A COMPARISON OF THE VALIDITY AND RELIABILITY OF KINCANNON'S AND HUGO'S MMPI SHORT FORMS IN A CLINICAL POPULATION

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To meet the need of making clinical evaluations in the most efficient way, many scales and short forms of the MMPI have been developed. A review of the literature indicated that the Mini-Mult devised by Kincannon (1967) and the Short Form by Hugo (1971a) were the best short forms of the MMPI which have been constructed. The purpose of this study was to determine which of these short forms would most accurately predict the standard MMPI in a clinical population.

Using a clinical population, the following hypotheses were tested: 1. There will be no significant difference between the MM and the SF in their ability to predict the group means for the scales of the standard MMPI. 2. There will be no significant difference between the correlations for the MMPI-MM and the correlations for the MMPI-SF. 3. There will be no significant difference in the distribution of the three highest MMPI scales compared to the distribution of the three highest MM scales or compared to the distribution of the three highest SF scales.

The standard 566-item MMPI was used from the files of sixty psychiatric patients from Beverly Hills Hospital. The scores for the MMPI, MM, and SF were all converted into K corrected T-scores. These T-scores were then used to calculate

the means, standard deviations, and Pearson Product Moment correlations for making a comparison of the MMPI, MM, and SF. In addition, a profile analysis was made to check the correspondence between the MM-MMPI and the SF-MMPI. Each of the short forms was able to predict the means of the MMPI to a high degree of accuracy, although three of the SF scales were significantly different. Looking at the eleven scales where the MM and SF could be compared, only one of the SF scales (2) was significantly different; therefore the first hypothesis was accepted. The SF-MMPI correlations were higher than the MM-MMPI correlations for nine of the eleven scales, with four of them being significantly higher. Thus, the second hypothesis was rejected. On the profile analysis, both short forms were significantly different from the MMPI. As a result, the third hypothesis was rejected; however, since both short forms were significantly different, no conclusions could be made concerning the superiority of one of the short forms for profile analysis. Some of the scales from each short form had high statistical correspondence with the MMPI. It was proposed that a new short form could be developed by combining the best scales from each test. Further research would be needed to test the accuracy of the new short form in various populations.

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CHAPTER I

INTRODUCTION

From earliest recorded history, man seems to have been fascinated by his own behavior. The many volumes which have been written about philosophy and theology testify to man's attempts to answer basic questions concerning himself and his behavior. Through speculation, introspection, and generalization about his own experiences, man has been able to generate a considerable amount of information pertaining to his nature.

During the last quarter of the nineteenth century, man began to apply scientific methodology to the study of psychology. From the time that Wilhelm Wundt established the first psychological laboratory in 1879 (Schultz, 1970), psychology began to establish itself as an independent branch of study, worthy of being considered a science. Man is still asking many of the same basic questions, although he is now applying the scientific method in attempting to find the answers.

The development of psychological testing has made a vast contribution to the scientific study of psychology. A standardized psychological test first appeared in 1905, when Alfred Binet developed a test for the identification

of mentally retarded children (Cronbach, 1970). Since that time, tests have been developed to measure many facets of man's behavior, including measures of aptitude, achievement, and personality. The First World War was the catalyst for the development of group tests, which were needed for the classification of the million and a half recruits.

The forerunner of today's self-report personality inventory was developed by R. S. Woodworth in order to classify the recruits of the First World War. The Woodworth Personnel Data Sheet attempted to standardize a psychiatric interview and to adapt the procedure for mass testing (Anastasi, 1971). Items were selected for the item pool which were supposed to be predictive of neurotic and pre-neurotic conditions according to a review of the literature. The item pool was then empirically reduced by not retaining any items which twenty-five per cent of a normal sample answered in an unfavorable direction. Although this test introduced an empirical method for eliminating some of the items, the test was based on a rational selection of items.

In developing the Minnesota Multiphasic Personality Inventory (MMPI), Hathaway and McKinley (1943) were the first to use a totally empirical method for the selection of items. From a large item pool, items were selected which statistically differentiated between normal and abnormal groups. Using this technique, the completed inventory contained 566 items.

Many of the innovations in psychological testing have emerged as a result of a practical need. Since the MMPI is probably the longest inventory which has been developed, there is a need to have a short inventory which would give the same type information as the MMPI.

During the first two decades after the MMPI was published, short forms consisted of eliminating the unscored items, leaving the validity and clinical scales intact. Recently, attempts have been made to develop a true abbreviated form of the inventory. Although the three validity scales and the ten clinical scales can be obtained from the first 399 questions of Form R, the full battery contains 566 questions. It takes a person, on the average, between one hour and one hour and a half to complete the total test. The inventory contains 200 items which are not scored on the validity and clinical scales. These items have been used for the development of over 200 additional scales (Dahlstrom & Welsh, 1968). Although this research has been profitable for the development of personality theories and research tools, a 566-item test is too long for some situations, including some research projects, clinical evaluations, and job screening.

There are at least three factors affecting situations in which a short form would be especially helpful. First, there is the human element. In the opinion of Lacks (1970) and Kincannon (1968), some patients who are mildly to

severely disturbed may be overwhelmed by the large number of items, resulting in minimal cooperation and, in some cases, a refusal to answer the questions which limits the clinical evaluation. The lack of cooperation would also affect research projects where it is extremely important to have a low attrition rate.

Second, the time element is a factor which should be considered, since it affects both the tester and the testee. In various counseling situations, a rapid evaluation is necessary. In job screening, a personnel battery which uses a short form of the MMPI would allow more time for other types of tests and for a longer personal interview. A shorter form of the MMPI would also be more palatable for research projects where subjects are so time conscious.

Third, the factor of expense is important. The short form is initially less expensive because it costs less to print. Depending upon how much it has been shortened, the expense of administration and scoring can be considerably reduced.

Now that short forms of the MMPI are being devised, it is necessary that they be tested and evaluated in a variety of settings. When a short form of the MMPI is developed with a specific population, it must be checked for reliability and validity with each population where it might be used. If the short form is able to predict the MMPI results with a high degree of accuracy for a population about which

there is MMPI data, then one could generalize the information concerning the MMPI to the shorter form in that specific population.

Definition of Terms

John Hugo (1971a) referred to the test which he developed as the Short Form (SF). Hereinafter, the short form developed by Hugo will be designated in this paper, SF. In this paper the popular abbreviation for the Mini-Mult, which is MM, will also be used.

