

A Comparison of MMPI and MMPI-2 T-Scores in Turkish Adults



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SUMMARY

Objectives: The aim of this study was to compare Minnesota Multiphasic Personality Inventory (MMPI) linear T-scores and MMPI-2 uniform T-scores in a Turkish Sample.

Materials and Methods: The study included 50 adult (30 female and 20 male) volunteers that completed MMPI and MMPI-2. Age of the participants ranged from 18 to 55 years (mean: 24.96 Sd 8.66). The tests were administered at least 3 weeks apart. MMPI linear T-score, MMPI-2 uniform T-score, and MMPI-2 linear T-score were compared via 3 x 2 repeated-measures ANOVA.

Results: There wasn't a significant difference between the mean MMPI subscales' scores and MMPI-2 subscales' scores. Change in the number of items and content did not result in significant difference; however, minimal differences were thought to be due to the method used to compute the T-scores. Additionally, MMPI-2 hypochondriasis, depression, and hysteria subscale scores differed between males and females.

Discussion: These findings support earlier reports of the psychometric equivalence of the original MMPI and MMPI-2. Additionally, there weren't any profile differences between the 2 tests; therefore, the findings support the idea knowledge of old profiles can be used in new ones. Nonetheless, during the transition from MMPI to MMPI-2, it may be helpful to remain aware of the differences in some subscales for females.

Keywords: MMPI, MMPI-2, comparability

INTRODUCTION

The Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway and McKinley 1943) is one of the most frequently used tools for assessing personality. The scale was adapted for use in Turkey by Savasir (1981), and has since found widespread use. Despite this widespread use, MMPI has been criticized for numerous reasons: 1. High correlation between the clinical subscales, as they do not properly represent the indication clusters they refer to (e.g. depression or paranoia scale); 2. Some items are complex, poorly worded, and sexist; 3. Comparison of the linear

T-scores calculated for the clinical subscales is difficult (Butcher and Pope 1992). Considering the fact that the norm group has lost its currency, a revision of the original MMPI proves to be a necessity. MMPI-2 was adapted for use in Turkey by Savasir and Culha (1996), and the psychometric test re-test validity of the MMPI-2-Turkish Version was reported by Bozkurt (2001); however, the Turkish Handbook for MMPI-2 has not as yet been published. Although the use of the scale as a means of psychiatric assessment has not begun, its use in research has already become widespread (Uluc 2008; Yildirim et al. 2005; Demir et al. 2002)

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and such studies are critically important for their potential to contribute to the transition of widespread use of the MMPI-2.

The popularity of the original MMPI in several fields, especially psychiatry, resulted in researchers focusing on this tool, and this popularity enabled the formation of a large MMPI research pool. One of the most important outcomes of these studies is the frequently observed profile patterns and the MMPI maps in which interpretations of these patterns are relayed. As such, the revision committee adopted a comparatively conservative approach, so as to enable use of the original MMPI profile maps and preservation of the integrity of the clinical subscales during the MMPI-2 development process (Fekken 1992). The cautious approach by the MMPI-2 committee resulted in the continuation of the criticisms directed at the original MMPI, such as the high correlations observed between the clinical subscales. This has been accepted as the price to be paid for protecting the parity between the original MMPI and the MMPI-2; however, to what extent this parity has been protected remains a crucial question. The differences between the original MMPI and the MMPI-2 can be classified, as follows: (a) Updated norm group; (b) Rewritten scale items; (c) Use of uniform T-scores. Below is a more comprehensive summary of the alterations related to calculation of the uniform T-scores and updating the scale's items that comprise the focal points of the discussion on the parity between the original MMPI and MMPI-2.

Updating Items

Among the most basic criticisms of the original MMPI are that some of the items are difficult to understand and some are intended primarily for males. During the revision process, 82 of the original MMPI items were rephrased and rewritten, and others were removed completely. According to Ben-Porath and Butcher (1989), there wasn't a significant difference between the item cumulative correlations of the rewritten and original items. As such, it was suggested that substitution of the original items with the rewritten versions would not create a difference in raw score sums; however, some studies indicated that there was a big enough difference in the patients' answers to the rewritten items that it would affect the T-scores (Ward 1991). The frequently used approach for evaluating profile differences that can result from rephrasing items is to convert the same participants' MMPI-2 scores to original MMPI T-scores using appropriate corrections, and to compare the differences. A similar approach was used in this study.

