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A Review of Short Forms of the MMPI

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A REVIEW OF SHORT FORMS OF THE MMPI

by

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INTRODUCTION

Since its development in the 1940's the MMPI has become the most widely used and thoroughly researched of all personality inventories, but even more widespread use has been prohibited by its lengthy format. Administration time is excessive for applications where there are restrictive time limits as in the rapid evaluation of consultation, or where for some reason the client would be unable or unwilling to complete a long form, as in research questionnaires. To meet the need for a shorter personality inventory based on the extensively researched MMPI, several short forms have been developed and used with a variety of subject populations. The degree of correspondence to a standard length MMPI achieved by these abbreviated versions has been variable, depending on the particular instrument and the population in question.

The present review consists of a critical appraisal of available short forms, with recommendations for further research and applications.

EARLY ATTEMPTS AT ABBREVIATION

One of the characteristics of the MMPI which has encouraged much additional research is its large pool of items related to a wide range of personality characteristics. As originally produced, the MMPI had 200 items of a total of 550 that were unscored, which were intended to serve as a resevoir for development of additional scales. Includion of these nonworking items in the original form permitted old protocols to be rescored for newly developed scales. Although important for research purposes, unscored items result in an increase in testing time; therefore, it is not surprising that early attempts at abbreviation included their removal.

Ferguson

Ferguson (1946) eliminated 200 unscored items from the 550 items of the original card form. Working in an army hospital situation with both outpatients and inpatients, he reported that comparisons of the two forms of administration did not result in any appreciable differences in profiles obtained. Unfortunately however, no data were presented concerning reliability and validity.

Holzberg and Alessi

According to Gough (1946) all of the items contribute to the context of the other items, and even unscored items are an important factor in test results. In order to empirically investigate this contention Holzberg and Alessi (1949) tested 30 psychiatric inpatients

with both the long card form and a shortened (350-item) version, with one or two days between administrations. One-half of the group was first given the long form followed by the short form, while the other half had the order reversed. Correlations of K-corrected scores were computed for each scale; correlations ranged from .519 to .927 with a mean of .760 (median .769). The authors of the MMPI manual (Hathaway and McKinley, 1967) report card form scale reliabilities for normals ranging from .71 to .83.

Rather surprisingly, one-half of the scales showed statistically significant differences between mean scores of the long and short forms. It is important to keep in mind the above data when considering even shorter versions. One cannot expect to find better reliability for short forms than can be obtained from standard or only slightly abbreviated versions. Table 1 (pages 4 and 5) presents available data on the test-retest reliability of standard length and slightly abridged MMPI's, and should serve as a standard of comparisons for other short forms.

MacDonald

MacDonald (1952), using a 356-item version which allowed for scoring of all the validity and clinical scales except Si, compared the card form with the group form, with discouraging results. Correlations between forms for raw scores ranged from .507 to .880 (median .71). Mean scale scores for Pd and Ma were significantly different for the two forms. Unfortunately, his design does not permit comparisons with the full MMPI. It is interesting to note

TABLE 1

Test-Retest Reliability of Standard Length and Slightly Abbreviated MMPI's

Author/Date	Sample	Design	Scales Overest.	Scales Underest.	Highest Clinical Scale % Agreement With MMPI		L	F	K	1	2	3	4	5	6	7	8	9	0	Mdn.
							Correlations With MMPI Scale													
Holzberg & Alessi 1949	30 Psychiatric Patients	Independent Card Form w/200 Nonworking Items Removed 1-2 Day Interval	F, 1, 6	L, 1	-		.85	.93	-	.67	.80	.87	.60	.76	.78	.72	.89	.59	-	.78
							Without K Correction													
Cottle 1950	100 College Students	Card/Booklet Part Counterbal. 1 Day Interval	-	-	-		.46	.75	.76	.81	.66	.72	.80	.91	.56	.90	.86	.76	-	.76
MacDonald 1952	50/M, 33/F College Students 34 Student Nurses	356 Items Card/Group 1 Week Interval	9	4	-	T	.72	.72	.68	.57	.75	.57	.59	.73	.47	.67	.71	.71	-	.69
						Raw	.62	.71	.72	.59	.77	.61	.63	.88	.51	.79	.82	.75	-	.71
Rosen 19[illegible]	40 Male V. A. Psychiatric Inpat.	Card Form Reliab. 2-7 Day Interval	K	4, 6, 7, 8	-		.62	.81	.65	.86	.80	.88	.87	.64	.75	.88	.86	.55	.83	.81
Windle 1955	55 Female College Students	Booklet Reliab. Not Counterbal. 1 Week Interval	1, 2, 7 lower on retest		-		.79	.62	.92	.73	.84	.71	.84	-	.81	.92	.82	.79	-	.81
Urmer, Et Al 1960	39/M, 2/F Hospital Patients	Booklet/Tapud Counterbalanced 1 Wk. to 3 Mo.	None	None	-		.82	.83	.74	.86	.80	.67	.79	.98	.77	.81	.86	-	.57	.80
Wolf, Freinek & Shaffer, 1964	58 Student Nurses	Oral/Booklet Counterbalanced 1 Day Interval	None	None	-		.81	.75	.86	.64	.80	.73	.74	.83	.73	.86	.81	.74	.90	.80
Wolf & Shaffer 1964	120 Semiliterate Inmates Less Than 6th Grade Reading	Oral/Booklet Counterbalanced 1 Day Interval	None	None	-		.76	.75	.75	.66	.61	.65	.54	.40	.71	.80	.82	.77	.71	.71

TABLE 1 (Continued)

Test-Retest Reliability of Standard Length and Slightly Abbreviated MMPI's

Author/Date	Sample	Design	Scales Overest.	Scales Underest.	Highest Clinical Scale % Agreement With MMPI		Correlations With MMPI Scale L	F	K	1	2	3	4	5	6	7	8	9	0	Mdn.
Wolf, Freinek & Shaffer, 1964	120/M Inmates 6th Grade Reading Level	Oral/Booklet Counterbalanced 1 Day Interval	None	None	-		.74	.80	.85	.78	.70	.76	.70	.76	.77	.84	.85	.75	.86	.77
Lichtenstein & Bryan, 1966	40 Psychiatric Inpatients	Booklet/Abbre. Booklet, Not Counterbalanced 2 Day Interval	-	-	50%		.89	.77	.88	.74	.86	.74	.72	.82	.71	.66	.71	.83	-	.75
Lichtenstein & Bryan, 1966	42 Hospital Workers	3 Validity Scales + 9, Clinical Si Omit. Slightly Abbreviated MMPI, 1 Day Interval	-	-	50%		.72	.83	.68	.87	.84	.86	.75	.92	.75	.74	.69	.75	-	.75
Kincannon 1968	30/M, 30/F Psychiatric Inpatients	MMPI Reliability Not Counterbal. 1-2 Day Interval	Two-Thirds Over-Or-Under-Estimated		61%		.88	.62	.86	.87	.86	.80	.91	-	.78	.91	.88	.87	-	.87
Faschingbauer 1972	28/M, 33/F College Students	MMPI Reliability Counterbalanced 1 Day Interval	-	-	62%	M	.73	.97	.89	.49	.88	.81	.95	.91	.89	.93	.95	.96	.94	.91
						F	.85	.82	.87	.92	.96	.85	.91	.77	.71	.93	.95	.85	.96	.87
Taylor & Graham 1974	68 College Students	4th Grade Level Booklet Counterbalanced 1 Week Interval	L, F, K, 8	2, 7	51%		.78	.72	.82	.69	.73	.49	.60	.84	.53	.70	.80	-	.90	.73
Hobbs & Fowler 1974	20 V. A. Schizophrenic Inpatients	MMPI Reliability Not Counterbal.	-	-	-		.88	.83	.87	.66	.94	.83	.87	-	.85	.84	.89	.83	-	.65

that at this early date, and with relatively "long" short forms, MacDonald concluded that the correlation coefficients for the two forms were not high enough to make reliable predictions from one form to the other.

Olson

Olson's (1954) study of a 420-item MMPI, referred to as the Hastings short form, represents the first published use of extracted short form data. By stopping at item number 420 of the group form, only 20 items from scale Si and two items from scale K are lost, and the item order is kept the same as in the original group form. Test-retest design was considered unnecessary, based on the assumption that no differences in responses to items 1 through 420 occur as a result of elimination the last 146 items. Tables for prorating of the missing items are presented, along with cross-validation data which suggest the clinical usefulness of such an approach. A savings in testing time of 26% is claimed.

Briggs and Tellegen

In another attempt at reducing the length of the MMPI, Briggs and Tellegen (1967) recommended a 373-item version consisting of the first 366 booklet items plus the seven K items beyond item 366, but not including the last 28 scale Si items. Using a sample of 400 psychiatric inpatients a transformation table was developed for predicting the standard MMPI scale Si from the first 42 items.

Similarly, if scoring of scales Si and K is not required, the

first 366 items of the booklet form may be used to yield all the usual clinical scales. Form R, utilizing a new item order also permits scoring of all 14 basic scales using the first 399 items.

Jorgensen

The first attempt at developing a substantially shortened MMPI was that of Jorgensen (1958), which resulted in an 176-item form with five scales omitted. F, Hy, Mf, Pa and Sc were omitted because the author had found them to be not useful, sources of false positives, or less valid than oral checks. A new scale, the Common Neurotic Features Scale (CNF), was added because Jorgensen had found it to be efficient and useful. Although one of the reasons given for dropping scale Sc was its high correlation with Pt, Jorgensen reports a correlation of .93 between Pt and his CNF scale.

