Impact of Using Raw Versus Uniform T Scores in MMPI-2-RF Descriptive and Inferential Research

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INTRODUCTION

- Uniform T scoring is a standardized scoring approach used to translate raw scores into standardized scores (Graham, 2012).

- The MMPI-2-RF Uniform T Score distribution is somewhat positively skewed—since experiencing a large number of psychiatric symptoms is relatively rare in the general population—with a mean of 50 and standard deviation of 10.

- Clinicians use T scores to interpret test results, as they provide a standardized approach to understanding the extremity of self-reported symptoms as compared to the general population (Ben-Porath, 2012; Ben-Porath & Tellegen, 2008/2011; Graham, 2012).

- Despite clinicians interpreting Uniform T scores, many MMPI-2-RF researchers conduct analyses using raw scores (Tellegen & Ben-Porath, 2008/2011).

- Given the disconnect between scale versions used by researchers and clinicians, we were interested in comparing psychometric properties of MMPI-2-RF substantive scale raw and Uniform T scores within a sample of psychiatric forensic inpatients who completed the measure in a valid manner.

- To our knowledge, the impact of using raw versus Uniform T scores in MMPI-2-RF research has not been independently empirically examined.

HYPOTHESIS

Given the change in distribution properties inherent in standardizing raw into T scores, we hypothesized there would be meaningful differences in score distributions (e.g., skewness, kurtosis), scale intercorrelations, and correlations with relevant psychiatric diagnostic criteria, with raw scores exhibiting a more normal distribution and stronger correlations, as compared to Uniform T scores.

METHOD

- We used MMPI-2-RF Validity Scale scores to identify $n = 764$ forensic inpatients who completed the measure in a valid manner.

- 72.5% were male. Of the 694 with available ethnicity data, 58.2% identified as Caucasian, 23.6% as African American, 13.7% as Hispanic/Latino, 2.4% as Asian American, and 2.0% identified as being of another race. Their mean age was 40.63 years ($SD = 11.40$).

- We used uncontaminated diagnoses from the date of testing to identify whether patients experienced (1) internalizing dysfunction, (2) thought dysfunction, and (3) externalizing dysfunction disorders.

Table 1. Descriptive Results for MMPI-2-RF Higher-Order and Restructured Clinical Scale Raw and Uniform T Scores in a Forensic Inpatient Sample ($n = 764$)

	M	SD	Min.	Max.	Skewness	Kurtosis	r_{pb} with Dx.
INTERNALIZING DYSFUNCTION SCALES							
EID Emotional / Internalizing Dysfunction (raw)	10.3	8.0	0	38	1.03	0.46	.19
EID Emotional / Internalizing Dysfunction (T)	49.8	11.9	30	89	0.71	0.16	.18
RCd Demoralization (raw)	5.8	5.7	0	23	1.00	0.00	.17
RCd Demoralization (T)	52.1	11.5	37	85	0.62	-0.29	.17
RC2 Low Positive Emotions (raw)	4.4	3.3	0	17	0.98	0.81	.11
RC2 Low Positive Emotions (T)	51.1	12.6	34	99	0.91	0.68	.11
RC7 Dysfunctional Negative Emotions (raw)	5.4	4.8	0	21	0.92	0.07	.18
RC7 Dysfunctional Negative Emotions (T)	48.0	11.0	34	86	0.88	0.41	.18
THOUGHT DYSFUNCTION SCALES							
THD Thought Dysfunction (raw)	3.5	3.8	0	20	1.52	0.09	.07
THD Thought Dysfunction (T)	56.5	14.7	39	100	0.95	0.09	.08
RC6 Ideas of Persecution (raw)	2.5	2.9	0	16	1.46	1.80	.03
RC6 Ideas of Persecution (T)	60.4	15.6	43	100	0.71	-0.20	.04
RC8 Aberrant Experiences (raw)	3.0	3.0	0	15	1.28	1.30	.06
RC8 Aberrant Experiences (T)	53.8	12.2	39	96	0.75	0.18	.07
EXTERNALIZING DYSFUNCTION SCALES							
BXD Behavioral / Externalizing Dysfunction (raw)	8.2	4.4	0	22	0.38	-0.38	.20
BXD Behavioral / Externalizing Dysfunction (T)	55.7	11.1	32	92	0.38	-0.20	.21
RC4 Antisocial Behavior (raw)	7.8	4.3	0	20	0.37	-0.53	.21
RC4 Antisocial Behavior (T)	59.0	11.9	34	93	0.34	-0.42	.21
RC9 Hypomanic Activation (raw)	9.8	5.4	0	27	0.48	-0.43	.06
RC9 Hypomanic Activation (T)	46.6	10.8	25	88	0.75	0.52	.06

