traveling about.
147. I have often lost out on things because I couldn't make up my mind soon enough.
148. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.
149. I used to keep a diary.
150. I would rather win than lose in a game.
151. Someone has been trying to poison me.
152. Most nights I go to sleep without thoughts or ideas bothering me.
153. During the past few years I have been well most of the time.
154. I have never had a fit or convulsion.
155. I am neither gaining nor losing weight.
156. I have had periods in which I carried on activities without knowing later what I had been doing.
157. I feel that I have often been punished without cause.
158. I cry easily.
159. I cannot understand what I read as well as I used to.
160. I have never felt better in my life than I do now.
161. The top of my head sometimes feels tender.
162. I resent having anyone take me in so cleverly that I have had to admit that it was one on me.
163. I do not tire quickly.
164. I like to study and read about things that I am working at.
165. I like to know some important people because it makes me feel important.
166. I am afraid when I look down from a high place.
167. It wouldn't make me nervous if any members of my family got into trouble with the law.
168. There is something wrong with my mind.
169. I am not afraid to handle money.
170. What others think of me does not bother me.
171. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things.
172. I frequently have to fight against showing that I am bashful.
173. I liked school.

GO ON TO THE NEXT PAGE

174. I have never had a fainting spell.
175. I seldom or never have dizzy spells.
176. I do not have a great fear of snakes.
177. My mother was a good woman.
178. My memory seems to be all right.
179. I am worried about sex matters.
180. I find it hard to make talk when I meet new people.
181. When I get bored I like to stir up some excitement.
182. I am afraid of losing my mind.
183. I am against giving money to beggars.
184. I commonly hear voices without knowing where they come from.
185. My hearing is apparently as good as that of most people.
186. I frequently notice my hand shakes when I try to do something.
187. My hands have not become clumsy or awkward.
188. I can read a long while without tiring my eyes.
189. I feel weak all over much of the time.
190. I have very few headaches.
191. Sometimes, when embarrassed, I break out in a sweat which annoys me greatly.
192. I have had no difficulty in keeping my balance in walking.
193. I do not have spells of hay fever or asthma.
194. I have had attacks in which I could not control my movements or speech but in which I knew what was going on around me.
195. I do not like everyone I know.
196. I like to visit places where I have never been before.
197. Someone has been trying to rob me.
198. I daydream very little.
199. Children should be taught all the main facts of sex.
200. There are persons who are trying to steal my thoughts and ideas.
201. I wish I were not so shy.
202. I believe I am a condemned person.
203. If I were a reporter I would very much like to report news of the theater.
204. I would like to be a journalist.
205. At times it has been impossible for me to keep from stealing or shoplifting something.
206. I am very religious (more than most people).
207. I enjoy many different kinds of play and recreation.
208. I like to flirt.
209. I believe my sins are unpardonable.
210. Everything tastes the same.
211. I can sleep during the day but not at night.
212. My people treat me more like a child than a grown-up.
213. In walking I am very careful to step over sidewalk cracks.
214. I have never had any breaking out on my skin that has worried me.
215. I have used alcohol excessively.
216. There is very little love and companionship in my family as compared to other homes.
217. I frequently find myself worrying about something.
218. It does not bother me particularly to see animals suffer.
219. I think I would like the work of a building contractor.

GO ON TO THE NEXT PAGE

220. I loved my mother.
221. I like science.
222. It is not hard for me to ask help from my friends even though I cannot return the favor.
223. I very much like hunting.
224. My parents have often objected to the kind of people I went around with.
225. I gossip a little at times.
226. Some of my family have habits that bother and annoy me very much.
227. I have been told that I walk during sleep.
228. At times I feel that I can make up my mind with unusually great ease.
229. I should like to belong to several clubs or lodges.
230. I hardly ever notice my heart pounding and I am seldom short of breath.
231. I like to talk about sex.
232. I have been inspired to a program of life based on duty which I have since carefully followed.
233. I have at times stood in the way of people who were trying to do something, not because it amounted to much but because of the principle of the thing.
234. I get mad easily and then get over it soon.
235. I have been quite independent and free from family rule.
236. I brood a great deal.
237. My relatives are nearly all in sympathy with me.
238. I have periods of such great restlessness that I cannot sit long in a chair.
239. I have been disappointed in love.
240. I never worry about my looks.
241. I dream frequently about things that are best kept to myself.
242. I believe I am no more nervous than most others.
243. I have few or no pains.
244. My way of doing things is apt to be misunderstood by others.
245. My parents and family find more fault with me than they should.
246. My neck spots with red often.
247. I have reason for feeling jealous of one or more members of my family.
248. Sometimes without any reason or even when things are going wrong I feel excitedly happy, "on top of the world."
249. I believe there is a Devil and a Hell in afterlife.
250. I don't blame anyone for trying to grab everything he can get in this world.
251. I have had blank spells in which my activities were interrupted and I did not know what was going on around me.
252. No one cares much what happens to you.
253. I can be friendly with people who do things which I consider wrong.
254. I like to be with a crowd who play jokes on one another.
255. Sometimes at elections I vote for men about whom I know very little.
256. The only interesting part of newspapers is the "funnies."
257. I usually expect to succeed in things I do.
258. I believe there is a God.
259. I have difficulty in starting to do things.
260. I was a slow learner in school.
261. If I were an artist I would like to draw flowers.
262. It does not bother me that I am not better looking.
263. I sweat very easily even on cool days.

