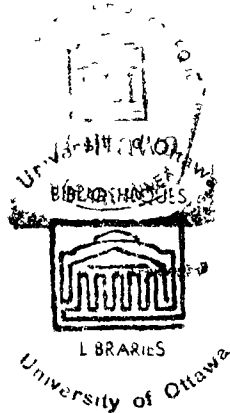


THE DIAGNOSIS OF THREE PATHOLOGICAL GROUPS  
WITH THE L, F AND K SCALES OF THE MMPI

by Jeffrey B. Earle

Thesis presented to the Faculty of Arts  
of the University of Ottawa through the  
Institute of Psychology, and in partial  
fulfilment of the requirements for the  
degree of Master of Arts.



Ottawa, Canada, 1953

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## ACKNOWLEDGEMENT

This thesis was prepared under the direction of Mr. Maurice Chagnon, M.A., whose encouragement was very greatly appreciated.

The writer also wishes to thank Dr. Wilson Van Dusen for his continued interest in the project.

## CURRICULUM STUDIORUM

Jeffrey B. Earle was born in Montreal, Quebec, on April 2, 1920. Obtained the B.A., from Sir George Williams College in 1950, and has been attending the Institute of Psychology of the University of Ottawa since the autumn of 1950.

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## INTRODUCTION

The immediate inquiry was an attempt to determine the possibility of differentiating between neurotic, psychotic and psychopathic groups, through a combination of the validity or non-clinical scales of the Minnesota Multiphasic Personality Inventory, hereinafter referred to as the MMPI. It was felt that previous studies reporting on the diagnostic implications of these three scales, had not entirely delineated their ability to differentiate these three syndromes when used together. In this regard, it has been observed that L, F and K have exerted no small influence in the formulation of some of the more widely recognized diagnostic profiles at present being used by clinicians, and at least three of these configurations involved one or more of the validity scales. With this in mind, therefore, it seemed reasonable to conclude that L, F and K might differentiate between the three abnormal groups noted above, if they were used as a diagnostic triad.

The second consideration involved, was that if these scales did isolate one or all of the three, broad categories of pathology, then an L-F-K index might be constructed as a diagnostic aid, with the result that clinicians would have an additional tool at their disposal when using the MMPI.

The third consideration was that if this approach to the MMPI proved to be significant, then it could reasonably be made to serve as a pilot project for further research into the possibilities of establishing a diagnostic index based upon the remaining clinical scales, thus creating a new method of using the instrument for quick and reliable screening. In this context, it might be pointed out that the MMPI has become one of the more satisfactory screening aids, but can be improved upon in this function, as a variety of users have observed. Further, it might be anticipated that such a proposed index could very well open up a new approach in diagnosis with the test.

## CHAPTER I

### THE MMPI AS A DIAGNOSTIC TOOL

In order to provide a well-proportioned study of any nosological device, one must first determine what has already been accomplished. Thereupon a description and localization of the diagnostic implications of the MMPI will follow. An investigation into the characteristics of the instrument will focus attention on the uses of the tool in general and also upon the validity scales in particular. The immediate inquiry was an attempt to determine the exact role of these validity factors in the diagnosis of three pathological groups.

#### 1. Diagnosis With the MMPI.

The MMPI was designed to provide in a single instrument a method of determining all the more salient phases of personality<sup>1</sup>. It was the hope of its authors that the tool would somewhat lessen the conflict between psychologists and psychiatrists as to the basic concomitants of the abnormal personality<sup>2</sup>. In practice, the ability of the instrument to detect pathology as it was represented by the names of the

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1 S. R. Hathaway and J. C. McKinley, The Minnesota Multiphasic Personality Inventory: The Manual, New York, Psychological Corporation, 1951, p. 5.

2 Ibid., p. 7.

clinical scales has not been altogether satisfactory, and a number of studies have tended to confirm this. One such, by Benton, observed the test to be rather deficient in its assessment of conditions represented by the names of the different scales<sup>3</sup>. This weakness, however, had been 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 somewhat negative 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 one, simple symptom without complication. However, this argument notwithstanding, the MMPI has been rather inadequate in that its test profiles have not diagnosed directly with a large number of patients<sup>4</sup>. On the other hand, the instrument has been found effective in clarifying many difficult cases<sup>5</sup>, and as a screening aid wherein the arrangement of patients on the basis of test results was found to be the best procedure, rather

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

4 S. R. Hathaway, The Minnesota Multiphasic Inventory, in Military Clinical Psychology, TM 8-242 - AFM 160-45, issue of July 1951, p. 72.

5 Wm. C. Cottle, The MMPI: A Review, in Kansas Studies in Education, Vol. 3, No. 2, issue of March 1953, p. 38.

than using the tool as a method of buttressing already formulated diagnostic opinions<sup>6</sup>.

As an adjunct to all of the above, Cottle stated that most of the research which he had examined, pointed out that few of the scales could designate pathology according to their names, but that the test was excellent in its assessment of general abnormality<sup>7</sup>, a view which fitted in rather well with the concepts laid down by the test authors, one of whom observed that the Inventory was not intended for the measurement of pure traits, nor was it designed to represent discrete, etiological or prognostic entities<sup>8</sup>. It may therefore be concluded that the aforementioned studies which denied the ability of the MMPI in diagnosis had not properly considered that the primary task of this tool was to pick up groupings or constellations of symptoms and to represent these as such and nothing more.

In this brief survey of the diagnostic implications of the MMPI, three cardinal features of the test's use in the clinical situation have been surveyed: (1) Whereas some earlier studies concluded that the MMPI was not reliable, later research indicated that the test was distinctly valuable

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6 S. R. Hathaway, op. cit., p. 90.

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

8 S.R. Hathaway, op. cit., p. 72.

when configural data had been employed. (2) The instrument was observed to be a useful tool in psychiatric and military screening. (3) The MMPI was never intended to define pathology in terms of the clinical scale names.

## 2. Diagnosis With L, F and K.

The test authors have pointed out that L, F and K were largely intended as validity indicators when the MMPI was first formulated. Thus, they were intended to provide a series of checks on the individual reminiscent of earlier inventories such as the Humm-Wadsworth. To this end, the L or Lie Scale was planned as an indicator of any tendencies by the subject to falsify his responses in a favourable or socially approved direction. The F or Validity Scale, on the other hand, determined whether the test had been administered and scored correctly, while K was essentially a suppressor variable through which the diagnostic capabilities of a number of the clinical scales could be improved<sup>9</sup>. Apart from these characteristics, however, a number of reports showed that L, F and K were, in themselves, significant personality indicators, and as such, highly useful in diagnosis. In this connection, however, Hathaway stated that a prime difficulty in their

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

interpretation was that they had two specific meanings. In the first, as designators of the test - taking attitude and competency of the subject being examined, and as indicators of the validity of the clinical scales, and secondly, but more subtly, wherein they tended to pick out refined distortions in a subject's answers<sup>10</sup>. To this end, high L and K scores would show defensiveness, whereas high F and low K would indicate self-criticism or the wish to appear in an unfavourable light deliberately or unconsciously<sup>11</sup>.