Note. r_{pb} with Dx. (point-biserial correlation with diagnostic category: internalizing dysfunction scales were associated with presence of internalizing diagnosis; thought dysfunction scales were associated with presence of thought dysfunction diagnosis; externalizing scales were associated with presence of externalizing diagnosis). Rounded truncated Uniform T scores are examined.

Table 2. MMPI-2-RF Scale Raw and Uniform T Score Intercorrelations ($n = 764$)

Raw Score (below) / Uniform T Score (Right)	EID	RCd	RC2	RC7	THD	RC6	RC8	BXD	RC4	RC9
EID Emotional / Internalizing Dysfunction	.99*	.91*	.70*	.75*	.45*	.44*	.46*	.33*	.42*	.31*
RCd Demoralization	.92*	.99*	.53*	.74*	.49*	.46*	.52*	.39*	.48*	.39*
RC2 Low Positive Emotions	.70*	.55*	1.00*	.25*	.14*	.17*	.12*	-0.01	.15*	-.19*
RC7 Dysfunctional Negative Emotions	.75*	.74*	.25*	1.00*	.59*	.54*	.62*	.48*	.47*	.62*
THD Thought Dysfunction	.42*	.46*	.13*	.58*	.98*	.85*	.87*	.31*	.29*	.51*
RC6 Ideas of Persecution	.42*	.44*	.18*	.52*	.88*	.97*	.62*	.24*	.23*	.43*
RC8 Aberrant Experiences	.45*	.51*	.12*	.63*	.87*	.65*	.99*	.41*	.38*	.57*
BXD Behavioral / Externalizing Dysfunction	.32*	.38*	-0.01	.48*	.30*	.23*	.40*	1.00*	.88*	.70*
RC4 Antisocial Behavior	.42*	.47*	.15*	.47*	.28*	.22*	.37*	.88*	1.00*	.49*
RC9 Hypomanic Activation	.30*	.38*	-.18*	.61*	.49*	.42*	.56*	.70*	.49*	.99*

Note. *$p < .01$. Raw score intercorrelations are presented below the diagonal. Uniform T score intercorrelations are presented above the diagonal. Raw/T intercorrelations are presented on the diagonal. Shading indicates correlations in the same domain of psychopathology. Rounded truncated Uniform T scores are examined.

RESULTS

- Raw and Uniform T scores were extremely highly associated.

- Despite their similarities, there were some notable differences between raw and Uniform T scores in spread, kurtosis, and skewness.

- Raw score data were slightly more skewed and leptokurtic than Uniform T score data for internalizing and thought dysfunction scales, but the pattern for externalizing scales was less clear.

- Externalizing scale raw scores were slightly more platykurtic, as compared to Uniform T scores.

- Point-biserial correlations between scores and clinical diagnosis were similar.

- Of note, four of twelve scale intercorrelations were slightly stronger for raw than for Uniform T scores.

DISCUSSION

- We investigated the impact of using raw versus Uniform T scores on MMPI-2-RF scale psychometric properties.

- Many raw scores had slightly higher skewness and kurtosis values, indicating greater non-normality of distributions.

- Associations with extra-test diagnostic criteria were similar, and some scale intercorrelations were very slightly stronger for raw as compared to T scores.

- These modest differences suggest that researchers should consider using Uniform T scores rather than raw scores, but that literature using raw scores is likely to meaningfully generalize to clinical settings where Uniform T scores are interpreted.

- Future studies should examine whether the results replicate across settings and with a wider variety of external criteria.

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