Statement of the Purpose

The purpose of this study is to determine how accurately the short form of the MMPI, which was developed by Hugo (1971a), will predict the standard MMPI in a clinical population. In addition, a comparison will be made between Hugo's short form and Kincannon's short form (1967) to determine which of these is more accurate in a clinical setting. Kincannon's short form, the Mini-Mult (MM), was developed using a clinical population and the short form by Hugo was developed using a college population. The Mini-Mult has been tested on populations different from the one with which it was developed (Lacks & Powell, 1970; Armentrout & Rouzer, 1970; Armentrout, 1970; Trybus & Hewitt, 1972). The short form developed by Hugo has not been investigated with other populations; however, Hugo did compare his short form and the Mini-Mult in a college population in his original

study (1971a). As a result, he concluded that his short form was able to predict the standard MMPI more accurately than the Mini-Mult in that setting. This study is designed to see if the same conclusions are applicable for a clinical population.

Hypotheses

The following hypotheses concerning the MM and the SF will be investigated:

1. There will be no significant difference ($p < .05$) between the MM and the SF in their ability to predict the group means for the scales of the standard MMPI.

2. There will be no significant difference ($p < .05$) between the correlations for the MMPI-MM and the correlations for the MMPI-SF.

3. There will be no significant difference ($p < .05$) in the distribution of the three highest MMPI scales compared to the distribution of the three highest MM scales or compared to the distribution of the three highest SF scales.

Preview of the Remainder of this Study

The remainder of this study will include a review of the literature, a statement of the method, the results, the discussion, and the summary. In the review of the literature a brief look will be taken at short forms of intelligence and personality tests. Special emphasis will be given to the MM and SF. Included in the statement of the method will

be the subjects, instruments, and procedures used for the experiment. The results will consist of the data obtained. In the discussion the conclusions reached and the recommendations for further research will be stated. The summary will be comprised of a restatement of the entire paper with specific references to its pertinent results and conclusions.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this chapter is to review the development of the short forms of psychological tests, specifically those tests which are related to intelligence and personality. Since the movement to shorten tests began with intelligence tests and because some of the problems encountered with them are also applicable to personality tests, intelligence tests are included. Short forms of personality tests appeared later and their development depended in part upon the work which had already been done with the short forms of intelligence tests. A major portion of this chapter will review the investigation of the Mini-Mult. Due to the recent development of the SF, no published references were found. However, a review of the development of the SF will be included.

Abbreviated Intelligence Tests

The first abbreviation of the Binet-Simon was introduced by Doll (1917) in order to detect mental defectives more rapidly. This abbreviation was adapted to meet the need of screening the military inductees for World War I. The abbreviated version met with only limited success, and the idea of an abbreviated intelligence test was not actively pursued until Kent (1932) introduced a short, oral, individual

test of intelligence. Then, World War II brought into sharper focus the need for shorter tests to facilitate the screening of military personnel.

John A. Hugo, II (1971a) cites six methods which have been used by various people to shorten intelligence tests. In so far as these methods are related to shortening personality tests, it seems that they could be more concisely listed under three headings: Scale Sampling, with four subtopics; Item Sampling, and Factor Sampling.

Under Scale Sampling, Hugo discusses four ways to determine which scales to use for an abbreviated intelligence test. First, the scales which have the highest correlation with the total IQ can be summed up, so that the full scale score is given. Second, the technique of multiple regression allows differential weights to be assigned to the most predictive scales. Third, stratified subtests can be used so that the different elements are sampled. For example, Doppelt (1956) used two of the Verbal subtests and two of the Performance subtests to construct an abbreviated Wechsler Adult Intelligence Scale (WAIS). Fourth, idiosyncratic scale sampling provides a method for testing populations which are limited by such factors as age, psychiatric diagnosis, physical disability, et cetera.

Scale Sampling has received the greatest amount of research for developing abbreviated forms of intelligence tests. In situations where the only information necessary is

an estimate of the total IQ, a short form based on one or more scales is adequate, provided it has been shown to be valid and reliable. However, if a combination of scales representing different types of functioning is necessary for a diagnosis, then the IQ which is obtained from one or more scales may not be adequate. Many personality tests depend upon the diagnosis which is obtained from the whole profile (Gough, 1946; Marks & Seeman, 1963; Ruesch, 1945; Welsh & Dahlstrom, 1963). Therefore, Scale Sampling would have severe limitations when applied to abbreviated personality tests.

Item Sampling is the second method which can be used for developing an abbreviated intelligence test. Using this method, items would be taken from several of the scales or from all of the scales in an attempt to have all the functions of the test represented in the shortened form. Hugo (1971a) states that one would have a "quasi-split half" (p. 4) test.

A third method which can be used to shorten an intelligence test is Factor Sampling. On the basis of factor analyses, items, or subtests, are selected to represent the various factors which are measured by the full form. Thus, all the factors of the full form can be included in the shortened form.

In addition, Hugo points out three means for obtaining the full scale score after the items have been selected. Included are:

> Multiplication according to the proportion of items taken from any scale; linear regression equations for transforming the several subtest scores into a least squares estimate of a full scale score; and multiple regression equation with the subtest scores on all k subtests as predictors (p. 6).

He reports that his review of the literature generally favors the multiple regression method.

After the items have been selected and a procedure for deriving a full scale score is obtained, the procedure most commonly used for validating the derived short form is to demonstrate that it has a high correlation with the long form of the intelligence test from which it was taken (Kincannon, 1967). However, a high correlation between the two forms does not prove that the short form has the same type of validity as the long form. Therefore, it is necessary to have additional methods for validating the short forms of intelligence tests.

Mumpower (1964), after reviewing six studies of short forms of intelligence tests, where the correlations of the abbreviated scales to the full scales ranged from .55 to .95, pointed out that even a correlation as high as .90 accounts for only 81 per cent of the variance in short form IQ scores which may be attributed to the Full Scale IQ score leaving 19 per cent, or nearly one fifth, of the variance unaccounted for. Because of this, he declared that a short form test must prove itself on both a statistical basis and also in clinical application.

