

APPLICATION OF THE MINNESOTA MULTIPHASIC
PERSONALITY INVENTORY, IN DIFFERENTIATING
CRIMINALS AND THEIR NON-CRIMINAL BROTHERS

A Thesis
Presented to
the Faculty of the Department of Psychology
The University of Houston

M. D. ANDERSON MEMORIAL LIBRARY
UNIVERSITY OF HOUSTON

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Melvin Mart
August, 1951

67708

**APPLICATION OF THE MINNESOTA MULTIPHASIC
PERSONALITY INVENTORY IN DIFFERENTIATING
CRIMINALS AND THEIR NON-CRIMINAL BROTHERS**

**An Abstract of a Thesis
Presented to
the Faculty of the Department of Psychology
The University of Houston**

**In Partial Fulfillment
of the Requirements for the Degree
Master of Arts**

**by
Melvin Mart
August, 1951**

The purpose of this study was to investigate the capacity of the Minnesota Multiphasic Personality Inventory to differentiate significantly between criminals and their non-criminal brothers. Brothers were selected since it provided a control situation in which at least a relative degree of common hereditary and environmental factors were present. A greater degree of personality maladjustment can be expected from the criminal brothers if it can be assumed that criminality is the overt manifestation of basic personality maladjustment.

The subjects for the experiment were chosen randomly from the alphabetical index file of all active inmates of the Texas Prison System. The sample was restricted to those who had been given the MMPI upon entrance into the prison, had an educational age of at least 5.0, and had an available brother in the free world. The two groups were not equated for age because of the necessity of obtaining a sample of adequate size, but in instances where more than one brother was available, the one nearest in age to the inmate was chosen. The test was sent to the brothers through the mail with a letter of explanation. In spite of the limitations of this method, self administration of the test without supervision was the only available procedure which could be utilized uniformly for the entire sample. The tests, when returned, were scored and put on profile

sheets. The final sample, excluding invalid tests, consisted of ninety six inmates and an equal number of free world brothers.

The results indicated that the MMPI did discriminate between criminals and their non-criminal brothers. The differences were significant at the .01 level of confidence on six of the nine clinically significant scales with the most striking difference on the Psychopathic Deviate Scale. The correlations were low and insignificant indicating little relationship between the scores made by the two groups. The three validating scales cast some doubt on the validity of the results as they indicated that the brothers attempted to falsify their scores more than the inmates so as to put them in a more socially acceptable light, and they were better motivated towards achieving good scores than their criminal brothers. The inmates were more careless in answering the items, and had greater difficulty in understanding them. That a cautious interpretation of the results is necessary was further substantiated by the limitations of the experimental procedure, and by the effect of not equating such variables as age and possibly socioeconomic status. The MMPI seems to have sufficient discriminatory capacity to justify its continued use in the study of criminals and non-criminals though further study is needed under more controlled conditions.

ACKNOWLEDGMENTS

To the entire administration of the Texas Prison System I gratefully acknowledge their help and cooperation during my stay at the prison. I would like especially to thank Dr. Rupert C. Keeninger, Director of the Bureau of Classification for his many constructive suggestions and criticisms in planning and carrying out this study.

To the members of my thesis committee, Dr. James L. McCary, Chairman, Dr. Richard I. Evans, and Dr. Samuel B. Red I am indebted for their interest, help, and encouragement in my work.

TABLE OF CONTENTS

CHAPTER	PAGE
I. THE PROBLEM AND DEFINITIONS OF TERMS USED . .	1
The problem	2
Statement of the problem	2
Importance of the study	2
Definitions of terms used	3
Criminal	3
Non-Criminal	3
Personality	3
II. REVIEW OF THE LITERATURE	4
History of the explanation of crime	4
Present status of the problem	6
Previous investigations of criminality . . .	8
III. THE MATERIALS USED AND GROUPS STUDIED	13
Description of the MMPI	13
Groups studied	17
Limitations of the study	20
IV. RESULTS AND DISCUSSION	24
Characteristics of the groups	24
Results	27
Discussion	31

CHAPTER	PAGE
V. SUMMARY AND CONCLUSIONS	37
Summary	37
Conclusions	38
BIBLIOGRAPHY	39
APPENDIX A. Sample Letter and Instruction Sheet .	41
APPENDIX B. Raw Scores of All Subjects	43
APPENDIX C. Sample of Scattergram and Statistics .	45

LIST OF TABLES

TABLE	PAGE
I. Mean and Median Ages and Grade Level of Both Groups	24
II. Mean Educational Age and I.Q., and Distribu- tion by Race of Inmate Sample	25
III. Distribution of Inmate Sample According to Type of Offense	26
IV. Significance of Difference of Mean Raw Scores of Inmates and Brother Groups and Pearson r's on the Twelve Sub-Scales	23
V. Number of Inmates and Brothers with T-Score of 70 or Above on Clinically Significant Sub- Scales	29

LIST OF FIGURES

FIGURE	PAGE
1. Profiles of the Mean Raw Scores of the Inmate and Brother Groups	30

CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

The literature on criminality and its causes contains many reports indicating significant differences in the psychological and social characteristics of law breakers and law observers. Upon close inspection of these studies, it was found that many of the differences were not significant so that predictions could be made or sound generalizations built. Most of the reports failed to demonstrate significant differences in social and psychological attributes between criminals and non-criminals. That criminal and non-criminal behavior functions as a dichotomous phenomenon is open to question and appears to be the basis for more extensive research. The testing instruments used have, for the most part, failed to discriminate adequately, and no personality variables have been isolated which could be used for prediction of criminality. In recent years a test has been devised which seems to differentiate significantly between delinquents and non-delinquents, and it seems reasonable to assume that it may be equally useful with criminals and non-criminals.¹ The

¹ D. F. Capwell, "Personality Patterns of Adolescent Girls: I. Girls Who Show Improvement in I.Q.," Journal of Applied Psychology, 29: 212-228, 1945. "Personality Patterns of Adolescent Girls: II. Delinquents and Non Delinquents," Journal of Applied Psychology, 29: 289-297, 1945.

instrument is the Minnesota Multiphasic Personality Inventory.²

I. THE PROBLEM

Statement of the problem. It was the purpose of this study to investigate the capacity of the MMPI³ to differentiate significantly between criminals and their non-criminal brothers. Brothers were selected for this study since it provided a control situation in which at least a relative degree of common hereditary and environmental factors were present. If it can be assumed that criminality as well as delinquency is the overt manifestation of basic personality maladjustment⁴ then a greater degree of personality maladjustment can be expected from the criminal brothers.

Importance of the study. Demonstrating that criminals are or are not significantly different from their non-criminal brothers in social and psychological characteristics will be evidence in favor of or against the

² By Starke R. Hathaway and J. Charnley McKinley. Published by The Psychological Corporation, New York, New York.

³ The abbreviation of the Minnesota Multiphasic Personality Inventory used above will be used in the remainder of the paper.

⁴ Capwell, op. cit., pp. 289-297.

contention that there is a criminal type. Since hereditary and environmental factors are presumably more nearly alike for siblings than non-siblings, any demonstrated significant differences will more nearly represent true differences. It would be of considerable value to probation officers and rehabilitation officials of a prison system to have an instrument which actually differentiates significantly between criminals and non-criminals.

II. DEFINITIONS OF TERMS USED

Criminal. Since prison samples are not representative of the total criminal population the term "criminal" is used to represent those men who are serving time in the Texas Prison System.

Non-criminal. The term "non-criminal" refers to those men who have not served a sentence in prison.

Personality. Since there is a great deal of confusion and uncertainty over the existence, number and kind of personality traits, the term "personality" throughout this study refers to whatever it is that the nine clinically significant sub-scales of the MMPI claim to measure.

CHAPTER II

REVIEW OF THE LITERATURE

History of the explanation of crime. The principal explanation of crime during medieval and early modern times was that "crime was due to innate depravity and the instigation of the devil."¹ From this frame of reference the classical school of criminal law and criminology developed which had its basis in hedonistic psychology. Accordingly, the pleasures anticipated from a certain act may be balanced against the pains anticipated from the same act. The assumption was that the individual had a free will, and would make his decision with reference to the hedonistic explanation alone. Lombroso² and his followers turned attention from crimes to criminals thus laying the foundation for the study of the individual criminal. The essential points of his theory which have been subsequently largely discounted are as follows: (a) Criminals are a distinct type by birth. (b) This type can be recognized by stigmata or anomalies such as asymmetrical cranium, long lower jaw, flattened nose, scanty beard, and low sensitivity to pain. (c) These stigmata show that the criminal is either a reversion to

¹ E. H. Sutherland, Principles of Criminology, (Chicago, Philadelphia: J. B. Lippincott Company, 1934), p. 43.

