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# Empirical Correlates of Low Scores on MMPI-2/MMPI-2-RF Restructured Clinical Scales in a Sample of University Students

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## Abstract

In the present study, the authors explored the meaning of low scores on the MMPI-2/MMPI-2-RF Restructured Clinical (RC) scales. Using responses of a sample of university students ( $N = 811$ ), the authors examined whether low ( $T < 39$ ), within-normal-limits ( $T = 39-64$ ), and high ( $T > 65$ ) score levels on the RC scales are differentially associated with Multidimensional Personality Questionnaire (MPQ)-defined personality descriptions. Eleven primary MPQ scales and three higher order MPQ scales (Negative Emotionality, Positive Emotionality, and Constraint) were used to yield these descriptions. MANOVAs were conducted for each RC scale and followed up by univariate ANOVAs and post hoc Dunnett T3 tests to identify reliable RC-scale-defined group differences for the individual MPQ scales. For those cases that exhibited significant differences between the low and within-normal subgroups on the Dunnett T3 tests, effect sizes were computed. The authors identified and discussed meaningful MPQ-based personality characteristics of the low scoring subjects.

## Keywords

MMPI-2/MMPI-2-RF Restructured Clinical (RC) Scales, Multidimensional Personality Questionnaire (MPQ), Low Score Correlates

As a criterion-keyed instrument, the Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1943) was designed to distinguish test takers diagnosed with a range of major mental disorders from nonpatients. Elevated scores on each of the clinical scales and most additional scales of the MMPI and MMPI-2 (Butcher et al., 2001) are believed to indicate clinically dysfunctional attributes and related maladaptive personality characteristics. Given this emphasis on psychopathology, the overwhelming majority of MMPI/MMPI-2 research has understandably focused on the meaning of high scores, whereas low scores have been left largely unexamined.

However, Keiller and Graham (1993) found in a nonclinical sample extra test characteristics—linked to low scores on most of the MMPI-2 clinical scales—to be conceptually meaningful and interpretively useful and to be more positive than those associated with within-normal-limits and high scores. In a subsequent study conducted at an outpatient mental health setting, Graham, Ben-Porath, and McNulty (1997) provided further evidence of the meaningfulness of low scores. Although both these studies indicated that the same interpretive rules could not be applied across scales, Graham et al. (1997) noted that no low scores on clinical

scales indicated more *negative* characteristics than did within-normal-limits scores.

With the introduction of Restructured Clinical (RC) scales, now also included in the MMPI-2-Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008; Tellegen & Ben-Porath, 2008), the question of the meaning of low scores reemerges. Just as Keiller and Graham (1993) found to be the case for the clinical scales, different interpretive possibilities suggest themselves for low RC-scale scores. For instance, in the affective domain, high RC7 scores are indicative of *high* levels of negative emotionality, so that one would expect low RC7 scores to indicate relatively *low* negative emotionality levels. High RC2 scores, on the other hand, target *low* levels of positive emotionality, and one would

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accordingly anticipate low RC2 scores to indicate relatively *high* positive emotionality levels.

In the present study, we examined associations between low scores on the RC scales and personality characteristics assessed by the Multidimensional Personality Questionnaire (MPQ; Tellegen & Waller, 2008). The MPQ measures three higher order dimensions representing broad temperamental parameters: Positive Emotionality, Negative Emotionality, and Constraint. Its 11 primary traits comprise the following: Well-Being, Social Potency, Achievement, Social Closeness, Stress Reaction, Aggression, Alienation, Control, Harm Avoidance, Traditionalism, and Absorption.

## Method

Archival data (Sellbom & Ben-Porath, 2005) collected on 985 students enrolled in general psychology courses at a Midwestern university were reanalyzed in this study. The following exclusion criteria were used for the MMPI-2: Cannot Say  $T \geq 30$ , VRIN or TRIN  $T \geq 80$ , and for the MPQ: VRIN or TRIN  $T \geq 78$ . These procedures left 811 (82%) subjects (290 male and 521 female), who ranged in age from 18 to 63 years ( $M = 19.42$ ,  $SD = 2.98$ ). About 80% of the students were freshmen. Although ethnicity was not included in the demographics questionnaire, the authors believe that the sample likely reflected the general composition of this university, which is approximately 90% Caucasian (Sellbom & Ben-Porath, 2005).