Uniform T-Scores

In the original MMPI raw scores for 8 of the 10 clinical scales (excluding the social introversion and masculinity/femininity scales) were converted to linear T-scores separately for males and females. Next, 16 normal distribution curves veering to the right, with an average of 60 T-scores, were obtained. The limitation of this method results from the fact that a comparison between scale scores is possible because the T-scores between the quantile are different for each scale. Another important change in the MMPI-2 is that the calculation method for T-scores

changed, and now uniform T-score calculation is used. By using uniform T-scores instead of linear T-scores, skewness resulting from the raw score distribution was minimized, and T-scores obtained from different clinical subscales were rendered comparable (Tellegen and Ben-Porath 1992). Ben-Porath and Butcher (1989) contended that there wasn't a significant difference between the original MMPI test re-test correlations and the original MMPI/MMPI-2 test re-test correlations, in terms of clinical subscales, and that therefore uniform T-scores would not cause a problem for profile assessment. Harrell (1990) suggested that the original MMPI profiles and MMPI-2 profiles were rather similar, in terms of their relationship to psychiatric symptoms. On the other hand, a significant difference was not observed between the linear T-scores of the MMPI-2 and the linear T-scores of the original MMPI. As such, it can be considered that some of the item alterations, which is one of the most noteworthy differences in the MMPI-2, does not result in a significant difference between the original MMPI and the MMPI-2. Based on the above, the aim of the present study was to compare MMPI and MMPI-2 T-scores in a Turkish sample.

MATERIALS and METHODS

Participants

The study included 50 (30 female and 20 male) participants that worked at Hacettepe University. Advertisements about the study were posted on campus. The volunteers were informed about the study and provided written informed consent. Volunteers without a psychiatric diagnosis and a negative history of psychiatric treatment completed the MMPI and MMPI-2. The participants were aged 18-55 years (mean: 24.96 , SD: 8.66 years).

Materials

MMPI

MMPI was developed by Hathaway and McKinley (1940) to assess personal and social adjustment. MMPI consists of 566 items. Each item is assigned a score of 0 (no) or 1 (yes). MMPI includes 3 validity scales (lie, validity, and correction) and 10 clinical scales (hypochondriasis, depression, hysteria, psychopathic deviate, masculinity-femininity, paranoia, psychasthenia, schizophrenia, hypomania, and social introversion). The Turkish version of the inventory was developed by Savaşır (1981).

MMPI-2

MMPI-2 is a 567-item instrument used to assess personality. MMPI-2 includes 3 validity and 10 clinical scales, as does the MMPI. The difference between the 2 scales is the importance of the content scales; MMPI-2 focuses more on the content scales. Content scales include items about attitudes, beliefs, and symptoms, and it is thought, as compared to the clinical profile, they are easier to understand and interpret. Content scales are critical advantage for applying studies. The Turkish version of the inventory was developed by Savaşır and Çulha (1996). The MMPI-2 has been used for research purposes in Turkey (Vatan and Dağ 2009; Uluç 2007; Yıldırım et al. 2005; Demir et al. 2002).

Procedure

The participants completed MMPI and MMPI-2 with a 3-weeks apart. The participants were randomly assigned to 1 of 2 counterbalanced conditions. Group 1 participants completed the MMPI, and then the MMPI-2, whereas those in group 2 completed the MMPI-2, followed by the MMPI. MMPI linear T-scores, MMPI-2 uniform T-scores, and MMPI-2 linear T-scores were used for analysis. T-scores were estimated via K corrections in the process.

RESULTS

Data were analyzed via repeated measures ANOVA using SPSS v.16.0 for Windows. MMPI linear T-scores, MMPI-2 uniform T-scores, and MMPI-2 linear T-scores were compared via 3 (group) x 2 (gender) repeated measures ANOVA.

The mean and standard deviation of the participants' T-scores for subscales are shown in Table 1.

Based on the analyses, there were 2 main effects and 1 interaction effect. According to the findings, a gender main effect was not observed for any of the validity or clinical subscales (Table 2). Even in the case of some conversion main effects, they were between MMPI linear T-scores and MMPI-2 linear T-scores (F, Hy, Pa subscales), and between MMPI linear T-scores and MMPI-2 uniform T-scores (L and Si subscales). The interaction effect, whether gender creates a significant difference questioned for MMPI linear T-scores, MMPI-2 uniform T-scores, and MMPI-2 linear T-scores was significant for the K, Hs, D, Hy, Pa, Pt, Sc, Ma, and Si subscale scales (Table 2); however, according to the t-test results, which was performed in order to determine with which scoring method this interaction was meaningful, significant findings were only observed for the neurotic scales (Hs, D and Hy subscales) (Figures 1 and 2).

Table 1. Mean $\pm$ SD subscale T-scores.