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264. I am entirely self-confident.
265. It is safer to trust nobody.
266. Once a week or oftener I become very excited.
267. When in a group of people I have trouble thinking of the right things to talk about.
268. Something exciting will almost always pull me out of it when I am feeling low.
269. I can easily make other people afraid of me, and sometimes do for the fun of it.
270. When I leave home I do not worry about whether the door is locked and the windows closed.
271. I do not blame a person for taking advantage of someone who lays himself open to it.
272. At times I am all full of energy.
273. I have numbness in one or more regions of my skin.
274. My eyesight is as good as it has been for years.
275. Someone has control over my mind.
276. I enjoy children.
277. At times I have been so entertained by the cleverness of a crook that I have hoped he would get by with it.
278. I have often felt that strangers were looking at me critically.
279. I drink an unusually large amount of water every day.
280. Most people make friends because friends are likely to be useful to them.
281. I do not often notice my ears ringing or buzzing.
282. Once in a while I feel hate toward members of my family whom I usually love.
283. If I were a reporter I would very much like to report sporting news.
284. I am sure I am being talked about.
285. Once in a while I laugh at a dirty joke.
286. I am never happier than when alone.
287. I have very few fears compared to my friends.
288. I am troubled by attacks of nausea and vomiting.
289. I am always disgusted with the law when a criminal is freed through the arguments of a smart lawyer.
290. I work under a great deal of tension.
291. At one or more times in my life I felt that someone was making me do things by hypnotizing me.
292. I am likely not to speak to people until they speak to me.
293. Someone has been trying to influence my mind.
294. I have never been in trouble with the law.
295. I liked "Alice in Wonderland" by Lewis Carroll.
296. I have periods in which I feel unusually cheerful without any special reason.
297. I wish I were not bothered by thoughts about sex.
298. If several people find themselves in trouble, the best thing for them to do is to agree upon a story and stick to it.
299. I think that I feel more intensely than most people do.
300. There never was a time in my life when I liked to play with dolls.
301. Life is a strain for me much of the time.
302. I have never been in trouble because of my sex behavior.
303. I am so touchy on some subjects that I can't talk about them.
304. In school I found it very hard to talk before the class.
305. Even when I am with people I feel lonely much of the time.
306. I get all the sympathy I should.

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307. I refuse to play some games because I am not good at them.
308. At times I have very much wanted to leave home.
309. I seem to make friends about as quickly as others do.
310. My sex life is satisfactory.
311. During one period when I was a youngster I engaged in petty thievery.
312. I dislike having people about me.
313. The man who provides temptation by leaving valuable property unprotected is about as much to blame for its theft as the one who steals it.
314. Once in a while I think of things too bad to talk about.
315. I am sure I get a raw deal from life.
316. I think nearly anyone would tell a lie to keep out of trouble.
317. I am more sensitive than most other people.
318. My daily life is full of things that keep me interested.
319. Most people inwardly dislike putting themselves out to help other people.
320. Many of my dreams are about sex matters.
321. I am easily embarrassed.
322. I worry over money and business.
323. I have had very peculiar and strange experiences.
324. I have never been in love with anyone.
325. The things that some of my family have done have frightened me.
326. At times I have fits of laughing and crying that I cannot control.
327. My mother or father often made me obey even when I thought that it was unreasonable.
328. I find it hard to keep my mind on a task or job.
329. I almost never dream.
330. I have never been paralyzed or had any unusual weakness of any of my muscles.
331. If people had not had it in for me I would have been much more successful.
332. Sometimes my voice leaves me or changes even though I have no cold.
333. No one seems to understand me.
334. Peculiar odors come to me at times.
335. I cannot keep my mind on one thing.
336. I easily become impatient with people.
337. I feel anxiety about something or someone almost all the time.
338. I have certainly had more than my share of things to worry about.
339. Most of the time I wish I were dead.
340. Sometimes I become so excited that I find it hard to get to sleep.
341. At times I hear so well it bothers me.
342. I forget right away what people say to me.
343. I usually have to stop and think before I act even in trifling matters.
344. Often I cross the street in order not to meet someone I see.
345. I often feel as if things were not real.
346. I have a habit of counting things that are not important such as bulbs on electric signs, and so forth.
347. I have no enemies who really wish to harm me.
348. I tend to be on my guard with people who are somewhat more friendly than I had expected.
349. I have strange and peculiar thoughts.
350. I hear strange things when I am alone.
351. I get anxious and upset when I have to make a short trip away from home.

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352. I have been afraid of things or people that I knew could not hurt me.
353. I have no dread of going into a room by myself where other people have already gathered and are talking.
354. I am afraid of using a knife or anything very sharp or pointed.
355. Sometimes I enjoy hurting persons I love.
356. I have more trouble concentrating than others seem to have.
357. I have several times given up doing a thing because I thought too little of my ability.
358. Bad words, often terrible words, come into my mind and I cannot get rid of them.
359. Sometimes some unimportant thought will run through my mind and bother me for days.
360. Almost every day something happens to frighten me.
361. I am inclined to take things hard.
362. I am more sensitive than most other people.
363. At times I have enjoyed being hurt by someone I loved.
364. People say insulting and vulgar things about me.
365. I feel uneasy indoors.
366. Even when I am with people I feel lonely much of the time.
367. I am not afraid of fire.
368. I have sometimes stayed away from another person because I feared doing or saying something that I might regret afterwards.
369. Religion gives me no worry.
370. I hate to have to rush when working.
371. I am not unusually self-conscious.
372. I tend to be interested in several different hobbies rather than to stick to one of them for a long time.
373. I feel sure that there is only one true religion.
374. At periods my mind seems to work more slowly than usual.
375. When I am feeling very happy and active, someone who is blue or low will spoil it all.
376. Policemen are usually honest.
377. At parties I am more likely to sit by myself or with just one other person than to join in with the crowd.
378. I do not like to see women smoke.
379. I very seldom have spells of the blues.
380. When someone says silly or ignorant things about something I know about, I try to set him right.
381. I am often said to be hotheaded.
382. I wish I could get over worrying about things I have said that may have injured other people's feelings.
383. People often disappoint me.
384. I feel unable to tell anyone all about myself.
385. Lightning is one of my fears.
386. I like to keep people guessing what I'm going to do next.
387. The only miracles I know of are simply tricks that people play on one another.
388. I am afraid to be alone in the dark.
389. My plans have frequently seemed so full of difficulties that I have had to give them up.
390. I have often felt badly over being misunderstood when trying to keep someone from making a mistake.
391. I love to go to dances.
392. A windstorm terrifies me.
393. Horses that don't pull should be beaten or kicked.
394. I frequently ask people for advice.