For his clinical research, Mumpower hypothesized that the results of the short form Wechsler Intelligence Scale for Children (WISC) would be sufficiently valid to use as a substitute, with a high degree of confidence, for the whole test. He administered a short form of the WISC to fifty children who had previously taken the Full Scale. The resulting IQ scores were very similar for the Full Scale and the short form with respective means of 85.64 and 83.52, standard deviations of 19.93 and 18.33, and ranges of 48 to 133 and 46 to 135. The group ranged in age from 7-2 to 15-10 with a mean age of 11-3. In this particular study, the correlation between the Full Scale and the short form was .95, which is consistent with those reported in other studies (Enburg, Rowley & Stone, 1961). Each child was classified according to his Full Scale IQ and his short form IQ using a ten point scale that ranged from "exceptionally able" to "retarded custodial." Then each pair of classifications was compared. Of the fifty classifications, thirty-nine placed the child in the same category. However, in eleven cases the two forms failed to place the children in the same category. This study demonstrated that even with a correlation as high as .95, it is possible to have a 22 per cent misclassification rate. In a second study, Mumpower attempted to predict full scale scores from two short forms which resulted in a 24 per cent error of classification. After this study, Mumpower (1964) concluded, "At what point does the

error become more than one can accept or tolerate? How many psychologists will accept a procedure that is likely to be wrong in one out of every four or five cases?" (p. 113).

Kincannon (1967) criticizes Mumpower for failing to point out that the full scale WISC is not completely reliable. A more accurate estimate of the error would have been obtained if there had been a control group. This control would entail a retest of the full scale WISC which would give the test-retest reliability of the full scale. When the r of the full scale test-retest is compared to the r of the full scale short form, "a relative loss of efficiency" (p. 4) would be demonstrated.

Silverstein (1965) points out an alternative solution to the problem of providing a control. If the correlation of a short form and a full scale can be predicted on the basis of a theoretical rationale, then this data can be substituted as the data a control would normally provide. Kincannon (1967) points out that if there is no control, there should be some theoretical rationale which would account for the variance normally identified by the use of a control.

Another factor to be considered in the development of a short form is how accurately it can be generalized to populations other than the one upon which it was constructed. Doppelt (1956) addresses himself to the criticism that inadequate population samples had been used for the development

of many of the short forms. For the derivation of his short form, he used the data gathered in the national standardization of the WAIS as reported in the WAIS manual. The use of the national standardization data enabled him to be more confident in making the same generalizations about his short form as were applicable to the WAIS.

Kincannon (1967) summarizes the main considerations which should be made for developing and using an abbreviated intelligence test:

> First, the derivation should be based on a sample representative of the population in which the derivation will be used. Second, it seems probable that loss of precision can be mitigated by adequate coverage of the domain of traits included in the test from which the abbreviation is derived. Third, high correlations are not sufficient demonstration of validity for individual predictions. Fourth, unless a theoretical expectancy can be presented, a control group is necessary to determine the relative loss of precision attributable to the use of an abbreviation. Fifth, and finally, loss of efficiency is in part a function of the degree of precision desired for the individual predictions (p. 8).

Since the shortened personality tests have not been extensively researched, the above summation would also be helpful in evaluating the short form personality tests which have already been prepared.

Abbreviated Personality Tests

Hugo (1971a) points out that of all the reports concerning the development and evaluation of short personality tests, there are twice as many reports pertaining to the MMPI as

there are with all of the other personality tests combined. The popularity of the use of the MMPI for the development of short forms can be attributed to both its length and the abundance of research it has stimulated. If a short form could validly and reliably predict the full MMPI scores, then much of the data concerning the use of the full MMPI could be generalized for the short form.

In addition, the popularity of the MMPI for short form research is partly attributable to its empirical development. It first appeared as a collection of 504 items which were classified under 25 different headings (Hathaway & McKinley, 1940). As one of the most frequently used instruments of the clinical psychologist from 1940 to 1950, it went through several adaptations, including having its items put in a standard booklet form (Cronback, 1970). Skovron (1969) outlined nine points which were taken into consideration for the development of the MMPI:

> First, items were chosen to be intelligible at low reading ability levels. Second, items were stated in the first person in an attempt to produce more self-reference in the examinee. Third, all scoring was dependent on simple item weights of zero or one, and little skill was required in producing the complete profile. Fourth, items were deliberately varied in content, going far beyond clear face validity. Fifth, in the hope of breaking the monotony of true responses always being associated with bad things, there was an effort to find or state items for which an undesirable implication was associated with a false response. Sixth, to check further upon the subject's reading ability and to provide a measure of the strength of the tendency to be overly candid, a special scale called F was provided. This was arbitrarily composed

> of items having very infrequent endorsement among the normalizing sample of subjects. Seventh, for measures of too strong a tendency to say good things, the L scale was introduced. The items express desirable social facts, but the candid subject usually cannot endorse them. Eighth, normative data were obtained from ordinary middle-aged persons more like those who might be tested in the practical situations of clinical work than the normative samples that most inventories had used. And ninth, all items were validated by reference to empirical frequency differences between the general normal group and various clinically defined deviant groups characterized by internationally known and used categorical terms (p. 16).

Following the guide lines which Skovron summarized, an empirically based standardized test was derived which was able, with a high degree of accuracy, to identify people who had been diagnosed in one of the traditional psychoneurotic categories. In addition, the validity scales L, F, and K were able to help identify response patterns and invalid records. The Lie Score (L) is composed of questions which are worded in the socially desirable direction, however, it is unlikely that the endorsement of these items would be a truthful answer. The Validity Score (F) is composed of items very infrequently answered in the scored direction by the standardization group, therefore a high F may indicate that the directions were not understood or followed, that the person has deliberately tried to look bad or has responded carelessly. The Correction Score (K) uses a combination of items to measure the test-taking attitude. A high K score might be an attempt to fake good or it might indicate defensiveness, whereas a low K score might indicate

self-criticism or a deliberate attempt to fake bad. The result was an inventory which could be used with both a clinical and normal population. With so many advantages and possible applications, it is, therefore, understandable why the MMPI has been the most popular candidate for developing an abbreviation.

Since the 1940's, over 200 scales have been developed using both clinical and normal populations. These scales, which obtained some or all of their items from the MMPI, were designed to measure specific characteristics (Altus, 1945, 1953; Altus & Bell, 1945, 1947; Canter, 1960; Clark, 1948, 1949a, 1949b; Gough, McClosky & Meehl, 1952).

Three tests (Berdie & Layton, 1957; Gough, 1969; Heist & Yonge, 1968) which are at least somewhat shorter than the full MMPI, attempt to give an evaluation of the total personality. Unlike the scales which concentrate on a specific characteristic, these three inventories serve a function with normal populations similar to the function served by the MMPI with clinical populations. However, the shortest one, which contains 355 items, would not be considered a short test when it is compared to the MMPI of 399 items.