That these non-clinical scales are useful in diagnosis, has been borne out by clinical experience and research. L was shown to have its most useful function, not only as a method for determining the accurately taken test, but also as a measure of the degree to which any given subject would lie about himself, this in itself being indicative of some degree of pathoformic behaviour. Relative to F, Brozek and Schiele stated that high F may indicate the presence of significant personality disturbances<sup>12</sup>, and Schmidt noted that psychotics usually had a greater spike on F than with any other

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10 Ibid., p. 23.

11 Loc. cit.

12 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.

pathology<sup>13</sup>, and in another study by Cofer and others, it was shown that the scale was a good indicator of simulated emotional disorders<sup>14</sup>. This latter finding was supported by Gough who found that his F - K dissimulation index was able to detect individuals attempting to fake abnormal conditions. He also stated that feigned neurotic profiles were identifiable by high F and low K scores, and concluded that the faking of neurotic or psychotic profiles was practically impossible without detection, though the neurotic simulation was less easily picked out than the psychotic one<sup>15</sup>.

On the other hand, the K Scale also had a diagnostic function of its own. In this regard, Cottle described it as reflecting the conscious or unconscious attitude influencing a subject's reaction to the personality test items<sup>16</sup>. Therefore, high K like low L was indicative of the person so defensive that he would try to conceal abnormal traits thus securing a relatively normal pattern. Low K, like high F,

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

14 C.N. Cofer, 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. 498.

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

16 Wm. C. Cottle, op. cit., p. 8.

however, picked out the subject who attempted to portray himself as more abnormal than he was<sup>17</sup>. Thus, excessive candour and defensiveness as concomitants of personality are adequately delineated by L, F and K.

In summary, therefore, it was observed that the prime functions of L, F and K were as validity indicators and as methods by which the diagnostic functions of the test could be sharpened. In addition, they were found to be useful as assessors of a variety of personality trends. More recently, however, their role in pattern or configural analysis has been emphasized, wherein they have become an integral part of a variety of MMPI syndrome designators. As an illustration, such designators have been seen in Meehl's psychotic profile which had a characteristically elevated F, Sc greater than Pt, and Pa or Ma markedly raised; and in his neurotic pattern with its elevated neurotic triad, Pt greater than Sc and with a lowered F<sup>18</sup>.

In this survey of diagnosis with L, F and K, it was ascertained that the scales functioned not only as validity indicators, but also as designators of personality trends and abnormality, the latter being brought out by using configural patterns in conjunction with the clinical scales.

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17 S.R. Hathaway, op. cit., p. 77.

18 P.E. Meehl, Profile Analysis of the MMPI in Differential Diagnosis, in the Journal of Applied Psychology, Vol. 30, No. 5, 1946, p. 520.

### 3. Review of the Literature.

A number of studies on L, F and K have been published since the MMPI was introduced to the profession about thirteen years ago. A good summary of these has been provided by Cottle<sup>19</sup>, and his survey was of considerable help in forming the main outline for this review, excepting that a few studies not included in his summary have been added. In general, all of these references have been divided into three categories as follows: (1) The Lie Scale - including inquiries into the L score on the basis of validating and diagnostic implications. (2) The Validity Scale - noting its relationship to the validity of a given test, and the importance of F in diagnosis. (3) The Correction Scale - wherein reports of research conducted with K as a suppressor variable and as a differentiating power of certain clinical scales have been added. The following review of the literature therefore, was conducted in accordance with the above method of presentation.

#### The Lie Scale (L).

This scale was designed to detect those subjects who might deliberately try to distort their test by structuring their answers in the most favourable direction. In order to

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<sup>19</sup> Wm. C. Cottle, op. cit., p. 6 ff.

accomplish this, each of the items making up the Scale represented a socially desirable situation, but one which was rarely true of the individual. These items scattered throughout the Inventory provided a subtle trap for those wishing to give too good an impression of themselves. In such a capacity, therefore, the L score would be a personality indicator in its own right. In substantiation of this role, it has already been observed that when normal-appearing profiles were faked, the L and K scores were appreciably raised. Thus L was found to have some ability to detect malingering. One research reported that L as well as K tended to become elevated with the development of more optimistic attitudes, thus reflecting clinical improvement<sup>20</sup>, and a study by Gough found that L, F and K had very significant implications apart from their function as validity factors, to which end persons securing a high L were often overconventional, rigid, self-centered and uncompromising<sup>21</sup>.

To conclude, therefore, L was found to have some ability to measure personality trends, but little work has been done in an effort to determine its role as a differential diagnostic aid.

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

21 H.G. Gough, op. cit., p. 216.

## The Validity Scale (F).

This Scale was constructed as a method by which it could be determined whether the MMPI had been correctly taken by the subject, and whether it had been properly scored by the administrator, the criterion of validity being the height of F. However, the test authors stated that it could not be used as a personality scale<sup>22</sup>, though a wide range of studies have tended to disprove this contention. In this regard, it has already been noted that Schmidt found that F tended to rise sharply with psychotic profiles, and Cofer et al, observed that subjects who attempted to fake emotional upsets could be easily detected since they usually had a raw F score of 20 or more. To continue, Gough showed that the schizophrenic had a highly elevated F as opposed to the neurotic, and observed that this scale had psychopathological connotations of its own, and probably marked the presence of significant personality disturbances<sup>23</sup>. In substantiation of these findings, Buechley and Ball found that F was a good designator of schizophrenia always provided that there were other indications in the test

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

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

results to support such a diagnosis<sup>24</sup>, and Guthrie, in outlining his six diagnostic profiles, observed that F was raised in manic states and in psychotic depression<sup>25</sup>.

In summary, therefore, the F Scale would seem to be something more than merely a validity indicator. The large proportion of research which dealt with the problem, also supported this contention. With this in mind, therefore, it would appear that F has considerable diagnostic importance in its own right, but no studies have as yet shown the differential diagnostic power of the scale when it is not operating in conjunction with the clinical scales.