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395. The future is too uncertain for a person to make serious plans.
396. Often, even though everything is going fine for me, I feel that I don't care about anything.
397. I have sometimes felt that difficulties were piling up so high that I could not overcome them.
398. I often think, "I wish I were a child again."
399. I am not easily angered.
400. If given the chance I could do some things that would be of great benefit to the world.
401. I have no fear of water.
402. I often must sleep over a matter before I decide what to do.
403. It is great to be living in these times when so much is going on.
404. People have often misunderstood my intentions when I was trying to put them right and be helpful.
405. I have no trouble swallowing.
406. I have often met people who were supposed to be experts who were no better than I.
407. I am usually calm and not easily upset.
408. I am apt to hide my feelings in some things, to the point that people may hurt me without their knowing about it.
409. At times I have worn myself out by undertaking too much.
410. I would certainly enjoy beating a crook at his own game.
411. It makes me feel like a failure when I hear of the success of someone I know well.
412. I do not dread seeing a doctor about a sickness or injury.
413. I deserve severe punishment for my sins.
414. I am apt to take disappointments so keenly that I can't put them out of my mind.
415. If given the chance I would make a good leader of people.
416. It bothers me to have someone watch me at work even though I know I can do it well.
417. I am often so annoyed when someone tries to get ahead of me in a line of people that I speak to him about it.
418. At times I think I am no good at all.
419. I played hooky from school quite often as a youngster.
420. I have had some very unusual religious experiences.
421. One or more members of my family is very nervous.
422. I have felt embarrassed over the type of work that one or more members of my family have done.
423. I like or have liked fishing very much.
424. I feel hungry almost all the time.
425. I dream frequently.
426. I have at times had to be rough with people who were rude or annoying.
427. I am embarrassed by dirty stories.
428. I like to read newspaper editorials.
429. I like to attend lectures on serious subjects.
430. I am attracted by members of the opposite sex.
431. I worry quite a bit over possible misfortunes.
432. I have strong political opinions.
433. I used to have imaginary companions.
434. I would like to be an auto racer.
435. Usually I would prefer to work with women.
436. People generally demand more respect for their own rights than they are willing to allow for others.

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437. It is all right to get around the law if you don't actually break it.
438. There are certain people whom I dislike so much that I am inwardly pleased when they are catching it for something they have done.
439. It makes me nervous to have to wait.
440. I try to remember good stories to pass them on to other people.
441. I like tall women.
442. I have had periods in which I lost sleep over worry.
443. I am apt to pass up something I want to do because others feel that I am not going about it in the right way.
444. I do not try to correct people who express an ignorant belief.
445. I was fond of excitement when I was young (or in childhood).
446. I enjoy gambling for small stakes.
447. I am often inclined to go out of my way to win a point with someone who has opposed me.
448. I am bothered by people outside, on streetcars, in stores, etc., watching me.
449. I enjoy social gatherings just to be with people.
450. I enjoy the excitement of a crowd.
451. My worries seem to disappear when I get into a crowd of lively friends.
452. I like to poke fun at people.
453. When I was a child I didn't care to be a member of a crowd or gang.
454. I could be happy living all alone in a cabin in the woods or mountains.
455. I am quite often not in on the gossip and talk of the group I belong to.
456. A person shouldn't be punished for breaking a law that he thinks is unreasonable.
457. I believe that a person should never taste an alcoholic drink.
458. The man who had most to do with me when I was a child (such as my father, stepfather, etc.) was very strict with me.
459. I have one or more bad habits which are so strong that it is no use in fighting against them.
460. I have used alcohol moderately (or not at all).
461. I find it hard to set aside a task that I have undertaken, even for a short time.
462. I have had no difficulty starting or holding my urine.
463. I used to like hopscotch.
464. I have never seen a vision.
465. I have several times had a change of heart about my life work.
466. Except by a doctor's orders I never take drugs or sleeping powders.
467. I often memorize numbers that are not important (such as automobile licenses, etc.).
468. I am often sorry because I am so cross and grouchy.
469. I have often found people jealous of my good ideas, just because they had not thought of them first.
470. Sexual things disgust me.
471. In school my marks in deportment were quite regularly bad.
472. I am fascinated by fire.
473. Whenever possible I avoid being in a crowd.
474. I have to urinate no more often than others.
475. When I am cornered I tell that portion of the truth which is not likely to hurt me.
476. I am a special agent of God.
477. If I were in trouble with several friends who were equally to blame, I would rather take the whole blame than to give them away.

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478. I have never been made especially nervous over trouble that any members of my family have gotten into.
479. I do not mind meeting strangers.
480. I am often afraid of the dark.
481. I can remember "playing sick" to get out of something.
482. While in trains, busses, etc., I often talk to strangers.
483. Christ performed miracles such as changing water into wine.
484. I have one or more faults which are so big that it seems better to accept them and try to control them rather than to try to get rid of them.
485. When a man is with a woman he is usually thinking about things related to her sex.
486. I have never noticed any blood in my urine.
487. I feel like giving up quickly when things go wrong.
488. I pray several times every week.
489. I feel sympathetic towards people who tend to hang on to their griefs and troubles.
490. I read in the Bible several times a week.
491. I have no patience with people who believe there is only one true religion.
492. I dread the thought of an earthquake.
493. I prefer work which requires close attention, to work which allows me to be careless.
494. I am afraid of finding myself in a closet or small closed place.
495. I usually "lay my cards on the table" with people that I am trying to correct or improve.
496. I have never seen things doubled (that is, an object never looks like two objects to me without my being able to make it look like one object).
497. I enjoy stories of adventure.
498. It is always a good thing to be frank.
499. I must admit that I have at times been worried beyond reason over something that really did not matter.
500. I readily become one hundred per cent sold on a good idea.
501. I usually work things out for myself rather than get someone to show me how.
502. I like to let people know where I stand on things.
503. It is unusual for me to express strong approval or disapproval of the actions of others.
504. I do not try to cover up my poor opinion or pity of a person so that he won't know how I feel.
505. I have had periods when I felt so full of pep that sleep did not seem necessary for days at a time.
506. I am a high-strung person.
507. I have frequently worked under people who seem to have things arranged so that they get credit for good work but are able to pass off mistakes onto those under them.
508. I believe my sense of smell is as good as other people's.
509. I sometimes find it hard to stick up for my rights because I am so reserved.
510. Dirt frightens or disgusts me.
511. I have a daydream life about which I do not tell other people.
512. I dislike to take a bath.
513. I think Lincoln was greater than Washington.
514. I like mannish women.
515. In my home we have always had the ordinary necessities (such as enough food, clothing, etc.).
516. Some of my family have quick tempers.