Abbreviated MMPI's

A variety of techniques have been employed in order to develop short forms of the MMPI. During the first ten years

after the MMPI was published, several investigators experimented with short forms in which the unscored items had been deleted. Ferguson (1946) approached the problem with the specific purpose of "obtaining the profile more quickly where time was a factor" (p. 253). After evaluating the test, he decided that 200 items were not being utilized in the scoring, so he proceeded to experiment both with and without these items. He provided no statistical results and concluded with this comment, "We did not notice any appreciable difference on the resulting profiles revealed by our patients" (p. 248). However, Gough (1946) cautioned that forms which had been shortened by deleting the unscored items, should not be used for clinical purposes until their validity had been verified.

Holzberg and Alessi (1949) made a study similar to the one made by Ferguson; however, they added reliability data. With their method, there was a 37 per cent savings in the administration time and a 30 per cent savings in the scoring time. The correlations between the individual scales of the long and short forms ranged from .52 to .93. These correlations compare favorable with the reliability coefficients (test-retest) which were found in the original research concerning the MMPI. There were statistically significant differences between the mean weighted scores on one half of the scales; however, these results were not judged to be clinically significant in relation to the effect they had on

the profiles. This study tends to substantiate Ferguson's conclusion that there were no appreciable differences on the profile results between the full and shortened forms.

MacDonald (1952a) recognized that there was no data available comparing the group and individual forms which had been shortened to the 256 scorable items. A high school population of fifty males and sixty-seven females comprised the population. One group took the group form first while the other group took the individual form first. The data raised considerable questions as to the validity of the two forms. Since both forms had identical items presented in the same order of administration, it was expected that the correlations would be high. This data revealed that only one scale (Mf) had a correlation high enough to increase the efficiency of prediction above chance by fifty per cent.

In a follow-up study, MacDonald (1952b) investigated the effect of time interval between test and retest as well as the effect of item arrangement. He hypothesized that these two factors might account for the low statistical data obtained with the high school population. His results indicated that these two factors did not significantly affect the performance of the subjects. Therefore, he concluded that these factors were not the cause of the low statistical results as had been suggested in the earlier study.

Olson (1954) pointed out that the indiscriminate use of short forms would limit future research which would require

all 566 items. Nevertheless, he acknowledged that a valid short form should be available for special needs. Olson developed the Hasting Short Form which consisted of the first 420 items, since only 22 items were scored beyond that point. Two of the items were for K and twenty of the items were for Si. To solve this problem, he formulated a table for the correction of the Si raw score by proration. For the K items, the most promising correction technique was merely to add one point to the raw K score when that score equaled twelve on the short form. The Hasting Short Form, which resulted in a 26 per cent savings in time, was able to predict the long form score and profile with very little change. The K scale was accurate within one raw score point in 97 per cent of the cross-validation group. The Si score was accurate within five points in 97 per cent of the entire sample. Olson concluded that his was the most reliable and valid abbreviated short form of the MMPI at that time. It should be pointed out, however, that 420 items is still too long for some of the clinical and research applications listed earlier in this paper.

The first abbreviated form of the MMPI, which retained most of the profile picture and also significantly reduced the number of items, was the short form by Jorgensen (1958). Working on the assumption that an ability test could be shortened by a reduction in items, or sections, without necessarily reducing the validity or reliability, Jorgensen

proceeded to apply those principles to the MMPI. An item evaluation was made, and items for the short form were selected on the basis of two criteria: "A frequency of greater than fifty percent for the highest scoring cases for a given scale and ratio of frequency for highest scoring cases to frequency for lowest scoring cases not less than 3:1 (reduced to 2.5:1 for Pd and Ma)" (p. 341). From this evaluation, 176 items were selected to be included in the short form. The scales included in this short form were L, K, Hs, D, Pd, Pt, Ma, and the CNF (Common Neurotic Features), which was developed by the author. He justified the omission of the scales F, Mf, Pa, and Sc, since he felt that these scales were not valid with the population he was using.

One of the most glaring errors of this study was the failure to produce any validity or reliability data. Jorgensen (1958) made this evaluation: "The writer has been using the short form of the MMPI (176 items) for several months now, and, from observation, it appears to be just as useful as the 365-item form" (p. 348). With the deletion of several scales and the lack of statistical data, this short form can not be defended as a valid or reliable short form of the MMPI.

Working on the rationale that the social desirability of an item on a true-false personality test would determine the rating which it was given, Edwards (1957) developed a thirty-nine item Social Desirability (SD) Scale. Edwards and Walker (1961) proposed that the SD scale could serve as a short form

of the MMPI since it was possible to predict mean MMPI scores from the way the thirty-nine items were answered. Correlating the observed and predicted MMPI scores of thirty male college subjects, they found that the subjects who had the highest score on the SD scale had the highest correlation between the observed and predicted scores. For three groups consisting of ten subjects each, who were rated high, average, and low on the SD scale, the average correlations were .90, .84, and .79 respectively. They concluded that this stability supports the use of expectancy tables. In a latter study, Edwards (1962) presented the values for P and Q which would predict the mean scores on forty-three MMPI scales. Based upon a sample of 155 males, the predicted and observed scores obtained a correlation of .93.

Marlowe and Gottesman (1964a) questioned the use of the SD scale for predicting the MMPI.

> Edwards has described a rationale for predicting MMPI scores based upon social desirability response bias. The clinical utility of this technique was examined by comparing the predicted average MMPI profile with the average profile actually obtained by college males. The estimated and actual profiles were markedly discrepant, indicating that Edwards' SD scale is not a useful substitute for the MMPI (p. 181).

Plotting the predicted profiles gave three scales with mean T scores at or above seventy and seven scales with mean T scores at or above sixty. This would not be the type of profile which would be expected as the mean profile of the average college male (Marlowe & Gottesman, 1964b).

Of all the scales and short forms of the MMPI reviewed thus far in this study, each one had one or more serious inadequacies when it was correlated with the full MMPI or compared with the profile configuration of the full MMPI. According to Buros (1972), the Mini-Mult (Kincannon, 1967) was the first abbreviated form which actually reflected the full MMPI. However, a review of the literature for the development and use of the Mini-Mult shows conflicting data as to the accuracy of this short form.

In developing the MM, Kincannon (1967) attempted to show that the assumptions underlying the Spearman-Brown formula were not appropriate for abbreviating the MMPI. The Spearman-Brown formula assumes that: the longer form of a test is more valid, the items on a test are equivalent in score value and the process of shortening the long form would involve a random selection of items. Kincannon pointed out that the MMPI items are not equivalent and that the test could be shortened by the proper means of item analysis. He reasoned that the short form's reliability would not be seriously decreased.