#### The Correction Scale (K).

The K score was observed to be a suppressor variable designed specifically to sharpen the discriminating power of certain of the clinical scales in the test. Psychologically, K has tended to delineate those attitudes which have influenced a subject's reaction to personality test items. Thus, a low K score was found to be indicative of self-criticality and a tendency to portray oneself as more abnormal than is

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<sup>24</sup> R. Buechley and Harry Ball, A New Test of "Validity" for the Group MMPI, in the Journal of Consulting Psychology, Vol. 16, No. 4, 1952, p. 299.

<sup>25</sup> G.M. Guthrie, Six MMPI Diagnostic Profile Patterns, in the Journal of Psychology, Vol. 30, No. 2, 1950, p. 321.

actually true. On the other hand, high K was observed to pick out the person who attempted to conceal abnormal traits and to secure a normal score on the test<sup>26</sup>. In another direction, however, the authors have noted that K increased the proportion of clinically diagnosed cases scoring above the 90th percentile of normals on five of the scales, these being Hs, Pd, Pt, Sc and Ma<sup>27</sup>.

From the above, it will be revealed that K was intended as a further validating check on the test and as a method of improving diagnosis. In actual practise, however, it was reported that K contributed very little to differential diagnosis, and Hunt and others, in attempting to check the discriminatory power of the scale with psychotics and non-psychotics, found that it did not contribute any improvement and that it failed to reduce those abnormalers scoring in the normal range<sup>28</sup>. They did observe, however, that low K scores might be associated with a certain psychiatric hypochondriasis which could spuriously elevate some of the personality scales.

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26 Wm. C. Cottle, op. cit., p. 8.

27 Loc. cit., 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).

28 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.

In conclusion, it was conjectured that K measures some type and degree, or depth of pathology in addition to its created function as a suppressor variable, but according to Hunt, it will not provide differential diagnostic power.

#### 4. The Hypothesis.

Throughout the survey noted above, it was ascertained that few observers had dealt with the problem of whether L, F and K could effect differential diagnosis by themselves, either singly or grouped. Many studies have indicated that they can be formulated into diagnostic profiles in conjunction with the clinical scales, and in this manner are reasonably able to provide a satisfactory diagnosis. However, it was felt that it might be useful to determine whether they could be used for differential diagnostic purposes by themselves, and if so, to what degree they might be relied upon to deliver this diagnosis validly. Further, the MMPI as it is presently being used, has not been found altogether satisfactory in differentiating between psychosis and neurosis, the similarity of which has been found to be somewhat too close for comfort. Thus, if they could be made to serve as an index with which to provide a greater distinction between psychosis and neurosis as well as psychopathic personality, then a new function of these scales would be added to their present uses.

The thesis behind the contention that they might be made to serve as differential indicators of the three broad pathologies noted above, has been somewhat enhanced by an interesting study conducted by Cottle and Powell. They found that random answers to the test by means of dice and random numbers, seldom produced a normal pattern. They noted that to obtain profiles or scores representative of the normal individual, the censoring and integrating capacities of personality must be added. In substance, they found that to answer MMPI items in a false direction would produce a profile highest on the neurotic triad, whereas if the items were all answered true, a profile highest on the psychotic side would be the result. The sum total of the conclusion reached by these observers was that normal results on the MMPI cannot be a result of chance<sup>29</sup>.

The above study, therefore, was of considerable worth to the thesis that L, F and K have something to do with neurosis, psychosis and psychopathic personality, inasmuch as varying elevations of the scales have been observed to be indicators of falsification in a too positive direction, representing neurosis. Psychopathic personality, on the other

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29 Wm. C. Cottle, op. cit., p. 30, citing Wm. C. Cottle and J.O. Powell, The Effect of Random Answers to the MMPI, in Psychology and Education, Vol. 11, No. (not given), 1951, p. (not given).

hand, has been closely linked to the elevated F. This, therefore, has led directly to the hypothesis that L, F and K can distinguish between neurosis, psychosis and psychopathic personality, and that as a result, a diagnostic index of the three scales can be constructed to serve in this capacity.

## CHAPTER II

### THE EXPERIMENTAL DESIGN

The aim of the following chapter was to provide the reader with a brief outline of the MMPI, followed by a discussion of the population with which this research was conducted. In addition, the statistical method has been surveyed with some discussion of the techniques employed therein. To this end, the chapter has been divided into a series of sections designed to provide ready access to the above material.

#### 1. The Tool.

Hathaway and McKinley first started to construct the MMPI in 1937, and by 1943 it had officially appeared for professional use. From the outset, it was their intention to devise an instrument which would be useful for general screening purposes in clinical and military situations, as well as in counseling and guidance centres. In addition, the authors anticipated that the Inventory would greatly aid in the clarification of complex diagnoses, and would lessen the conflict between psychologists and psychiatrists. To this end, the test was expected to be practically universal in its interpretation and applicability to individual cases<sup>1</sup>.

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<sup>1</sup> S.R. Hathaway and J.C. McKinley, op. cit., p. 7.

In its present form, the MMPI has been made up of 550 statements culled from a wide variety of sources which have included previously devised personality inventories such as the Hamm-Wadsworth Temperament Scale, the Bernreuter Personality Inventory, and the Bell Adjustment Inventory. Further to this, however, the authors also selected items from a wide variety of medical and psychiatric texts and sources. All of these have been included in both forms of the test as it is now being used. These two forms, both of which were devised to assess the same elements of personality structure, consist of a card type inventory for administration to individual subjects, and a booklet form for use with a large number of individuals in a single administration. During the test, the subject is expected to answer the items in one of three directions, true, false, or cannot say (?), by appropriately sorting the cards in the individual form or by marking the chosen answer on the IBM scoring sheet if the booklet form is being used<sup>2</sup>.

When the test has been satisfactorily completed, the procedure next involves the counting of the responses in such a way that scores on four validity and nine clinical scales will be derived. In the presentation of these results, the next procedure has been to change the raw data into a T-score

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<sup>2</sup> Wm. C. Cottle, op. cit., p. 8.

and plot this finding on an MMPI profile chart. This latter phase permits the test administrator to analyze the relative strengths of the various phases, the pattern of which has usually been more important than the existence of any one phase to an abnormal degree. To conclude, this whole procedure of administration tends to vary from 30 to 90 minutes depending upon the circumstances, though this of course would not include the time necessary to make an adequate diagnosis upon the basis of the obtained results<sup>3</sup>.