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517. I cannot do anything well.
518. I have often felt guilty because I have pretended to feel more sorry about something than I really was.
519. There is something wrong with my sex organs.
520. I strongly defend my own opinions as a rule.
521. In a group of people I would not be embarrassed to be called upon to start a discussion or give an opinion about something I know well.
522. I have no fear of spiders.
523. I practically never blush.
524. I am not afraid of picking up a disease or germs from door knobs.
525. I am made nervous by certain animals.
526. The future seems hopeless to me.
527. The members of my family and my close relatives get along quite well.
528. I blush no more often than others.
529. I would like to wear expensive clothes.
530. I am often afraid that I am going to blush.
531. People can pretty easily change me even though I thought that my mind was already made up on a subject.
532. I can stand as much pain as others can.
533. I am not bothered by a great deal of belching of gas from my stomach.
534. Several times I have been the last to give up trying to do a thing.
535. My mouth feels dry almost all the time.
536. It makes me angry to have people hurry me.
537. I would like to hunt lions in Africa.
538. I think I would like the work of a dressmaker.
539. I am not afraid of mice.
540. My face has never been paralyzed.
541. My skin seems to be unusually sensitive to touch.
542. I have never had any black, tarry-looking bowel movements.
543. Several times a week I feel as if something dreadful is about to happen.
544. I feel tired a good deal of the time.
545. Sometimes I have the same dream over and over.
546. I like to read about history.
547. I like parties and socials.
548. I never attend a sexy show if I can avoid it.
549. I shrink from facing a crisis or difficulty.
550. I like repairing a door latch.
551. Sometimes I am sure that other people can tell what I am thinking.
552. I like to read about science.
553. I am afraid of being alone in a wide-open place.
554. If I were an artist I would like to draw children.
555. I sometimes feel that I am about to go to pieces.

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556. I am very careful about my manner of dress.
557. I would like to be a private secretary.
558. A large number of people are guilty of bad sexual conduct.
559. I have often been frightened in the middle of the night.
560. I am greatly bothered by forgetting where I put things.
561. I very much like horseback riding.
562. The one to whom I was most attached and whom I most admired as a child was a woman. (Mother, sister, aunt, or other woman.)
563. I like adventure stories better than romantic stories.
564. I am apt to pass up something I want to do when others feel that it isn't worth doing.
565. I feel like jumping off when I am on a high place.
566. I like movie love scenes.

APPENDIX 2

**THE MINNESOTA MULTIPHASIC PERSONALITY
INVENTORY**

The Minnesota Multiphasic Personality Inventory

Starke R. Hathaway and J. Charnley McKinley

M
Male

Name _____

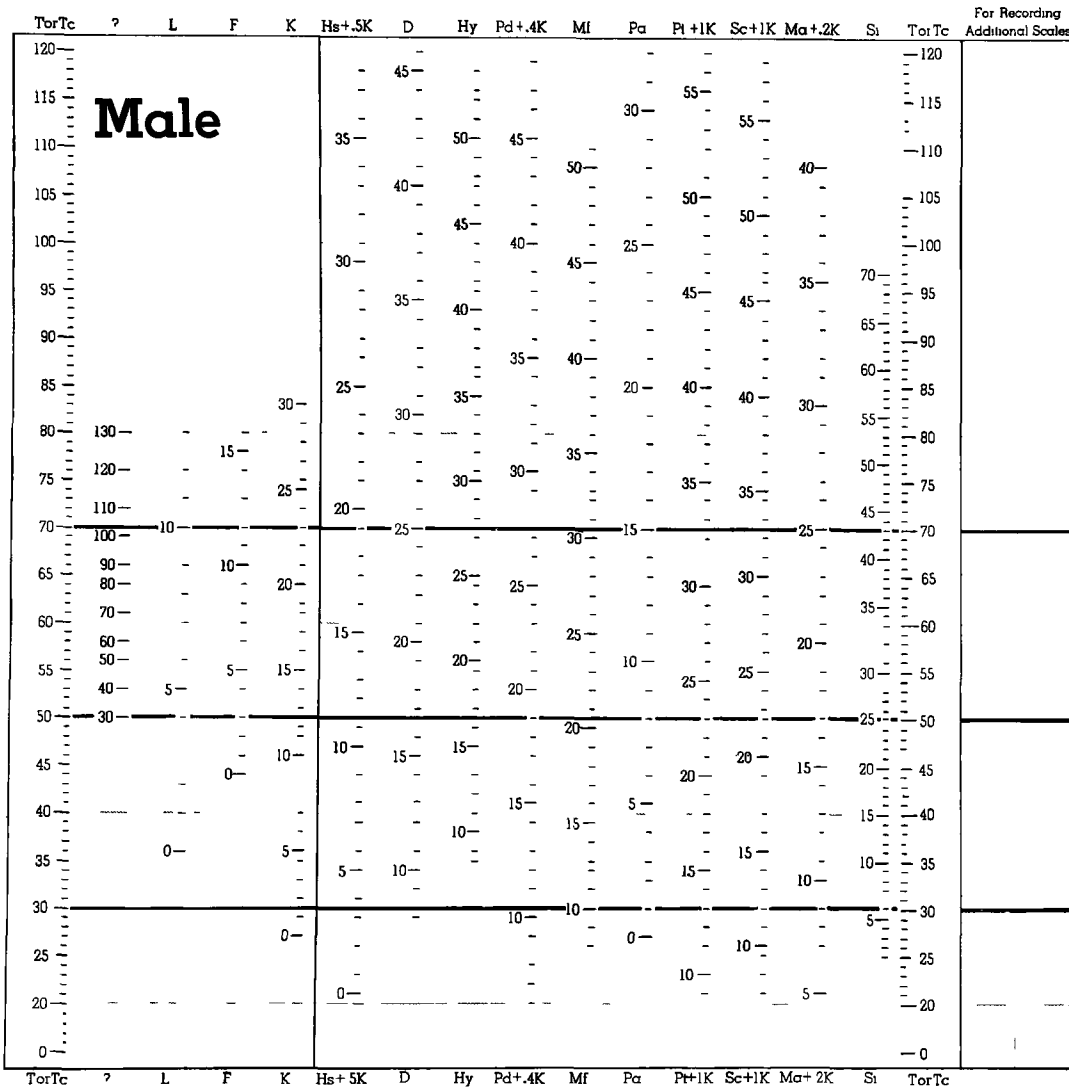
Address _____

Occupation _____ Date Tested _____

Education _____ Age _____

Marital Status _____ Referred by _____

Scorer's Initials _____



Fractions of K			
K	S	4	2
30	15	12	6
29	15	12	6
28	14	11	6
27	14	11	5
26	13	10	5
25	13	10	5
24	12	10	5
23	12	9	5
22	11	9	4
21	11	8	4
20	10	8	4
19	10	8	4
18	9	7	4
17	9	7	3
16	8	6	3
15	8	6	3
14	7	6	3
13	7	5	3
12	6	5	2
11	6	4	2
10	5	4	2
9	5	4	2
8	4	3	2
7	4	3	1
6	3	2	1
5	3	2	1
4	2	2	1
3	2	2	1
2	1	1	0
1	1	1	0
0	0	0	0