Participants were divided separately for eight of the nine RC scales into low ( $T < 39$ ), within-normal-limits ( $T = 39-64$ ), and high ( $T > 65$ ) score subgroups. Since the lowest possible  $T$ -score on RC6 is 43, the upper bound for low scores on this scale was shifted from  $T < 39$  to  $T < 44$ .

## Measures

The current MPQ contains 276 binary, true–false statements. Research has provided validity and reliability (see Tellegen & Waller, 2008) evidence for this instrument. In the data set used in the present study (Sellbom & Ben-Porath, 2005), Cronbach's  $\alpha$  coefficients of internal consistency for the MPQ scales ranged from .78 to .89.

Eight of the nine MMPI-2 RC scales (Tellegen et al., 2003) assess distinctive components of the original MMPI-2 clinical scales while the ninth represents the broad dimension of demoralization. In the present data set, Cronbach's  $\alpha$  coefficients for these nine scales ranged from .71 to .90.

## Data Analyses

Multistep statistical analysis was applied to the sample of combined male and female participants to examine differences between low, within-normal-limits, and high scores. Two multivariate analyses of variances (MANOVAs) were

conducted, one to test differences on the three higher order MPQ factor scales and the other to test differences on the 11 primary MPQ scales between the three score subgroups assembled for each of the nine RC scales. A series of univariate analyses of variances (ANOVAs) and post hoc Dunnett T3 tests followed to evaluate differences between the low scoring and within-normal-limits scoring groups. For each of those differences effect sizes (Cohen's  $d$ ; Cohen, 1988) were computed.

## Results

All MANOVA results for the RC scales were significant ( $p < .01$ ). Although all MPQ scales were analyzed for each RC scale, Tables 1 and 2 display MPQ  $z$ -score means, standard deviations, and effect sizes only for those scales for which in addition the ANOVA result was significant ( $p < .05$ ) and the Dunnett T3 test demonstrated a significant difference ( $p < .05$ ) between low and within-normal-limits subgroups. In Table 3, the column labeled “less likely to” displays self-descriptors for those MPQ scales on which the low-score RC-scale group scored significantly *below* the within-normal-limits subgroup, whereas the column labeled “more likely to” shows self-descriptors for MPQ scales on which the low-score RC-scale group scored significantly *above* the within-normal-limits subgroup. The following is a narrative summary of the findings reported in these three tables.

For RCd, ANOVAs revealed significant score-level differences on Positive Emotionality and Negative Emotionality and on nine MPQ primary scales. Moderate effect sizes were observed for the low versus within-normal limits subgroup for Stress Reaction, Negative Emotionality, and Alienation.

For RC1, significant ANOVA differences were found on all three MPQ higher order factor scales and on eight MPQ primary scales. Moderate effect sizes for low versus within-normal-limits subgroups were observed for Negative Emotionality and Stress Reaction.

RC2 ANOVAs revealed significant differences on all three MPQ higher order factor scales and on eight MPQ primary scales. Moderate effect sizes for low versus within-normal-limits subgroups were observed for Positive Emotionality, Well-Being, and Social Potency, and the effect size for Stress Reaction was close to moderate.

For RC3, ANOVAs revealed significant differences on Negative Emotionality and on eight MPQ primary scales. Moderate effect sizes for low versus within-normal-limits subgroups were observed for Negative Emotionality, Aggression, Stress Reaction, Alienation, and Traditionalism.

Significant ANOVA differences were found for RC4 score levels on Negative Emotionality and Constraint and on 10 MPQ primary scales. Moderate effect sizes for low versus within-normal-limits subgroups were observed for Constraint and Control.