	Female						Male						Total					
	MMPI Linear		MMPI-2 Uniform		MMPI-2 Linear		MMPI Linear		MMPI-2 Uniform		MMPI-2 Linear		MMPI Linear		MMPI-2 Uniform		MMPI-2 Linear	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
L	44.10	9.77	46.83	9.36	41.26	9.97	41.55	6.93	46.60	9.10	40.10	7.51	43.08	8.76	46.74	9.17	40.80	9.00
F	47.66	8.56	52.16	10.30	48.86	9.32	55.80	14.03	56.60	16.94	53.50	14.68	50.92	11.66	53.94	13.38	50.72	11.84
K	49.33	9.83	47.10	9.41	49.70	10.49	48.00	9.50	52.20	11.97	48.65	10.27	48.80	9.62	49.14	10.69	49.28	10.31
Hs	47.56	11.66	55.63	13.45	51.06	11.88	53.95	12.74	46.35	11.01	50.75	11.83	50.12	12.38	51.92	13.23	50.94	11.74
D	45.96	11.14	53.33	11.35	48.40	12.20	54.50	14.66	44.70	11.32	47.90	13.37	49.38	13.21	49.88	12.01	48.20	12.55
Hy	49.40	9.72	54.93	12.87	53.83	12.40	53.15	9.93	44.65	8.20	53.35	8.89	50.90	9.88	50.82	12.25	53.64	11.03
Pd	53.63	13.51	52.66	11.03	53.76	11.71	57.60	15.31	55.35	13.62	57.05	14.85	55.22	14.24	53.74	12.07	55.08	13.01
Mf	55.20	10.85	65.63	10.46	48.53	12.45	57.20	10.80	70.45	13.29	62.80	13.30	*					
Pa	50.70	11.60	53.33	10.22	49.53	8.99	52.20	10.91	49.30	13.73	47.75	11.90	51.30	11.24	51.72	11.78	48.82	10.72
Pt	48.16	11.87	53.70	13.24	49.43	13.20	54.90	12.63	50.75	11.59	51.90	11.58	50.86	12.50	52.52	12.57	50.38	12.51
Sc	49.73	10.16	53.43	12.55	50.40	10.41	54.35	11.93	53.50	11.84	51.65	9.59	51.58	11.02	53.46	12.15	50.90	10.01
Ma	57.03	13.81	53.16	12.27	53.96	12.76	57.25	15.16	58.15	14.04	57.40	13.49	57.12	14.21	55.16	13.10	55.34	13.03
Si	46.70	12.40	54.56	12.48	49.03	13.69	51.90	12.53	50.90	9.55	51.35	10.49	48.78	12.59	53.10	11.43	49.96	12.44

*The Mf subscale was evaluated separately for females and males; therefore, its total score and ANOVA results are not included in the table.

Table 2. ANOVA results for MMPI linear, MMPI-2 uniform, and MMPI-2 linear T-scores.

Scale	Source	Sum of Squares	df	Mean of Squares	F	P
L	Between Subject	10,170.593	49			
	Group (F/M)	62.41	1	62.41	0.30	0.59
	Error	10,108.183	48	210.58		
	Within Subject	2582.834	100			
	Measure	898.127	2	449.06	26.09	.000***
	Group*Measure	32.607	2	16.303	0.95	0.39
	Error	1652.100	96	17.21		
	Total	12,753.427	149			

Table 2a

F	Between Subject	19,136.06	49			
	Group (F/M)	1183.36	1	1183.36	3.16	0.08
	Error	17,952.70	48	374.01		
	Within Subject	3453.56	100			
	Measure	281.04	2	140.52	4.40	0.01**
	Group*Measure	103.92	2	51.96	1.63	0.20
	Error	3068.60	96	31.96		
	Total	22589.62	149			
K	Between Subject	13033.53	49			
	Group (F/M)	29.52	1	29.52	0.11	0.74
	Error	13,004.01	48	270.92		
	Within Subject	2351.792	100			
	Measure	23.22	2	11.60	55.4	0.58
	Group*Measure	317.162	2	158.58	7.57	0.001***
	Error	2011.41	96	20.95		
	Total	15,385.322	149			
Hs	Between Subject	17,053.36	49			
	Group (F/M)	41.39	1	41.39	0.12	0.73
	Error	17,012.27	48	354.42		
	Within Subject	5815.46	100			
	Measure	1.34	2	.62	0.02	0.98
	Group*Measure	1482.94	2	741.47	16.44	0.000***
	Error	4331.18	96	45.11		
	Total	22,868.82	149			
D	Between Subject	18,950.14	49			
	Group (F/M)	1.44	1	1.44	0.004	0.056
	Error	18,948.7	48	394.77		
	Within Subject	4506.053	100			
	Measure	105.15	2	52.57	1.92	0.15
	Group*Measure	1796.77	2	884.893	32.29	0.000***
	Error	2631.133	96	27.40		
	Total	23,456.193	149			
Hy	Between Subject	13,838.5	49			
	Group (F/M)	196.93	1	96.93	0.69	0.41
	Error	13,641.57	48	284.20		
	Within Subject	4623.008	100			
	Measure	352.116	2	176.06	5.58	0.005**
	Group*Measure	1243.582	2	621.791	9.72	0.000***
	Error	3027.31	96	31.53		
	Total	18,461.158	149			
Pd	Between Subject	22,406.64	49			
	Group (F/M)	394.68	1	394.68	0.86	0.36
	Error	22,011.96	48	458.582		
	Within Subject	3058.67	100			