APPENDIX 2

115

Raw Score _____
 K to be added _____
 Raw Score with K _____

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51-125S

Signature _____ Date _____

MINNESOTA Multiphasic Personality Inventory

Starke R. Hathaway and J. Charnley McKinley

F
Female

Name _____

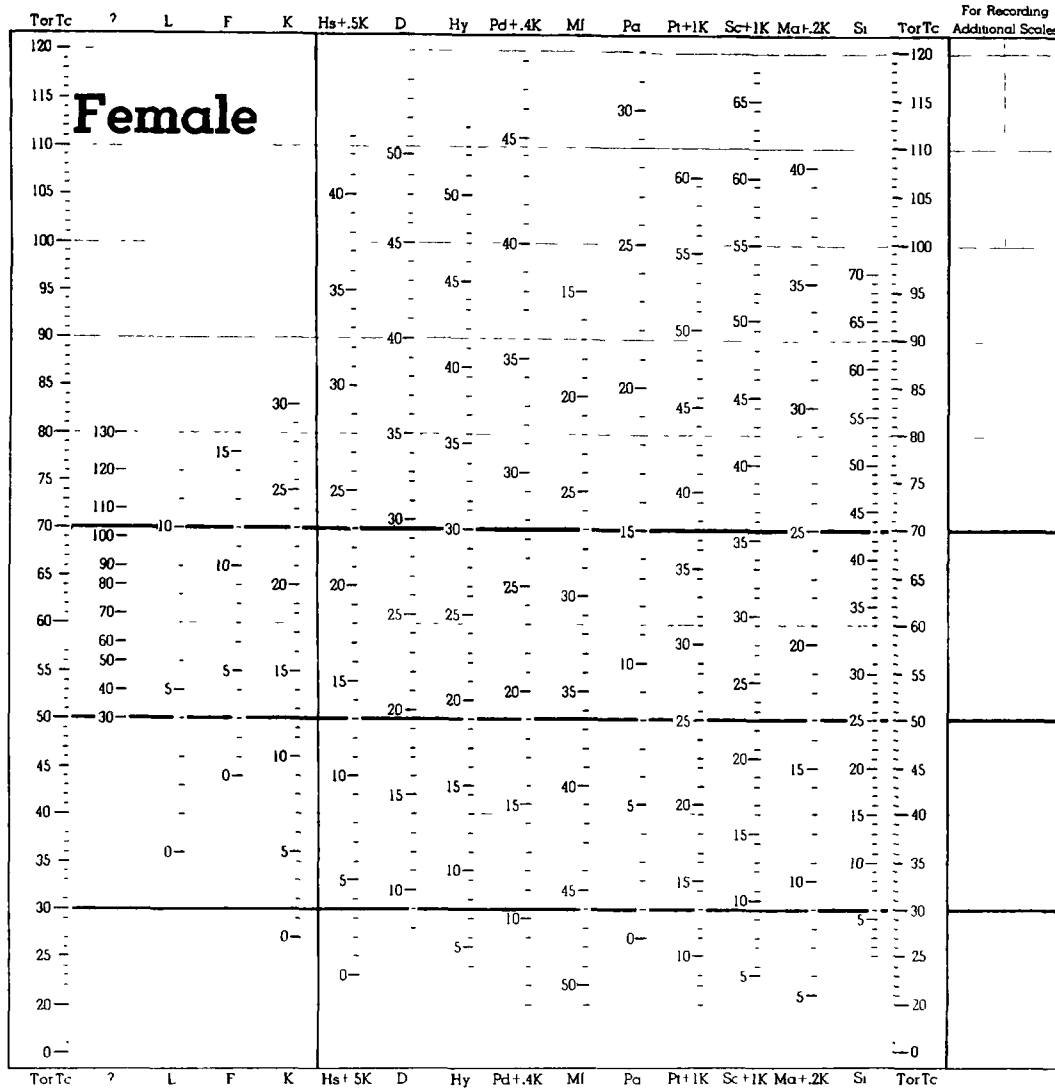
Address _____

Occupation _____ Date Tested _____

Education _____ Age _____

Marital Status _____ Referred by _____

Scorer's Initials _____



For Recording Additional Scales

Fractions of K			
K	.5	.4	.2
30	15	12	6
29	15	12	6
28	14	11	6
27	14	11	5
26	13	10	5
25	13	10	5
24	12	10	5
23	12	9	5
22	11	9	4
21	11	8	4
20	10	8	4
19	10	8	4
18	9	7	4
17	9	7	3
16	8	6	3
15	8	6	3
14	7	6	3
13	7	5	3
12	6	5	2
11	6	4	2
10	5	4	2
9	5	4	2
8	4	3	2
7	4	3	1
6	3	2	1
5	3	2	1
4	2	2	1
3	2	2	1
2	1	1	0
1	1	1	0
0	0	0	0

Raw Score _____

K to be added _____

Raw Score with K _____

Signature _____ Date _____

NOTES

APPENDIX 3

THE CORRELATION MATRIX

USED TO COMPUTE R
cf. L...M...