**Table 1.** Means, Standard Deviations, and Effect Sizes for Statistically Significant ( $p \leq .05$ ) Differences Between Low Versus Within-Normal-Limits Scores on the MMPI-2/MMPI-2-RF RC Scales Observed for the MPQ Higher Order Scales

MPQ Scales	Low Scores			Within-Normal-Limits Scores			High Scores			Effect Sizes	
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>D</i>	CI at 0.99
RCd											
Negative Emotionality	-0.97	0.59	41	-0.18	0.88	589	0.79	0.97	181	0.92 M	0.82, 1.15
RC1											
Negative Emotionality	-0.68	0.78	39	-0.13	0.92	624	0.73	1.01	148	0.60 M	0.51, 0.93
RC2											
Positive Emotionality	0.74	0.63	122	0.02	0.88	618	-1.43	1.02	71	-0.85 M	-0.71, 0.95
Negative Emotionality	-0.36	0.90	122	0.00	0.98	618	0.59	1.07	71	0.37	0.27, 0.58
RC3											
Negative Emotionality	-1.29	0.45	22	-0.15	0.92	620	0.71	0.93	169	1.26 L	1.16, 1.50
RC4											
Negative Emotionality	-0.53	0.91	37	-0.14	0.92	591	0.55	1.05	183	0.42	0.33, 0.81
Constraint	0.69	0.82	37	0.14	0.93	591	-0.61	0.98	183	-0.60 M	-0.25, 0.69
RC6											
Negative Emotionality	-0.58	0.74	194	-0.22	0.85	389	0.87	0.878	228	0.44	0.33, 0.58
Constraint	0.22	1.05	194	-0.05	0.96	389	-0.10	1.00	228	-0.27	-0.08, 0.40
RC7											
Positive Emotionality	0.45	0.79	44	0.08	0.95	557	-0.30	1.09	210	-0.39	-0.09, 0.50
Negative Emotionality	-1.33	0.45	44	-0.24	0.80	557	0.92	0.85	210	1.40 L	1.31, 1.57
RC8											
Negative Emotionality	-0.80	0.69	57	-0.20	0.88	495	0.57	0.99	259	0.70 M	0.59, 0.93
RC9											
Positive Emotionality	-0.96	1.00	17	-0.12	1.00	537	0.31	0.91	257	0.84 M	0.73, 1.47
Negative Emotionality	-1.16	0.70	17	-0.28	0.86	537	0.66	0.93	257	1.03 M	0.93, 1.47

Note. MMPI = Minnesota Multiphasic Personality Inventory; MPQ = Multidimensional Personality Questionnaire; CI = confidence interval. Negative (-) signs are used for the effect sizes when the low group scored higher than the within-normal-limits group. The largest observed effect sizes, moderate (0.60 to 1.20) or large (1.21 to 2.00), are identified as M and L, respectively. For further statistical details please contact the first author.

For *RC6*, ANOVAs revealed significant differences on Negative Emotionality and Constraint and on eight MPQ primary scales. Effect sizes for low versus within-normal-limits subgroups, although significant, were modest.

*RC7* ANOVAs revealed significant differences on all three MPQ higher order factor scales and on eight MPQ primary scales. Effect sizes for low versus within-normal-limits subgroups were large for Negative Emotionality and Stress Reaction and moderate for Aggression and Alienation.

For *RC8*, ANOVAs revealed significant differences between score levels on Negative Emotionality and Constraint and on nine MPQ primary scales. Moderate effect sizes for low versus within-normal-limits subgroups were observed for Negative Emotionality, Aggression, and Absorption.

For *RC9*, significant ANOVA differences were found on all three MPQ higher order factor scales and on eight MPQ primary scales. Moderate effect sizes for low versus within-normal-limits subgroups were observed for Positive Emotionality, Negative Emotionality, Social Potency, Aggression, Alienation, Control, and Absorption.