Table 2b

	Measure	73.44	2	36.72	1.19	0.31
	Group*Measure	9.89	2	4.94	0.16	0.85
	Error	2975.34	96	30.99		
	Total	25,465.31	149			
Pa	Between Subject	15,382.9	49			
	Group (F/M)	74.53	1	74.53	0.23	0.63
	Error	15308.37	48	318.92		
	Within Subject	2936.01	100			
	Measure	240.96	2	120.48	4.61	0.012*
	Group*Measure	185.84	2	92.92	3.55	0.032***
	Error	2509.21	96	26.14		
	Total	18,318.91	149			
Pt	Between Subject	20,491.71	49			
	Group (F/M)	151.29	1	151.29	0.36	0.55
	Error	20,340.42	48	432.76		
	Within Subject	2653.07	100			
	Measure	62.49	2	31.24	1.48	0.23
	Group*Measure	564.41	2	282.20	13.37	0.000***
	Error	2026.17	96	21.11		
	Total	23,144.78	149			
Sc	Between Subject	16,030.94	49			
	Group (F/M)	140.82	1	140.82	0.43	0.52
	Error	15,890.12	48	331.04		
	Within Subject	22,16.57	100			
	Measure	144.41	2	72.21	3.57	0.03*
	Group*Measure	133.75	2	66.87	3.31	0.04*
	Error	1938.41	96	20.19		
	Total	18,247.51	149			
Ma	Between Subject	24,357.93	49			
	Group (F/M)	298.14	1	298.14	0.60	0.44
	Error	24,059.79	48	501.25		
	Within Subject	2346.53	100			
	Measure	69.24	2	34.62	1.56	.221
	Group*Measure	141.88	2	73.94	3.19	0.046*
	Error	2135.41	96	22.24		
	Total	26,704.46	149			
Si	Between Subject	18,302.91	49			
	Group (F/M)	59.29	1	59.29	0.16	0.67
	Error	18,243.62	48			
	Within Subject	3780.077	100			
	Measure	304.69	2	152.34	4.90	.009**
	Group*Measure	490.92	2	245.46	7.89	.001**
	Error	2985.167	96	31.10		
	Total	22,083.687	149			

*P < 0.05; **P < 0.01; ***P < 0.001.

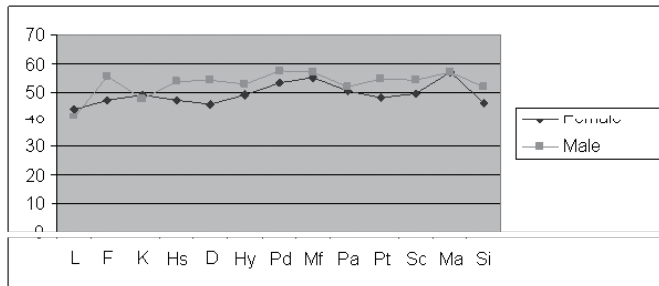


Figure 1. Profile based on the participants' mean MMPI subscale scores.

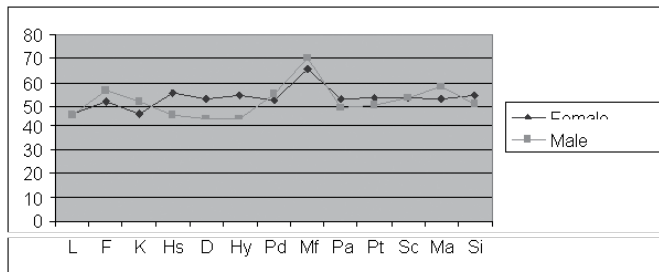


Figure 2. Profile based on the participants' mean MMPI-2 subscale scores.