APPENDIX 4

THE DOOLITTLE SOLUTION

The Doolittle Solution

	L 2	F 3	Hs 4	D 5	Hy 6	Pd 7	Pa 8	Pt 9	Cc 10	Ma 11	Ir 12	Cr 1	Ck
A	1.000	-.213	.257	.123	.261	-.052	-.107	-.028	-.099	-.253	.179	-.192	.877
B	-1.000	.213	-.257	-.123	-.261	.052	.107	.028	.099	.253	-.179	.192	-.877
C		1.000	.041	.244	.054	.360	.545	.426	.658	.351	.053	.210	3.729
D		-.045	.055	.026	.055	-.011	-.023	-.006	-.021	-.054	.038	-.041	.186
E		.955	.096	.270	.109	.349	.522	.420	.637	.297	.091	.170	3.916
F		-1.000	-.100	-.283	-.115	-.365	-.547	-.440	-.667	-.311	-.096	-.178	-4.101
G			1.000	.610	.851	-.026	.197	.456	.330	-.122	.516	-.481	3.630
H			-.066	-.032	-.067	.013	.027	.007	.025	.065	-.046	.049	-.226
I			-.010	-.027	-.011	-.035	-.052	-.042	-.064	-.030	-.009	-.017	-.393
J			.924	.551	.773	-.048	.172	.421	.291	-.087	.461	-.449	3.011
K			-1.000	-.596	-.837	.051	-.186	-.456	-.315	.094	-.498	.485	-3.259
L				1.000	.650	.028	.344	.756	.462	-.281	.744	-.325	4.355
M				-.015	-.032	.006	.013	.003	.012	.031	-.022	.023	-.108
N				-.076	-.031	-.099	-.148	-.119	-.180	-.084	-.026	-.048	-1.108
O				-.329	-.461	.028	-.103	-.251	-.174	.052	-.275	.267	-1.796
P				.580	.126	-.036	.107	.389	.120	-.282	.421	-.083	1.343
Q				-1.000	-.217	.062	-.185	-.672	-.208	.486	-.727	.142	-2.317
R					1.000	.094	.040	.533	.346	-.138	.389	-.404	3.677
S					-.068	.013	.028	.007	.026	.066	-.047	.050	-.229
T					-.013	-.040	-.060	-.048	-.073	-.034	-.010	-.019	-.449
U					-.647	.040	-.144	-.352	-.244	.072	-.385	.375	-2.520
V					-.027	.008	-.023	-.085	-.026	.061	-.091	.018	-.292
W					.245	.115	-.159	.055	.029	.028	-.145	.019	.188
X					-1.000	-.470	.649	-.226	-.119	-.115	.594	-.079	-.766
Y						1.000	.275	.269	.436	.301	-.409	.490	2.766
Z						-.003	-.005	-.001	-.005	-.013	.009	-.010	.045
a						-.127	-.191	-.153	-.233	-.108	-.033	-.062	-1.430
b						-.002	.009	.022	.015	-.004	.024	-.023	.155
c						-.002	.007	.024	.007	-.017	.026	-.005	.083
d						-.054	.075	-.026	-.014	-.013	.068	-.009	-.088
e						.811	.169	.134	.207	.144	-.315	.381	1.531
f						-1.000	-.208	-.165	-.255	-.178	.388	-.470	-1.888

The Doolittle Solution

	Fa 8	Pt 9	Sc 10	Na 11	Ir 12	Cr 1	Ck
g	1.000	.340	.393	-.025	.069	.110	3.182
h	-.011	-.003	-.010	-.027	.019	-.020	.093
i	-.285	-.229	-.348	-.162	-.050	-.093	-2.140
j	-.032	-.078	-.054	.016	-.086	.084	-.561
k	-.020	-.072	-.022	.052	-.078	.015	-.248
l	-.013	.036	.019	.018	-.094	.012	.122
m	-.035	-.020	-.043	-.030	.066	-.079	-.319
n	.513	-.035	-.066	-.158	-.154	.029	.129
o	-1.000	.068	.129	.307	.300	-.057	-.252
p		1.000	.752	.056	.497	-.145	4.913
q		-.001	-.003	-.007	.005	-.005	.025
r		-.184	-.280	-.130	-.040	-.075	-1.721
s		-.192	-.133	.039	-.210	.204	-1.373
t		-.261	-.081	.189	-.283	.055	-.902
u		-.013	-.007	-.006	.033	-.004	-.042
v		-.022	-.034	-.024	.052	-.063	-.252
w		-.002	-.004	-.011	-.010	.002	.009
x		.324	.210	.107	.044	-.030	.655
y		-1.000	-.649	-.329	-.135	.092	-2.021
z			1.000	.287	.166	.117	4.849
A			-.010	-.025	.010	-.019	.087
B			-.425	-.198	-.061	-.113	-2.612
C			-.092	.027	-.145	.141	-.950
D			-.025	.059	-.087	.017	-.280
E			-.003	-.003	.017	-.002	-.022
F			-.053	-.037	.080	-.097	-.391
G			-.008	-.020	-.020	.004	.017
H			-.136	-.069	-.028	.019	-.425
I			.247	.020	-.060	.067	.273
J			-1.000	-.080	.244	-.069	-1.105

The Doolittle Solution

	Na 11	Ir 12	Cr 1	Clc
K'	1.000	-.551	.331	.957
L'	-.064	.045	-.048	.222
M'	-.092	-.028	-.053	-1.218
N'	-.008	.043	-.042	.282
O'	-.137	.205	-.040	.653
P'	-.003	.017	-.002	-.021
Q'	-.026	.056	-.068	-.273
R'	-.048	-.047	.009	.040
S'	-.035	-.014	.010	-.216
T'	-.002	.005	-.005	-.022
U'	.584	-.270	.091	.405
V'	-1.000	.462	-.155	-.693
W'		1.000	-.511	2.143
X'		-.032	.034	-.157
Y'		-.009	-.016	-.374
Z'		-.230	.224	-1.501
a'		-.306	.060	-.976
b'		-.086	.011	.111
c'		-.122	.148	.594
d'		-.046	.009	.039
e'		-.006	.004	-.088
f'		-.015	.016	.067
g'		-.125	.042	.187
h'		.023	.021	.045
i'		-1.000	-.906	-1.906

APPENDIX 5

**WEIGHTED SCORES FOR USE
WITH THE DIAGNOSTIC REGRESSION FORMULA**

Weighted scores for use with the diagnostic regression formula.

L		F		Hs	
$(b_{crL} = -.030)$		$(b_{crF} = -.336)$		$(b_{crHs} = -.494)$	
R.S.	W.S.	R.S.	W.S.	R.S.	W.S.
1 =	-.030	1 =	-.336	1 =	-.494
2 =	-.060	2 =	-.671	2 =	-.989
3 =	-.090	3 =	-1.007	3 =	-1.483
4 =	-.120	4 =	-1.342	4 =	-1.978
5 =	-.150	5 =	-1.678	5 =	-2.472
6 =	-.180	6 =	-2.014	6 =	-2.967
7 =	-.210	7 =	-2.349	7 =	-3.461
8 =	-.240	8 =	-2.685	8 =	-3.956
9 =	-.270	9 =	-3.020	9 =	-4.450
10 =	-.300	10 =	-3.356	10 =	-4.945
		11 =	-3.692	11 =	-5.439
		12 =	-4.027	12 =	-5.934
		13 =	-4.363	13 =	-6.428
		14 =	-4.698	14 =	-6.923
		15 =	-5.034	15 =	-7.417
				16 =	-7.912
				17 =	-8.406
				18 =	-8.901
				19 =	-9.395
				20 =	-9.890
				21 =	-10.384
				22 =	-10.879
				23 =	-11.373
				24 =	-11.868
				25 =	-12.362
				26 =	-12.857
				27 =	-13.351
				28 =	-13.846
				29 =	-14.340
				30 =	-14.835

Weighted scores for use with the diagnostic regression formula.