## Discussion

The present study has demonstrated significant and meaningful self-reported personality differences between low scorers and those scoring within normal limits on the MMPI-2/MMPI-2-RF RC scales. Although the focus of our analyses was on MPQ differences between low scores and within-normal-limits scores on the RC scales, we noted, consistent with Keiller and Graham's (1993) and Graham et al.'s (1997) observation, that the meaning of low score correlates tended to be the opposite of those of the high scores and that the extra test characteristics tended to be more positive than those associated with high scores.

On all RC scales, low scorers averaged at least moderately lower on the MPQ Negative Emotionality scale than those scoring within normal limits. On the other hand, the RC scales did not generate multiple low-score links to MPQ Positive Emotionality. *RC2* was the one scale on which low scorers averaged substantially higher on Positive Emotionality than the within-normal-limits group. And only low scores on *RC9* were distinctively

**Table 2.** Means, Standard Deviations, and Effect Sizes for Statistically Significant ( $p \leq .05$ ) Differences Between Low Versus Within-Normal-Limits Scores on the MMPI-2/MMPI-2-RF RC Scales Observed for the MPQ Primary Scales

MPQ Scales	Low Scores			Within-Normal-Limits Scores			High Scores			Effect Sizes	
	M	SD	N	M	SD	N	M	SD	N	d	CI at 0.99
<b>RCd</b>											
Stress Reaction	-1.13	0.51	41	-0.22	0.90	589	0.96	0.66	181	1.04 M	0.94, 1.24
Alienation	-0.80	0.46	41	-0.20	0.84	589	0.83	1.09	181	0.73 M	0.64, 0.92
<b>RC1</b>											
Stress Reaction	-0.75	0.86	39	-0.14	0.95	624	0.78	0.80	148	0.65 M	0.55, 1.00
Alienation	-0.56	0.74	39	-0.14	0.90	624	0.72	1.12	148	0.47	0.38, 0.78
<b>RC2</b>											
Well-Being	0.76	0.38	122	0.04	0.85	618	-1.70	0.99	71	-0.92 M	0.82, 1.00
Social Potency	0.53	0.86	122	-0.02	0.96	618	-0.74	1.02	71	-0.58	-0.38, 0.68
Achievement	0.23	0.97	122	0.02	0.96	618	-0.69	1.05	71	-0.22	-0.32, 0.01
Social Closeness	0.44	0.74	122	-0.01	0.98	618	-0.71	1.13	71	-0.48	-0.30, 0.58
Stress Reaction	-0.58	0.91	122	0.02	0.96	618	0.83	0.83	71	0.63 M	0.53, 0.84