The following procedure was used to develop the seventy-one item short form called the Mini-Mult (Kincannon, 1968):

> First, the items within each scale were clustered. The cluster formations were based on the Comrey data. Clusters were defined as aggregates of items, each having a phi coefficient greater than, or equal to, .30 with reference to the other items within the cluster. Second, a number of items were selected to

> proportionately represent each cluster. In most cases, the items scored on the greatest number of the clinical and validity scales were the ones chosen (p. 320).

In evaluating the short form, three comparison groups were used. Each person was given the standard MMPI twice and the MM once. The second administration of the MMPI and the MM were alternately given in order to rule out the effects of test order. From these three administrations, four sets of scores were obtained. These included the first standard administration (S1), the Mini-Mult scored from the S1 protocol (M1), the second standard administration (S2), and the independently administered Mini-Mult (M2). The MM scores were then converted into estimated standard scale scores before analysis. When the mean and standard deviations were calculated, it was apparent that in every case the standard deviation was smaller for the MM. This was particularly true for scales F and 9, which would suggest that the MM underestimates extreme elevations for these scales. In relation to the mean scores, in every case the tests which were administered last were in a more socially desirable direction. Two-thirds of these cases were statistically reliable.

The Spearman-Brown formula would have predicted an average loss of 28 per cent for the MM. The actual loss was 9 per cent, which was a 19 per cent improvement in the predicted loss of reliability. When a comparison was made of the correlation between the S1-S2 and the S1-M2 to determine

the degree of correspondence of the two forms, there was a mean loss of 14 per cent. This loss was not as great as the 28 per cent predicted by the Spearman-Brown.

To further evaluate the degree of correspondence between the two forms, Kincannon made two other analyses. First, he plotted the K corrected profiles for the S1, S2, and M2 administrations. By ranking the three high point scales from the original administration with the high point scales from the second administration, the degree of loss of code-type correspondence ranged from 0-22 per cent for the Mini-Mult with a mean of 8 per cent. Second, he correlated the ratings of three clinical psychologists on the amount of overlap for the three raters combined on the S1-S2 and the S1-M2. The mean percentages of overlap for the three raters combined on the S1-M2 was about 62 per cent, while the same comparison for the S1-S2 was about 76 per cent. From this data, it was inferred that in clinical application, the MM suffered only a 14 per cent loss in correspondence, which is consistent with the previous correlational estimate. Kincannon concludes that in each practical situation, the amount of acceptable error is a matter of judgment. If the situation warrants an abbreviated form, "the amount of error introduced through use of the Mini-Mult would be tolerable" (p. 323).

Skovron (1969) investigated the criticism of Mumpower (1964) and Silverstein (1965), which states that short to

long form correlations for abbreviated intelligence tests underestimate the classification error rate of the shortened forms. Assuming that this criticism would also apply to personality tests, Skovron designed an experiment to test the extent of classification error on the MM. Using 100 MMPI's from the files of Dayton State Hospital, profiles for both the MMPI and the MM were compared on eleven of the categories, as specified by Marks and Seeman (1963). A twelfth category was used to include all those cases which did not fit into one of the eleven configurations. The MM was not able to predict the Marks and Seeman code types when compared with the standard MMPI. In its present form it was judged to be inadequate for clinical application. However, Skovron concluded that its usefulness could be increased by the introduction of a correction factor and the addition of the MMPI scales 5 and 0.

Lacks (1970a) points out that the Mini-Mult is fulfilling the need for a shortened form of the MMPI. However, before it can be used with confidence, "there is further need to compare its performance with that of the full MMPI in a wide variety of settings" (p. 126). Using similar statistical and clinical procedures as were used in developing the MM, Lacks obtained results which were very similar to Kincannon's original study. Lacks concluded that the MM predicts the full MMPI with a high degree of accuracy. Continuing her

testing of a variety of settings, Lacks (1970b) analyzed the MMPI and MM profiles of 40 psychiatric attendant applicants. She concluded that the MM might be used in personnel selection since there were only four significant differences in the thirty-three t-tests which were run.

Armentrout and Rouzer (1970) used the Mini-Mult with a group of delinquents. Group results yielded correlations for males which were significant beyond the .001 level for all scales. Correlations for females were significant at the .01 level or beyond for all scales except L and 1. However, low correlations were obtained for the MM's ability to predict the validity, high points, and elevation of the standard MMPI profile. Although individual correspondence was high, few conclusions could be made concerning the full profile. Armentrout (1970) conducted a similar investigation with a college population. Again, he found high correlations for the individual scales of the MMPI and the MM. However, few conclusions were reached concerning the ability of the MM to predict the profile of the MMPI.

Newton (1971) investigated the MM with male alcoholic inpatients. The scores used for comparison were the standard MMPI (form R), the MM scored from the standard MMPI (internal MM), and a separate booklet prepared with only the MM questions and standard MMPI instructions (external MM). He investigated the effect of the internal and external administrations. In every case the correlation of the internal MM to MMPI was

higher than the correlation of the external MM to the MMPI. In addition, eighteen out of twenty-two comparisons showed a move toward the socially desirable direction on the second administration. It was emphasized that in future investigations, the form of the MM which is being used (internal or external) should be stated.

The utility of the Mini-Mult with adolescents and parents was investigated in a Child Guidance Clinic (Gayton & Wilson, 1971). The results were high correlations for the comparison of individual scale scores, but a reduction in correspondence was found when practical application was made of the two forms. The fact that Kincannon (1968) and Lacks (1970a, 1970b) report close correspondence between the two forms in both statistical and practical ways, conflicts with the reports of Armentrout (1970), Armentrout and Rouzer (1970), and Skovron (1969). They found the high statistical correspondence, but noted poor correspondence for practical application. Gayton and Wilson (1971) conclude:

> The discrepancy may either be a result of using different criteria for determining amount of correspondence or because different populations are being used. . . . The question of practical utility appears to be a function of what criteria are used and what population is examined (p. 570).

Pulvermacher and Bringmann (1971) used a bilingual, French-Canadian population of college students. The correlations of the standard French booklet form of the MMPI to the internal MM were significantly lower on five scales

for men and on four scales for women than they had been in previous research (Dahlstrom & Welsh, 1968). In general, all median correlations were lower than those which had been obtained by the use of the full MMPI in Canada. They concluded that not only the MM, but also the standard MMPI should be used with caution with Canadian subjects until proper standardization could be completed.