Hs ($b_{crHs} = -.494$)		D ($b_{crD} = -.158$)		Hy ($b_{crHy} = .323$)	
R.S.	W.S.	R.S.	W.S.	R.S.	W.S.
31 =	-15.329	1 =	-.158	1 =	.323
32 =	-15.824	2 =	-.316	2 =	.645
33 =	-16.318	3 =	-.474	3 =	.968
34 =	-16.813	4 =	-.632	4 =	1.291
35 =	-17.307	5 =	-.789	5 =	1.613
36 =	-17.802	6 =	-.947	6 =	1.936
37 =	-18.296	7 =	-1.105	7 =	2.259
38 =	-18.791	8 =	-1.263	8 =	2.582
39 =	-19.285	9 =	-1.421	9 =	2.904
40 =	-19.780	10 =	-1.579	10 =	3.227
		11 =	-1.737	11 =	3.550
		12 =	-1.895	12 =	3.872
		13 =	-2.053	13 =	4.195
		14 =	-2.211	14 =	4.518
		15 =	-2.368	15 =	4.840
		16 =	-2.526	16 =	5.163
		17 =	-2.684	17 =	5.486
		18 =	-2.842	18 =	5.809
		19 =	-3.000	19 =	6.131
		20 =	-3.158	20 =	6.454
		21 =	-3.316	21 =	6.777
		22 =	-3.474	22 =	7.099
		23 =	-3.632	23 =	7.422
		24 =	-3.790	24 =	7.745
		25 =	-3.947	25 =	8.067
		26 =	-4.105	26 =	8.390
		27 =	-4.263	27 =	8.713
		28 =	-4.421	28 =	9.036
		29 =	-4.579	29 =	9.358
		30 =	-4.737	30 =	9.681

Weighted scores for use with the diagnostic regression formula.

D (^b _{crD} = -.158)		Hy (^b _{crHy} = .323)		Pd (^b _{crPd} = .288)	
R.S.	W.S.	R.S.	W.S.	R.S.	W.S.
31 =	-4.895	31 =	10.004	1 =	.268
32 =	-5.053	32 =	10.326	2 =	.576
33 =	-5.211	33 =	10.649	3 =	.863
34 =	-5.369	34 =	10.972	4 =	1.151
35 =	-5.526	35 =	11.294	5 =	1.439
36 =	-5.684	36 =	11.617	6 =	1.727
37 =	-5.842	37 =	11.940	7 =	2.015
38 =	-6.000	38 =	12.263	8 =	2.302
39 =	-6.158	39 =	12.585	9 =	2.590
40 =	-6.316	40 =	12.908	10 =	2.878
41 =	-6.474	41 =	13.231	11 =	3.166
42 =	-6.632	42 =	13.553	12 =	3.454
43 =	-6.790	43 =	13.876	13 =	3.741
44 =	-6.948	44 =	14.199	14 =	4.029
45 =	-7.105	45 =	14.521	15 =	4.317
46 =	-7.263	46 =	14.844	16 =	4.605
47 =	-7.421	47 =	15.167	17 =	4.893
48 =	-7.579	48 =	15.490	18 =	5.180
49 =	-7.737	49 =	15.812	19 =	5.468
50 =	-7.895	50 =	16.135	20 =	5.756
51 =	-8.053	51 =	16.458	21 =	6.044
52 =	-8.211	52 =	16.780	22 =	6.332
53 =	-8.369	53 =	17.103	23 =	6.619
54 =	-8.527	54 =	17.426	24 =	6.907
55 =	-8.684	55 =	17.748	25 =	7.195
56 =	-8.842	56 =	18.071	26 =	7.483
57 =	-9.000	57 =	18.394	27 =	7.771
58 =	-9.158	58 =	18.717	28 =	8.058
59 =	-9.316	59 =	18.039	29 =	8.346
60 =	-9.474	60 =	18.362	30 =	8.634

Weighted scores for use with the diagnostic regression formula.

Pd ($b_{crPd} = .288$)		Pa ($b_{crPa} = .322$)		Pt ($b_{crPt} = .461$)	
R.S.	W.S.	R.S.	W.S.	R.S.	W.S.
31 =	8.922	1 =	.322	1 =	.461
32 =	9.210	2 =	.644	2 =	.922
33 =	9.497	3 =	.966	3 =	1.383
34 =	9.785	4 =	1.288	4 =	1.844
35 =	10.073	5 =	1.610	5 =	2.305
36 =	10.361	6 =	1.932	6 =	2.767
37 =	10.649	7 =	2.254	7 =	3.228
38 =	10.936	8 =	2.576	8 =	3.689
39 =	11.224	9 =	2.898	9 =	4.150
40 =	11.512	10 =	3.220	10 =	4.611
41 =	11.800	11 =	3.542	11 =	5.072
42 =	12.088	12 =	3.864	12 =	5.533
43 =	12.375	13 =	4.186	13 =	5.994
44 =	12.663	14 =	4.508	14 =	6.455
45 =	12.951	15 =	4.830	15 =	6.916
46 =	13.239	16 =	5.152	16 =	7.378
47 =	13.527	17 =	5.474	17 =	7.839
48 =	13.814	18 =	5.796	18 =	8.300
49 =	14.102	19 =	6.118	19 =	8.761
50 =	14.390	20 =	6.440	20 =	9.222
51 =	14.678	21 =	6.762	21 =	9.683
52 =	14.966	22 =	7.084	22 =	10.144
53 =	15.253	23 =	7.406	23 =	10.605
54 =	15.541	24 =	7.728	24 =	11.066
55 =	15.829	25 =	8.050	25 =	11.527
56 =	16.117	26 =	8.372	26 =	11.989
57 =	16.405	27 =	8.694	27 =	12.450
58 =	16.692	28 =	9.016	28 =	12.911
59 =	16.980	29 =	9.338	29 =	13.372
60 =	17.268	30 =	9.660	30 =	13.833

Weighted scores for use with the diagnostic regression formula.

