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 way to approach 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).
- 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 patients 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)

<table>
<thead>
<tr>
<th>Scale Name</th>
<th>M</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>t* with Dz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EID Emotional / Internalizing Dysfunction (raw)</td>
<td>10.3</td>
<td>8.0</td>
<td>0</td>
<td>38</td>
<td>1.03</td>
<td>0.46</td>
<td>.19</td>
</tr>
<tr>
<td>EID Emotional / Internalizing Dysfunction (T)</td>
<td>49.8</td>
<td>11.9</td>
<td>30</td>
<td>89</td>
<td>0.71</td>
<td>0.16</td>
<td>.18</td>
</tr>
<tr>
<td>RCd Demoralization (raw)</td>
<td>5.8</td>
<td>5.7</td>
<td>0</td>
<td>23</td>
<td>1.00</td>
<td>0.00</td>
<td>.17</td>
</tr>
<tr>
<td>RCd Demoralization (T)</td>
<td>52.1</td>
<td>11.5</td>
<td>37</td>
<td>85</td>
<td>0.62</td>
<td>-0.29</td>
<td>.17</td>
</tr>
<tr>
<td>RC2 Low Positive Emotions (raw)</td>
<td>4.4</td>
<td>3.3</td>
<td>0</td>
<td>17</td>
<td>0.98</td>
<td>0.81</td>
<td>.11</td>
</tr>
<tr>
<td>RC2 Low Positive Emotions (T)</td>
<td>51.1</td>
<td>12.6</td>
<td>34</td>
<td>99</td>
<td>0.91</td>
<td>0.68</td>
<td>.11</td>
</tr>
<tr>
<td>RC7 Dysfunctional Negative Emotions (raw)</td>
<td>5.4</td>
<td>4.8</td>
<td>0</td>
<td>21</td>
<td>0.92</td>
<td>0.07</td>
<td>.18</td>
</tr>
<tr>
<td>RC7 Dysfunctional Negative Emotions (T)</td>
<td>48.0</td>
<td>11.0</td>
<td>34</td>
<td>86</td>
<td>0.88</td>
<td>0.41</td>
<td>.18</td>
</tr>
</tbody>
</table>

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 | .06 |
- 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 Ablative Experiences (raw) | 3.0 | 3.0 | 0 | 15 | 1.28 | 1.30 | .06 |
- RC8 Ablative 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 |

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

<table>
<thead>
<tr>
<th>Correlation Type</th>
<th>Scale Name</th>
<th>Raw Score (Below)</th>
<th>Uniform T Score (Right)</th>
<th>EID</th>
<th>RCd</th>
<th>RC2</th>
<th>RC7</th>
<th>THD</th>
<th>RC6</th>
<th>RC8</th>
<th>BXd</th>
<th>RC4</th>
<th>RC9</th>
</tr>
</thead>
<tbody>
<tr>
<td>EID Emotional / Internalizing Dysfunction</td>
<td>.99</td>
<td>.91</td>
<td>.70</td>
<td>.75</td>
<td>.45</td>
<td>.46</td>
<td>.34</td>
<td>.33</td>
<td>.42</td>
<td>.31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCd Demoralization</td>
<td>.92</td>
<td>.99</td>
<td>.53</td>
<td>.74</td>
<td>.49</td>
<td>.46</td>
<td>.52</td>
<td>.39</td>
<td>.48</td>
<td>.39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC2 Low Positive Emotions</td>
<td>.70</td>
<td>.55</td>
<td>1.00</td>
<td>.25</td>
<td>.14</td>
<td>.17</td>
<td>.12</td>
<td>-.01</td>
<td>.15</td>
<td>-.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC7 Dysfunctional Negative Emotions</td>
<td>.75</td>
<td>.74</td>
<td>.25</td>
<td>1.00</td>
<td>.59</td>
<td>.54</td>
<td>.62</td>
<td>.48</td>
<td>.47</td>
<td>.62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>THD Thought Dysfunction</td>
<td>.42</td>
<td>.46</td>
<td>.13</td>
<td>.58</td>
<td>.98</td>
<td>.85</td>
<td>.87</td>
<td>.31</td>
<td>.29</td>
<td>.51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC6 Ideas of Persecution</td>
<td>.42</td>
<td>.44</td>
<td>.18</td>
<td>.52</td>
<td>.88</td>
<td>.97</td>
<td>.62</td>
<td>.24</td>
<td>.23</td>
<td>.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC8 Ablative Experiences</td>
<td>.45</td>
<td>.51</td>
<td>.12</td>
<td>.63</td>
<td>.87</td>
<td>.65</td>
<td>.99</td>
<td>.41</td>
<td>.38</td>
<td>.57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BXd Behavioral / Externalizing Dysfunction</td>
<td>.32</td>
<td>.38</td>
<td>.01</td>
<td>.48</td>
<td>.30</td>
<td>.23</td>
<td>.40</td>
<td>1.00</td>
<td>.88</td>
<td>.70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC4 Antisocial Behavior</td>
<td>.42</td>
<td>.47</td>
<td>.15</td>
<td>.47</td>
<td>.28</td>
<td>.22</td>
<td>.37</td>
<td>.88</td>
<td>1.00</td>
<td>.49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC9 Hypomanic Activation</td>
<td>.30</td>
<td>.38</td>
<td>.18</td>
<td>.61</td>
<td>.45</td>
<td>.42</td>
<td>.56</td>
<td>.70</td>
<td>.49</td>
<td>.99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: r* with Dz. (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.

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.

REFERENCES & ACKNOWLEDGEMENTS


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

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