The authors have observed that the MMPI was the first personality inventory which had been specifically constructed to measure differentiated clinical syndromes. To this end, the items which composed most of the scales were selected on the basis of their ability to distinguish between a normal group and a criterion group made up of clinically diagnosed abnormals with relatively pure psychiatric pathology. The normal population was composed of 724 persons not under the immediate care of a physician, and which included 265 individuals from the University of Minnesota Testing Bureau who were largely high school graduates; 265 skilled W.P.A., workers, and 254 hospitalized cases of physical illness, all of which had been checked to preclude the possibility of

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

psychiatric involvement<sup>4</sup>. Sampling of the population was fairly adequate for the age range 16-55 years and for both sexes<sup>5</sup>.

The 550 statements making up the body of the test have been designed to cover a wide range of subject matter from physical illness to the morale and social attitudes of the individual being subjected to the test situation. The subject matter was classified under 26 main headings, though it was not necessarily taken for granted that each item was adequately classified merely because it had been placed in a given category<sup>6</sup>. An illustration of these 26 headings has been provided in Table I, p. 20.

Relative to the nine clinical and four validity scales, these were not specifically named in accordance with the symptom complex which they represent on the test, since they have all been shown to have considerable meaning within the normal range<sup>7</sup>. In conclusion, and to provide the reader with a brief description of the scales which make up the Inventory as it is presently known, a resumé has been included in Table II, p. 21.

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<sup>4</sup> Wm. C. Gottle, op. cit., p. 1 ff.

<sup>5</sup> S.R. Hathaway and J.C. McKinley, op. cit., p. 5.

<sup>6</sup> Loc. cit.

<sup>7</sup> Loc. cit.

TABLE I.- The 550 MMPI statements organized according to subject matter and number of items<sup>8</sup>.

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	19
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

<sup>8</sup> S.R. Hathaway and J.C. McKinley, loc. cit.

TABLE II.- The MMPI scales organized according to their title and the authors' description of them<sup>9</sup>.

Title	Authors' Description
? Cannot say category	Includes items which the subject cannot answer either 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 discriminatory power of five of the clinical scales.
Hs Hypochondriasis	Shows the amount of abnormal concern about bodily functions.
D Depression	Checks the depth of depression.
Hy Hysteria	Shows the presence of conversion-type symptoms.
Pd Psychopathic deviate	Shows lack of emotional response, disregard of social mores and the inability to profit from experience.
Mf Masculinity-femininity	Tendency toward male or female interests.
Pa Paranoia	Suspiciousness, delusions of persecution, over-sensitiveness.
Pt Psychasthenia	Phobias or compulsive behaviour.
Sc Schizophrenia	Bizarre thoughts and behaviour.
Ma Hypomania	Overproductivity in thought and in action.

<sup>9</sup> Ibid., p. 1.

A number of studies have shown the MMPI to be one of the more popular instruments in general usage. Burton indicated that it ranked about fifth in number of administrations per test in clinical settings, and that it was the most widely used of the structured personality inventories. In frequency of use, however, it deferred to the Rorschach, the Wechsler-Bellevue, and the Thematic Apperception Test<sup>10</sup>. Possibly one reason for its popularity is that the MMPI provides definite contributions in the clinical setting which are somewhat more difficult to obtain with many of the other structured inventories.

## 2. The Population.

The population used in this inquiry was obtained from the Atlas, a text specifically designed as a case history handbook for serious users of the MMPI. To this end, it dealt with a representative cross-section of psychiatric pathology presented in a collection of 968 case histories of which 458 were males and 510 were females<sup>11</sup>, with an age range extending from early adolescence to old age.

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<sup>10</sup> A. Burton, The Use of Psychometric and Projective Tests in Clinical Psychology, in the Journal of Psychology, Vol. 28, No. 2, 1949, p. 452 ff.

<sup>11</sup> S.R. Hathaway and P.E. Meehl, An Atlas for the Clinical Use of the MMPI, Minneapolis, University of Minnesota Press, 1950, p. iii.

The selection of those cases for inclusion in this study represented an interesting problem, since the criterion of selection had to be based upon the diagnostic categories employed by the authors. This, however, was not the most satisfactory situation, since, as the authors observed, the diagnostic labels might tend to vary with patients who had been seen over a long period of time<sup>12</sup>. On the other hand, it was noted that those histories which were chosen for inclusion in the Atlas had been selected with considerable care on the basis of completeness of clinical records, representativeness in frequency of diagnostic categories, and several other considerations not too closely linked with MMPI profiles. In addition, the authors did not reject any case on the grounds that the profile of a given subject did not fit the diagnosis. It was noted, therefore, that a great majority of the Atlas population represented the three pathological groups required in this study, although the labeling might be open to considerable criticism due to the complex symptomatology of a large number of them.

With this one ~~obvious~~ weakness at the outset, it was felt that the possibility of misclassification might be somewhat obviated by only choosing those cases wherein there seemed a reasonable certainty that the diagnostic label would

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12 Ibid., p. vi.

be correct. With this in mind, only those patients with a primary diagnosis representing the pathological entity under which classification had been made, were selected for inclusion in the sample. This was accomplished by choosing on the basis of the first diagnostic label of the series with which a particular case had been diagnosed. The authority for this method of sampling the Atlas population was obtained in a notation by Hathaway and Meehl, wherein they stated that even though each case was observed to be accompanied by one or more descriptive or diagnostic terms, the first of these terms was the one which they felt most emphasized the true characteristics of that particular patient in terms of the previously conducted psychiatric diagnosis. Thus, even though several other classificatory terms followed this main diagnosis, these were felt to be less certain as to accuracy and were only included in the Atlas in order to show the complexity of the particular case<sup>13</sup>.

Another problem which added to the difficulty of selection, was that of validity as determined by the L, F and K scales. Thus, even though 72 cases with invalid validity profiles were included in the sample, this was done because Hathaway and Meehl stated that for research purposes it was of considerable advantage to use those cases whose L, F and K

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13 Ibid., p. xi.

scores were higher than had been recommended for accuracy by the test authors, their reason being that adequate clinical interpretation depended upon full consideration of such higher-than-usual validity scores. Therefore, for purposes of this inquiry these 72 cases were not considered invalid, even though the scores on L, F and K would so indicate, and because other material in the profiles reflected validity, or there was outside evidence of it<sup>14</sup>.