Pt		Sc		Ma	
$(^b_{crPt}=.461)$		$(^b_{crSc}=.211)$		$(^b_{crMa}=.443)$	
R.S.	W.S.	R.S.	W.S.	R.S.	W.S.
31 =	14.294	1 =	.211	1 =	.443
32 =	14.755	2 =	.422	2 =	.886
33 =	15.216	3 =	.633	3 =	1.329
34 =	15.677	4 =	.844	4 =	1.772
35 =	16.138	5 =	1.055	5 =	2.214
36 =	16.600	6 =	1.266	6 =	2.657
37 =	17.061	7 =	1.477	7 =	3.100
38 =	17.522	8 =	1.688	8 =	3.543
39 =	17.983	9 =	1.899	9 =	3.986
40 =	18.444	10 =	2.110	10 =	4.429
41 =	18.905	11 =	2.321	11 =	4.872
42 =	19.366	12 =	2.532	12 =	5.315
43 =	19.827	13 =	2.743	13 =	5.758
44 =	20.288	14 =	2.954	14 =	6.201
45 =	20.749	15 =	3.165	15 =	6.643
46 =	21.211	16 =	3.376	16 =	7.086
47 =	21.672	17 =	3.587	17 =	7.529
48 =	22.133	18 =	3.798	18 =	7.972
49 =	22.594	19 =	4.009	19 =	8.415
50 =	23.055	20 =	4.220	20 =	8.858
51 =	23.516	21 =	4.431	21 =	9.301
52 =	23.977	22 =	4.642	22 =	9.744
53 =	24.438	23 =	4.853	23 =	10.187
54 =	24.899	24 =	5.064	24 =	10.630
55 =	25.360	25 =	5.275	25 =	11.072
56 =	25.822	26 =	5.486	26 =	11.515
57 =	26.283	27 =	5.697	27 =	11.958
58 =	26.744	28 =	5.908	28 =	11.401
59 =	27.205	29 =	6.119	29 =	12.844
60 =	27.666	30 =	6.330	30 =	13.287

Weighted scores for use with the diagnostic regression formula.

Sc ($b_{crSc} = .211$)		Ma ($b_{crMa} = .443$)	
R.S.	W.S.	R.S.	W.S.
31 =	6.541	31 =	13.730
32 =	6.752	32 =	14.173
33 =	6.963	33 =	14.616
34 =	7.174	34 =	15.059
35 =	7.385	35 =	15.502
36 =	7.596	36 =	15.945
37 =	7.807	37 =	16.388
38 =	8.018	38 =	16.831
39 =	8.229	39 =	17.274
40 =	8.440	40 =	17.717
41 =	8.651		
42 =	8.862		
43 =	9.073		
44 =	9.284		
45 =	9.495		
46 =	9.706		
47 =	9.917		
48 =	10.128		
49 =	10.339		
50 =	10.550		
51 =	10.761		
52 =	10.972		
53 =	10.183		
54 =	11.394		
55 =	11.605		
56 =	11.816		
57 =	12.027		
58 =	12.238		
59 =	12.449		
60 =	12.660		

APPENDIX 6

AN ABSTRACT OF

THE DEVELOPMENT OF A QUANTITATIVE METHOD FOR DIFFERENTIATING
BETWEEN PATHOLOGICAL GROUPS WITH THE MMPI

APPENDIX 6

AN ABSTRACT OF

The Development of a Quantitative Method for Differentiating Between Pathological Groups With the MMPI

This inquiry was made in order to develop a quantitative method by which MMPI protocols could be diagnostically differentiated in terms of maladjustment, mental disease and character disorder.

The purpose was to find a procedure which would be more accurate than a molecular analysis of test findings, yet which would maintain the advantages of a configural approach, without its attendant confusion, time-consumption and the problematic nature of some of the presently available patterns. In brief, it was anticipated that the quantitative method would be more adaptable to military and clinical screening situations than present diagnostic procedures involving the MMPI.

All available information concerning the role of the test in diagnosis was collected through an extensive survey of the literature, the purpose being to determine the various methods and degree of accuracy with which this inventory had previously been used in a clinical capacity.

The experimental group was made up of 300 cases selected from Hathaway and Meehl's Atlas and subsequently obtained from the University of Minnesota Testing Bureau. In each case, the

criterion of selection was based upon the primary diagnostic label with which it was identified. Those subjects with a cross-section of pathology were eliminated, since there was a reasonable doubt as to which condition best exemplified their situation.

The arrangement of the population permitted the establishment of three pathological groups, these being labelled maladjusted (N=100), mentally diseased (N=100), and character disordered (N=100). All were chosen with considerable care on the basis of completeness of case histories, representativeness in frequency of diagnostic categories, and several other criteria not too closely linked to MMPI profiles. No case was rejected on the grounds that the profile of a given subject did not fit the diagnosis. However, subjects with suspected profiles were not used in the inquiry.

Regarding age range and sex, these were not controlled, since it was argued that if a syndrome existed, it should do so regardless of age or sex.

The method of evaluating the diagnostic implications of the quantitative procedure involved a conventional approach. To this end, all of the variables were intercorrelated to determine the precise relationship of each factor to all of the others. The inquiry was concluded with a regression equation, this leading to a prediction formula for use with the test.

The findings indicated that the quantitative method diagnosed 64% of the maladjusted, 7% of the mentally diseased and 64% of the character disordered.

By way of comparison, treatment of the data in a molecular manner, traditionally the earliest approach to the use of the MMPI, yielded a correct diagnosis with 50% of the maladjusted, 7% of the mentally diseased and 21% of the character disordered. Differences between the two methods were significant at the 1% level of confidence for the character disordered group and at the 5% level for the maladjusted population.

Respecting a comparison between a global treatment of MMPI data and the quantitative method, it was found that configural analysis differentiated 63% of the maladjusted, 50% of the mentally diseased and 48% of the character disordered. Differences between the two methods were significant at the 1% level of confidence with respect to the mentally diseased group, and at the 5% level for the character disordered population, the former favouring configural analysis, the latter favouring a quantitative approach.

It was concluded that a quantitative method of diagnosis with the MMPI might be more effective than molecular analysis, though little or no better than present forms of pattern analysis in the hands of an expert. The major consideration favouring the use of quantified ratios with the Inventory would be the rapid and reasonably accurate screening possibilities

wherein the quantitative approach is unexcelled. In addition, many of the inconsistencies and heavily subjective aspects of molecular and configurational analysis are avoided.