Leone, Mosticoni, Ianella, Biondi, and Butcher's (2018) Effort to Compare the MMPI-2-RF with the MMPI-2 Falls Well Short

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Abstract

Leone, Mosticoni, Iannella, Biondi, and Butcher's (2018) comparison of the MMPI-2 and MMPI-2-RF in a clinical sample falls well short of its goals. On the basis of analyses conducted with a sample of patients, the authors conclude that the MMPI-2-RF is less sensitive to psychopathology and is susceptible to gender bias. However, their study fails to meet basic requirements for sound research methodology and reporting of research findings. The findings reported are inconsistent with or contradict the authors' conclusions, many of which have already been rebutted in previous publications, which they ignored. Leone et al.'s (2018) discussion fails to acknowledge the many limitations of their study and veers to a tangential and misleading consideration of MMPI-2-RF use and research.

Introduction

Leone, Mosticoni, Iannella, Biondi, and Butcher (2018) attempt to examine "the utility of the MMPI-2-RF, and how its performance compares with the MMPI-2 scales in [a] contemporary clinical sample" (p. 7). Relying on a sample of patients clinically diagnosed with Schizophrenia, Depressive Disorders, Somatic Symptom Disorders, or Borderline Personality Disorder, the authors report scores on the MMPI-2 Clinical Scales, the MMPI-2/MMPI-2-RF Restructured Clinical Scales, and nine additional MMPI-2 scales, conducting comparisons within diagnostic groups and by gender.

Leone et al. (2018) conclude that the MMPI-2-RF is less sensitive to psychopathology and is susceptible to gender bias. However, their study falls well short of basic requirements for sound research methodology and reporting of research findings. Even if these shortcomings are set aside, their findings are inconsistent with or contradict the authors' conclusions, many of which have already been rebutted in previous publications, which they ignored. Leone et al.'s (2018) discussion fails to acknowledge the many limitations of their study and veers to a tangential and misleading consideration of MMPI-2-RF use and research patters.

Methodological and Reporting Shortcomings

Leone et al. (2018) report they "obtained a sample of psychiatric inpatients" (p. 9) who were referred during the period of January 2010 through April 2017. Missing is basic information such as why these patients were referred for an assessment, which is needed to understand what population this sample represents (and how well it does so). They go on to indicate that diagnoses were "carried out within 12 hours after admission and lasting about 60 minutes" (p. 9). Assuming this means patients were diagnosed within 12 hours of admission on the basis of a 60-minute interview, the primary independent variable of this study was rather

hastily operationalized. Moreover, no information is provided on any efforts made to corroborate the initial diagnostic impressions over the course of patients' hospitalization. In addition, the authors are silent on the issue of comorbidity. Did any of the patients meet diagnostic criteria for more than one disorder in their study? If so, this information is critical for proper appraisal of their results. If not, this would seem to be a very atypical clinical sample. The sample is also atypical in that just over a quarter of the inpatients were diagnosed with a somatic symptom disorder. This would be very unusual in the United States, raising questions about the generalizability of any findings.

A very serious shortcoming in Leone et al.'s (2018) report is the absence of information about protocol validity. In a paper highlighting methodological problems in MMPI research, Butcher, Graham, and Ben-Porath (1995) indicated: "For MMPI-2 data to be useful for either clinical or research purposes, one must have confidence that individuals responded to the test items in the manner that was intended" (p. 323) and noted: "It is very important for investigators to exclude from MMPI-2 research studies the data of persons who have not responded to the items in an acceptable (valid) manner" (p. 323). Reporting the rates of and exclusion of invalid protocols is indeed standard practice in MMPI research. Leone et al. (2018) are silent on this matter. Their failure to follow Butcher et al.'s (1995) recommendation for sound MMPI research practices is puzzling, since Butcher is among the co-authors of Leone et al.'s (2018) study.

Table 1 of Leone et al. (2018) indicates that an unknown number (but at least three) of their participants were 17 years old. Butcher and Williams (2000) explained that the MMPI-2 is intended for use with and normed for individuals 18 years of age and older, and that the MMPI-A, the adolescent version of the inventory, should be used with anyone younger. It is unclear why Leone et al. (2018) included data from individuals younger than 18 in their study, particularly given Butcher's prior admonition against administering the adult version to adolescents.