In another attempt to account for the discrepancies in the reported accuracy of the MM, Harford, Lubetkin, and Alpert (1972) proposed that the differences might be due to the severity of the psychopathology of the population being used. After concluding that the MM was not an accurate substitute for the MMPI with an outpatient population, they divided their sample into severe and less severe groups, using a raw score of eleven on the F scale as the cut off. The median correlations for the severe and less severe groups were .61 and .39 respectively. Using Chi square there was a significantly higher number of profile code type matches among the severe group as compared to the less severe group. They concluded that the degree of pathology should be a consideration in finding the most appropriate setting for the administration of the MM.

Using the MM with 114 sophomore volunteers (56 per cent Caucasian and 44 per cent Negro), Trybus and Hewitt (1972) obtained MMPI-MM correlations for the different scales which ranged from .59 to .87 with a median of .81. Racial differences

appeared to be minimal since there were no significant differences in the MM's ability to predict full scale MMPI scores for either group.

In summary, almost all of the investigations have reported high statistical results for the MM. However, from a practical or clinical application point of view, the articles are divided. Kincannon (1968) and Lacks (1970a, 1970b) state that there is minimal loss in profile correspondence, while Skovron (1969), Armentrout (1970), Armentrout and Rouzer (1970), and Harford, Lubetkin, and Alpert (1972) reply that few conclusions can be drawn from the MM profiles when the full MMPI is used as a criterion. In addition, several studies point out other weaknesses of the MM. Kincannon (1968) and Trybus and Hewitt (1972) indicate that the scores for scales F and 9 are underestimated and the scores for scale L are overestimated in many cases. The MM is also limited by the absence of scales 5 and 0. Almost all of the reports agreed that a short form of the MMPI was needed and that in situations where the full form could not be given, the Mini-Mult could be expected to give results which could be used with caution.

Recently, another short form (Hugo, 1971b) of the MMPI was developed which appears to have several advantages over the MM. The SF by Hugo includes the three validity scales and the ten clinical scales from the standard MMPI. The addition of these scales is a tremendous advantage for profile

analysis. Hugo also reported a smaller loss of code type correspondence when he compared the SF and the MM. The construction of the SF will be reviewed.

A college population of 520 subjects was used for the development and comparisons of the SF (Hugo, 1971b):

> The standard 566 item MMPI was administered to 176 intorductory psychology students. A multiple linear regression analysis was computed for each scale. Those items whose regression weights divided by their standard error yielded a significant t-value, including no less than one-third and no more than one half the original scale total, were selected for inclusion. The final item total was 173 with scales ranging in size from 10 to 31 items (p. 1213-B).

The remaining 344 students were used in a series of readministrations in order to test all the possible combinations of test administration and to provide a cross-validation study. In the derivation sample (group 1), the full form reliability coefficients ranged from .59 to .81, with a median correlation of .67. The Spearman-Brown would have estimated that the SF correlations would have ranged from .35 to .65. The SF validity coefficients ranged from .51 to .77, with a median correlation of .67, which resembles the above data for the full form. In addition, profiles were analyzed by the method suggested by Lichtenstein and Bryan (1966). From this data the range of code type loss ranged from 0 to 9 per cent, with a mean loss of 4 per cent (Hugo, 1971a).

Using the data from one of his cross validation groups, which was not included in the derivation group, Hugo compares the MM and SF in the following areas. First, the correlation

of the MMPI-SF and the MMPI-MM revealed that in eight of eleven cases the SF validity coefficients exceeded those of the MM. Second, the average loss in correspondence for the SF was 13 per cent, while for the MM it was 19 per cent. Third, the reliability correlations which were run showed that the majority of the correlations were higher for the SF than for the MM, although this was an unreliable trend.

When the scores were converted into T-scores, the means of the SF demonstrated closer approximations to the MMPI than the MM in every case. In addition, a sign test revealed that in nine out of eleven cases, the MM suffered greater restriction in variance than did the SF at a statistically significant level ($p < .05$). When profiles were compared, the SF had a smaller loss than the MM. Hugo concluded that the SF was a better predictor of the MMPI than the MM with a college population.

Hugo's assertion of the superiority of his SF with a college population has not been investigated by others, nor has the possibility that the SF might be useful with other populations been tested. Although Hugo presents impressive statistics for the SF in a college population, further empirical investigations are needed in order to determine the applicability of the SF in other populations.

CHAPTER III

METHOD

Within the limits of the present experimental design, the subjects, instruments, and procedures of this study were matched to those of previous studies (Kincannon, 1967; Hugo, 1971), so that a general comparison of results could be made. One additional statistical analysis was needed in order to investigate the relationship of the two short forms. The analysis of results by use of the Spearman-Brown formula was deleted since Kincannon (1968) questioned the appropriateness of the assumptions of the formula for the abbreviation of the MMPI.

Subjects

The subjects for this study were sixty psychiatric patients from Beverly Hills Hospital, Dallas, Texas. The files were pulled in chronological order according to date of admission. From these files, the first thirty males and the first thirty females, who met the following criteria, were used. First, the patient had to be eighteen years of age or older. Second, the patient had completed the standard MMPI booklet form of 566 items at the time of admission.

The age of the subjects ranged from eighteen to seventy-five, with the median age for the males being thirty-eight

and the median age for females being thirty-three. Seventy-one per cent were married, seventeen per cent were single, ten per cent were divorced, and two per cent were widowed. Ninety-six per cent of the sample were white.

Instruments

The standard booklet form of the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1943) which has 566 items was the only test administered. Using the MMPI answer sheets, the scores for the MMPI were copied. By using templates and conversion tables developed by the authors of the short forms, the same answer sheets were used to obtain scores for the 71-item Mini-Mult (Kincannon, 1967) and the 173-item Short Form (Hugo, 1971a). The templates were used on the MMPI answer sheets to provide raw scores for the short forms. The estimated raw scores of the MMPI were then obtained by using the conversion tables. At this point the estimated MMPI raw scores were transformed into K corrected T scores in the usual way.