Working with the MMPI protocols of 100 non-psychotic psychiatric patients, Jorgensen selected items that were endorsed frequently by high scoring subjects but infrequently by low scoring subjects. In addition to 127 items selected in this manner, 47 more unscored items were added either as buffers or because their content suggested that discussion of them with patients might lead to useful information. Unreported short-to-long form conversion measures were devised by unspecified methods. Although Jorgensen reported that experience with his short form had been encouraging, no validity or reliability data has been reported. It appears that Jorgensen's version was developed to serve a specialized local need, and its introduction has not stimulated validating studies.

Although the need for an abbreviated MMPI appeared to be widely acknowledged, the previously mentioned short forms have been too lengthy for many purposes and/or have not stimulated research that verified their validity.

THE FIRST POPULAR SHORT FORM: KINCANNON'S MINI-MULT

The first really short form, the 71-item Mini-Mult (Kincannon, 1968), has generated numerous studies, which are summarized in Table 2 (pages 10 and 11). Additionally, it has provided the base for slightly longer modified versions seeking to improve upon its performance. These revisions include the Midi-Mult (Dean, 1972), Spera's Maxi-Mult (Spera, 1973) and McLachlan's (1974) 94-item test, which is also termed the Maxi-Mult. Initial reports on the Mini-Mult were quite favorable, but not all subsequent research has been able to replicate Kincannon's results.

Using Comrey's cluster formation data as a basis (Comrey, 1957 a, b, c; 1958 a, b, c, d, e, f, g), Kincannon constructed a 71-item short form scorable for validity scales and the usual clinical scales with the exception of Mf and Si. Items were selected to proportionately represent each cluster, and in most cases items scorable on the greatest number of scales were selected.

MMPI answer sheets of 100 psychiatric inpatients were scored for both the standard and shortened scales (Mini-Mult). Regression equations were then derived for converting Mini-Mult raw scores to standard scores, and correlations between the two forms computed for each scale. Correlations ranged from .80 to .93, with a median of .87.

Fifty MMPI's of patients admitted to a community mental health center were then scored for both the MMPI and the Mini-Mult and scale correlations computed. Correlations were similar to those from the inpatient population, and ranged from .70 to .96. Kincannon does not

TABLE 2

Available Data On Kincannon's 71-Item Mini-Mult

Author/Date	Sample	Design	Scales Overest.	Scales Underest.	Highest Clinical Scale % Agreement With MMPI		Correlations With MMPI Scale L	F	K	1	2	3	4	6	7	8	9	Mdn.
Kincannon 1968	30/M, 30/F Psychiatric Inpat.	Extracted	1	F, 9	-		.62	.87	.93	.93	.91	.82	.90	.84	.96	.90	.80	.88
Kincannon 1968	30/M, 30/F Psychiatric Inpat.	Independent Counterbalanced 1 Day Interval	None	None	53% w/previous admin. of MMPI		.78	.62	.82	.80	.86	.82	.86	.68	.92	.91	.67	.82
Lacks & Powell 1970	20/M, 20/F Psychiatric Attendent Applicants	Extracted	6	7, 9	-							.65 to .90						
Lacks 1970	94 Psychiatric Inpatients	Extracted	None	F, 9	-							.68 to .89						
Armentrout 1970	68/M, 76/F College Students	Independent Not Counterbal. 2-7 Day Interval	-	-	24% M 37% F	M F	.35 .58	.09 .72	.73 .61	.44 .71	.47 .61	.49 .61	.67 .73	.70 .42	.71 .85	.56 .75	.44 .56	.49 .61
Armentrout & Rouzer, 1970	100/M, 25/F Delinquents at a Residential Diagnostic Center	Independent Not Counterbal. 1-2 Day Interval	-	-	47% M 52% F													
Gayton & Wilson 1971	100 Parents of Child Guidance Clinic Clients	Extracted	D, K, 9	None	-	M F	.53 .48	.32 .32	.89 .98	.64 .86	.46 .79	.69 .74	.68 .75	.45 .48	.66 .73	.39 .57	.45 .26	.53 .73
Gayton & Wilson 1971	30/M, 30/F Emotionally Disturbed Adolescents	Extracted	-	-	-	M F	.77 .78	.54 .69	.86 .86	.76 .88	.60 .82	.54 .62	.72 .69	.79 .74	.84 .77	.67 .65	.55 .63	.72 .77
Newton 1971	48/M Hospitalized Alcoholics	Independent Counterbalanced 1 Day Interval	-	-	-		.61	.30	.46	.69	.64	.46	.61	.39	.54	.53	.28	.53
Pulvermacher & Bringmann, 1971	15/M, 21/F Bilingual College Students	Extracted	-	-	-							.07 to .89						
Dean 1972	General Medical Sample N=175	Extracted	All except 2 & 3 Over-Or-Under-Estimated				.73	.77	-	-	-	-	-	-	-	-	.72	.82
Spera 1972	200 V. A. Psychiatric Inpat.	Extracted	L, 2, 3, 6	F, K, 6, 7, 8, 9,	40%		.76	.79	.83	.93	.88	.88	.82	.77	.90	.78	.73	.62
Gayton, Osman & Wilson, 1972	47 College Students	Independent Oral/Written Counterbalanced	-	-	-	Oral Wrtn	.31 .47	.40 .39	.77 .58	.72 .64	.66 .66	.65 .78	.50 .56	.52 .54	.83 .77	.68 .60	.58 .58	- -

TABLE 2 (Continued)

Available Data On Kincannon's 71-Item Mini-Mult

Author/Date	Sample	Design	Scales Overest.	Scales Underest.	Highest Clinical Scale % Agreement With MMPI	Correlations With MMPI Scale L	F	K	1	2	3	4	6	7	8	9	Mdn.
Trybus & Hewitt 1972	22/M (5 Black) 92/F (46 Black) College Students	Extracted	L, 1, 2, 3, 4, 6	F, K, 9	-	.63	.82	.86	.81	.71	.89	.87	.78	.87	.83	.79	.81
Platt & Scura 1972	183/M Reformatory Inmates Mean Age 19.7	Extracted	L, 1, 3, 6, 8	K, 7, 9	21%	.44	.52	.83	.40	.58	.49	.60	.59	.61	.49	.59	.58
Harford, Et Al 1972	39/M, 39/F Awaiting Outpat. Services	Independent 430-Item MMPI/Mini	L, 1, 6	F, K, 2, 4, 7	27%	.44	.69	.81	.21	.86	.46	.73	.46	.71	.54	.53	.54
Umansky 1972	50/M, 50/F Psychiatric Outpat.	Extracted	1, 6	F, K, 7	46%	.76	.80	.84	.26	.78	.48	.74	.75	.82	.67	.55	.75
Leer 1973	200/M V.A. Psychiatric Inpat.	Extracted	None	F, 7, 8, 9	40%	.75	.79	.84	.93	.89	.88	.68	.77	.90	.76	.73	.79
Palmer 1973	30/M, 30/F Unselected First Admission Psychiatric Inpatients	Independent Counterbalanced 1 Day Interval	-	-	39%	-	.08	-	.71	-	-	-	-	-	-	-	.59
Percell & Delk 1973	121 College Students	Oral/Written	-	-	Oral 35%, Written Statement 32%	5 Written Statement .58 to .91 7 Written Question .46 to .88 Oral .50 to .88 Extracted Mini .76 to .94											
Hobbs & Fowler 1974	40 V. A. Schizophrenics	Extracted	5 of 11 Over-Or-Under-Estimated		-	.71	.87	.89	.10	.73	.43	.63	.83	.83	.73	.68	.73
Hobbs & Fowler 1974		Independent Counterbalanced	4 of 11 Over-Or-Under-Estimated			.61	.79	.86	.70	.73	.48	.38	.74	.79	.74	.61	.74
Huisman 1974	36 Brain Damaged 18 Controls	Extracted	None	9	55%	.88	.69	.84	.91	.88	.89	.78	.77	.79	.65	.58	.78
Hedlund, Powell & D. W. Cho, 1974	2721 Psychiatric Inpatients 634 Outpatients	Extracted	-	-	56%	.77	.87	.91	.83	.85	.88	.79	.86	.81	.83	.74	.84

state whether the regression equations from the previous sample were used, or if new equations were developed for the second sample.

Kincannon's third sample was a group of 60 new psychiatric inpatients who were given the standard MMPI, followed by a retest and an orally administered Mini-Mult. The three tests were administered on three consecutive days, with one-half the subjects taking the standard length retest on the second day and one-half on the third. Regression equations developed for the two previous samples were used and scale correlations computed for all possible combinations of the two forms. Using a *t* test for paired comparisons, and comparing the Mini-Mults extracted from the first admission with the standard first admission, scales F, 1 and 9 were found to differ significantly. Variability of all scales was less for the Mini-Mults than the MMPI's, with the effect being greater for scales F and 9. There seemed to be a consistent tendency for the Mini-Mult to underestimate extreme elevations on these two scales. The mean difference on scale 1 was considered to be a statistical artifact, resulting by chance from the number of *t* tests carried out. No significant differences appeared between the independently administered Mini-Mult and the MMPI retest on this scale.

Scale correlations were computed for all possible combinations of test forms, and are presented in Table 3 (page 13). Correlations of the standard MMPI with the retest ranged from .62 to .91, with a median of .87. Correlations with the independent Mini-Mult ranged from .45 to .88, with a median of .82. The extracted Mini-Mult scale correlations with the long form ranged from .80 to .96, with a median of .88.