Leone et al. (2018) purport to compare the MMPI-2 and MMPI-2-RF in their study. However, their analyses are limited to 9 of the 42 substantive scales of the MMPI-2-RF. This hardly qualifies as a comparison of the two versions, which they claim to have done, including in the title of their paper. Moreover, their description of the Restructured Clinical (RC) Scales is incorrect and misleading. Leone et al. (2018) state that development of the RC Scales involved "eliminating items from the clinical scales because they were considered to weaken them and to cause unnecessary item overlap" (p. 8). This remarkably superficial and incorrect description reflects a gross misunderstanding of the rationale for and methods used to develop the RC Scales, which are discussed in detail by Tellegen, Ben-Porath, McNulty, Arbisi. Graham, and Kaemmer (2003). Briefly, the RC Scales were developed by capturing only one distinct component for each Clinical Scale while minimizing the contribution of Demoralization, which was the primary source of excessive correlations between the original scales.

This description is followed by a repetition of RC Scale criticisms Butcher and his colleagues have made elsewhere, all of which have been repeatedly rebutted in the literature (cf., Tellegen, Ben-Porath, Sellbom, Arbisi, McNulty, & Graham, 2006; Tellegen, Ben-Porath, & Sellbom, 2009). Leone et al.'s (2018) criticism about RC3 having "drifted" from the original Clinical Scale 3 ignores Tellegen et al.'s (2006) previous response to the same concern. Briefly, Tellegen et al. (2006) explained that factor analyses conducted in the restructuring project showed that Scale 3 had four distinct components: somatic complaints, demoralization, disavowal of cynicism, and denial of social discomfort. They noted that the first two are assessed by the Restructured Clinical Scales Somatic Complaints and Demoralization, whereas the last

component was set aside for further development (and is now represented by the Shyness scale on the MMPI-2-RF), leaving disavowal of cynicism as the major distinctive component of Scale 3. Tellegen et al. (2006) explained that because disavowal of cynicism was negatively correlated with somatic complaining, demoralization, and psychopathology in general, the scoring key for these items was reversed, resulting in a scale labeled Cynicism. Tellegen et al. (2009) explained why and demonstrated that this scale is not redundant with a similarly labeled MMPI-2 Content Scale. Leone at el.'s (2018) neglect of published rebuttals of Butcher and others' prior RC Scale criticisms is inconsistent with expectations of scholarly discourse.

Finally, a disclosure of co-author Butcher's financial interest in the MMPI-2, as specified in the American Psychological Association's Publication Manual (APA, 2010), is missing from Leone et al.'s (2018) article.

Misinterpretation of Findings

Setting aside the methodological and reporting shortcomings just noted, Leone et al.'s (2018) conclusions are inconsistent with, and in some instances contradicted by, the findings they report. The authors assert, based on a comparison of mean RC and Clinical Scale scores for their overall sample, that "the RC Scales show an overall lower level of sensitivity to mental health problems than the MMPI-2 Clinical Scales" (p. 10). This statement reflects either a misunderstanding or misuse of the term "sensitivity." Comparisons of group means do not address psychometric sensitivity.

Leone et al. (2018) assert that because the RC Scale Demoralization (RCd) is highly correlated with the Welsh Anxiety Scale (A), it is "largely comprised of anxiety related symptoms" (p. 11). However, had the authors examined the item content of either of these scales, they would have seen that neither focuses on anxiety symptoms. Tellegen et al. (2006) discuss in detail associations between RCd and A, and the original psychodynamic interpretation of A (and R). Moreover, the two scales do not yield the same results. This is illustrated by all four panels of Leone et al.'s Figure 2, which show that for each of their diagnostic groups the RCd score is larger than the score on A.

Seeking to replicate findings reported first by Rouse et al. (2008), Leone et al. (2018) observe high correlations between the RC Scales and selected MMPI-2 supplementary scales, which they appear to view as a problem. They ignore the response to Rouse et al. (2008) by Tellegen, Ben-Porath, and Sellbom (2009), who noted that, with the MMPI-2, redundancy of the RC Scales with other scales would not be a problem. However, correlations such as the ones Leone et al. (2018) report do not in fact establish redundancy. Tellegen et al. (2009) had previously demonstrated that Rouse et al.'s (2008) RC Scale proxies did not adequately represent any of the RC Scales and accounted for less Clinical Scale variance than did the RC Scales.