Procedure

The means and standard deviations for the scales of the MMPI, MM, and SF were calculated. Then *t*-tests were used to test the significance of difference between the means of the MMPI-MM and the MMPI-SF. Pearson Product Moment Correlations were computed between the scales of the MMPI-MM, the MMPI-SF,

and the MM-SF. To test the significance of difference between the correlations for the MM and SF, t-tests for multiple correlations were used. Since great importance is placed on the complete profile in making clinical evaluations, the ability of the short forms to duplicate the standard profiles was investigated. Using a modified form of the method suggested by Lichtenstein and Bryan (1966), the stability of the three highest points on the MMPI, MM, and SF were analyzed. Percentages were figured for the frequency of a scale score being ranked first on the MMPI and also being ranked first, second, third, or lower on the MM and the SF respectively. This procedure was also followed for the second and third ranked scores on the MMPI. Ties were resolved by randomly assigning scale rank when a tie occurred. Using the percentages reported by Lichtenstein and Bryan (1966) for the profile stability of the MMPI on test-retest as the expected percentages, and the percentages obtained from the above count for the MM and SF as the observed, Chi square was used to determine if there was a significant difference between the profile of the MMPI test-retest as compared with the profiles of the MMPI-MM and the MMPI-SF respectively.

CHAPTER IV

RESULTS

Since the Mini-Mult consists of only eleven of the thirteen scales which are routinely used for MMPI evaluations, the comparisons of the MM to the SF are limited to eleven scales. It should be noted that all data are reported for sexes combined; in addition, the data for scale 5 are reported for sexes combined (5), for females (5F), and for males (5M).

The hypothesis which stated that there would be no significant difference between the MM and the SF in their ability to predict the group means for scales of the standard MMPI was accepted. Table I presents the T-score scale means, standard deviations, and *t*-values for the significance of difference between means for all sixty subjects. Inspection of the table shows that the majority of the mean values are within the normal range; however, both the MMPI and the MM have scales 2, 4, and 8 above 70. Further inspection indicates that the short forms underestimate the standard deviation: the MM underestimates it on ten of the eleven scales while the SF underestimates it on ten of the fifteen scales. The *t*-values for the difference between means ranged from .0785--1.2792 on the MM with none of them being significant. The *t*-values for

TABLE I

T SCORE SCALE MEANS, STANDARD DEVIATIONS, AND t-VALUES FOR THE MMPI, MM, AND SF

Scale	MMPI		MM			SF		
	Mean	SD	Mean	SD	t	Mean	SD	t
L	51.81	8.44	51.23	7.29	.4028	50.85	7.27	.6675
F	63.55	12.05	61.56	11.05	.9428	64.33	12.67	.3455
K	51.36	8.78	51.05	7.63	.2064	52.40	8.97	.6418
1	63.80	15.77	64.78	13.18	.3693	63.78	14.51	.0072
2	72.21	16.78	74.71	16.67	.8187	65.61	14.27	2.3210*
3	66.25	12.30	65.73	11.13	.2428	65.65	11.58	.2751
4	71.06	11.99	71.96	10.43	.4387	69.18	11.21	.8872
5	53.08	10.96	-----	-----	-----	55.53	15.79	.9873
5F	46.80	8.96	-----	-----	-----	44.17	12.76	.9249
5M	59.37	9.09	-----	-----	-----	66.90	8.81	3.2593*
6	64.15	12.59	64.33	12.50	.0785	61.55	13.27	1.1010
7	68.76	16.88	66.76	17.21	.6426	68.25	15.42	.1727
8	72.06	20.79	71.00	17.97	.2987	65.81	15.82	1.8531
9	61.88	12.46	59.33	9.21	1.2792	62.10	11.30	.1013
0	59.38	11.55	-----	-----	-----	54.91	10.08	2.2587*

*$p < .05$

the difference between means for the SF ranged from .0072--3.2593 with scales 2, 5M, and 0 being significantly ($p < .05$) different. When the means for the MM and SF were compared, only scale 2 of the SF had a significant t-value. Since

only one t-value out of twenty two was significant and since there was no trend in the t-values, no definite conclusions could be made concerning which of the short forms is the best predictor for the group means of the scales of the MMPI.

Table II presents the Pearson Product Moment Correlations between the MMPI-MM, the MMPI-SF, the MM-SF, and the t-values for the significance of difference between multiple correlations. These correlations, all of which are significant ($p < .05$), are within the same range as the correlations reported for MMPI-MM and MMPI-SF in other studies (Kincannon, 1967; Hugo, 1971). The hypothesis which states that there

TABLE II

PEARSON PRODUCT MOMENT CORRELATIONS AND t-VALUES FOR THE MMPI, MM, AND SF

Scale	MMPI-MM	MMPI-SF	MM-SF	t-Value
L	.78	.88*	.63	2.4098
F	.85	.94*	.87	3.9846
K	.88	.93*	.92	3.0934
1	.87	.94*	.89	3.3890
2	.88	.91	.94	1.5983
3	.89	.89	.99	.0000
4	.78	.83	.75	1.1417
5	---	.88	---	------
5F	---	.83	---	------
5M	---	.80	---	------
6	.83	.87	.81	1.1026
7	.91	.92	.94	.5900
8	.92	.90	.82	.8431
9	.72	.82	.83	2.2807
0	---	.92	---	------

*$p < .05$

will be no significant difference between the correlations for the MMPI-MM and the correlations for the MMPI-SF was rejected. The correlations for the MMPI-SF were higher than the MMPI-MM correlations in nine of the eleven cases with four of the nine being significantly higher ($p < .05$).

Table III contains the distribution of shifts for the three highest ranking scales on the MMPI as compared with the ranking of the same three scales on the MM and the SF.

TABLE III

DISTRIBUTION OF SHIFTS IN RANKINGS OF THE THREE HIGHEST SCALES ON THE MMPI TO THE MM AND SF

Rank on the MMPI	Rank of the same scale on the MMPI, MM, and SF			
	1	2	3	4
1	50 52 45	21 23 17	16 12 5	13 13 33
2	16 23 22	33 27 15	15 22 17	37 28 47
3	12 10 17	20 22 23	29 20 30	39 48 30

Frequency counts for the MM and SF were converted into percentages so that they could be compared with the percentages reported by Lichtenstein and Bryan (1966) for test-retest reliability of the MMPI. The upper figure in each cell is the percentage for the test-retest of the MMPI (Lichtenstein &

Bryan, 1966). The middle figure in each cell is for the MMPI-MM comparison, and the bottom figure in each cell is for the MMPI-SF comparison. Chi square was calculated between the percentage value for the MMPI and the MM (Chi square = 16.28; $p < .05$). It was also calculated between the MMPI and the SF (Chi square = 59.28; $p < .001$). The null hypothesis concerning the application of the short form profiles stated that there will be no significant difference in the distribution of the three highest MMPI scales compared to the distribution of the three highest MM scales or compared to the distribution of the three highest SF scales. This hypothesis was rejected since both tests were significantly different from the MMPI; however, there was a trend (although not significant) for the MM to be the better predictor of the full MMPI profile.