² Ibid., pp. 4-6.

the savage type--an atavism--or else is degenerate and especially of the epileptoid type. (d) Because of his nature, the typical criminal cannot refrain from crime unless the circumstances of his life are unusually favorable. Tarde³ did not agree with the theory of a constitutional criminal type. He believed that crime has a social genesis which operates especially through what he called laws of imitation and suggestion. The debate between the schools of Tarde and Lombroso resulted in a general acceptance of the "multiple factor" theory of criminality including all kinds of factors, both individual and social, within the total explanation. The difficulty inherent in this theory is that the qualitative and quantitative relations between the several factors are not known. Present day theories and emphases may be categorized as biological, personality, primary social groups, and broader social processes. Sutherland believes that "the conflict of cultures is . . . the fundamental principle in the explanation of crime."⁴ Bonger felt that the existing economic system was a major factor in crime causation while Healy maintained that mental abnormalities and peculiarities were the main

³ W. E. Cole, "Causation of Crime," V. G. Branham and S. B. Kutash, editors, Encyclopedia of Criminology (New York: Philosophical Library, 1949), p. 46.

⁴ E. H. Sutherland, op. cit., p. 52.

causes of delinquency, whereas unfavorable home conditions and bad companions were second in importance.⁵

Present status of the problem. In the preceding section the familiar conflict is presented between heredity and environment. Both classes of theories have the same basic, underlying assumption: that criminals are qualitatively different from the general population, and represent a distinct type or class. In recent years the general "type" approach to criminal behavior has been replaced by a more individual, gestalt approach. This approach maintains that hereditary and environmental factors dynamically interact upon one another, and the sum total of all the forces affecting the personality integration of any given individual results in an organization different from the mere summation of its parts. In order to understand the criminal it is necessary, therefore, to understand all the forces which have influenced that particular individual within his total, unique personality structure. One cannot study isolated factors or molecular aspects of the personality structure of the individual criminal; one must study the whole or gestalt. So as has been stated, it seems to follow that a criminal type, per se, does not exist, in light of contemporary thought.

⁵ Cole, op. cit., p. 46.

In a very thorough study, Schuessler and Cressey⁶ evaluated all the published studies on the subject of personality differences between criminals and non-criminals as determined by objective tests of personality, and came to the conclusion that as often as not, the evidence favored the view that personality traits are distributed in the criminal population in about the same way as in the general population. Freeman pointed out that:

... We have sought to impose upon these violators a distinct type of personality in order to account for their criminalism ... what actually comes into court is a constant stream of personalities representing the average stuff out of which our population is composed. Among that delinquent group will be found no such special combination of psychological or sociological forces as claimed by our criminologists.⁷

Shields⁸ points out that the way one reacts to his environment is more dependent upon the organization of the individual than the stimulus to which one reacts. As far as criminal reaction is concerned, it is not explained by the nature of the stimulus, but is dependent primarily upon the individual--his original endowments plus the changes which have been caused by past experiences and disease.

⁶ K. F. Schuessler and D. R. Cressey, "Personality Characteristics of Criminals," American Journal of Sociology, 55: 476-484, 1950.

⁷ M. J. Freeman, "Changing Concepts in Crime," Journal of Criminal Psychopathology, 4: 290-305, 1942.

⁸ J. A. Shields, "Twelve Thousand Criminals," Journal of Criminal Law and Criminology, 28: 806-814, 1938.

Previous investigations of criminality. In a study bearing directly on this investigation, Freeman⁹ compared juvenile delinquents and their non-delinquent brothers using the California Personality Test.¹⁰ The results supported the contention that there are no essential differences in emotional or social behavior between the delinquent group and their non-delinquent brothers. He compared the norms of the delinquent group with those of the general outside population and found no essential differences. He noted that a similar number of severe personality disorders characterized both the delinquents and their non-delinquent brothers. Freeman concluded that every adult criminal, in one way or another, presents a personality problem. Though his conduct on the whole is no different from the average personality in the outside population his symptom finds its expression in a social area which happens to constitute a violation of the law.

The ability of the MMPI to discriminate between delinquent and non-delinquent girls was demonstrated by Capwell.¹¹ Using 101 delinquent girls at the Minnesota

⁹ Freeman, op. cit., pp. 290-305.

¹⁰ E. W. Tiegs, W. W. Clark and L. P. Thorpe, California Test of Personality: Manual of Directions (Los Angeles: California Test Bureau, 1942).

¹¹ D. F. Capwell, "Personality Patterns of Adolescent Girls: I. Girls Who Show Improvement in IQ," Journal of

State School for Girls and 85 non-delinquents in the Public Schools of Sauk Centre, Minnesota a psychological examination including the MMPI was administered and then readministered from four to fifteen months later. A study of the results show that most of the scales in the MMPI differentiate between the two groups in a satisfactory fashion. On the basis of these results, with the exception of the Lie and Hysteria scales on the first test and the Hysteria scale on the second test, the delinquent girls are more similar in their responses to patients used in the standardization of the MMPI than are the non-delinquent girls. The most pronounced differences are on the Psychopathic Deviate and Paranoia scales, but even where the scores are not equivalent to a T-score of 70 or over, the criterion for significant maladjustment, they still are further toward the maladjustment end of the scale than are the scores of the non-delinquents.

Applied Psychology, 29: 212-228, 1945. "Personality Patterns of Adolescent Girls: II. Delinquents and Non-Delinquents," Journal of Applied Psychology, 29: 289-297, 1945.

As a consequence of Capwell's study, Monachesi¹² attempted to ascertain if the Inventory would continue to differentiate between delinquent and non-delinquent girls, and also to discover if it would differentiate between delinquent and non-delinquent males. Though the critical ratios calculated for most of the scales weren't as high as those reported by Capwell, they were high enough to conclude that the Inventory continued to differentiate satisfactorily between delinquent and non-delinquent females. It is impossible, however, to make any such statement with reference to the results of the males. According to the critical ratios obtained, the MMPI is unable to differentiate between male delinquents and non-delinquents in a consistent fashion. Differences in average scores on six of the scales (Question, Validity, Hypochondriasis, Masculinity-Femininity, Paranoia, Schizophrenia) resulted in critical ratios which fell below the five percent level of significance. None of the critical ratios calculated for male differences in average scores was significant at the one percent level of confidence. It was noted, too, that on the Hypochondriasis,

¹² E. D. Monachesi, "Some Personality Characteristics of Delinquents and Non-Delinquents," Journal of Criminal Law and Criminology, 38: 487-500, 1948. "Personality Characteristics of Institutionalized and Non-Institutionalized Male Delinquents," Journal of Criminal Law and Criminology, 41: 167-179, 1950.

Masculinity-Femininity, Psychasthenia, Schizophrenia, and Hypomania scales the non-delinquent males achieved significantly higher average scores than delinquent males.

Monachesi offers several possible explanations to account for the variations in the Inventory's capacity to differentiate between female and male delinquents and non-delinquents. Taking into consideration some of the characteristics of the samples of non-delinquent males, it may be that he compared individuals who stand side by side on a behavior continuum and the dividing line that exists between them is merely one which is drawn by the fact of apprehension and adjudication. That this may have happened is indicated by the fact that one of the avowed purposes of the organizations used to draw the non-delinquent sample is the prevention or modification of behavior problems in boys. When applied to females, however, this explanation has questionable plausibility. Though the female and male non-delinquent groups resemble one another in purposes and in general organization, they cater to an entirely different clientele and the members of such female groups are on the whole individuals who do not deviate to any considerable degree from the normal. Another possible explanation is that a portion of the delinquency associated with the male sex is behavior which is induced by the social environment

rather than springing from the emotional pattern of the individual delinquent while the more restricted behavioral environment of females prescribed by our culture would seem to render most of female delinquency and criminality primarily a function of the females' inability, because of personality defects, to play the conventional roles imposed upon them by society. Monachesi raises a final point in that in testing female delinquents who have been subjected to the processes of discovery, apprehension and adjudication he may be testing individuals who, because of the odium with which society regards the deviant female, are rendered emotionally disturbed. In other words, the differences found in the response of delinquent males and females to the Inventory may be due to differentials in the attitudes of society toward deviant males and females.