TABLE 3

Kincannon's Data: Correlations Between Comparable Scales For All Combinations Of Two Administrations Of The MMPI And The Mini-Mult

Scale	Combination					
	S_1M_1	S_1S_2	S_1M_2	M_1S_2	M_2S_2	M_1M_2
L	.82	.88	.75	.70	.78	.72
F	.87	.62	.45	.60	.62	.63
K	.93	.86	.80	.82	.82	.85
1	.93	.87	.72	.84	.80	.76
2	.91	.86	.79	.78	.86	.83
3	.82	.80	.70	.77	.82	.76
4	.90	.91	.83	.83	.86	.88
6	.84	.78	.79	.66	.68	.76
7	.96	.91	.88	.89	.92	.87
8	.90	.88	.84	.82	.91	.83
9	.80	.87	.71	.72	.67	.75

Note: S_1 = first administration, standard scale; S_2 = second administration, standard scale; M_1 = first administration, Mini-Mult (scored from the S_1 protocol); M_2 = independently administered Mini-Mult.

Two attempts at objectively determining the correspondence of the Mini-Mult and the MMPI were made. In the first, data were presented comparing the ordinal position of scales on retest and on the Mini-Mult, with rank on the original administration of the MMPI. The data are given in percentages and an 8% average loss of code-type correspondence was reported. The second evaluation was a scale by scale comparison of the test-retest reliability of the Mini-Mult and the reliability of the MMPI. A 9% average loss in reliability was reported.

An additional comparison involved independent ratings by three clinical psychologists of the degree their interpretations of pairs of profiles would overlap. The pairs were made up of an original administration and a retest, or the original administration and the independently administered Mini-Mult. The pairs were not identified and order of presentation was on a random basis. The mean percentage of overlap ratings for the MMPI test-retest comparisons were 76.5% and for the MMPI-Mini-Mult comparison 61.4%, which Kincannon infers to be a 14% loss in correspondence.

Although appearing deficient in certain respects, such as predictive ability of scales F and Ma and the omission of scales Mf and Si, Kincannon's Mini-Mult was sufficiently promising to stimulate numerous attempts at replication and extension of his findings.

Early Validation Attempts

One of the earliest attempts to replicate Kincannon's findings with a psychiatric population was that of Lacks (1970) who extracted Mini-Mult scores from the MMPI's of 50 white male and 44 white female

lower socio-economic level patients of an acute intensive treatment center. Comparisons with the full MMPI showed results similar to Kincannon's, with correlations ranging from .68 to .89 (median .83). Scores for scales F and Ma were underestimated by the Mini-Mult.

An examination was made of the Mini-Mult's ability to predict several indices of psychopathology (one or more clinical scales above a T score of 69, three or more scales above 69, five or more scales above 69, and scale F above 11 and above 15 raw score points). Agreement with a full MMPI was found to range from 91% and 100% with a median of 96%. As in all studies using extracted short forms, the conclusions can be generalized to independent administrations to only a limited degree.

In another early replication attempt, Armentrout (1970) investigated the correspondence of the Mini-Mult and the MMPI in a sample of 68 male and 76 female college students. The Mini-Mult was administered first using a tape recorded presentation with the subjects marking individual answer sheets. The standard booklet form was administered two to seven days later, and Kincannon's table was used to convert Mini-Mult raw scores into standard scores. Correlations between forms were computed for validity and clinical scales, with male and female data analyzed separately. All correlations except scale F for males were significant at the .01 level, and of the significant correlations only scale L failed to reach the .001 level of significance. Correlations ranged from a low of .09 for males on scale F to a high of .85 on scale Pt for females. The median correlation for males was .49 and for females .61.

When comparing ability to discriminate technically invalid pro-

files (L, F or K greater than T score of 70), the Mini-Mult consistently underestimated the MMPI scores. Combined data for males and females indicate 13 invalid MMPI profiles, but only one of these was identified by the Mini-Mult. However, there were only two false positive invalid profiles for the Mini-Mult. The clinical significance of this underestimation of validity scales may be slight; in most cases profiles are not routinely rejected for validity elevations greater than 70.

Comparison of rank-ordered K-corrected T scores indicates 31% agreement on the highest clinical scale, 11% of the cases with exactly the same two highest scales, and 19% with the same two highest scales if order of the two is not considered. Armentrout's conclusion that the Mini-Mult profiles do not permit prediction of the one or two most elevated MMPI scales is correct, but should be tempered by the awareness that test-retest data with standard MMPI's indicate less than 100% agreement on highest peaks; see Table 4, page 17. This is particularly true with a normal population, as in the Armentrout study. The MMPI manual points out that reliability is effected by the range of scores in the population examined. A group with a relatively narrow range of scores, as is probable with college students, produces lower reliabilities than does a more diverse group.

The use of the Mini-Mult as a predictor of MMPI clinical scales above a T score of 70 was also investigated, with results considered to be disappointing. For scales that the MMPI found to be over 70, the Mini-Mult duplicated the findings in only 13% of the cases. However, if one looks at the percentage of MMPI profiles with no scales over 70 which are correctly identified by the Mini-Mult, one finds an agreement

TABLE 4

MMPI Test-Retest Reliability:
Percentage Of Agreement On Highest Clinical Scale

Author	Sample	Design	% Agreement
Lichtenstein & Bryan, 1966	40 Psychiatric Inpatients	Booklet/Abbre. Booklet, Not Counterbalanced 2 Day Interval	50%
Lichtenstein & Bryan, 1966	42 Hospital Workers	3 Validity Scales + 9 Clinical, Si Omitted, Slightly Abbreviated MMPI, 1 Day Interval	50%
Kincannon, 1968	30/M, 30/F Psychiatric Inpat.	MMPI Reliability Not Counterbal. 1-2 Day Interval	61%
Faschingbauer, 1972	28/M, 33/F College Students	MMPI Reliability Counterbalanced 1 Day Interval	62%
Taylor & Graham, 1974	68 College Students	4th Grade Level Booklet Counterbalanced 1 Week Interval	51%

rate of 82%. Again, this measure is adversely effected by the relatively narrow range of scores. Many scores of over 70 on the MMPI may have been barely over 70, making their identification more difficult than if they had been markedly higher.

Armentrout focuses on the inadequacy of the Mini-Mult as a predictor of specific scale scores on the MMPI, and recommends against its use with a college population. However, if the Mini-Mult is not used as a diagnostic device but its use is limited to screening purposes, the Mini-Mult may have some merit. Its greatly reduced administration time (only 16 minutes), and 82% agreement with the MMPI on cases with T scores less than 70 make it an attractive alternative to doing without a screening device altogether.

One weakness of the above study is that no estimate is possible of the relative amount of error variance in the short form compared with the variance inherent in the MMPI. A MMPI retest would provide the needed basis for comparison. Undoubtedly, in a college population with a relatively limited distribution of scores, even a retest with a standard MMPI would show inaccuracies in prediction of specific scale scores and imperfect agreement on the two highest scores.

Oral-Written Comparability

Although the Mini-Mult contains only 71 items, if the examiner reads the questions to the subject as in the Kincannon study, then the time saving of the shorter version is lost. Gayton, Ozmon and Wilson (1972) investigated the comparability of oral and written Mini-Mults with college students. Forty-seven male undergraduates were selected

and all were given the oral Mini-Mult, the written Mini-Mult and the full MMPI on three separate occasions, with counterbalanced order of administration.

Short form raw scores were converted to standard scores using Kincannon's prediction table. Correlations between the full MMPI and the shortened forms were significant (p .05) for all scales. The only significant difference between the oral and written forms was on scale K, where the oral form correlated more highly with the full MMPI than did the written form. In another comparison, each profile was assigned to one of three categories: (1) all scales less than 70; (2) one to three scales greater than 70; and (3) four or more scales greater than 70. MMPI-Oral Mini-Mult agreement on categories was 79%, MMPI-Written Mini-Mult was 92%. The most important comparison, in view of the intended use of the Mini-Mult, was the rate of agreement on category 1, all scale scores less than 70. For the oral form and written forms there were only four and five classification errors, respectively, out of a sample of 47.

The authors' conclusion of close correspondence between the oral and written form of the Mini-Mult appears fully justified by the data.

Pursuing the question of comparability of oral and written forms of the Mini-Mult, Percell and Delk (1973) compared the MMPI with three Mini-Mults: Kincannon's oral question form; a written question form; and a written statement form. One hundred twenty-one college students were administered a standard MMPI and on a later day one of the three short forms.

Correlations of the written statement forms with the standard MMPI

were slightly higher than were the other two versions, ranging from .58 to .91. As in earlier studies, the Mini-Mults underestimated the validity scales and did poorly in identifying profiles invalid according to the standard MMPI. When data for the three forms are considered together, identification of invalid profiles occurs in only one case out of 14. Identification of MMPI peak profiles was successful in 48%, 35% and 32% of the cases for the oral question, written question and written statement forms respectively. Results were similarly discouraging for identifying profiles with at least one peak above 70. The results suggest that for clinical purposes the three forms may be used interchangeably.

The Percell and Delk study suffers from a common weakness in design: No provision for retest with the standard MMPI. Interpretation of the results of this study should be limited to conclusions concerning the similarity of the three short versions to each other. Conclusions about the comparability of the short forms to the standard MMPI are not warranted by the design.