DISCUSSION

According to the present findings, there wasn't a gender main effect. Even in the case of some conversion main effects, they were primarily between MMPI linear T-scores and MMPI-2 linear T-scores. On the other hand, there weren't any significant differences between the MMPI-2 linear T-scores and original MMPI linear T-scores; therefore, it can be considered that some of the item alterations, which is one of the most noteworthy differences between MMPI and MMPI-2, did not result in a significant difference between the 2 versions of the scale. The differences observed between the L and Si subscales can be interpreted as follows: MMPI L scores are lower in those with a high level of education and high SES yet it was reported that when interpreting and assessing MMPI-2 findings such demographic information was not necessary (Butcher et al. 1990). Within the framework of such an expectation, it can be predicted that the item alterations caused a more significant change in the L scale. For the Si scale, on the other hand, the norm sample, which was formed solely by females in the original MMPI, was rendered more balanced in MMPI-2. It can be accepted that this alteration in the sample may create a comparatively bigger impact on the scale scores.

Interaction Effect of Point Conversion Manner and Gender

When assessing the interaction effect, whether or not gender created a significant difference in MMPI linear T-scores, MMPI-2 uniform T-scores, and MMPI-2 linear T-scores was investigated. As a result, when calculating the

interaction for repeated analyses, the number of participants, which was 50, was reduced into 2 analysis units of 30 females and 20 males. According to the results, gender did not affect any of the validity or clinical subscales. On the other hand, the interaction effect of gender and measurement was significant for almost all of the subscales (K, Hs, D, Hy, Pa, Pt, Sc, Ma, and Si); however, according to the t-test results, which was performed in order to determine with which scoring method this interaction was significant, significant findings were only noted for the neurotic scales (Hs, D, and Hy subscales).

When comparing Figures 1 and 2 visually, a slight increase in the scores of females for MMPI-2 profiles is observed. Females' Hs, D, and Hy subscale scores were higher than males', whereas for the other subscales male and female scores were similar. This is in agreement with Ward's (1991) contention that MMPI-2 scores in females are slightly higher than for MMPI due to the fact that the items were rewritten in order to minimize the sexist structure of the original MMPI. Likewise, when Figure 1 and Figure 2 are compared visually, it is seen that the content scales' clinical subscales other than the Hs, D, and Hy subscales almost coincide for males and females. There was an observable gender difference in MMPI-2 that was the opposite of the gender difference in the original MMPI, which is visibly observable in the Hs, D, and Hy subscales. The reasons for not being able to reach meaningful differences in other sub-scales in t-tests stem from the fact that the meaningfulness threshold has been drawn to $P > 0.016$ and that slight score differences do not present themselves as meaningful due to the narrowing down of the sample. This can be related to the limited sample size, which is a limitation of the present study. Another explanation could be that the neurotic scales are more susceptible to gender difference. Maness et al. (2000) reported that gender-related differences in MMPI-2 are indicative of traditional gender roles in the measurement tool. Higher neurotic scale scores in females might be due to (a) the fact that women have a greater awareness of interpersonal relationships and somatic experiences, and (b) that men tend to suppress their emotions and opt for introverted anger and isolation. Another explanation could be the fact that male and female coping strategies used for daily life stress differ (Endler et al. 2003). This case creates a gender-related difference in the neurotic scales of the MMPI-2. These strategies, both of which emphasize both gender roles and the coping strategies, should be assessed within our cultural frame and should be tested in future studies.

The present findings as a whole indicate that the profiles of the original MMPI and MMPI-2 are comparable. It might be that the slight differences in scores between the 2 measurement tools were related to the mathematical methods used for converting the T-scores, but that this case cannot have a very effective result in the clinical sense. An important finding is that the MMPI-2 elicits gender-related differences in terms

of the neurotic scales. Several different reasons of such gender difference have been proposed to be investigated. Whatever the source of this difference, the findings indicate that it is necessary to consider gender differences when assessing MMPI-2 profiles. One of the limitations of the present study is the small sample included; however, due to the nature of the variant analysis and the fact that even the slightest score differences, which were not clinically important, become meaningful and make interpreting the data difficult as the sample size increases, it can be considered that the limited sample is an advantage. Another limitation is that the findings were obtained from a normal sample group, which makes it difficult to generalize the findings to clinical samples; however, as the majority of the norm group for the original MMPI were normal, it can be considered that studies that include a normal sample can shed light on clinical applications and research. Nevertheless, there is a need for additional research, taking into consideration sample size and characteristics.

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