CHAPTER III

THE MATERIALS USED AND GROUPS STUDIED

Description of the MMPI. The Inventory is made up of thirteen scales designed to measure how the responses of the individual tested is similar to the responses made by the standardization group. The standardization group consists of a sample of persons clinically diagnosed as suffering from several categories of emotional disturbances. In interpretation, items responded to as either true or false are scored according to empirically derived scoring keys. The raw scores are then translated into a scale of standard scores with an average value of fifty and a borderline value of seventy. In general, the higher the score is above fifty the more significant is the deviation. The test is available in either a card or booklet form.

For the purposes of this study the booklet form of the Inventory was used. It contains 566 statements for which an answer sheet is provided. Actually the Inventory contains 550 items but sixteen items have been duplicated to facilitate scoring. At the present time the first 367 items plus seven other K-scale items are the only ones scored for the thirteen scales now in use. The remaining items possibly will be used in subsequent development of

additional scales. All the inmates in the Texas Prison System who have taken the MMPI had the short 373 item group form thus including all scored items. It was deemed desirable, therefore, to administer the same short, group form to the experimental group of brothers of the inmates.

Three of the thirteen scales are used for validation purposes. The first of these is the Question score (Q) computed by counting the number of items to which the subject has not responded. The answer sheets for the MMPI's administered to the inmates of the Texas Prison System were inspected and if more than one out of fifteen items were not responded to, the test was considered invalid. The actual number of items to which the subject did not respond was not computed. The same procedure was followed for the experimental group of brothers. The second validating score is the Lie score (L). This is designed to measure the degree to which the subject may be attempting to falsify his scores by choosing those placing him in the most socially acceptable light. The third is called the Validity score (F). A high score on this scale indicates that the subject was either careless in selecting his responses or was unable to understand the meaning of the statements in the inventory. A fourth scale, the K scale (K), is basically a "correction factor"

for sharpening the discriminatory value of several of the other scales, but is not clinically significant in itself.

The remaining nine scales measure the degree to which the subject's responses are similar to individuals who have been clinically diagnosed as being afflicted with psychological disabilities by the neuro-psychiatric staff of the University of Minnesota Hospitals. The first of these denotes the similarity in response of the testee to persons suffering from hypochondriasis (the Hs scale). Another scale indicates the similarity in response of those tested and persons diagnosed as suffering from depression (the D scale). Also, the hysteria scale (Hy) measures the degree to which the subject is like patients who have developed conversion-type hysteria symptoms. In addition, a psychopathic deviate scale (Pd) is part of the test and measures the similarity of the subject to a group of persons whose main difficulty lies in their absence of deep emotional response, their inability to profit from experience, and their disregard of social mores. Another scale measures the testee's inclination toward interests which are commonly associated with masculinity and femininity (the Mf scale). The paranoia scale (Pa) measures the degree to which subjects are similar to a group of clinical patients who were characterized by suspiciousness, over-

sensitivity, and delusions of persecution, and who were diagnosed as paranoia, paranoid state, or paranoid schizophrenia. Another, the psychasthenia scale (Pt), measures the similarity of the subject to psychiatric patients plagued by phobias or compulsive behavior. The Inventory also contains a scale measuring the similarity of the testee's responses to patients afflicted with the symptoms of schizophrenia such as emotional apathy and extreme withdrawal. This is called the schizophrenia scale (Sc). Finally, the hypomania scale (Ma)¹ measures the degree to which persons tested are like in their responses to persons who are characterized by overproductivity in thought and action.²

¹ The abbreviations of the scales described above will be used in the rest of the paper.

² For a thorough discussion of the construction and standardization of these scales see: S. R. Hathaway and J. C. McKinley, "A Multiphasic Personality Schedule (Minnesota): I. Construction of the Schedule," The Journal of Psychology, 10: 249-254, 1940. "A Multiphasic Personality Schedule (Minnesota): II. A Differential Study of Hypochondriasis," The Journal of Psychology, 10: 255-263, 1940. "A Multiphasic Personality Schedule (Minnesota): III. The Measurement of Symptomatic Depression," The Journal of Psychology, 14: 73-84, 1942. J. C. McKinley and S. R. Hathaway, "A Multiphasic Personality Schedule (Minnesota): IV. Psychasthenia," The Journal of Applied Psychology, 26: 614-624, 1942. "The Minnesota Personality Inventory: V. Hysteria, Hypomania and Psychopathic Deviate," The Journal of Applied Psychology, 28: 153-174, 1944. "The Identification and Measurement of the Psychoneuroses in Medical Practice," The Journal of the American Medical Association, 122: 261-267, 1943. S. R. Hathaway and J. C. McKinley, Manual for the Minnesota Multiphasic Personality Inventory (Minneapolis: University of Minnesota Press, 1943).

Groups studied. Every man entering the Texas Prison System (TPS)³ is given a series of tests, one of which is the MMPI. The subjects for this experiment were chosen randomly from the alphabetical index file of all active⁴ inmates of the TPS. The MMPI had been administered to over four thousand inmates starting in Nov. 1943 up to the time of the sampling. These men were given the test within the first few days of their arrival which, while not eliminating the effect of prison life from their test scores, would do so as nearly as possible. Inmates who had come into the TPS before Nov. 1943 had not been given the MMPI. Since prison environment was one of the factors to be controlled as nearly as possible, it was deemed desirable to eliminate from the sample all inmates who were serving time before Nov. 1943, and therefore had not had the MMPI upon entrance into the prison. It was necessary, also, to eliminate from the sample all those chosen who were below the educational age of 5.0 as measured by the Stanford Achievement Test.⁵

Supplementary Manual for the Minnesota Multiphasic Personality Inventory (New York: The Psychological Corporation, 1946).

3 This abbreviation will be used in the rest of the paper.

4 By active is meant those inmates who, at the time of the random sampling, were serving terms in the TPS.

5 T. L. Kelly, G. M. Ruch and L. M. Terman, Stanford Achievement Tests: Manual of Directions (Yonkers-on-Hudson, New York, and Chicago, Ill.; World Book Company, 1940).

This was set arbitrarily as it was felt that an educational age of less than 5.0 would result in an MMPI profile of questionable validity because of not understanding the directions or the test items themselves.⁶ The sample was chosen with respect to the availability of the inmate's brothers in the free world. First of all, the inmates had to have a brother, and secondly, the brother's whereabouts had to be known. In the event there was more than one brother, the one nearest in chronological age to the inmate was chosen. Originally the experimental design was set up to limit arbitrarily the difference in ages between the inmate and his free world brother, but this was found to be impractical because of the other factors restricting the size of the sample.

Thus, the subjects for this experiment were chosen randomly from the alphabetical index file of all active inmates of the TPS. The sample was restricted to those who had been given the MMPI upon entrance, had an educational age of at least 5.0 as measured by the Stanford Achievement Test, and had an available brother in the free world. The age differences between inmates and their brothers were not controlled because of the necessity of obtaining a sample of adequate size.

⁶ Dr. Rupert C. Koenninger, Director of the Bureau of Classification of the TPS, suggested the 5.0 limit.

The main problem in the experimental procedure was to determine the most practical method of administering the MMPI to the brothers in the free world. Upon inspection of the total potential sample of three hundred, it was found that the brothers were scattered throughout the cities and towns of Texas mainly, but there was also a representation from the several states. The only way all these men could be tested was to send them the test through the mail, have them take the test themselves, and return it through the mail. This procedure is considered feasible by Dr. Starke R. Hathaway, the co-author of the MMPI.⁷ This method has its sources of error: the possibility of the brother conferring with members of his family while marking his responses, his not understanding the directions, a tendency to be overcautious in answering the statements because his criminal brother was involved, and taking too much time to complete the test. In spite of these limitations, sending the tests through the mail, and having them self-administered was the only available procedure which could be utilized uniformly for the entire sample. In addition to a letter of explanation, the test booklet and answer sheet,

⁷ In a letter to Dr. Rupert C. Koeninger, Director of the Bureau of Classification of the FPS, Dr. Hathaway said: "... with reference to your testing of brothers of inmates, I think it is quite feasible to send the booklet form of the MMPI to the relatives."

and a stamped, addressed return envelope, an instruction and information sheet was included.⁸ On this, the subject was given general instructions for taking the test, and asked to give information concerning date of birth, last grade completed in school, number of times, if any, arrested, and number of times, if any, in reform school and prison. The tests, when returned, were scored and put on profile sheets. Of the three hundred letters mailed, 126 tests were received which were scorable, or 42%. Of the 126, thirty were invalid, or 24%.