Application to Normals

In a study by Trybus and Hewitt (1972), 114 undergraduate college students were given the MMPI, with Mini-Mult scales extracted from the standard protocol. Comparisons of the mean scale scores for the MMPI and derived Mini-Mult were made. Although differences were significant for all scales (p less than .01) except Pt and Sc, the actual mean raw score differences did not exceed 1.5 points. Correlations between the scales ranged from .59 to .87 with a median of .81. The obtained cor-

relations, although lower than those obtained by Kincannon, are similar to those obtained in other studies with college students. A breakdown by race (51 of the sample were Negro) indicated that the Mini-Mult predicted MMPI scores equally well (or poorly) for both races.

Pulvermacher and Bringmann (1971) extracted Mini-Mult scores from the French language MMPI's of 36 French-Canadian students. They found median correlations of .61 and .56 for males and females respectively, somewhat below the correlations commonly reported with normals. An unknown amount of variability is attributable to a lack of standardization of the MMPI with Canadian subjects.

Lacks and Powell (1970) using essentially the same approach as Trybus and Hewitt but with a different population, obtained the MMPI tests of 20 male and 20 female psychiatric attendant applicants, and rescored them using Kincannon's templates. Comparisons by sex with the standard MMPI scores revealed only one significant difference: Pa for males was significantly overestimated by the Mini-Mult. With data combined over sex, differences were found for Pa, Pt and Ma. One or two differences would be expected by chance using an alpha of .05, since there were 33 t tests performed. Correlations between the two forms ranged from .65 to .90. As in the Trybus and Hewitt study, the results have little practical application since they are based entirely on data extracted from a full length MMPI.

Application to Psychiatric Inpatient Populations

Newton's (1971) investigation of the Mini-Mult with 48 alcoholic inpatients (mean C.A. 46) found rather low correlations between an

independently administered Mini-Mult and Form R of the MMPI. Correlations ranged from .28 to .69 with a median of .53. Order of presentation of the two forms was balanced, but when the data were analyzed in terms of scores on retest compared with original administration, a significant increase in responding in a socially desirable manner was noted. Newton's conclusion that the Mini-Mult does not approximate the standard MMPI as closely as originally suggested, would perhaps be more correctly stated as the use of Kincannon's conversion tables for converting Mini-Mult raw scores into standard MMPI scores resulted in low scale correlations between the two forms, for the present population. It would be worthwhile to determine if regression equations developed on the same population from which the present sample was drawn result in a significant increase in correspondence. Item selection on the Mini-Mult may be adequate, but conversion tables inappropriate.

Although the lowered scale correlations obtained by Newton may partially be attributed to population characteristics different from those in Kincannon's study, Palmer (1973) failed to replicate Kincannon's correlations using a population similar to the one for which the Mini-Mult was developed. Sixty state mental hospital patients were administered Form R of the MMPI and a written form of the Mini-Mult, with order counterbalanced. Test-retest interval was one day. Correlations between the two forms ranged from .08 for scale F to .71 for Hs with a median of .59. Kincannon reported a median correlation of .82 and a low correlation of .62 using essentially the same population and design (60 psychiatric inpatients, one day test-retest interval).

It is interesting to note that in the Palmer study percent of

agreement between subjects' responses to individual items of the two forms ranged from 59% to 98% with a median of only 83%. Palmer concludes that the results may indicate an unreliability of the population rather than the instrument. These data emphasize the importance of conservative interpretation of extracted short forms, where correspondence with the long form is overestimated.

In a recent study, Huisman (1974) investigated the use of the Mini-Mult with patients having verified brain damage. His sample consisted of three groups of 18 subjects each: one with left hemisphere lesions, one with right hemisphere lesions, and one a group of medical controls. Using extracted Mini-Mult scores he found a significant mean difference only on scale 9, which underestimated the MMPI. All correlations between the forms were significant, and ranged from .58 to .91 with a median of .78. Agreement on high scale score occurred in 55.5% of the cases. Breakdown by severity of pathology, using an F score of 11 as the cut-off point, did not indicate better correspondence for the more severe group.

In another recent study with the Mini-Mult, Hobbs and Fowler (1974) randomly assigned 60 V.A. hospital inpatients to one of three test conditions: (1) MMPI followed in two days with an oral Mini-Mult; (2) Mini-Mult followed by an MMPI; and (3) test-retest with the MMPI. Correlations with the MMPI for both the extracted and independent Mini-Mults were at the levels found by earlier researchers (median .73 and .74 respectively), but did not show the usual higher correlations for the extracted forms. The Mini-Mult correlations compared rather poorly with the obtained MMPI reliability figures

which had a median r of .85.

Using Kincannon's formulae for percentage of loss of reliability and loss in degree of scale equivalence average losses of 25.8% and 21.6% were obtained, considerably greater than Kincannon's 9% and 14%.

Application to Psychiatric Outpatient Populations

In another study, Harford, Lubetkin and Alpert (1972) extracted Mini-Mult scores from the MMPI protocols of 39 male and 39 female individuals on a waiting list of an outpatient psychiatric service of an urban hospital. The MMPI administered was a 430-item form which contains all the items for the three validity and ten clinical scales. As in most studies, scale correlations between the two forms were significant, ranging from .21 to .81 with a median correlation of .54. T test comparisons indicated significant mean differences for eight of the scales. These results are particularly poor, especially for extracted data.

Lacks' (1970) indices of pathology were used: (a) one or more clinical scales above a t score of 69; (b) three or more clinical scales above 69; (3) five or more clinical scales above 69; and (d) F scale value above 15 raw score points. Agreement between the two forms was 94%, 76%, 71% and 87% respectively.

Correspondence of highest profile peaks of K-corrected scale scores shows only a 27% agreement rate between the two forms, and only 15% agreement on two highest scales, regardless of order of the two.

In order to test the hypothesis that the utility of the Mini-

Mult varies with the severity of the disturbance of the population, Harford, et al, reanalyzed the data with the present sample divided into two groups on the basis of F scores. The F scores were considered to be measures of severity, with a cut-off point of 11 raw score points being used. The resulting median correlation for the severe group was .61 (N=35), while the less severe group had a median correlation of only .39. Although the data are not given, correspondence in terms of clinical codes was reported to be significantly better for the severe group. Although Huisman (1974) was unable to replicate these findings with a group of brain damaged individuals and medical controls, the results are in general agreement with those of Kincannon (1968) and Lacks (1970) who found a high correspondence for an inpatient population, and Armentrout and Rouzer (1970) and Armentrout (1970) who found low correspondence for normals. The above data bring into question the utility of the Mini-Mult as a preliminary assessment instrument for outpatients.

Hartman and Robertson (1972) also investigated the use of the Mini-Mult with outpatient clients of a community mental health agency, who were awaiting treatment. The 566-item MMPI and the Mini-Mult were given in alternating order within a week of each other to 30 male and 30 females. Scores were obtained for an extracted Mini-Mult, and independent Mini-Mult, and a full MMPI.

Statistical comparison of scale scores for the three sets of scores was accomplished with an analysis of variance, with males and females treated separately. Both Mini-Mults underestimated the F scale and overestimated K and Pd scales. The extracted Mini-Mult

underestimated Pa, while the independent Mini-Mult underestimated Ma. Sex differences in responding were significant for D, Hy, Pd and Ma.

Scale correlations between the MMPI and independent Mini-Mult ranged from .64 to .87 with a median of .78 with the extracted Mini-Mult correlating only slightly higher (median .83). These results are better than those obtained by Harford, et al, and approach the correlations obtained by Kincannon with inpatients.

Agreement by three psychologists on general diagnostic categories, based on profile codes of the MMPI and independent Mini-Mult, was 77% for males, 50% for females. Concurrence of the two forms on scale high points occurred in 45% of the sample.

The authors conclude that the Mini-Mult is nearly as effective an instrument for an outpatient psychiatric population as earlier studies indicate it is for psychiatric inpatients.

Gayton and Wilson (1971) investigated the use of the Mini-Mult with emotionally disturbed adolescents and their parents, in what is essentially two experiments. In the first, 60 valid MMPI protocols of an equal number of male and female adolescent clients of a child guidance clinic were selected, and rescored for Mini-Mult items. In the second, the protocols of 50 pairs of parents were selected from the records of the same clinic and scored in a similar manner. Statistical analysis was carried out separately for males and females of both groups. All correlations between the two forms were found to be significant for both sexes of both groups. Using t tests, no statistically significant differences between scale means were found for the adolescent group, but there were several for the parental

group. For fathers the Mini-Mult overestimated scales D and K, and for mothers scale Ma was overestimated.

Correspondence of profile elevations was assessed by the ability of the Mini-Mult to assign profiles into one of three categories: (1) all scales less than T score of 70; (2) one to three scores greater than 70; and (3) four or more scales greater than 70. Degree of agreement on category placement was 66% for adolescent males, 76% for adolescent females, 70% for fathers and 82% for mothers.

From a practical standpoint, Gayton and Wilson consider the most serious classification error to be having the Mini-Mult predict no scores greater than T score 70 when the MMPI was predicting one or more significant elevations. This occurred in three cases for boys, two cases for girls, and five cases each for fathers and mothers. Although there were a total of three cases in which the Mini-Mult predicted three or more elevations greater than 70 and the MMPI found none, false positive cases such as these do not greatly reduce the utility of a short form as a screening device.

Application to Institutionalized Non-Psychiatric Subjects

Working with a non-psychiatric population of institutionalized adolescents, Armentrout and Rouzer (1970) tested 100 male and 25 female delinquents with the Mini-Mult and the MMPI, in that order, upon arrival at a residential diagnostic center. Intertest intervals were from 24 to 48 hours. Correlations between the tests were significant beyond the .001 level on all scales for males, and for females only scales L and Hs did not reach significance at the .001 level.