The final selection of the sample, therefore, was conducted with due regard to the factors noted above. However, from the total of 968 cases in the Atlas which represented the differential groups of interest, the final selection was reduced to a relatively hard core of 753, composed of 362 neurotics, 231 psychotics and 160 psychopaths. This substantial reduction was a result of three factors: (1) Cases with incomplete L, F and K scores could not be used for obvious reasons. (2) The diagnosis represented by the clinical description given by the authors of the Atlas, could not, in many cases be considered representative of neurosis, psychosis and psychopathic personality. As an example of this, there were large numbers of patients with histories of simple, adult maladjustment, organic syndromes, mutilative tendencies and the like, none of which could very accurately be described

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<sup>14</sup> Ibid., p. x.

as belonging to one of the three conditions outlined above.

(3) The diagnosis in some cases was so complex that a satisfactory decision as to just what the main disorder really was, became very difficult. The latter category was responsible for the omission of the largest number of cases.

In addition to the above, it was felt that some attention should have been paid to the problem of age range and sex in the sample, however, it was contended that in diagnosis, if a syndrome existed for a particular disorder, it should always be independent of age and sex. With this in mind, therefore, it was not considered necessarily desirable to control these variables.

It will be observed that a number of descriptive terms have been used relative to the selection of the population for this study, and these should be clarified by brief definitions. To this end, the typical psychoneurotic condition may be considered as a relatively crystallized pattern of poorly adapted attitudes and responses, the like of which are not sufficiently serious to merit comittal to a mental institution, whereas psychosis may be regarded as substantially the same, but of more pervasive proportions leading to a characteristic loss of contact with reality, thus making the patient eligible for

comittal<sup>15</sup>. On the other hand, psychopathic personality can be regarded as that disorder of the personality which is characterized by emotional immaturity, impulsiveness, lack of responsibility, and an inability to make social and moral adjustments<sup>16</sup>.

The three, broad, pathological conditions outlined above, may be further sub-divided into a series of related syndromes. These sub-types have played an important role in the development of the case history material contained in the Atlas, and are therefore of importance to this particular inquiry. Nevertheless, the exact definition of such conditions was not included in this summary, the reader being referred to the usual outlines in the conventional literature. It was felt, however, that some description of the three main, clinical entities should be provided, and these are as follows:

- (1) Neurosis - includes hypochondriasis; hysteria, psychasthenia; reactive depression and mixed conditions.
- (2) Psychosis - includes manic-depression, manic and depressed phases; schizophrenia, catatonic, simple, hebephrenic and paranoidal types; mixed psychoses.
- (3) Psychopathic personality - includes amoral, asocial types, pathologic emotionality and sexuality, and mixed types.

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<sup>15</sup> Norman Cameron, The Psychology of Behaviour Disorders: A Biosocial Interpretation, Boston, Houghton Mifflin, 1947, p. 9.

<sup>16</sup> Roy M. Dorcus and G. Wilson Shaffer, Textbook of Abnormal Psychology, Baltimore, Williams and Wilkins, 1950, p. 529 ff.

Wherever possible, only those patients with a relatively clear-cut symptomatology representative of each particular pathology, were accepted in the group used herein. Thus, if a patient exhibited marked fluctuations between one syndrome and another, then he was not included in the sample. In addition, very few cases which had been selected as representative of a particular disorder, were so selected on the basis of MMPI patterns or scores.

### 3. The Method.

The approach to the problem of evaluating the original hypothesis involved three, relatively separate statistical attacks, all selected in an effort to assess the differential implications of L, F and K from several angles. To this end, it was felt that the most conclusive results might be obtained by first studying the population with the simplest possible approach, this involving distributions around the mean, and then submitting the scales to a correlational study of each factor in its relationship to the others. The study was then concluded with the regression equation.

## a) Comparison of the Mean Distributions.

This first inquiry was the most elementary method with which the differential possibilities of L, F and K could be evaluated. To this end, the investigation consisted of a study of the basic characteristics of the several distributions. The approach was then concluded with an observation of the significance of the difference between the means, this being accomplished by application of the common C.R., formula which is as follows:

$$D/\sigma_{d_m} = \frac{M_1 - M_2}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}} \quad (1)$$

In the above,  $M_1$ ,  $\sigma_1$  and  $N_1$  refer to the mean, standard deviation and the number of subjects in a first series.  $M_2$ ,  $\sigma_2$  and  $N_2$  refer to the same elements of a second series.

It may be pointed out that this formula could be used because of the size of the three sub-groups of neurotics ( $N = 362$ ), psychotics ( $N = 231$ ), and psychopaths ( $N = 160$ ).

To conclude, it was felt that if significant differences were found to exist between the distributions, then critical scores could have been used for diagnostic purposes.

## b) Comparison of Distributions by Pairs.

The first approach to the evaluation of the diagnostic functions of L, F and K considered the factors as independent variables. This second stage introduced a study of patterns by comparing the scales in their interrelationship by pairs. To this end, therefore, Pearson's Product-moment coefficient was used as the mode of calculation, since it represented the most customary method of obtaining correlations between two variables. The raw score formula was represented as follows:

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

X and Y are representative, in turn, of the three sub-groups being used in this inquiry.  $N_t$  represents the total experimental group, and  $N_1$  and  $N_2$  are representative in turn, of the different sub-populations of neurotics, psychotics and psychopaths, respectively.

Each coefficient of correlation,  $r_{LK}$ ,  $r_{FK}$  and  $r_{LF}$ , was compared to every other in order to determine the significance of the difference between the three r's. In order to

accomplish this, the following formula was applied:

$$D/\sigma^d_z = \frac{z_1}{\sqrt{N_1 - 3}} - \frac{z_2}{\sqrt{N_2 - 3}}$$

$z_1$  and  $z_2$  refer to Fisher's  $z$  functions for  $r$ , and  $N_1$  and  $N_2$  refer to the distributions.

### c) The Regression Equation.

The third and final stage through which the differential value of the variables was ascertained, involved the use of a method by which the pattern of the three scores could be incorporated into one diagnostic index. This, however, involved a series of calculations designed to represent the scales as predictors of pathology with which any given MMPI profile could be examined. To this end, criterion scores of 1, 3 and 5 were arbitrarily selected for the neurotics, psychotics and psychopaths respectively. A multiple coefficient of correlation using the Doolittle method was then computed. From this stage, a series of intercorrelations were worked out and involving the variables two at a time, wherein each was intercorrelated with the criterion. Using the beta weights obtained through the Doolittle solution, a regression equation was next developed. It was then possible to make certain assumptions relative to diagnosis based on the

prediction formula which was utilized as a diagnostic index, its value being derived from the Atlas population. This whole equation may be stated as follows:

$$a = M_1 - b_{12}M_2 - b_{13}M_3 - b_{14}M_4 \quad (4)$$

Thus, "a" was found, this leading to formula (5), the second phase:

$$X_1 = a + b_{12}x_2 + b_{13}x_3 + b_{14}x_4 \quad (5)$$

This was then followed by computing the estimated error using formula (6) as follows:

$$\sigma^1 \sqrt{1 - R^2} \quad 1.234 \quad (6)$$

This completed the calculations required in the inquiry.