Limitations of the study. One of the basic inadequacies of a study of personality differences relates to the vagueness of the concept "personality." There is a great deal of uncertainty and confusion concerning the number and kind of personality traits which makes a cautious approach to interpretation of personality test results necessary. Insofar as criminality is concerned, there is no indication that criminal behavior is the result of a certain personality trait or that the trait is the result of criminal experiences. It might be that personality factors and criminal behavior are merely correlates, both being the function of a third condition or set of conditions such as factors affecting the individual's

⁸ See Appendix A for sample letter of explanation and instruction and information sheet.

participation in a culture (e.g., age and socio-economic status). It would be unwise, also, to extend conclusions based on samples of prisoners to the criminal population because:

1. Prison samples are not representative of the criminal population.
2. Answers may be unreliable because of the prison situation.
3. Prison experience may produce changes in the personality.⁹

These are some of the sources of error in the experiment having to do with the inmate brothers. The limitations concerning the experimental procedure in obtaining MMPI profiles on the free world brothers have been enumerated above (p. 19).

It is necessary to consider, too, that the sample was restricted in the sense that no inmate was used with an educational age of less than 5.0 so there is no sampling of MMPI profiles of this below 5.0 group. In this connection it should be noted that a much larger percentage of Negro and Mexican inmates score below 5.0 on the Stanford Achievement Test than do white inmates. The experimental sample, therefore, does not include a representative sampling of the racial populations in the TFS. The study

⁹ K. F. Schuessler and D. R. Cressey, "Personality Characteristics of Criminals," American Journal of Sociology, 55: 476-484, 1950.

is limited also in that it does not include a sampling of the inmates who were serving terms before the testing program was initiated. In addition, the study is restricted by the inadequacies of the testing instrument itself. The MMPI, being of the so-called objective paper and pencil variety, has the common fault of these tests in that the testee may deliberately falsify responses in order to misrepresent himself, especially if he is able to "see through" the questions. This may alter results on the MMPI notwithstanding the so-called "Lie Score," in the writer's opinion. The standardization group of the MMPI may be too narrow or unrepresentative of the general population, confined as it is to individuals in a certain sub-culture, patients at the University of Minnesota Hospitals, and family and friends who visited them. Furthermore, it would be rather difficult to define satisfactorily the nine clinically significant sub-scales so that everyone would agree. Finally, the assumption that the effects of common hereditary and environmental influences acting on brothers is high is open to question. For example, according to studies made, the average level of personality correlations on siblings is only .18.¹⁰

¹⁰ M. W. Crook, "Intra-Family Relationships in Personality Test Performance," Psychological Record, 1: 479-502, 1937.

It may be that the main value of using brothers is that it at least insures to some extent, some similarity of hereditary and environmental influences on the subjects including roughly equated socio-economic status.

CHAPTER IV

RESULTS AND DISCUSSION

Characteristics of the groups. The mean age of the inmates was 26.25 while that of the brothers was 29.17. The median age of the inmates was 24 and of the brothers 27. Though the median ages in both cases were lower, the same relationship existed; namely, the brothers were, on the average, approximately three years older than the inmates. The last grade completed in school was approximately the same for both groups: the mean for the inmates was 8.92, for the brothers 9.58; the median for both inmates and brothers was nine. These data are compiled in Table I.

TABLE I

THE MEAN AND MEDIAN AGES AND LAST GRADE COMPLETED IN SCHOOL
OF 96 INMATES AND THEIR FREE WORLD BROTHERS

	Age		Last Grade Completed	
	Mean	Median	Mean	Median
Inmates	26.25	24	8.92	9
Brothers	29.17	27	9.58	9

Using brothers served the purpose of roughly equating for socio-economic status as well as environmental

background. The sample included eighty one whites, seven Mexicans, and eight Negroes. Additional characteristics of the inmates are found in Table II. The mean educational age and mean I.Q. were 7.9 and 92.6 respectively. These data were not available for the brothers. The inmate group included a representative sampling of the different types of offenses as seen in Table III. The classification

TABLE II

THE MEAN EDUCATIONAL AGE AS MEASURED BY THE STANFORD ACHIEVEMENT TEST AND THE MEAN I.Q. AS MEASURED BY THE OTIS SHORT FORM INTELLIGENCE TEST OF 96 INMATES. THE DISTRIBUTION OF THE SAMPLE BY RACE IS ALSO SHOWN

Educational Age		I.Q.		Race		
N	Mean	N	Mean	W	M	N
96	7.9	92	92.6	81	7	8

of offenses is not clearcut enough to prevent some overlapping and confusion, but it is possible to get an overview of the various offenses and how they were distributed in the sample. Offenses concerned with robbery, burglary and theft head the list, comprising almost one-half the sample with robbery by assault, murder, forgery, and sex crimes following in that order.

TABLE III

DISTRIBUTION OF THE SAMPLE OF 96 INMATES ACCORDING TO TYPE OF OFFENSE. THE CRIMES HAVE BEEN GROUPED TOGETHER INTO FIVE CATEGORIES

Type of Offense	No.	Sub-Total
Burglary	24	
Robbery	9	
Theft-Burglary	5	
Theft over \$50	5	
Theft	3	
Robbery-Burglary-Theft	1	
		47
Robbery by Assault	14	
Robbery by Assault-Forgery	1	
		15
Murder	8	
Murder with malice	2	
Murder with malice-Burglary	1	
Murder without malice	1	
Assault to Murder	1	
		13
Forgery	6	
Forgery and Passing	4	
Forgery and Possession	1	
Defraud Check	1	
		12
Sodomy	4	
Bigamy	2	
Rape	2	
Rape and Burglary	1	
		9
Total		96

Results. Of the 126 MMPI's received, thirty were invalid by reason of either the L, F, or K scores reaching a T-score of over 70. The 96 remaining pairs constitute the sample.

It can be seen by examining Table IV that the MMPI discriminated clearly between the inmates and their brothers on six of the clinically significant sub-scales. The differences between the mean scores on the D, Hy, Pd, Pa, Pt, and Sc scales were significant at the .01 level of confidence so that in only one time in a hundred would we expect those differences to occur by chance. At the .05 level of confidence, meaning that in only five times in a hundred would we expect the differences to occur by chance factors, in addition to the six scales enumerated above, the Mf scale was significant. The mean difference on the Hs scale was not significant though in the unexpected direction, i.e., the brothers' mean was higher.

Of the three validating scales only the F scale showed the inmates scoring higher on the average than the brothers. The difference was significant at the .01 level indicating that, as a group, the inmates were more careless or more unable to comprehend the items than the brothers. The L and K scores both showed differences in the unexpected direction. The K score mean difference was significant at the .05 level; the L score at the .01 level. This

TABLE IV

THE MMPI MEAN RAW SCORE, DIFFERENCE IN MEAN SCORE, STANDARD ERROR OF THE DIFFERENCE, CRITICAL RATIO, SIGNIFICANCE OF THE DIFFERENCE AT THE .05 AND .01 LEVELS OF CONFIDENCE, THE PEARSON CORRELATION, AND THE PROBABLE ERROR OF THE CORRELATION OF 96 INMATES AND THEIR FREE WORLD BROTHERS

Scale	Mean Raw Score Diff. in Mean SE _D				Critical Significance			r	PE _r
	Inm.	Bro. Score			Ratio	.05	.01		
* L	3.84	5.14	1.30	.33	3.94	1.96 yes	2.58 yes	-.07	.07
F	5.80	3.84	1.96	.36	5.44	1.96 yes	2.58 yes	.19	.07
* K	13.98	15.20	1.22	.60	2.03	1.96 yes	2.58 no	.13	.07
* Hs	14.67	15.60	.93	.66	1.41	1.96 no	2.58 no	-.13	.07
D	21.50	18.78	2.72	.67	4.06	1.96 yes	2.58 yes	-.14	.07
Hy	21.54	19.26	2.28	.71	3.21	1.96 yes	2.58 yes	-.01	.07
Pd	28.16	21.38	6.78	.58	11.69	1.96 yes	2.58 yes	.08	.07
Mf	23.44	21.85	1.59	.70	2.27	1.96 yes	2.58 no	-.01	.07
Pa	10.29	8.82	1.47	.49	3.00	1.96 yes	2.58 yes	.08	.07
Pt	28.18	23.38	4.80	.67	7.16	1.96 yes	2.58 yes	-.02	.07
Sc	27.15	23.15	4.00	.74	5.41	1.96 yes	2.58 yes	.07	.07
Va	20.53	20.20	.33	.56	.59	1.96 no	2.58 no	.08	.07

* Brothers' scores are higher than inmates.