As in other studies validity scales on the Mini-Mult tended to underestimate MMPI elevations. Only 24% (9 of 37) of invalid profiles (t scores of validity scales greater than 70) of males were identified by the Mini-Mult, but 75% (6 of 8) invalid profiles of females were identified. Approximately half of the pairs of profiles had identical K-corrected high points (males, 47 out of 100; females, 13 out of 25).

In the area of general elevation, 18 MMPI profiles of males had no elevations above 70, which corresponded to 9 on the Mini-Mult. For females the figures are 2 for the MMPI, 1 for the Mini-Mult. A smaller amount of indicated pathology upon retest has been a consistent finding of several studies (Windle, 1955; Kincannon, 1968); the differences between the Mini-Mult profiles and the MMPI retest include variability due to this factor, but the design of the experiment does not allow specification of the amount.

In a study similar to that of Armentrout and Rouzer, Platt and Scura (1972) investigated the use of the Mini-Mult with a slightly older population. One hundred eighty-three male reformatory inmates, ranging in age from 16 through 27 were given an MMPI as part of the routine entrance test battery. In contrast to the earlier study, Mini-Mult test scores for the present study were extracted from the standard form, which eliminates the variability due to retesting or a rapid mood change.

Correlations between forms for all scales were significant at the .001 level, and ranged from .40 for Hs to .83 for K. Median correlation was .58. However, comparisons based on the indices of

pathology recommended by Lacks (1970) and on profile pair high points (21% agreement) produced disappointing results. The authors do not recommend the use of the Mini-Mult with a population similar to the present one, because of the low degree of correspondence between the two forms.

Summary of Findings On The Mini-Mult

Examination of available data on the Mini-Mult (see Table 2, pages 10 and 11) indicates that: (1) Correlations between the MMPI and the Mini-Mult are statistically significant but generally not high enough for clinically useful prediction; (2) Percentage of agreement between the two forms on the highest clinical scale is moderate, ranging from 24% to 52% with a median of 40%; (3) Statistically significant mean differences between the two forms are common. Since paired t tests are used in most studies to compare mean scale scores, a number of significant differences would be expected to appear by chance. However, certain scales appear more frequently than can be accounted for by chance alone (see Table 5, page 30). Scales Hs and Pa are most frequently overestimated, and scales F, Pt and Ma most frequently underestimated; (4) Many methods are used to determine the clinical correspondence of the two forms, and the resulting percentages range from quite low to nearly 100%. Some comparison methods appear to be more meaningful than others, and will be examined in greater depth after consideration of other short forms.

TABLE 5

Frequency of MMPI Mean Scale Elevations
Significantly Overestimated and Underestimated
By the MMPI (Based on Nine Studies)

Scale	Overestimated	Underestimated
L	3	0
**F	0	6
K	1	4
*Hs	4	0
D	3	1
Hy	3	0
Pd	1	1
*Pa	5	1
**Pt	0	5
Sc	1	2
**Ma	1	8

* Scales Consistently Over Estimated
** Scales Consistently Under Estimated

ADAPTATIONS OF THE MINI-MULT

Dean's Midi-Mult

In order to improve the ability of the Mini-Mult to predict scales L, F and Ma on the MMPI, Dean (1972) devised new item subsets for these scales, and entitled the new 86-item version the Midi-Mult. Additionally, she computed new regression equations for all scales except D and Hy.

Dean's samples represented an essentially normal population, as they were drawn from individuals utilizing the Health Evaluation Center of an urban hospital. Three samples were used containing 175, 125 and 125 subjects respectively. All patients took a standard MMPI, and scores for abbreviated MMPI's were extracted from them. Statistical analysis of data from the first sample indicated statistical differences between the two forms for all scale means except Hy and D with scales L, F and Ma showing the lowest correlations (.73, .77 and .72 respectively). The sample was used for derivation of new item subsets for L, F and Ma, using Comrey's factor analysis data as a basis. Varying combinations were tried until correlations with the MMPI of at least .80 were obtained. Sample II was also used for derivation of regression equations for converting to long forms. Statistical analysis of sample III indicated no statistical differences between scale means for the two forms, using paired t tests. Correlations ranging from .81 to .92 were obtained, using the new items and regression equations. Agreement between the Midi-Mult

and the MMPI on the highest profile peak was achieved in 58% of the cases (72 of 125). Dean also reports agreement on normality/abnormality in all except five cases, using as her criteria of abnormality three scales greater than 70 or D, Pa, Sc or Ma greater than 80. Dean emphasizes the necessity of validating abbreviated MMPI's on the population in question, and recommends trying the Midi-Mult on predominately normal groups, and using the Mini-Mult with a psychiatric group.

Since the original Dean study utilized only extracted data, Gilroy and Steinbacher (1973) compared the relative ability of "internal" and "external" Midi-Mults to predict MMPI scores in a sample of 59 male and 56 female college students. Order of administration was counterbalanced with a test-retest interval of less than a week. The extracted Midi-Mult produced higher correlations with a standard MMPI than did the independently administered Midi-Mult. For the extracted form correlations ranged from .72 to .92 with a median of .83; the independently administered form produced correlations with the standard MMPI ranging from .52 to .84 with a median of .68.

When mean scale elevation differences are considered, several scales achieved statistical significance. Dean's new scales Ma and F were not among them, but her scale L was significantly higher. There were significant differences for scales D and Hy, but these represent unaltered Mini-Mult scales converted using Kincannon's table. Scales Pd and Pa, which were both underestimated, are Mini-Mult scales converted to MMPI scores with Dean's regression equations.

For both the independent and extracted forms scale Ma produced

the lowest correlations. The correlation for scale Ma obtained from the extracted data (.72) was slightly higher than that ordinarily obtained from the Mini-Mult, but the independently administered Midi-Mult produced a lower correlation (.52) than those sometimes obtained for that scale from independently administered Mini-Mults. Table 6 (page 34) summarizes the pertinent data.

In comparison with the two relevant Mini-Mult studies (Armentrout, 1970; Gayton, et al, 1973), Gilroy and Steinbacher have been able to demonstrate higher correlations on scales L and F than have been obtained by the Mini-Mult with college students, but no significant increase in correlations for scale Ma (see Table 7, page 35). Even with revised regression equations there does not seem to be a significant increase in correlations for other scales, and mean scale elevation differences are still numerous.

Gilroy and Steinbacher conclude that the Midi-Mult and Dean's transformation table are appropriate for college students, but for other populations preliminary validations utilizing extracted scores should be carried out before application of the Midi-Mult or any other short form is carried out.

In an extension of the use of the Midi-Mult to a non-normal population, Newmark, Cook and Greer (1973) extracted Midi-Mults from the MMPI's of 97 male and 131 female psychiatric patients at the University of North Carolina Medical School, and found no significant mean scale differences for females and only two significant differences for males (D and Pa). Correlations for males ranged from .44 for Pa to .82 for Ma (median .73), and .57 for Pa to .82 for Pt

TABLE 6

Correlations Of The Mini-Mult And The Midi-Mult
With The Standard MMPI For Scale Ma

	Correlation	
	Extracted Short Form	Independently Administered Short Form
Gilroy & Steinbacher 1973, Midi-Mult	.72	.52
*Mini-Mult	Median .61 Range .26 to .80	Median .57 Range .28 to .67

* Based On Six Studies

TABLE 7

The Mini-Mult And Midi-Mult With College Students: Three Studies

	Design		Correlations With MMPI Scale											
			L	F	K	1	2	3	4	6	7	8	9	Mdn.
Mini-Mult Armentrout 1970	68/M, 76/F Ind. Not Counterbal. 2-7 Day Interval	Males	.35	.09	.73	.44	.47	.49	.67	.70	.71	.56	.44	.56
		Females	.58	.72	.61	.71	.61	.61	.73	.42	.85	.75	.56	.61
Mini-Mult Gayton, Et Al, 1972	47 Students Independent Counterbalanced Oral/Written Forms	Oral	.31	.40	.77	.72	.66	.65	.50	.52	.83	.68	.58	.65
		Written	.47	.39	.58	.64	.66	.78	.56	.54	.77	.60	.58	.58
Midi-Mult Gilroy & Steinbacher 1973	59/M, 56/F Ind. Counterbalanced Less than 1 Wk. Interval	Independent	.61	.57	.72	.79	.78	.64	.72	.59	.84	.79	.52	.72
		Extracted	.81	.67	.86	.92	.88	.80	.87	.77	.92	.89	.72	.86

(median .71) for females. The Midi-Mult correctly identified 65% of the invalid MMPI profiles, with no false positives, and agreed with the MMPI on highest single scale for 45% of the valid profiles. Several other profile comparisons were made, and Newmark, et al, interpret the data as indicating the inappropriateness of the Midi-Mult for a psychiatric population.

Leer (1973) investigated further the relative performance of extracted Mini-Mults and extracted Midi-Mults in a male psychiatric inpatient population, (N=200, mean C.A. 37) and found significant mean scale differences for scales F, Pt, Sc and Ma on the Mini-Mult, but on the Midi-Mult found significant mean differences only on scales K and Pa. A slightly higher median correlation was found for the Midi-Mult as compared to the Mini-Mult (.85 compared to .79).