Alienation	-0.32	0.81	122	-0.02	0.97	618	0.70	1.20	71	0.32	0.22, 0.51
<b>RC3</b>											
Stress Reaction	-0.80	0.67	22	-0.09	0.98	620	0.42	0.96	169	0.73 M	0.63, 1.10
Aggression	-1.05	0.50	22	-0.07	0.97	620	0.40	0.99	169	1.02 M	0.92, 1.30
Alienation	-0.99	0.41	22	-0.17	0.89	620	0.75	1.05	169	0.93 M	0.84, 1.16
Traditionalism	-0.61	1.20	22	-0.01	0.97	620	0.10	1.06	169	0.61 M	0.51, 1.27
<b>RC4</b>											
Control	0.69	0.81	37	0.11	0.96	591	-0.52	0.96	183	-0.61 M	-0.27, 0.71
<b>RC6</b>											
Social Closeness	0.35	0.87	194	0.04	0.98	389	-0.36	1.03	228	-0.33	-0.17, 0.46
Aggression	-0.47	0.87	194	-0.08	0.93	389	0.54	0.97	228	0.43	0.31, 0.59
Alienation	-0.59	0.64	194	-0.25	0.77	389	0.93	0.97	228	0.47	0.37, 0.59
Harm Avoidance	0.29	0.95	194	-0.07	0.99	389	-0.12	1.01	228	-0.37	-0.19, 0.50
<b>RC7</b>											
Well-Being	0.66	0.60	44	0.13	0.89	557	-0.49	1.15	210	-0.61 M	-0.38, 0.71
Social Closeness	0.58	0.69	44	0.10	0.96	557	-0.39	1.04	210	-0.51	-0.24, 0.61
Stress Reaction	-1.49	0.45	44	-0.23	0.85	557	0.92	0.67	210	1.52 L	1.43, 1.70
Aggression	-0.77	0.58	44	-0.11	0.97	557	0.46	0.97	210	0.70 M	0.59, 0.92
Alienation	-0.92	0.47	44	-0.23	0.81	557	0.81	1.04	210	0.87 M	0.79, 1.06
Absorption	-0.58	1.00	44	-0.09	0.99	557	0.37	0.92	210	0.50	0.39, 0.88
<b>RC8</b>											
Social Potency	-0.33	1.04	57	0.02	0.99	495	0.04	1.00	259	0.35	0.24, 0.71
Achievement	-0.36	1.02	57	0.01	0.98	495	0.05	1.02	259	0.38	0.26, 0.72
Stress Reaction	-0.49	1.01	57	-0.17	0.96	495	0.42	0.93	259	0.33	0.22, 0.68
Aggression	-0.68	0.73	57	-0.07	0.97	495	0.29	1.00	259	0.64 M	0.53, 0.89
Alienation	-0.61	0.74	57	-0.23	0.84	495	0.58	1.07	259	0.46	0.36, 0.71
Harm Avoidance	0.47	0.89	57	-0.02	1.03	495	-0.07	0.95	259	-0.48	-0.18, 0.60
Absorption	-0.93	0.91	57	-0.19	0.91	495	0.57	0.88	259	0.81 M	0.71, 1.13
<b>RC9</b>											
Social Potency	-1.05	0.84	17	-0.17	0.97	537	0.42	0.92	257	0.91 M	0.80, 1.44
Aggression	-1.06	0.56	17	-0.29	0.85	537	0.68	0.95	257	0.92 M	0.82, 1.26
Alienation	-0.79	0.66	17	-0.19	0.90	537	0.44	1.07	257	0.67 M	0.57, 1.08
Absorption	-1.11	0.99	17	-0.14	0.98	537	0.37	0.90	257	0.99 M	0.88, 1.61