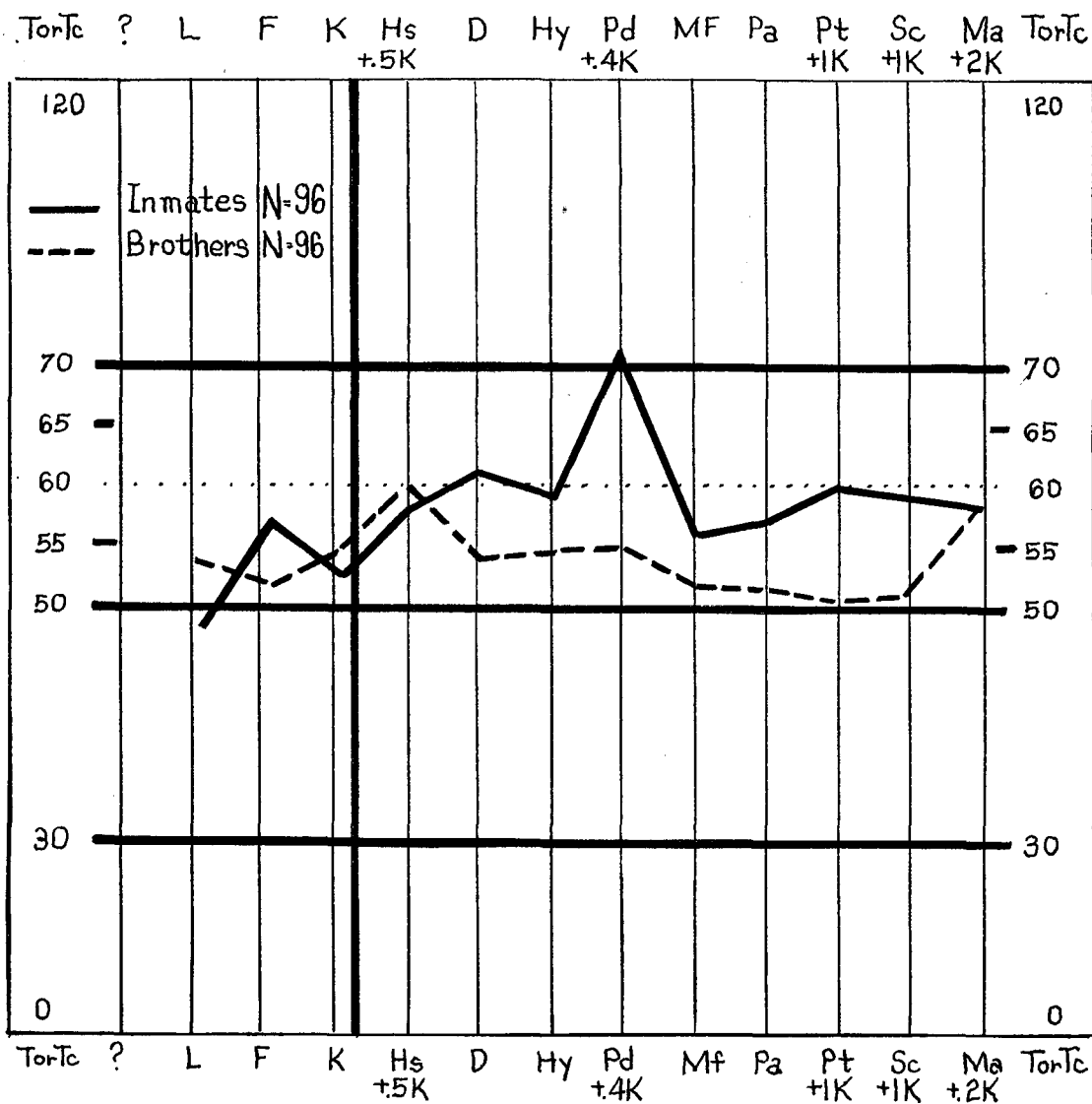
seems to indicate that the brothers were more motivated toward getting good scores than the inmates, and also that the brothers attempted to falsify their scores more than the inmates by choosing responses placing them in a more acceptable light socially.

A comparison of the average scores of the two groups is presented graphically in Figure I. Although there were significant differences on several of the scales, the only one which had a T-score of over 70 making it clinically significant was the Psychopathic Deviate scale. The inmate scores, in general, however, were more towards the maladjusted end of the scale than those of their brothers. This trend is borne out by examining Table V showing that, on all scales, there were many more inmates with T-scores of 70 or above than brothers. On the Pd scale 64 out of 96 or two out of three inmates scored 70 or above, while only 9 of the brothers scored 70 or above.

TABLE V

NUMBER OF INMATES AND BROTHERS HAVING A T-SCORE OF 70 OR ABOVE ON EACH OF THE CLINICALLY SIGNIFICANT SUB-SCALES OF THE MMPI. N IS 96 FOR EACH GROUP

Scale	Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma
No. Inm.	21	23	15	64	15	12	21	21	17
No. Bro.	4	9	7	9	7	7	1	2	2



Inmates

M Raw Score	<u>3.84</u>	<u>5.80</u>	<u>13.98</u>	<u>14.67</u>	<u>21.50</u>	<u>21.54</u>	<u>28.16</u>	<u>23.44</u>	<u>10.29</u>	<u>28.18</u>	<u>27.15</u>	<u>20.53</u>
M T-Score	<u>49</u>	<u>57.5</u>	<u>53</u>	<u>58</u>	<u>61.5</u>	<u>59</u>	<u>71</u>	<u>56</u>	<u>57</u>	<u>60.5</u>	<u>59.5</u>	<u>58.5</u>

Brothers

M Raw Score	<u>5.14</u>	<u>3.84</u>	<u>15.20</u>	<u>15.60</u>	<u>18.78</u>	<u>19.26</u>	<u>21.38</u>	<u>21.85</u>	<u>8.82</u>	<u>23.38</u>	<u>23.15</u>	<u>20.20</u>
M T-Score	<u>53.5</u>	<u>52</u>	<u>55.5</u>	<u>81</u>	<u>54.5</u>	<u>55.5</u>	<u>56</u>	<u>52.5</u>	<u>52</u>	<u>51</u>	<u>51.5</u>	<u>58</u>

FIGURE 1

Mean Raw scores and T-scores of 96 inmates
and their 96 brothers on the MMPI

It is interesting to note that although brothers were used in this study, no significant relationships exist between their scores on any of the scales. Referring to Table IV, page 28, none of the Pearson product-moment correlations was higher than $+.19$, indicating very little relationship between the scores made by the inmates and their brothers. Six of the twelve correlations were slightly negative, the range being $-.14$ to $+.19$ on all twelve. These correlations were a little lower than those reported in the literature between siblings on personality characteristics, but in any case they were insignificant.¹

Discussion. The results obtained in this study were at variance with those reported by Freeman² and Monachesi.³ Freeman found no significant differences between juvenile delinquents and their non-delinquent brothers as measured by the California Personality Test, while Monachesi reported similar results with comparable groups of delinquents and non-delinquents using the MMPI. Since significant differences were found on a majority of the scales of the MMPI in this investigation of the personality characteristics of inmates and their free world

¹ M. N. Crook, "Intra-Family Relationships in Personality Test Performance," Psychological Record, 1: 479-502, 1937.

² See Chapter II, p. 8.

³ See Chapter II, p. 10.

brothers, several explanations may be offered to account for these differences.

The first of these explanations involves a consideration of some of the characteristics of the samples employed in this study. As indicated previously, socio-economic status was assumed to be equated for the two groups inasmuch as they were brothers. This was not necessarily true as the brothers may have achieved a higher socio-economic position due to their being older on the average, or because as brothers reach maturity they tend to split away from each other and their family and strike out for themselves. That the brothers were three years older on the average than the inmates may be an important factor. Two out of every three were older than their inmate brothers. The exact role of age in relation to criminality is not clear. It is not possible to say, with any degree of certainty, that criminality is a function of age, but there is general agreement that it is a function of the social, economic, and emotional security of the individual. That social, economic, and emotional security is, in part, a function of age is also generally agreed. Even though it is impossible to make individual predictions, one can say there is a tendency for older persons to be more stable and amenable to the restrictions of society, and

to have achieved a greater degree of economic security than younger ones.