A second sample of 23 subjects was administered Form R of the MMPI, followed within a week by an independently administered Midi-Mult. Significant mean differences between the independent Midi-Mult and the MMPI were found for five scales: Pd, Pt, Sc, L and Pa. For extracted forms, there was 40% agreement on highest scale between the MMPI and the Mini-Mult, and for the Midi-Mult, a somewhat higher, 55%, agreement.

In reviewing the available data on the Midi-Mult (see Table 8, page 37) the most significant improvement appears to be higher correlations for scale F than have been obtained with the Mini-Mult. For extracted scores the advantage appears to be slight; the median scale F correlation for the Mini-Mult is .70 (12 samples) and for the Midi-Mult .74 (6 samples). However, for independently administered

TABLE 8

Available Data On Dean's 86-Item Midi-Mult

Author/Date	Sample	Design	Scales Overest.	Scales Underest.	Highest Clinical Scale % Agreement With MMPI		Correlations With MMPI Scale L	F	K	1	2	3	4	5	6	7	8	9	0	Mdn.
Dean 1972	Normal Population Gen. Medical Sample 125 Subjects	Extracted Midi 86 Items Revised L, F, Ma	None	None	53%		.83	.88	.92	.91	.89	.86	.81	-	.81	94	.87	.89	-	.87
Gilroy & Steinbacher, 1973	59/M, 56/F College Students	Ind. & Ext. Counterbalanced Less Than 1 Wk.	Ind. L, 2 Ext. L, 2	Ind. 4, 6 Ext. 3, 4, 6	-	Ind.	.61	.57	.72	.79	.78	.64	.72	-	.59	.84	.79	.52	-	
						Ext.	.81	.67	.86	.92	.88	.80	.87	-	.77	.92	.89	.72	-	.86
Leer 1973	23 Psychiatric Inpat. 73% Psychotic 16% Neurotic 11% Character Disord. Mean CA 35	Independent 1 Week Interval	-	-	-		.66	.57	.74	.77	.85	.66	.67	-	.59	.83	.79	.46	-	.67
Leer 1973	200 Male Psychiatric Inpat.	Extracted	K	6	55%		.70	.83	.87	.92	.88	.86	.83	-	.77	.92	.85	.63	-	.85
Newmark, Cook & Greer, 1973	97/M, 131/F Psychiatric Inpat.	Extracted	None	M-D & 6 F-None	M-37% F-52%	M	.63	.68	.73	.71	.49	.75	.81	-	.44	.79	.80	.82	-	.73
						F	.65	.70	.71	.64	.58	.73	.77	-	.57	.82	78	.81	-	.71
Newmark 1974	65/M, 65/F Psychiatric Outpat. Mean Age 30.8	Extracted	M-6 F-None	M-None F-4 & 6	23%	M	.61	.74	.71	.81	.51	.76	.83	-	.67	.60	.62	.58	-	.64
							.73	.74	.76	.62	.69	.72	.67	-	.49	.62	.58	.81	-	.69

forms the advantage is greater. Median for the Mini-Mult is .39 (6 samples) and .60 for the Midi-Mult (3 samples).

Dean appears to have been somewhat successful in her attempt to improve the validity of the F scale, slightly successful with the L scale, and unsuccessful with scale Ma. Since the item subsets for the remaining scales are identical for the Mini-Mult and the Midi-Mult, selection of conversion tables for the clinical scales would depend on the population of interest. The Midi-Mult regression equations were developed for college students while the Mini-Mult regression equations are based on a psychiatric sample. Implementation of Gilroy and Steinbacher's recommendation of a preliminary validation sample and development of regression equations for the population of interest represents the optimal means of converting short form scores to their long form equivalents.

Spera's Maxi-Mult

In another attempt to increase the clinical usefulness of the Mini-Mult, Spera (1973) developed a 104-item short form containing Grayson's Critical Items (1951), which he compared with the Mini-Mult, using a male, psychiatric inpatient population. Grayson's items represent statements that are rarely endorsed by normals, and are therefore useful as screening items. Additionally, when combined with the Mini-Mult (8 of 31 are already included) they increase the number of items on scales that have previously been found to be somewhat weak, particularly scale F. They also permit scoring of scales Mf and Si.

Spera's initial sample of 200 male V.A. psychiatric hospital inpatients (mean age 37) were administered form R of the MMPI, with Mini-Mult and Maxi-Mult scores extracted and regression equations derived for the Maxi-Mult. Comparisons of the two forms on correspondence to the full MMPI were made for mean scale scores, scale correlations, and three point code type. Results favored the Maxi-Mult over the Mini-Mult.

A second sample of 24 subjects similar to those in the first study was selected, and administered form R of the MMPI, followed within five to seven days with a written version of the Maxi-Mult. Comparison of the mean scale scores of the independently administered Maxi-Mult with the MMPI indicated no statistically significant differences. This is quite impressive, considering the design was not counterbalanced for order of presentation of the two forms. All scale correlations were significant, with a median correlation of .81. Profile peak comparisons indicate that there was 63% agreement between the two forms on the highest ranking scale. Spera concludes that for the present population the Maxi-Mult showed definite superiority over Kincannon's Mini-Mult.

In an attempt to replicate Spera's findings, Kozlowski (1974) investigated the use of the Maxi-Mult with a general hospital population, with discouraging results. Kozlowski's subjects were 30 male and 30 female referrals to the psychological services department in a general hospital, with 53% diagnosed as neurotic, 27% psychotic and 20% character disorders. Mean age was 36 for males and 32 for females. Subjects were given the standard MMPI and the

independent Maxi-Mult, with order of administration counterbalanced and a test-retest interval of not more than 24 hours.

Scale correlations ranged from .09 for scale Mf to .84 for scale D, with a median of .68. There was 51% agreement on the highest scale. Scale correlations for Mf were the result of a reversal of scoring of the original Mf items, developed by Spera for males only. Although correlations were not as high as those obtained by Spera, the percent of agreement on highest scale compares favorably with the best obtained from the Mini-Mult. The lengthening of scale F on the Maxi-Mult appears to have increased its reliability (and validity) substantially; for the Spera study the obtained correlations were .90 (extracted) and .84 (independent administration) and for Kozlowski .68. These correlations are higher than those reported for the Midi-Mult.

Khan (1974) investigated the utility of the Maxi-Mult in an outpatient psychiatric clinic, with discouraging results. The Maxi-Mult was administered to 30 male and 30 female clients either immediately before or immediately after the standard booklet form of the MMPI. Statistically significant differences between mean elevations of the two forms were found for eight scales. The median correlation for males was .67 and for females was .77.

Examination of available data (see Table 9, page 41) indicates that in general the correlations obtained by the Maxi-Mult are comparable to those obtained from the Midi-Mult or the Mini-Mult. Spera's version allows scoring for scale Mf and scale Si, although correlations for scale Mf have been too low to be clinically use-

TABLE 9

Available Data On Spera's 104-Item Maxi-Mult

Author/Date	Sample	Design	Scales Overest.	Scales Underest.	Highest Clinical Scale % Agreement With MMPI		Correlations With MMPI Scale												
							L	F	K	1	2	3	4	5	6	7	8	9	0	Mn.
Spera, 1973	200/M V.A. Psychiatric Inpatients	Extracted	None	None	77%		.70	.90	.84	.95	.88	.88	.82	.52	.86	.93	.91	.75	.65	.86
Spera, 1973	24/M V.A. Psychiatric Inpatients	Independent Not Counterbal. 5-7 Day Interval	None	None	62%		.54	.84	.75	.83	.81	.82	.84	.73	.75	.84	.86	.59	.58	.81
Kozlowski, 1974	60 Patients In A General Hospital	Independent Counterbalanced 24 Hour Interval	-	-	51%		.46	.68	.75	.79	.84	.65	.73	.09	.68	.72	.77	.53	.58	.68
Khan, 1974	30/M, 30/F Psychiatric Outpatients	Independent Counterbalanced No Interval	Eight Scales Significantly Different		48%	M	.42	.54	.83	.70	.73	.67	.84	.36	.57	.76	.85	.56	.67	.67
						F	.54	.87	.55	.87	.86	.83	.64	.01	.77	.88	.82	.41	.71	.77

ful (median .36).

McLachlan's Version

In another attempt at increasing the usefulness of the Mini-Mult, Graham and Schroeder (1972) selected by factor-analytic methods 20 additional items which allow prediction of scales 5 (Masculinity-Femininity) and 0 (Social Introversion). Regression equations were computed for a sample consisting of 49 psychiatric inpatients and 69 psychiatric outpatients, with cross validation on a sample of 100, evenly divided between inpatients and outpatients. Scores for the shortened scales were extracted from standard MMPI's. Correlations for the cross-validation groups were .75 for scale 5 and .81 for scale 0, which compare favorably with available reliability measures for the standard scales (see Table 1, pages 4 and 5).

In an attempt to replicate the findings of Graham and Schroeder, Finch, Griffin and Edwards (1974) extracted abbreviated Mf and Si scale scores from the MMPI profiles of 70 female and 58 male parents of emotionally disturbed children. Comparisons of the standard scores predicted by the shortened scales with the full MMPI scales indicated a somewhat lower correlation (.67 instead of .81) for scale Si than was obtained in the original study. The correlation for scale Mf was almost identical (.76 instead of .75), but as Finch, et al pointed out, this correlation is considerably inflated by the clustering of males and females at different points along the scale. Analysis by sex shows a correlation of only .21 for males and .47 for females. The authors' doubts concerning the utility of the abbreviated Mf

appear to be substantiated by the following research by McLachlan.