From the above equations, the assessment of the differential diagnostic powers of L, F and K were completed. However, had the findings been somewhat more significant, it would have been of interest to develop a diagnostic formula for each, separate pathological group. This was not considered, however, owing to the inconclusive results which had been obtained.

## CHAPTER III

### SUMMARY OF THE FINDINGS

An attempt was made in this inquiry to determine the precise degree to which L, F and K, the validity scales on the MMPI, could be shown to determine the difference between neurotics, psychotics and psychopaths. To this end, three statistical procedures were used. The first consisted of a comparison of the mean distributions of L, F and K in the three pathological groups. The second involved a comparison of the relationships between distributions, but considered in pairs, each factor being separately matched with every other. The third approach considered the regression equation wherein a prediction formula and the error of estimate were computed in order to permit examination of MMPI protocols with a ready-made diagnostic index.

This chapter is a description of the results obtained, and the procedure of presentation will follow that which was used in the previous one.

#### a) Comparison of the Mean Distributions.

This was the most elementary approach to the problem and consisted of a study of the range, central tendency and variability of the factors. An examination of Tables III, IV,

V and VI, would indicate that some significant differences existed between the three groups as measured by the scales. However, Table III shows that the mean scores for each pathology on any given scale all tended to be somewhat similar to the mean score of any other. Further, if the data were arranged in such a way as to cut across the three pathological groups for each scale, as in Tables IV, V and VI, it would seem to reveal that differential configurations between the three groups could not be formulated with any degree of success. Therefore, an L-F-K pattern for neurotics would not be particularly different from that of psychotics or psychopaths. To be sure, individual differences between patterns might be found, but variations between these would occur about as often as they would for different individuals suffering from the same disorder.

An examination of the findings represented by each table separately will provide a clearer estimate of the generalized conclusions presented above. To this end, the data have been presented for each scale on Tables IV, V and VI, respectively.

TABLE III.- Characteristics of the L, F and K Distributions for Neurotics, Psychotics and Psychopaths.

		Neurotics (N = 362)	Psychotics (N = 231)	Psychopaths (N = 160)
	R	0-12	0-14	0-12
L	M	5.0303	4.7099	4.2625
	♂	2.4556	1.4052	2.3729
	R	0-24	0-26	0-12
F	M	5.6878	7.3896	7.2250
	♂	4.1089	4.8407	4.7958
	R	3-29	2-29	3-27
K	M	14.5607	13.9956	14.1437
	♂	1.6051	1.6799	1.7870

Table IV shows that the differences between neurotics and psychotics, and between psychotics and psychopaths were significant at the 5% level, whereas the differences between psychopaths and neurotics were significant at the 1% level.

With these results, it would seem possible to distinguish the three pathological groups by means of the L score. However, because of the marked overlapping as observed in Table III, it would not be possible to establish critical scores for individual diagnostic purposes.

Somewhat the same situation was found with F. Here, the differences between neurotics and psychotics and between psychopaths and neurotics were found to be significant at the 1% level, whereas differences between psychotics and psychopaths were not significant at all. Again, as with L, the overlapping of scores would rule out the establishment of critical scores. However, the F Scale might be useful in making distinctions between neurotics and non-neurotics, and in this regard would be a better differentiator than either L or K.

Table VI shows the K Scale to be diagnostically unimportant. There were slight differences between psychopaths and neurotics, though not at the 5% level, and differences between neurotics and psychotics, and between psychotics and psychopaths were not significant at all.

TABLE IV.- The Significance of the Differences Between L Scale Means for Neurotics, Psychotics and Psychopaths.

	Neurotics (N = 362)	Psychotics (N = 231)	Psychopaths (N = 160)	Neurotics (N = 362)
Mean of L	5.0303	4.7099	4.2625	5.0303
$\sigma$	2.4556	1.4052	2.3729	2.4556
D	.3204	.4474	.7678	
$D/\sigma^d$	2.0273	2.1427	3.3779	

TABLE V.- The Significance of the Differences Between F Scale Means for Neurotics, Psychotics and Psychopaths.

	Neurotics (N = 362)	Psychotics (N = 231)	Psychopaths (N = 160)	Neurotics (N = 362)
Mean of F	5.6878	7.3896	7.2250	5.6878
$\sigma$	4.1089	4.8407	4.7958	4.1089
D	1.7018	.1646	1.5372	
D/ $\sigma^d$	4.4237	.3325	3.5241	

TABLE VI.- The Significance of the Differences Between K Scale Means for Neurotics, Psychotics and Psychopaths.

	Neurotics (N = 362)	Psychotics (N = 231)	Psychopaths (N = 160)	Neurotics (N = 362)
Mean of K	14.5607	13.9956	14.1437	14.5607
$\sigma$	1.6051	1.6799	1.7870	1.6051
D	.5651	.1481	.4170	
$D/\sigma^d$	1.5715	.3930	2.5380	

In conclusion, it was noted that differential diagnosis based on the mean differences of L, F and K would not be satisfactory. L and F tended to provide the more significant results, and K was disappointing. In all three scales the extreme overlapping made it impossible to establish critical scores on the basis of mean distributions.

b) Comparison of Distributions by Pairs.

The preliminary study of the differential ability of the scales was concerned with L, F and K as independent variables, whereas the present inquiry was an attempt to determine their diagnostic value when combined in pairs.

The findings here, showed that the differential diagnostic ability of the scales was not sharpened when they were combined in pairs, excepting that FK differentiated between psychopaths and neurotics, though not significantly.

To conclude, the correlations between the three scales when grouped in pairs, were too low to be of any significance, thus ruling out this method of differential diagnosis with L, F and K.

TABLE VII.- The Significance of the Differences of r's for LK Between Neurotics, Psychotics and Psychopaths.

	Neurotics (N = 362)		Psychotics (N = 231)		Psychopaths (N = 160)		Neurotics (N = 362)	
r	.4020	± .0441	.4987	± .0495	.4980	± .0596	.4020	± .0441
$z^*$	.4260		.5480		.5467		.4260	
$D_z$		.1220		.0013		.1207		
$D/\sigma^d$		-1.0252		-.0089		.9103		

\* Fisher's correlation function.