Leone et al. (2018) compare Clinical and RC Scale scores within each of the four diagnostic groups in their study. Beginning with the patients with Schizophrenia, while ignoring the very comparable findings for Clinical and RC Scales 6 and 8, they focus on lower scores on RC Scales 2 and 9 than their Clinical Scale counterparts. Leone et al. (2018) conclude that "the RC Scales significantly miss the mood swings between depressive and dysphoric/agitated periods. Notably, the depressive component linked to Schizophrenic disorders (schizophrenia spectrum disorders) is not addressed by the RC Scales" (p. 12). Here, Leone et al. (2018) ignore their own findings that the patients with Schizophrenia produced clinically elevated scores on RCd (73.61) and RC9 (64.9). The dysphoric affect they claim to be missing is reflected in a mean RCd score that exceeds these patients' score on Clinical Scale 2. The RC9 score of patients

with Schizophrenia, though elevated, is indeed considerably lower than their score on Clinical Scale 9. However, without information about the extent to which these individuals exhibited comorbid symptoms of hypomania, the difference between RC9 and Clinical Scale 9 is uninterpretable. The agitation Leone et al. (2018) assert to be missing in these cases would most appropriately be sought in some of the MMPI-2-RF Specific Problems Scales (e.g., Anger and Aggression), which Leone et al. (2018) omitted from their analyses.

In their discussion of findings on patients suffering depressive disorders, Leone et al. (2018) focus on the absence of elevation on RC8, stating, "RC8 very appreciably underestimates all aspects linked to interpersonal shutdown, to the feelings of social and emotional alienation, to difficulties in communicating one's own experience, to the current state of confusion and bewilderment experienced by these patients and to Ego mastery (Cognitive and Conative) difficulties" (p. 14). Here Leone et al. (2018) are reciting the labels of the MMPI-2 Harris-Lingoes subscales for Scale 8. Regrettably, they chose to ignore that these constructs are assessed by MMPI-2-RF scales they neglected to include in their analyses. For example, variance associated with the Harris-Lingoes Lack of Ego Mastery Cognitive and Conative scales can be found on the MMPI-2-RF Cognitive Complaints scale. The more parsimonious explanation for the difference between Scale 8 and RC8 is that this reflects the former's excessive saturation with demoralization, which significantly limits the discriminant validity of Clinical Scale 8 scores. For example, correlations in the .90 range are typically reported for Clinical Scales 8 and 7 in clinical samples, substantially hampering the ability of Scale 8 to differentiate disordered thinking from emotional dysfunction. Thus, Leone et al.'s (2018) findings with the depressed patients actually demonstrate improvements in the discriminant validity of the RC Scales over their Clinical Scale counterparts. Moreover, their prominent elevations on RCd and RC2 reflect the dysphoric affect and anhedonia characteristics of patients with depression, providing evidence of the convergent validity of scores on these scales.

Leone et al.'s (2018) report of findings for patients with somatic symptom disorder focuses on the "complete loss of the 13/31 Code-Type and all of its empirical correlates" (p. 15). They seem particularly perplexed by these patients' low scores on RC3, which reflects the keying change discussed earlier. As also noted earlier, Clinical Scale 3 is represented by a number of scales on the MMPI-2-RF. Its somatization component is accounted for by RC1, whereas other elements are reflected in the Somatic Scales Malaise, Gastrointestinal Complaints, Head Pain Complaints, and Neurological Complaints, and the Interpersonal Scale Shyness, which Leone et al. (2018) chose to omit from their study. This creates the misimpression that Scale 3 findings are missing from the MMPI-2-RF. The authors also comment on "the lack of detection of the depressive component by RC2" (p. 15). This comment further represents the authors' apparent lack of familiarity with the MMPI-2-RF. RC2 is a measure of anhedonia and as such an important component of endogenous depression. The somaticized depression that they deem missing from the MMPI-2-RF is actually expected to be found in the Malaise scale, which, as just noted, they ignored.