Using a novel approach to short form test construction, McLachlan (1974) constructed a 94 item device which permits scoring of all standard scales with the exception of L and Mf. Instead of revising items that showed low correlation with a long form, McLachlan revised scales which had low (less than .70) test-retest stability over a one to four year interval. Starting with Dean's L, F and Ma scales, Graham and Schroeder's Mf and Si, and the remainder of the scales from the Mini-Mult, McLachlan obtained extracted test-retest scores from 50 chronic alcoholics (35 male, 15 female) who had returned for inpatient treatment of alcoholism. Scales D, Hy, Pt, and Si were unaltered, but the other scales had items added until reliability was increased. Scales L and Mf were eliminated because of low reliability.

Regression equations and correlations of the revised scales with the long form are not given. Data given in Table 10 (page 44) is for the unrevised scales. McLachlan tentatively designated his device the "Maxi-Mult", so it may become necessary to differentiate between Spera's and McLachlan's versions. Correlations of the original short forms with the long form replicate the findings of Dean with her Midi-Mult scales L, F and Ma. Scale correlations for L and F were good (.84 and .75 respectively) while Ma was low, .63. Correlations for scale Mf were low, ranging from .00 to .60, substantiating Finch, et al's criticism of the usefulness of that shortened scale. Evaluation of McLachlan's revised scales, however, cannot be made without additional data.

TABLE 10

Available Data On
McLachlan's 94-Item Maxi-Mult

Author/Date			McLachlan, 1974		
Sample			35/M, 15/F Chronic Alcoholics Mean Age 45.9		
Design			Extracted 94-Item Maxi-Mult (Not to be confused with Spera's Maxi) 1 to 4 Year Interval		
Scales Overestimated			-		
Scales Underestimated			-		
Highest Clinical Scale % Agreement With MMPI			-		
Correlations With MMPI				Test	Retest
		L	Dean's Midi	.84	.82
		F	Dean's Midi	.75	.76
		K		.91	.89
	S	1	Kinc. Mini	.88	.91
	c	2	Kinc. Mini	.89	.79
	a	3	Kinc. Mini	.86	.86
	l	4	Kinc. Mini	.88	.81
	e	5	Male/Female	.60, .00	.44, .58
		6	Kinc. Mini	.75	.76
		7	Kinc. Mini	.91	.87
		8	Kinc. Mini	.87	.78
		9	Dean's Midi	.63	.61
		0	Graham & Sch.	.82	.90

RECENTLY DEVELOPED FORMS

Dissatisfactions with the apparent shortcomings of earlier short forms has resulted in the development of several longer, although still relatively short, abbreviated versions. Preliminary investigations are promising.

Hugo's 173-Item Version

Hugo's (1971) 173-item test is one of these medium length short forms. Developed by means of multiple regression analysis using several hundred college students as subjects, test-retest reliabilities approaching those of the long form are reported (.42 to .85, median .76). Correlations with the long form ranged from .49 to .89 with a median correlation of .66. Table 11, page 46, also includes data of a later study (Newmark, 1974, b) with Hugo's version where median correlations of .77 and .66 were obtained for male and female psychiatric outpatients. Hugo recommends the use of his version with college students in place of the cumbersome full scale MMPI.

Faschingbauer's 166-Item Version

Faschingbauer in 1972 developed a 166-item short form of the MMPI, which contains Kincannon's scales L, K, Hs, D, Hy and Pt with items added plus new scales for F, Pd, Pa, Sc, Ma, Mf and Si. Using a sample of 100 college students, he deleted or added items until correlations of .85 or better were obtained. An examination was then made of a relatively small (N=62) sample of psychiatric inpatients

TABLE 11

Available Data On The Hugo 173

Author/Date		Hugo, 1971	Newmark, 1974
Sample		374 College Students	65/M, 65/F Mean Age 30.8 Psychiatric Outpatients
Design		Hugo, 173	Extracted Hugo, 173
Scales Overestimated		None	None
Scales Underestimated		None	None
Highest Clinical Scale % Agreement With MMPI		-	34%
Correlations With MMPI			Male / Female
	L		.80 / .66
	F		.74 / .74
	K		.73 / .58
	Scale 1		.77 / .59
	Scale 2		.80 / .78
	Scale 3		.82 / .75
	Scale 4		.85 / .83
	Scale 5		- / -
	6		.64 / .83
	7		.71 / .72
	8		.68 / .67
	9		.79 / .86
	0		.77 / .66
Median		.76 (.42 to .85)	.77 / .66

using the 166-item extracted version. Favorable results were reported.

Results of Faschingbauer's validation study of a mixed group of college students and psychiatric patients (shown in Table 12, page 48) indicate a median correlation for extracted data of .91 and for the independently administered form .74.

The Newmark, et al (1973) study attempted to replicate Faschingbauer's findings with a larger, more heterogeneous sample of inpatients. Test scores were extracted from the MMPI protocols of 97 male and 131 female psychiatric inpatients and statistical comparisons made. Correlations from .60 to .87 were obtained, with significant mean differences on scale Pt for males and Sc for females. Since paired t tests were used with 26 comparisons, two differences could have occurred by chance.

For males and females respectively, there was 79% and 84% concurrence on validity, with all protocols found invalid by the short form, also invalid on the long form. For valid protocols, agreement on highest profile peak occurred for 62% of the male subjects and 70% of the female subjects. Agreement on presence of pathology (one or more scales greater than T score of 69) occurred in 87% and 94% of the males and females respectively. Agreement on general diagnostic category was 76% for the combined data. Several other analyses of correspondence were carried out.

The advantages of Faschingbauer's 166-item version over shorter forms are apparent in the consistently high correlations and the percentage of concurrence on highest profile peak, which compare favorably with the retests with the full MMPI.

TABLE 12

Available Data On Faschingbauer's 166-Item MMPI

Author/Date	Sample	Design	Scales Overest.	Scales Underest.	Highest Clinical Scale % Agreement With MMPI		Correlations With MMPI Scale L	F	K	1	2	3	4	5	6	7	8	9	0	Mdn.
Faschingbauer 1972	57/M, 64/F College Students & Psychiatric Patients	Extracted	-	-	-	M	.91	.94	.90	.93	.90	.91	.86	.84	.92	.93	.95	.87	.92	.91
						F	.86	.90	.88	.95	.91	.91	.94	.76	.86	.92	.95	.88	.91	.91
Faschingbauer 1972	29/M, 31/F College Students & Psychiatric Patients	Independent Counterbalanced 1 Day Interval	-	-	-	M	.80	.79	.78	.73	.74	.67	.71	.73	.46	.90	.89	.80	.87	.76
						F	.66	.49	.58	.88	.84	.88	.77	.65	.66	.88	.80	.69	.85	.73
Newmark, Cook, Clark & Faschingbauer, 1973	97/M, 131/F Psychiatric Inpatients	Extracted	M-Pt F-None	M-None F-Sc	- -	M	.84	.77	.87	.82	.80	.79	.85	.82	.86	.60	.69	.75	.73	.80
						F	.87	.78	.88	.75	.73	.89	.80	.76	.70	.68	.57	.82	.81	.78
Newmark 1974	65/M, 65/F Psychiatric Outpatients	Extracted	None	None	44%	M	.80	.72	.84	.65	.86	.83	.74	-	.81	.87	.84	.70	-	.81
						F	.87	.79	.82	.73	.82	.85	.69	-	.77	.75	.73	.71	-	.77

Newmark (1974), in an unpublished study, compared three shortened versions of the MMPI: The Midi, Hugo's version, and Faschingbauer's 166-item version, and found the Faschingbauer version to be consistently superior. MMPI protocols were obtained of 65 male and 65 female psychiatric outpatients, and short form scores extracted from them. Raw scores were converted to standard MMPI scores using the available conversion tables, and comparisons made. Scales Mf and Si were not included as they are not part of the Midi-Mult.

The only significant mean scale differences were on the Midi-Mult for scales Pa and Pd, where underestimation of the MMPI occurred. Correlations between forms were highest for the Faschingbauer, followed by Hugo's version and the Midi-Mult. Median correlations for the three forms were .79, .76 and .68 for males and .77, .73 and .67 for females. Agreement between the short and long forms for males and females was 28%/30% for the Midi-Mult, 43%/44% for Hugo's version and 60%/54% for Faschingbauer's short form. Comparisons on validity, rated similarity of profile pairs, and consensual diagnosis all consistently favored Faschingbauer's form and solidly support Newmark's conclusion of the superiority of Faschingbauer's version for a population of psychiatric outpatients.

Overall's 168-Item Version

In the most recent attempt at devising an abbreviated MMPI, Overall and Gomez-Mont (1974) found that most of the reliable variance in the usual MMPI conventional scales is found in the first 168 items of Form R. One hundred sixty-eight items were selected because

number 168 happens to fall at the bottom of page seven. Regression equations for converting to standard scale scores were computed, in some cases based on more than one of the abbreviated scales. The derivation sample consisted of 339 individuals representing both psychiatric outpatients and psychiatric inpatients. Correlations between the MMPI 168 and full MMPI ranging from .79 on Ma to .96 on Hs, with a median of .88. These correlations compare most favorably with available MMPI test-retest reliability figures. Cross validation is not reported.

Newmark (1974) extracted scores for the MMPI 168 from the protocols of 70 male and 70 female psychiatric inpatients and compared them with profiles from the full MMPI, using several techniques. Correlations between the two forms were generally as high as or higher than those obtained by Overall and Gomez-Mont. Median correlation for males was .88 and .90 for females. For both males and females, scale Si was significantly underestimated, but there were no other mean differences.