Note. MMPI = Minnesota Multiphasic Personality Inventory; MPQ = Multidimensional Personality Questionnaire; CI = confidence interval. Negative (-) signs are used for the effect sizes when the low group scored higher than the within-normal-limits group. The largest observed effect sizes, moderate (0.60 to 1.20) or large (1.21 to 2.00), are identified as M and L, respectively. For further statistical details please contact the first author.

**Table 3.** MPQ Self-Descriptors for Low Scorers Versus Within-Normal-Limits Scorers on Restructured Clinical Scales of the MMPI-2 and MMPI-2-RF

Restructured Clinical Scales	MPQ Self-Descriptors	
	Low Scorers Were Less Likely Than Within-Normal-Limits Scorers to	Low Scorers Were More Likely Than Within-Normal-Limits Scorers to
RCd	Be generally disposed toward negative emotions (NEM) <b>Be stress-reactive, emotionally labile, oversensitive (SR)</b> <b>Feel alienated, victimized, and unfortunate (AL)</b>	
RC1	<b>To be generally disposed toward negative emotions (NEM)</b> Be stress-reactive, emotionally labile, oversensitive (SR) Feel alienated, victimized, and unfortunate (AL)	
RC2	Be generally disposed toward negative emotions (NEM)  <b>Be stress-reactive, emotionally labile, oversensitive (SR)</b> Feel alienated, victimized, and unfortunate (AL)	<b>Be generally disposed toward positive emotions (PEM)</b> <b>Be cheerful, optimistic, enthusiastic (WB)</b> <b>Be assertive, forceful, and dominant; enjoy spotlight and leadership (SP)</b> Be hardworking and ambitious, strive for achievement; be a perfectionist (AC) Enjoy social interactions, seek closeness, and value supportive relationships (SC)
RC3	<b>Be generally disposed toward negative emotions (NEM)</b> <b>Be stress-reactive, emotionally labile, oversensitive (SR)</b> <b>Be aggressive and vindictive (AG)</b> <b>Endorse traditional moral values (TR)</b>	
RC4	Be generally disposed toward negative emotions (NEM)	<b>Be generally restrained and controlled behaviorally (CON)</b> <b>Plan ahead, be deliberate, and careful; control impulses (CO)</b>
RC6	<b>Be generally disposed toward negative emotions (NEM)</b>  Be aggressive and vindictive (AG)  Feel alienated, victimized, and unfortunate (AL)	Be generally restrained and controlled behaviorally (CON) Enjoy social interactions, seek closeness, and value supportive relationships (SC) Avoid risks associated with physical danger (HA)
RC7	Be generally disposed toward negative emotions (NEM) Be stress-reactive, emotionally labile, oversensitive (SR) <b>Be aggressive and vindictive (AG)</b>  <b>Feel alienated, victimized, and unfortunate (AL)</b>	Be disposed toward positive emotions (PEM) <b>Be cheerful, optimistic, enthusiastic (WB)</b> Enjoy social interactions, seek closeness, and value supportive relationships (SC)
RC8	Be prone to imaginative and altered states of awareness (AB) Be generally disposed toward negative emotions (NEM)  Be assertive, forceful, and dominant; enjoy spotlight and leadership (SP) Be hardworking and persistent; enjoy effort (AC) Be stress-reactive, emotionally labile, oversensitive (SR) <b>Be aggressive and vindictive (AG)</b> Feel alienated, victimized, and unfortunate (AL) <b>Be prone to imaginative and altered states of awareness (AB)</b>	Avoid taking risks associated with physical danger (HA)
RC9	<b>Be generally disposed toward positive emotions (PEM)</b> <b>Be generally disposed toward negative emotions (NEM)</b> <b>Be assertive, forceful, and dominant; enjoy spotlight and leadership (SP)</b> <b>Be aggressive and vindictive (AG)</b> <b>Feel alienated, victimized, and unfortunate (AL)</b> <b>Be prone to imaginative experiences and altered states of awareness (AB)</b>	

Note. MMPI = Minnesota Multiphasic Personality Inventory; MPQ = Multidimensional Personality Questionnaire. Effect sizes  $\geq 0.60$  are bolded.



associated with lower levels of *both* MPQ Positive Emotionality and Negative Emotionality.

Differential correlations indicative of *discriminant* validity were also evident, namely, whenever low and within-normal-limits RC-scale groups did *not* differ significantly with respect to conceptually unrelated personality characteristics. For instance, low scorers on RC7 did not appear to differ from within-normal-limits scores in levels of MPQ Constraint and Control, Achievement, and Social Potency. Also relevant in this connection, RC2 was strongly related to Positive Emotionality (−.43) and RC7 was not (−.21), whereas RC7 was strongly related to Negative Emotionality (.64) and RC2 was not (.19).

Study limitations include the use of a student sample limiting the generalizability of our results. Studies examining meanings of low scores in clinical settings and among different age, gender, and ethnic/cultural groups are needed. As has been true of past investigations, future ones need to include also validation studies focusing on non-self-report criteria. Finally, the significance of low scores on the remaining MMPI-2-RF scales also warrants empirical study.

#### Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: **Auke Tellegen** is a paid consultant to the MMPI publisher, the University of Minnesota Press, and as co-author of the MMPI-2-RF he receives royalties on sales of the test. **Yossef Ben-Porath** is a paid consultant to the MMPI publisher, the University of Minnesota Press, and Distributor, Pearson, and as co-author of the MMPI-2-RF he receives royalties on sales of the test.

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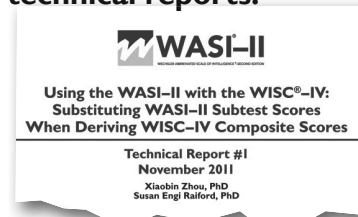
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