The results do not permit definite conclusions as to which of the short forms is superior for a clinical population. From the correlational data it appears that the SF is superior; however, no definite conclusions could be made from the clinical application as to which test was the better. There is the possibility that a difference could have been detected if a more elaborate experimental design could have been used, including a test-retest of the long and short forms.

CHAPTER V

DISCUSSION

Included in this chapter is a discussion of the factors which might have effected the results which were obtained. A list of the conclusions which were made from the study will be given as well as suggestions for future research.

Due to the limitations in the experimental design, it was not possible to obtain a second administration of the MMPI or a separate administration of the MM and SF. Since the MM and SF were both scored from the standard MMPI answer sheets, it was expected that the correlations of the MMPI-MM and the MMPI-SF would be high (Newton, 1971). It has been proposed that the more severe the pathology of a population, the higher the statistical data for the MM-MMPI comparison (Harford, Lubetkin, & Alpert, 1972). Assuming that the SF would also be affected by the severity of the pathology of a population, this might be a factor in accounting for the high correlations obtained in this study. The above two factors would also have affected the means and standard deviations of the short forms, causing them to be similar to the long form results.

In order to account for the fact that the SF had significantly higher correlations than the MM, it should be pointed

out that the number of items on the scales of the SF are equal to or greater than the number of items on the scales of the MM in every case. On the four scales of the SF where the correlations were significantly higher than the correlations for the MM, the SF had an average of twenty per cent more items per scale than did the MM. On the seven scales which did not have a significant difference between correlations, the SF had an average of seven per cent more items per scale. From this data it appears that the length of the scales of the abbreviated forms is a factor in determining their correlations.

The use of the Spearman-Brown formula to analyze the loss of efficiency of the short forms compared to the expected loss of efficiency (Spearman-Brown formula) (Kincannon, 1967; Hugo, 1971a) was judged to be inappropriate, since Kincannon had argued that the assumptions underlying the use of the Spearman-Brown formula were not met by the MMPI. Kincannon also used a test-retest of the MMPI as a control; however, this information was not available for this study. Therefore, it was necessary to find empirical data which would serve as a point of reference for comparing the two short forms. The conclusions which could be made from the data by Lichtenstein and Bryan (1966) for testing the short-term stability of MMPI profiles were limited by the fact that the populations were not exactly the same. The subjects for the study by Lichtenstein and

Bryan (1966) consisted of forty-two volunteer workers and forty newly admitted psychiatric patients. An inspection of the data indicates that the MM is probably the better predictor of the full MMPI profile, although both the MM and SF were significantly different from the MMPI. There are two possible contributing factors to this result. First, the MM was designed for a clinical population, whereas the SF was designed for a college population. It would be assumed that the MM would be the better predictor in a clinical population. Second, the data (Lichtenstein & Bryan, 1966) which was used for making the comparison resembles a clinical population more than it does a college population.

Conclusions from the Study

The following conclusions were made concerning the MM and SF in relation to each other and in relation to the MMPI. First, although the statistical correlations were high for the two short forms, the profile analysis did not indicate that the short forms could be substituted for the long form with a high degree of reliability. Second, although the SF had statistically higher correlations than did the MM, the lack of definite differences on the profile analysis made it impossible to conclude that one of the short forms was superior to the other for use with a clinical population.

Suggestions for Future Research

The MM and SF are the best short forms of the MMPI which have been developed at this time. This study indicates that either a revision of these forms or the development of another short form would be necessary, so that the MMPI results could be more validly and reliably obtained when there was a need to use an abbreviated form of the MMPI. It was proposed that a revision could be made by combining the best scales from the MM and SF. Kincannon (1968) has reported that the MM underestimates extreme elevations, especially on scales F and 9. Hugo (1971a) has reported that the MM was a significantly better predictor of scale 2 than the SF. Both of these findings were substantiated in this study. In addition, the SF now makes available scales 5 and 0. Using the data from this study to select the new short form, the following scales would be used: the SF scales would include L, F, K, 1, 5, 9, and 0; the MM scales would include 2, 3, 4, 6, 7, and 8. Since the means for SF scales 5M and 0 were significantly different from the MMPI means, it is suggested that adjustments in the conversion tables might correct this problem.

CHAPTER VI

SUMMARY

To meet the need of making clinical evaluations in the most efficient way, many scales and short forms of the MMPI have been developed. A review of the literature indicated that the Mini-Mult devised by Kincannon (1967) and the Short Form by Hugo (1971a) were the best short forms of the MMPI which have been constructed. The purpose of this study was to determine which of these short forms would most accurately predict the standard MMPI in a clinical population.

Using a clinical population, the following hypotheses were tested:

1. There will be no significant difference between the MM and the SF in their ability to predict the group means for the scales of the standard MMPI.

2. There will be no significant difference between the correlations for the MMPI-MM and the correlations for the MMPI-SF.

3. There will be no significant difference in the distribution of the three highest MMPI scales compared to the distribution of the three highest MM scales or compared to the distribution of the three highest SF scales.

The standard 566-item MMPI was used from the files of sixty psychiatric patients from Beverly Hills Hospital. The scores for the MMPI, MM, and SF were all converted into K corrected T-scores. These T-scores were then used to calculate the means, standard deviations, and Pearson Product Moment correlations for making a comparison of the MMPI, MM, and SF. In addition, a profile analysis was made to check the correspondence between the MM-MMPI and the SF-MMPI. Each of the short forms was able to predict the means of the MMPI to a high degree of accuracy, although three of the SF scales were significantly different. Looking at the eleven scales where the MM and SF could be compared, only one of the SF scales (2) was significantly different; therefore, the first hypothesis was accepted. The SF-MMPI correlations were higher than the MM-MMPI correlations for nine of the eleven scales, with four of them being significantly higher. Thus, the second hypothesis was rejected. On the profile analysis, both short forms were significantly different from the MMPI. As a result, the third hypothesis was rejected; however, since both short forms were significantly different, no conclusions could be made concerning the superiority of one of the short forms for profile analysis. Some of the scales from each short form had high statistical correspondence with the MMPI. It was proposed that a new short form could be developed by combining the best scales from each test. Further research would be

needed to test the accuracy of the new short form in various populations.

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