Leone et al.'s (2018) analysis of the results for patients with Borderline Personality Disorder begins with a claim that "the affective component is totally undersized (sic) by the RC Scales" (p. 15). This is belied by clinically significant elevations on two of the RC Scales that tap into emotional dysfunction (RCd and RC7). Elevations on RC4, RC6, and RC8 round out the rather complex clinical picture that would be expected in patients with this disorder. Here, too, consideration of scores on the full range of MMPI-2-RF substantive scales neglected by Leone et al. (2018) would be needed to flesh out the symptomatic picture.

Leone at al.'s (2018) analysis of gender differences demonstrates exactly the opposite of what they claim to have found. In Table 9 of their article, the authors compare RC Scale raw scores for men and women in their sample. They begin by asserting that "gender differences were found across the full range of the RC Scales" (p. 16). However, examination of the statistical analyses reported in Table 9 indicates statistically significant differences on only three of the nine RC Scales- RC1, RC4, and RC9. The authors do indeed highlight these three scales and conclude: "Therefore, the use of nongendered norms in psychological testing, as with the MMPI-2-RF, is inappropriate and likely results in inaccurate assessment of symptoms for men and women in some disorders" (p. 17). However, had Leone et al. (2018) converted the mean raw scores they report into nongendered T scores (a conversion facilitated by Appendix B of the MMPI-2-RF Technical Manual [Tellegen & Ben-Porath, 2008/2011]), they would have found that the mean nongendered T scores faithfully reflect the differences they report for the raw scores. Respectively for men and women, the mean nongendered T scores on RC1 are 70.4 and 76.5, on RC4 60.1 and 54.5, and on RC9, 53.0 and 49.1. Had they tested these mean differences for statistical significance, Leone et al. (2018) would have obtained the exact same results they report for the raw scores.

Tangential and Misleading Discussion

Leone et al. (2018) begin their discussion by summarizing their findings and conclusions, which, as just discussed, are largely at odds with the data they report. They do not acknowledge the methodological and reporting limitations of their study, including ones that, as discussed earlier, contradict co-author Butcher's previous recommendations for MMPI research.

The authors then veer to a tangential and misleading discussion of MMPI-2-RF acceptance. They begin by citing an opinion piece published in a non-peer-reviewed magazine, written by authors (Friedman & Nichols, 2017) who before they became staunch opponents of the MMPI-2-RF were equally adamant that the MMPI-2 was inadequate and doomed to failure (Adler, 1990). They then cite four MMPI-2 textbooks that are critical of the MMPI-2-RF (Butcher, 2011; Friedman, Bolinski, Levak, & Nichols. 2015; Graham, 2012; and Greene, 2012) but neglect to inform the reader that three of the four, excluding Butcher (2011), provide extensive guidance on MMPI-2-RF interpretation and two of the four (Friedman et al., 2015; Greene, 2012) incorporate the MMPI-2-RF in their book titles.

Leone et al. (2018) discuss the issue of nongendered norms, asserting that their use is not supported. However, as reviewed earlier, Leone et al. (2018) neglected to actually report and compare the nongendered T-score means for the men and women in their study and seem unaware that these means reflect the same differences they report at the raw-score level. Moreover, Leone et al.'s (2018) critique of the MMPI-2-RF nongendered norms ignores the availability of gender-specific comparison groups in the MMPI-2-RF Technical Manual and scoring software, which include means and standard deviations on the MMPI-2-RF for male and female psychiatric inpatients, the population of interest in their study.

The authors then turn to a tangential discussion of MMPI-2-RF acceptance. They begin by discussing the results of Williams and Lally's (2017) comparison of MMPI-2-RF and MMPI-2 usage patterns. Leone et al. (2018) neglect to cite or address Ben-Porath's (2017) demonstration that Williams and Lally's (2017) analysis was flawed, and that these authors failed to include up-to-date sales data that they were aware of, which refuted their claims. The Lally and Williams (2017) response to Ben-Porath (2017) did not correct these problems.