TABLE VIII.- The Significance of the Differences of r's for FK Between Neurotics, Psychotics and Psychopaths.

	Neurotics (N = 362)	Psychotics (N = 231)	Psychopaths (N = 160)	Neurotics (N = 362)
r	-.3671 ± .0455	-.5011 ± .0493	-.5934 ± .0513	-.3671 ± .0455
$z^*$	.3850	.5506	.6823	.3850
$D_z$	.1656	.1317	.2973	
$D/\sigma^d$	-1.3916	.9021	2.2421	

\* Fisher's correlation function.

TABLE IX.- The Significance of the Differences of r's for LF Between Neurotics, Psychotics and Psychopaths.

	Neurotics (N = 362)	Psychotics (N = 231)	Psychopaths (N = 160)	Neurotics (N = 362)
r	-.1864 ± .0508	-.2455 ± .0619	-.2858 ± .0728	-.1864 ± .0508
$z^*$	.1882	.2501	.2942	.1882
$D_z$	.0619	.0441	.1060	
$D/\sigma^d$	-.5202	.3021	.7994	

\* Fisher's correlation function.

## c) The Regression Equation.

This was the final stage in the evaluation of the data and involved the attempted establishment of an index with which MMPI protocols could be examined for the existence of neurosis, psychosis or psychopathic personality. To this end, the index was obtained by using formula #5 (cf), the result being as follows:

$$1.332 + (-.014)(L) + (.065)(F) + (.053)(K)$$

In anticipation of its use, all possible combinations of L, F and K were worked out, and the results transcribed on a table of scores. An example of this table has been provided in Appendix 5. It was felt that if it had been possible to predict the most likely measurement in one variable from the known measurement in another, then the index would have assessed any given protocol in terms of the degree of neurosis, psychosis or psychopathic personality found therein, this being accomplished by merely transcribing the obtained L, F and K scores into the spaces indicated by the formula shown above. However, with an error of estimate of  $\pm 1.260$  the value of the index was much reduced. This error of estimate was due to the large overlap between the arbitrarily selected criterion scores which represented the three pathological groups, and resulted in the index only being able to pick out

cases at either extreme of the distribution. It may also be stated, however, that "R" was equal to .122, from which it was ascertained that L, F and K together would only contribute about 12% to the overall ability of the MMPI to differentiate pathological conditions. In this regard, L, F and K contributed .5%, 11% and .7% respectively, to the total of 12% given above.

In conclusion, it was noted that differential diagnosis on the basis of the regression equation was not found to be satisfactory, and only those cases at the extremes of the distribution could be differentiated, these being a fair number of neurotics and a fair number of psychopaths.

#### d) Conclusions.

Of what value are L, F and K as diagnostic differentiators of neurosis, psychosis and psychopathic personality? In this regard, it was revealed that L and F made significant distinctions between the three groups, whereas K did not. Further, the three scales together would only account for about 12% of the overall diagnostic capacity of the MMPI, of which F by itself, contributed 11%.

With reference to the diagnostic index, this could not be satisfactorily developed because of the overlapping in the range of L, F and K raw scores, with the result that it

would only distinguish a few neurotics and psychopaths lying at either extreme of the distribution.

Although the diagnostic capacity of the scales proved to be somewhat disappointing, it was felt that the establishment of an index involving both validity and clinical elements represented by the whole test, might prove to be more effective in differentiating pathological groups, this, therefore, being a project proposed for future research. The possibility of using the MMPI in this way might prove to be more effective than present methods of pattern analysis, since most diagnostic profiles have been altogether too alike for comfort, and are not altogether suitable for quick screening.

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APPENDIX 1

BOOKLET FOR THE MINNESOTA  
MULTIPHASIC PERSONALITY INVENTORY

DO NOT OPEN UNTIL TOLD TO DO SO

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*Booklet for the Minnesota*

**MULTIPHASIC PERSONALITY  
INVENTORY**

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

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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.

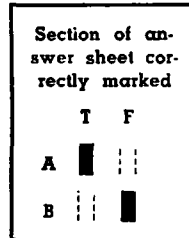
You are to mark your answers on the answer sheet you have. Look at the example of the answer sheet shown at the right. If a statement is TRUE or MOSTLY TRUE, as applied to you, blacken between the lines in the column headed T. (See A at the right.) If a statement is FALSE or NOT USUALLY TRUE, as applied 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.




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Published by THE PSYCHOLOGICAL CORPORATION, New York

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DO NOT MAKE ANY MARKS ON THIS BOOKLET

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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.

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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.

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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 every 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**



A	B	C	D	E	F	G	H	I	J	RAW SCORES
1	1	1	1	1	1	1	1	1	1	
2	2	2	2	2	2	2	2	2	2	
3	3	3	3	3	3	3	3	3	3	
4	4	4	4	4	4	4	4	4	4	
5	5	5	5	5	5	5	5	5	5	
6	6	6	6	6	6	6	6	6	6	
7	7	7	7	7	7	7	7	7	7	?
8	8	8	8	8	8	8	8	8	8	
9	9	9	9	9	9	9	9	9	9	
10	10	10	10	10	10	10	10	10	10	L
11	11	11	11	11	11	11	11	11	11	
12	12	12	12	12	12	12	12	12	12	F
13	13	13	13	13	13	13	13	13	13	
14	14	14	14	14	14	14	14	14	14	
15	15	15	15	15	15	15	15	15	15	K
16	16	16	16	16	16	16	16	16	16	
17	17	17	17	17	17	17	17	17	17	
18	18	18	18	18	18	18	18	18	18	H <sub>1</sub>
19	19	19	19	19	19	19	19	19	19	
20	20	20	20	20	20	20	20	20	20	D
21	21	21	21	21	21	21	21	21	21	
22	22	22	22	22	22	22	22	22	22	
23	23	23	23	23	23	23	23	23	23	H <sub>7</sub>
24	24	24	24	24	24	24	24	24	24	
25	25	25	25	25	25	25	25	25	25	
26	26	26	26	26	26	26	26	26	26	P <sub>d</sub>
27	27	27	27	27	27	27	27	27	27	
28	28	28	28	28	28	28	28	28	28	
29	29	29	29	29	29	29	29	29	29	M <sub>t</sub>
30	30	30	30	30	30	30	30	30	30	
31	31	31	31	31	31	31	31	31	31	P <sub>a</sub>
32	32	32	32	32	32	32	32	32	32	
33	33	33	33	33	33	33	33	33	33	
34	34	34	34	34	34	34	34	34	34	P <sub>i</sub>
35	35	35	35	35	35	35	35	35	35	
36	36	36	36	36	36	36	36	36	36	
37	37	37	37	37	37	37	37	37	37	S <sub>c</sub>
38	38	38	38	38	38	38	38	38	38	
39	39	39	39	39	39	39	39	39	39	
40	40	40	40	40	40	40	40	40	40	M <sub>a</sub>
41	41	41	41	41	41	41	41	41	41	
42	42	42	42	42	42	42	42	42	42	
43	43	43	43	43	43	43	43	43	43	
44	44	44	44	44	44	44	44	44	44	
45	45	45	45	45	45	45	45	45	45	
46	46	46	46	46	46	46	46	46	46	
47	47	47	47	47	47	47	47	47	47	
48	48	48	48	48	48	48	48	48	48	
49	49	49	49	49	49	49	49	49	49	
50	50	50	50	50	50	50	50	50	50	
51	51	51	51	51	51	51	51	51	51	
52	52	52	52	52	52	52	52	52	52	
53	53	53	53	53	53	53	53	53	53	
54	54	54	54	54	54	54	54	54	54	
55	55	55	55	55	55	55	55	55	55	