Another possible explanation to account for the results of this investigation stems from an analysis of the average scores of the two groups on the validating scales. That the Lie score difference was significant at the .01 level of confidence in favor of the brothers, indicates that the brothers possibly attempted to falsify their scores more than the inmates by choosing responses placing them in a more acceptable light socially. That the brothers were more motivated towards achieving good scores than the inmates was indicated by the K score mean difference being significant at the .05 level in favor of the brothers. The F or validating scale showed a significant difference at the .01 level in favor of the inmates. Thus the inmates were more careless and had greater inability to comprehend the items than the brothers. All three validating scales, therefore, are consistent, and provide a plausible explanation for some of the large differences found on the clinically significant scales. If it is true that the differences are not true differences, then the L, F, and K scales have adequately served their purpose by casting doubt on the validity of the results.

Lending support to the above-mentioned doubt of the validity of the results is the experimental procedure

itself. By sending the tests to the brothers who answered the items without supervision or time limit and with possible collusion by members of their families, tends to support the conclusions in the preceding paragraph that the brothers attempted to falsify their scores, and were more motivated towards achieving good scores than the inmates. That their criminal brother was involved would tend to make them even more cautious and more motivated. However, the tests were administered to the inmates under close supervision within a few days after their arrival at Huntsville. The chances are that their morale and motivation were at a low point inasmuch as they were just beginning prison terms, the first few days at Huntsville are spent in quarantine, and the prison environment generally is not too pleasant. Then, too, taking the MMPI as part of a battery of psychological tests was not voluntary. Finally, willingness voluntarily to take the test and return it to the TPI involved a selection factor which may have biased the brothers' sample.

Possible explanations for the results of this experiment include differences in age and socio-economic status of the two groups, more lying and greater motivation towards achieving good scores by the brothers as revealed by the L, F, and K scales, a biased sample of brothers, and the experimental procedure itself or a combination of all

of these.

Several possibilities can be offered to explain why the brothers were better motivated towards getting good scores. One possibility is that they wanted to avoid comparison with their criminal brother because of similar personality characteristics and the social stigma involved. On the other hand, they might have felt that getting good scores would, in some way, help their brothers in prison although nothing of the sort was stated or implied in the letter of introduction.⁴ Furthermore, there is a natural tendency when taking a personality test to try and present oneself as a normal individual.

In spite of the several limitations noted above, the results of this investigation might have represented true differences between criminals and their non-criminal brothers. While the writer does not believe a criminal type or types can be hypothesized on the basis of the MMPI at the present time, if the differences are valid ones, one can postulate that personality maladjustment is a correlate of criminal behavior and the MMPI has the capacity to measure it. It is a questionable procedure to formulate dynamic personality descriptions on the basis of MMPI profiles in terms of type of neurosis or psychosis or

⁴ See Appendix A.

other more specific category, but the test does permit diagnosis in terms of neurotic or psychotic syndromes.⁵ The question would then arise as to how the neurotic and psychotic syndromes of criminals differ from those of non-criminal neurotics and psychotics. Further research with the MMPI along these lines is needed. Furthermore, it would be valuable to run an item analysis of the MMPI profiles of a criminal population with special reference to the Psychopathic Deviate scale which, of all the scales, seems to differentiate between criminals and non-criminals most significantly.

⁵ W. K. Wheeler, K. B. Little, and G. F. J. Lehner, "The Internal Structure of the MMPI," Journal of Consulting Psychology, 15: 134-141, 1951.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary. A group of 96 inmates in the Texas Prison System and their 96 free world brothers were tested with the MMPI. Differentiation between the two groups was measured by computing the significance of the difference of the mean scores for each group, and the Pearson r was calculated for each of the twelve sub-scales. It was found that the MMPI discriminated the inmates from their brothers in degree of personality adjustment. The differences were significant at the .01 level of confidence on six of the nine scales: Depression, Hysteria, Psychopathic Deviate, Paranoia, Psychasthenia, and Schizophrenia. The most striking differences were found on the Psychopathic Deviate scale with the Psychasthenia and Schizophrenia scales following in that order. The correlations were low and insignificant indicating little relationship between scores made by the two groups. The range of the Pearson r 's was from $-.14$ to $+.19$. The brothers were three years older on the average than the inmates, but both groups had the same average grade completion level.

The three validating scales cast some doubt on the validity of the results. They revealed that the brothers attempted to falsify their scores so as to put them in a

more socially acceptable light than the inmates, and the brothers were better motivated towards achieving good scores. The inmates were more careless and unable to understand the items. Other possible explanations were the difference in age and socio-economic status of the two groups, and the experimental procedure itself.

Conclusions. The results of this experiment led to the following conclusions:

1. The MMPI seems to have sufficient discriminatory capacity to justify its continued use in the study of criminals and non-criminals.
2. Though the MMPI did discriminate the inmates from their brothers in degree of personality adjustment, further study of this problem is needed under more controlled conditions.
3. The Psychopathic Deviate scale seems to be especially valuable in discriminating between the two groups.

BIBLIOGRAPHY

- Capwell, Dora F., "Personality Patterns of Adolescent Girls: I. Girls Who Show Improvement in IQ," Journal of Applied Psychology, 29: 212-228, June, 1945.
- _____, "Personality Patterns of Adolescent Girls: II. Delinquents and Non-Delinquents," 29: 289-297, August, 1945.
- Cole, William E., "Causation of Crime." Vernon C. Branham and Samuel B. Kutash, editors, Encyclopedia of Criminology. New York: Philosophical Library, 1949. 527 pp.
- Crook, M. N., "Intra-Family Relationships in Personality Test Performance," Psychological Record, 1: 479-502, 1937.
- Freeman, M. J., "Changing Concepts in Crime," Journal of Criminal Psychopathology, IV: 290-305, 1942.
- Hathaway, Starke R. and J. Charnley McKinley, "A Multiphasic Personality Schedule (Minnesota): I. Construction of the Schedule," The Journal of Psychology, 10: 249-254, 1940.
- _____, "A Multiphasic Personality Schedule (Minnesota): II. A Differential Study of Hypochondriasis," The Journal of Psychology, 10: 255-268, 1940.
- _____, "A Multiphasic Personality Schedule (Minnesota): III. The Measurement of Symptomatic Depression," The Journal of Psychology, 14: 73-84, 1942.
- _____, Manual for the Minnesota Multiphasic Personality Inventory. Minneapolis: University of Minnesota Press, 1943.
- Kelley, Truman L., Giles M. Ruch, and Lewis M. Terman, Stanford Achievement Tests: Manual of Directions. Yonkers-on-Hudson, New York, and Chicago, Illinois: World Book Company, 1940.
- McKinley, J. Charnley, and Starke R. Hathaway, "A Multiphasic Personality Schedule (Minnesota): IV. Psychasthenia," The Journal of Applied Psychology, 26: 614-624, 1942.

- _____, "The Minnesota Personality Inventory: V. Hysteria, Hypomania and Psychopathic Deviate," The Journal of Applied Psychology, 28: 153-174, 1944.
- _____, "The Identification and Measurement of the Psychoneuroses in Medical Practice," The Journal of the American Medical Association, 122: 261-267, 1943.
- Monachesi, Elio D., "Some Personality Characteristics of Delinquents and Non-Delinquents," Journal of Criminal Law and Criminology, 38: 487-500, 1948.
- _____, "Personality Characteristics of Institutionalized and Non-Institutionalized Male Delinquents," Journal of Criminal Law and Criminology, 41: 167-179, 1950.
- Schuessler, Karl F., and Donald R. Cressey, "Personality Characteristics of Criminals," American Journal of Sociology, 55: 476-484, 1950.
- Shields, James A., "Twelve Thousand Criminals," Journal of Criminal Law and Criminology, 28: 806-814, 1938.
- Supplementary Manual for the Minnesota Multiphasic Personality Inventory. New York: The Psychological Corporation, 1946.
- Sutherland, Edwin H., Principles of Criminology. Chicago, Philadelphia: J. B. Lippincott Company, 1934. 596 pp.
- Tiegs, Ernest W., Willis W. Clark, and Louis P. Thorpe, California Test of Personality: Manual of Directions. Los Angeles: California Test Bureau, 1942.
- Wheeler, W. M., K. B. Little, and G. F. J. Lehner, "The Internal Structure of the MMPI," Journal of Consulting Psychology, 15: 134-141, 1951.