Agreement on highest clinical scale occurred for 70% of the valid profiles for males and 73% of the valid profiles for females. Examination of ability to identify invalid profiles, psychotic-neurotic discrimination, consensual diagnosis, and rated profile similarity produced good results. The results of the present study on the MMPI 168 are as good as any obtained from any abbreviated forms, and better than most reported test-retest comparisons with the standard MMPI.

In a study using a sample of most adequate size (N=3355)

Hedlund, et al (1974) compared the effectiveness of the Mini-Mult and the MMPI 168 with a combination of inpatients and outpatients. As might be expected, the MMPI 168 produced better results than did the Mini-Mult, with a median correlation of .90 compared with .84. Derivation of new regression equations based on half of the total sample, resulted in slight improvement in correlations for the Mini-Mult (from .84 to .86) but no improvement for the MMPI 168. This speaks well for the adequacy of the regression equations of Overall and Gomez-Mont for a psychiatric population. Although possibly resulting in a slight loss in accuracy, the availability of conversion tables for the MMPI 168 would be welcomed by practicioners not utilizing computer scoring.

Agreement on highest clinical scale occurred in 65% and 56% of the cases respectively for the two short forms, with 92% and 86% agreement on at least two of the three highest scales. Table 13, page 52, presents the available data on the MMPI 168.

Of the three medium length forms, the available data suggest that Hugo's version may be somewhat inferior to the other two, at least with psychiatric populations. Further studies comparing the effectiveness of these forms need to include data for independent administrations of the short form. One of the most encouraging characteristics of these medium length forms is their ability to accurately predict the highest scale on the MMPI, which is essential for diagnostic applications.

TABLE 13

Available Data On The MMPI-168

Author/Date	Sample	Design	Scales Overest.	Scales Underest.	Highest Clinical Scale % Agreement With MMPI		Correlations With MMPI Scale L	F	K	1	2	3	4	5	6	7	8	9	0	Mdn.
Overall & Gomez-Mont, 1974	339 Psychiatric Inpatients & Outpatients	Extracted	-	-	-		-	-	-	.56	-	-	-	-	-	-	-	.79	-	.88
Newmark, 1974	70/M, 70/F Psychiatric Inpatients	Extracted	-	-	70%	M	.93	.92	.84	.88	.95	.88	.84	.78	.86	.94	.89	.96	.82	.88
						F	.91	.93	.86	.90	.93	.84	.86	.77	.83	.92	.91	.93	.79	.90
Hedlund, Et Al, 1974		Extracted	-	-	65%		.94	.94	.88	.94	.94	.91	.84	-	.90	.69	.90	.83	.83	.90

CONCLUSIONS AND RECOMMENDATIONS

Research

Researchers interpreting the data from studies on shortened versions of the MMPI have utilized a variety of techniques differing greatly in degree of objectivity and clinical relevance. The great majority of available studies have indicated correlations between the short form scales and corresponding MMPI scales, with statistical analysis of obtained correlations in most cases indicating a high degree of statistical significance. Unfortunately, statistically significant correlations have frequently been found to be too low to have any practical predictive value.

Another objective measure frequently employed is the comparison of mean scale elevations, and statistical analysis of the mean differences between long and short form scales. In most studies at least one significant mean difference is found, and it is not unusual to find significant differences for one-half or more of the scales. Such differences are frequently no larger than one raw score point, and may not represent any practical significance. Mean profile comparisons are useful where group characteristics are of interest, but may obscure important differences in individual profile pairs.

One approach to the assessment of similarity of profile pairs utilizes some form of rating scale. Kincannon had clinical psychologists rate pairs of profiles on the degree to which their interpretations would overlap. An 11 interval scale was used representing a

range from "identical" to "no overlap". Newmark, et al, (1973) and Newmark (1974) utilized a four point scale and had three judges rate superimposed plots on degree of similarity. Although the above methods represent attempts to consider profile pair differences, the figures obtained are not readily interpretable. Additionally, the rating of profile similarity has little relationship to clinical practice. To this investigator, a more reasonable approach is to have clinicians give an interpretation for each profile obtained, permitting an index of diagnostic agreement to be computed.

Just such a method is used in consensual diagnosis comparisons, in which two or three psychologists, acting in conjunction, assign profiles to general diagnostic categories. In most cases, these categories are psychotic, neurotic, personality disorder and essentially normal. Although being closely related to clinical practice, consensual diagnosis comparisons introduce an unknown amount of variance which is not inherent in the data. A completely objective measure of profile correspondence would be more desirable.

The majority of available studies include some measure of correspondence based upon objective assignment to levels of pathology or diagnostic categories. One of the more frequently encountered schemata is that of Lacks (1970) who used the following indices:

(1) One or more clinical scores above a T score of 69;
(2) Three or more scales above 69;
(3) Five or more scales above 69;
(4) F above 11 raw score points; and
(5) F above 15 raw score points.

If the short form is to be used primarily as a screening device, the first category (one or more clinical scales above a T score of 69) is

of considerable importance. If the reason for administration is for diagnostic purposes, a more precise method of profile comparison is necessary.

Since MMPI profile analysis is generally based upon the two or three most elevated scales, a measure of similarity between the highest scales would be desirable. Lichtenstein and Bryan (1966) recommend a frequency count of how often the highest ranking score on the full MMPI is ranked first, second or third on the short form, and similarly for the second and third ranked scales. In their sample of 82 normals and psychiatric patients there was only 50% agreement on the highest ranked scale for two administrations of the full MMPI. Awareness of this and similar data for the MMPI should temper criticisms of apparent short form instability as indicated by moderate percentages for this index. Lichtenstein and Bryan's[1] warning that "profile stability over groups appears to be quite adequate for research use, but there is a risk of misclassifying individual profiles when clinical interpretations are made" applies with even greater force to shortened versions. Applications to essentially normal populations where the ranges of scores are more limited than in a psychiatric population, are especially susceptible to the above limitation.

A frequent short-coming of studies on shortened MMPI's is the failure to provide some comparison with the test-retest reliability

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[1] Lichtenstein, Edward and Bryan, James H., "Short Term Stability of MMPI Profiles." Journal of Consulting Psychology, 1966, Vol. 30, No. 2, p. 174.

that might be expected from a standard length MMPI. Table 1, pages 4 and 5, presents available reliability data, and suggests the upper limits that may be expected for the validity and reliability of an abbreviated version. Of course a more direct approach would be to include a test-retest of the MMPI for the population being considered.

Kincannon (1968) has suggested two objective indices for evaluation of reliability and validity relative to that obtained from a full MMPI. The first, percentage loss in reliability, compares the retest reliability of each short form scale with the retest reliability of the full MMPI. The second measure, loss of degree of correspondence, represents an objective measure of a short form's ability to predict the three highest scales obtained on an administration of the MMPI. Short form performance is compared to the agreement rate of two administrations of the MMPI, in order to indicate how much predictive accuracy is lost by using the shorter version. To this investigator, Kincannon's indices represent a relevant and objective measure of short form-long form correspondence, which should receive more frequent use.

Another common short-coming of short form studies is the extraction of data from available MMPI protocols, without independent administration of the shortened version. Although Gough's (1946) contention that even the unscored items have a significant effect on scale scores has not received consistent support, it appears that extracted data is not completely comparable to that obtained from independent administrations of a shortened version.

Palmer (1973) found that agreement between subject's responses

to items on the independently administered Mini-Mult and the same items within the standard MMPI ranged from 59% to 98% with a median of 83%. Correlations obtained from extracted data must always be considered as overestimations of correlations that might be obtained from an independently administered short form. While studies utilizing extracted data may be justified in the early stages of test development, they do not provide a complete answer to the question: Is the short form an adequate substitute for the full MMPI?.

There seems to be little need for additional studies utilizing extracted data, particularly with the much researched Mini-Mult. This investigator recommends that future studies utilize independently administered short forms with provision made for comparison with standard MMPI's. Kincannon's indices of correspondence provide both an objective and a clinically relevant means of comparison, and appear particularly well suited as tools for evaluation. The three recently developed medium length forms (Hugo's, Faschingbauer's and Overall's) appear promising, and are likely to prove more useful in a wide range of settings than have earlier shorter forms.

Clinical Applications of Short Forms

The advantages of valid short forms are apparent: the greatly reduced time and effort which they require of subjects allows them to be used for many purposes where a standard length MMPI would be unfeasible. Additionally, administration and scoring time are also somewhat reduced.

Several limitations should be kept in mind, however, by those

utilizing abbreviated versions. Short forms appear to be appropriate as screening instruments for detection of psychopathology, but are less valid when used for the determination of specific diagnoses. In all applications it is important to keep in mind that available conversion tables and regression equations are apt to be less accurate to the degree that the population in question differs from that on which they were derived. Derivation of new regression equations for each application as suggested by Gilroy and Steinbacher (1973) appears justified.

Summary

An examination was made of available short forms developed to meet the need for an abbreviated MMPI. Early attempts centered around removal of unused items, yielding forms that were still too long for many applications. The introduction of Kincannon's Mini-Mult in 1968 sparked renewed interest in short forms, resulting in numerous validation attempts and several slightly longer adaptations (Midi-Mult, Maxi-Mult, and McLachlan's version). Although of some utility as coarse screening devices, they have appeared generally deficient as diagnostic instruments. Several somewhat longer forms (Hugo's 173, Faschingbauer's 166 and Overall's 168) have been recently developed and appear quite promising as substitutes for the standard-length MMPI.

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