A B C D E F G H I J

APPENDIX 3

THE CORRELATION MATRIX  
USED TO COMPUTE  $R_{cr. LFK}$ .

The Correlation matrix used to compute  $R_{cr. LFK}$ .

	L 2	F 3	K 4	Criterion 1
L 2	1.000	-.467	.454	-.186
F 3		1.000	-.363	.279
K 4			1.000	-.062

**APPENDIX 4**

**THE DOOLITTLE SOLUTION**

## The Doolittle Solution

Variable	L 2	F 3	K 4	Cr 1	Check
A	1.0000	.467	.454	.186	.801
B	1.0000	.467	.454	.186	.801
C		1.0000	.363	.279	.449
D		.218	.212	.087	.374
E		.782	.151	.192	.823
F		1.0000	.193	.245	1.052
G			1.000	.062	1.029
H			.206	.084	.364
I			.029	.037	.159
J			.765	.059	.824
K			1.000	.077	1.077
L				1.000	1.031
M				.035	.149
N				.047	.202
O				.005	.063
P				.913	.915
Q				1.000	1.002

APPENDIX 5

WEIGHTED L, F AND K SCORES FOR USE  
WITH THE DIAGNOSTIC REGRESSION FORMULA

Weighted L, F and K scores for use with the diagnostic regression formula.

L ( $b_{crL} = -.014$ )		F ( $b_{crF} = .065$ )		K ( $b_{crK} = .053$ )	
R.S.	W.S.	R.S.	W.S.	R.S.	W.S.
1	-.014	1	.065	1	.053
2	-.028	2	.078	2	.106
3	-.042	3	.195	3	.159
4	-.056	4	.260	4	.212
5	-.070	5	.325	5	.265
6	-.084	6	.390	6	.318
7	-.098	7	.455	7	.371
8	-.112	8	.520	8	.424
9	-.126	9	.585	9	.477
10	-.140	10	.650	10	.530
11	-.154	11	.715	11	.583
12	-.168	12	.780	12	.636
13	-.182	13	.845	13	.689
14	-.196	14	.910	14	.742
15	-.210	15	.975	15	.795
		16	1.040	16	.848
		17	1.105	17	.901
		18	1.170	18	.954
		19	1.235	19	1.007
		20	1.300	20	1.060
		21	1.365	21	1.113
		22	1.430	22	1.166
		23	1.495	23	1.219
		24	1.560	24	1.272
		25	1.625	25	1.325
		26	1.690	26	1.378
		27	1.755	27	1.431
		28	1.820	28	1.484
		29	1.885	29	1.537
		30	1.950	30	1.590

APPENDIX 6

AN ABSTRACT OF

THE DIAGNOSIS OF THREE PATHOLOGICAL GROUPS

WITH THE L, F AND K SCALES OF THE MMPI

## APPENDIX 6

### ABSTRACT OF

#### The Diagnosis of Three Pathological Groups With the L, F and K Scales of the MMPI

An inquiry was made in order to assess the ability of L, F and K to function as diagnostic differentiators of neurosis, psychosis and psychopathic personality. All available information concerning the role of the three scales in diagnosis was collected through a survey of the literature, which determined the methods by which the MMPI had previously been used in a nosological capacity.

The experimental group consisting of 753 cases was selected from Hathaway and Meehl's Atlas, the criterion of selection being the primary diagnostic label accompanying each case. The grouping of the population resulted in the establishment of three main pathological combinations, these being neurotics (N = 362), psychotics (N = 231), and psychopaths (N = 160). No part of the selection was based on codes or profiles, and case histories were used to substantiate the diagnostic labels, this being done to assure a reasonable amount of objectivity.

Three main, statistical approaches were formulated to assess the diagnostic implications of L, F and K, these

being: a) A comparison of mean distributions. b) A comparison of distributions by pairs. c) A regression equation, this leading to a prediction formula for use with the test.

In the comparison of mean distributions, significant differences were found to exist between the three pathological groups as measured by the three scales. L distinguished between neurotics and psychotics, and between psychotics and psychopaths at the 5% level, and between neurotics and psychopaths at the 1% level. The F Scale differentiated between neurotics and psychotics, and between neurotics and psychopaths at the 1% level, but made no significant differentiation between psychotics and psychopaths. It was also ascertained that F might be useful in distinguishing between neurotic and non-neurotic individuals. No appreciable results were obtained with the K Scale.

The second approach showed that the differential diagnostic capacity of the three scales was not improved when they were combined in pairs, excepting that FK differentiated neurotics and psychopaths, though not significantly. The remaining correlations between the three factors grouped in pairs, were too low to be of any significance.

The final procedure which involved the establishment of a prediction formula for L, F and K, was not of particular value. A large, estimated error of  $\pm 1.260$  seriously impaired

the arbitrarily selected criterion scores, due to the overlap between the three nosological groups. However, it was observed that L, F and K contributed about 12% to the overall diagnostic capacity of the MMPI in the following proportion: L = .5%, F = 11%, and K = .7%.

It was concluded that the validity scales could not be used as an effective diagnostic aid without benefit of the remaining clinical scales, though they were found to contribute materially to overall diagnosis. It may be stated, therefore, that the computation of a regression equation for the remaining scales might result in the establishment of a useful diagnostic tool in clinical screening situations where discrete, nosological labels would be of importance.