APPENDICES

APPENDIX A

SAMPLE LETTER

April 30, 1951

Mr. John Doe
6046 Rio
San Antonio, Texas

Dear Mr. Doe:

When a man comes to the Texas Prison System he is given a series of tests one of which is a personality test. We have given this test to over four thousand (4000) men as they entered the prison. We find that most of these men have some common personality traits, and we wonder if the men in the free world differ or are the same as the men in the prison in personality characteristics.

Since a number of the men here have brothers on the outside, we would find it helpful to know if these tests show differences for the two brothers.

Would you help us by filling out the Personality Inventory sheet enclosed herewith? Instructions and a return envelope are attached so when you have completed the markings send the answer sheet, test booklet, and the instruction and information sheet back to us immediately. It is essential that you return the completed test and other materials within 72 hours.

We appreciate your cooperation in helping us. If you should come to visit your brother, I will be glad to talk with you regarding the showings the two of you made on these profiles.

Very truly yours,

Rupert C. Koeninger, Ph.D.
Director
Bureau of Classification

gbw

SAMPLE INSTRUCTION SHEET
INSTRUCTION AND INFORMATION SHEET

Follow the directions on the front cover of the test booklet. In marking your answers be sure that the number on the answer sheet is the same as the number of the statement in the test booklet.

You will answer ALL questions from 1 through 366. After statement 366 answer ONLY those statements which are circled.

Write your name on the answer sheet. Indicate the date you take the test. There are spaces provided on the answer sheet for your name and the date.

.....
 Fill in the information requested below.

Please print.

1. NAME: _____
2. DATE OF BIRTH: _____ MO. _____ DAY _____ YEAR _____
3. CIRCLE LAST GRADE COMPLETED IN SCHOOL
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
4. CIRCLE HOW MANY TIMES, IF ANY, YOU HAVE BEEN ARRESTED
 0 1 2 3 4 5 or over
5. CIRCLE HOW MANY TIMES, IF ANY, YOU HAVE BEEN IN:
 REFORM SCHOOL 0 1 2 3 4 5 or over
 PRISON 0 1 2 3 4 5 or over

RAW SCORES OF SUBJECTS

L		P		K		Hs		D		Hy		Pd		Mf		Pa		Pt		Sc		Ma	
I	B	I	B	I	B	I	B	I	B	I	B	I	B	I	B	I	B	I	B	I	B	I	B
2	6	7	4	8	14	9	11	27	19	12	15	29	20	24	18	7	3	31	26	30	26	26	18
4	4	3	1	20	20	17	11	21	14	21	20	29	21	17	22	6	9	25	22	26	23	16	16
1	9	10	5	12	16	13	23	19	20	16	27	29	18	20	20	6	12	27	24	30	24	28	19
3	8	9	7	13	15	15	12	28	18	23	15	31	24	24	26	16	6	38	23	40	26	26	20
9	4	4	4	20	22	19	15	28	23	27	24	27	31	17	25	5	11	33	25	26	31	18	17
4	5	7	5	15	16	27	11	35	15	32	17	28	20	27	19	18	4	33	20	29	23	14	19
5	2	8	9	11	8	18	15	25	23	22	17	33	17	34	25	10	15	31	31	33	39	16	24
3	8	1	3	11	22	10	14	15	22	21	23	33	23	27	21	11	9	29	25	21	24	22	10
5	6	9	5	16	10	18	15	19	26	24	23	26	18	21	19	5	8	24	23	27	24	17	12
5	4	7	0	20	16	18	9	28	16	26	17	31	19	21	22	11	5	24	22	23	23	20	15
3	2	5	8	15	10	26	13	28	17	27	13	29	23	21	23	12	16	25	29	20	26	19	28
1	7	7	1	16	12	14	9	20	19	20	15	28	21	24	22	8	9	27	25	29	22	24	19
3	4	10	7	8	11	13	8	21	12	16	15	31	22	23	27	10	14	28	20	30	21	25	20
6	4	3	3	10	14	21	11	20	17	25	20	30	23	21	31	12	6	20	23	24	20	29	19
9	6	3	4	22	11	19	9	19	24	26	16	24	25	26	16	7	5	28	26	27	22	17	22
2	6	3	2	14	21	11	14	14	17	17	24	25	23	18	31	8	9	21	22	17	23	22	15
3	5	8	2	10	16	17	9	26	12	26	17	38	18	27	17	10	5	29	16	27	19	20	21
1	6	7	5	9	19	13	14	23	18	18	19	32	22	30	22	13	12	28	25	27	28	27	20
4	4	7	2	18	19	21	14	22	20	26	26	30	23	31	23	10	10	24	23	31	22	22	17
0	6	10	5	8	16	23	12	18	20	29	17	23	21	25	19	12	5	32	28	33	29	25	18
6	5	3	1	16	9	12	7	19	15	17	16	21	21	23	23	7	5	23	15	21	10	18	18
4	4	5	1	13	15	9	17	19	23	18	22	25	23	23	23	8	8	19	29	16	23	16	11
1	9	3	2	11	14	11	10	19	20	20	15	23	19	21	30	7	9	18	23	21	22	22	19
10	3	5	2	21	9	12	13	22	19	23	19	27	23	19	23	10	8	34	16	34	14	15	15
2	2	6	7	9	9	10	11	16	21	18	12	30	23	18	25	13	8	23	28	19	19	21	19
2	3	12	2	7	10	18	9	24	16	17	18	30	19	19	31	17	6	36	20	36	14	27	17
0	3	3	3	7	7	12	7	23	19	18	15	27	13	31	21	9	6	37	27	28	26	20	18
3	2	6	4	18	11	11	13	22	17	22	19	32	19	35	22	11	6	21	21	27	23	16	15
2	5	2	1	9	19	12	14	20	18	18	24	25	30	19	22	8	10	26	23	14	23	22	16
8	9	5	4	14	18	13	23	14	20	29	30	33	20	35	23	13	11	32	22	28	24	19	18
3	3	5	4	9	20	15	10	25	15	14	18	20	20	18	15	14	8	27	22	25	22	14	14
3	3	6	3	12	22	9	15	25	22	26	26	32	29	31	25	10	11	28	25	26	33	17	17
10	7	4	1	20	10	11	6	25	19	19	12	32	20	23	21	13	9	30	23	27	20	18	18
5	0	4	3	16	15	15	14	23	13	21	14	30	20	29	17	13	6	23	22	22	22	17	18
8	6	10	9	21	10	19	15	23	16	27	18	34	20	21	19	18	15	28	20	36	28	18	20
4	6	7	4	10	16	7	9	16	22	16	7	27	14	22	24	9	8	19	28	23	24	26	16
5	8	4	3	19	22	26	13	16	23	30	23	20	22	20	21	8	8	28	25	23	30	18	11
4	5	7	5	22	20	22	15	27	23	23	15	33	28	26	19	11	5	27	26	38	24	17	17
1	6	8	6	9	18	20	12	15	19	17	24	21	25	15	24	9	9	30	25	28	25	14	16
3	7	8	4	12	19	17	12	20	19	26	18	31	21	30	24	5	6	25	24	29	22	24	14
6	6	7	8	15	13	19	17	30	20	28	18	35	21	25	17	12	14	28	23	24	31	23	20
6	4	9	6	17	21	19	16	28	16	18	21	31	23	28	22	12	9	40	24	34	27	19	16
4	4	6	4	15	10	13	17	20	23	13	22	27	24	14	21	11	8	27	17	27	16	20	16
2	9	7	4	16	20	13	12	22	19	27	18	35	21	27	22	11	6	34	23	35	22	23	14
2	3	1	7	18	16	11	13	22	17	22	27	30	25	24	24	9	10	28	24	26	24	21	16
4	4	4	4	23	17	17	11	21	15	28	18	36	20	23	15	11	9	31	20	29	20	22	14
1	6	5	2	16	22	9	14	17	18	17	25	27	24	26	31	9	9	28	22	28	24	31	16
4	7	9	4	12	17	11	22	21	19	18	28	32	23	29	23	10	12	27	22	36	23	16	17
5	2	8	8	16	17	10	12	20	22	15	15	29	24	19	15	5	3	25	23	28	22	24	11
8	3	8	5	19	8	22	9	24	20	28	18	24	13	21	22	15	6	24	27	31	26	19	19
2	6	9	8	20	14	12	12	24	21	22	17	38	20	28	22	7	3	37	27	40	28	21	14
6	3	2	3	19	14	16	8	23	21	19	16	32	14	24	24	13	6	36	26	24	22	12	16
3	3	4	6	11	19	9	12	15	18	21	18	32	23	20	22	14	9	25	28	23	28	22	21
7	4	6	3	16	20	12	16	20	25	23	20	25	29	23	19	9	6	25	26	28	24	24	18
4	8	5	0	16	22	11	12	22	17	20	25	29	25	28	19	6	6	27	22	28	24	17	19
2	6	3	0	14	18	13	10	19	19	16	20	26	22	18	16	10	10	23	22	21	20	22	18
4	2	2	3	15	7	11	11	18	15	23	18	33	18	22	23	14	6	26	19	24	19	17	14
6	4	9	5	13	11	12	11	18	18	18	17	23	21	22	25	6	13	28	24	31	19	27	14
5	4	0	4	21	16	14	17	18	21	19	27	30	28	17	19	6	13	27	33	26	24	20	20
6	6	10	4	13	18	13	13	27	20	13	24	23	22	16	19	14	13	39	23	42	23	22	18
2	5	4	0	16	16	16	9	21	15	23	16	28	16	19	17	19	9	31	17	32	19	14	14
5	4	6	1	9	7	27	10	30	27	32	24	26	26	17	23	10	14	33	26	26	19	24	15
3	7	9	4	10	13	16	9	23	21	25	14	21	20	15	30	9	10	25	28	28	24	24	19
4	4	6	4	17	19	11	13	20	14	21	20	24	18	33	30	4	9	26	31	29	29	29	24
1	5	8	1	11	9	19	7	24	17	24	13	27	12	25	17	6	5	30	13	33	15	20	12

RAW SCORES OF SUBJECTS

L		F		K		Hs		D		Hy		Pd		Mf		Pa		Pt		Sc		Ma	
I	B	I	B	I	B	I	B	I	B	I	B	I	B	I	B	I	B	I	B	I	B	I	B
2	7	5	1	10	17	7	11	18	18	22	20	34	18	32	20	12	8	31	18	30	21	26	14
0	5	10	3	8	15	11	10	26	19	17	18	35	24	35	21	17	5	37	23	47	17	25	17
1	4	6	1	12	21	11	12	21	21	18	17	27	22	28	22	14	9	38	27	32	23	20	12
4	9	10	1	8	16	20	11	23	19	26	20	27	14	27	16	10	8	28	17	22	17	17	15
5	2	8	2	11	13	23	10	34	16	34	16	30	15	24	21	12	6	31	18	30	18	23	19
4	9	1	1	15	22	9	14	13	22	15	19	24	24	15	20	5	4	18	25	19	27	20	11
2	7	5	5	7	16	7	13	29	12	15	23	19	19	25	17	12	8	25	16	22	18	14	20
4	7	7	4	13	14	15	12	20	25	23	21	30	27	30	18	15	5	30	29	28	25	28	24
6	5	3	7	14	7	10	14	20	30	20	28	33	28	21	23	7	15	21	27	20	24	20	15
0	2	8	1	16	19	16	15	23	15	23	24	26	24	16	21	5	13	30	23	32	24	23	21
7	7	3	7	23	14	16	11	19	13	25	18	31	23	24	28	12	16	29	22	27	24	23	23
4	7	4	4	9	9	17	15	27	26	26	20	24	17	13	22	13	11	31	30	29	22	25	17
2	4	3	0	20	23	18	14	31	15	29	20	33	22	36	19	11	8	36	23	33	26	18	19
3	5	4	4	15	9	11	10	19	18	19	16	19	15	28	17	11	5	25	16	22	16	24	13
4	9	8	6	12	15	9	13	22	22	18	20	19	15	26	17	15	8	29	18	21	17	11	19
4	4	8	6	13	20	21	13	19	21	16	18	25	21	23	22	11	10	27	25	31	25	20	12
1	6	3	5	9	14	7	17	17	28	11	27	25	22	15	21	4	9	23	27	20	30	23	14
3	8	1	2	16	22	8	16	18	20	16	25	26	24	19	23	7	8	24	24	22	25	17	18
5	7	4	6	11	18	17	14	19	18	22	20	23	22	22	21	7	6	27	22	24	27	18	22
1	2	8	2	7	18	13	16	22	17	20	24	34	23	23	24	20	13	31	21	33	24	17	23
2	5	9	0	10	14	14	11	19	15	15	15	22	20	25	20	8	5	32	21	28	17	20	11
6	7	9	3	10	8	23	15	26	26	36	22	26	17	26	23	15	10	38	29	32	23	24	19
2	4	5	3	18	11	8	14	19	18	18	12	28	16	22	20	7	4	19	21	11	17	18	14
4	4	2	4	16	14	11	19	16	24	19	24	27	24	15	24	8	9	21	30	23	23	19	11
3	5	3	3	16	10	15	7	17	15	18	12	31	24	27	22	12	9	22	16	22	16	17	17
2	5	4	7	16	11	8	10	12	25	14	17	29	27	16	17	4	7	23	26	23	24	27	23
3	4	4	7	9	12	18	9	24	13	26	16	34	21	33	27	17	15	34	20	35	22	21	20
9	3	4	10	13	12	15	14	26	18	22	15	32	25	30	25	10	18	27	30	29	30	15	29
4	5	9	3	16	22	20	12	18	17	19	22	24	24	17	22	8	11	21	25	24	28	22	16
3	4	4	1	17	17	11	10	21	18	19	17	30	25	13	22	7	8	26	24	22	22	18	18
2	8	6	10	10	12	15	14	20	5	20	15	27	23	20	26	9	7	33	21	26	24	24	21

APPENDIX C

SAMPLE OF SCATTERGRAM AND STATISTICS

A SCATTERGRAM AND CALCULATION OF THE CORRELATION BETWEEN RAW SCORES MADE BY 96 INMATES AND THEIR BROTHERS ON THE S₈ SCALE OF THE MMPI. THE CALCULATION OF THE SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE MEANS IS ALSO SHOWN

		Inmate Raw Score (x)													
		9	14	19	24	29	34	39	44						
		13	18	23	28	33	38	43	48	fy	y'	fy'	fy' ²	Σx'	Σx'y'
Brother Raw Score (y)	44-48														
	39-43					1				1	4	4	16	1	4
	34-38									0	3	0	0	0	0
	29-33				2	3	3			8	2	16	32	1	2
	24-28				8	16	7	3	2	36	1	36(56)	36	11	11
	19-23			3	7	11	12	3	1	37	0			8	0
	14-18	1			5	2	2	2		13	-1	-13	13	2	-2
	9-13				1				1	1	-2	-2(-15)	4	-1	2
fx		1	3	23	32	25	8	3	1	96			41	101	22
x'		-3	-2	-1	0	1	2	3	4						
fx'		-3	-6	-23	-32	25	16	9	4	22					
fx' ²		9	12	23		25	32	27	16	144					
Σy'		-1	0	5	20	15	1	2	-1	41					
Σx'y'		3	0	-5	0	15	2	6	-4	17					

APPENDIX C (continued)

STATISTICS

$$cy = \frac{41}{96} = .43$$

$$cx = \frac{22}{96} = .23$$

$$cy^2 = .1849$$

$$cx^2 = .0529$$

$$AMy = 21.0$$

$$AMx = 26.0$$

$$ci = \frac{2.15}{23.15}$$

$$ci = \frac{1.15}{27.15}$$

$$My = 23.15$$

$$Mx = 27.15$$

$$SDy = \sqrt{\frac{101}{96} - .1849} \times 5 = 4.65 \quad SDx = \sqrt{\frac{144}{96} - .0529} \times 5 = 6.00$$

$$SE_{My} = \frac{4.65}{\sqrt{96}} = .47$$

$$SE_{Mx} = \frac{6.00}{\sqrt{96}} = .61$$

$$SE_D = \sqrt{.47^2 + .61^2 - 2 \times .07 \times .47 \times .61} = .74$$

$$\frac{D}{SE_D} = 5.41$$

$$r = \frac{\frac{17}{96} - (.43 \times .23)}{.93 \times 1.2} = .07$$

$$PE_r = \frac{.6745 (1 - .07^2)}{\sqrt{96}} = .07$$