Leone et al. (2018) then move on to an "In Press" book chapter by Williams, Butcher, and Paulson (In Press), in which the authors reportedly compared the number of research studies on various personality assessment devices. Leone et al. (2018) assert that Williams and colleagues found 1,646 publications on the MMPI-2 and only 320 on the MMPI-2-RF from 2003 to 2016. Two noteworthy points are omitted. First, the MMPI-2-RF was published in late 2008. Perhaps Williams and colleagues chose 2003 because that was the year the RC Scales were added to the MMPI-2. Nevertheless, counting studies conducted prior to publication of the MMPI-2-RF provides a misleading comparison. Moreover, a search of publication databases indicates that a claim of 1,646 MMPI-2 research studies necessitates inclusion of publications in which the MMPI-2 was used as a dependent variable. Most of this research was not designed to and cannot inform MMPI-2 interpretation. In contrast, the vast majority of the now over 380 peer-reviewed MMPI-2-RF publications were designed to provide empirical data to guide use of the inventory in mental health, medical, forensic, correctional, and public safety assessment settings.

This body of peer-reviewed MMPI-2-RF research, coupled with the unparalleled quantity and quality of empirical correlate data reported in the Technical Manual (Tellegen & Ben-Porath, 2008/2011) provides a comprehensive and modern empirical foundation linking the MMPI-2-RF to contemporary concepts and constructs in the fields of personality and psychopathology, and it can guide use of the inventory in empirically informed and conceptually grounded interpretation. Nothing comparable is available for the MMPI-2. The only innovations in its substantive scales since the 1989 publication of the second edition of the inventory have been the Personality Psychopathology-Five (PSY-5) Scales (Harkness, McNulty, & Ben-Porath, 1995) and the RC Scales (Tellegen et al., 2003). The former have been updated for the MMPI-2-RF and the latter are the core scales of the inventory. Code-types, which remain the primary source for MMPI-2 interpretation, are based on a technique invented in the 1950s and, for the most part, data collected in the 1960s. They also lack an empirically-validated conceptual framework, and consequently code-types are lacking in construct validity.

Leone et al. (2018) cite a study by Mihura, Roy, and Graceffo (2017), who reported finding that the MMPI-2 is taught in 92% of graduate programs and the MMPI-2-RF in 67%. They present this as evidence of "the extensive use of the MMPI-2 over other personality assessment instruments" (p. 18). Although teaching patterns are themselves of interest, they are at best indirect markers of usage and level of user qualifications. To that point, Leone et al. (2018) neglected to inform their readers that in three recent surveys of neuropsychologists MMPI-2-RF use substantially outpaced that of the MMPI-2 (Martin, Schroeder, & Odland, 2015; Russo, 2018; Schroeder, Martin, & Odland, 2016).

Leone et al. (2018) cite the Federal Aviation Administration's *Guide for Medical Examiners* (FAA, 2013), which indicates that the MMPI-2-RF is not an approved substitute for the MMPI-2. The authors claim that this was the result of the FAA's study of its job applicants. The citation from the FAA guide is correct, but discussion of the FAA's "study" is incomplete. Analyses of the FAA dataset conducted by the first author of this article indicated that MMPI-2-RF scores outperformed MMPI-2 scales in predicting subsequent disqualification of Air Traffic Controller candidates. Moreover, the FAA is an outlier among federal agencies, the vast majority of which use the MMPI-2-RF routinely, as do the U.S. Department of Defense, the Department of Veterans Affairs, and many major city law enforcement agencies.

Conclusions

Leone, Mosticoni, Ianella, Biondu, and Butcher (2018) sought to compare the utility of the MMPI-2 and MMPI-2-RF in clinical assessments of psychiatric inpatients. Their study is marked by multiple methodological shortcomings. The authors also failed to include important information that is routinely conveyed in reports of empirical research in general and MMPI investigations in particular. Even if these methodological and writing shortfalls are set aside, the results they report are either inconsistent or at odds with Leone et al.'s (2018) conclusions that the MMPI-2-RF is lacking when it comes to assessment of clinical samples. On the contrary, the data they report add to a substantial body of literature (ignored by the authors), which has established the convergent and discriminant validity of MMPI-2-RF scales as measures of personality and psychopathology constructs. Leone et al.'s (2018) discussion veers to a tangential and very misleading comparison of MMPI-2-RF acceptance.

To summarize, the published studies discussed in Leone et al.'s (2018) article are, contrary to what they suggest, not problematic. The new data they do report are flawed and contradict their conclusions, and provide further evidence of the convergent and discriminant validity of the MMPI-2-RF RC Scales.

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As co-authors of the MMPI-2-RF, Yossef Ben-Porath and Auke Tellegen receive royalties on sales of the test. They also serve as paid consultants to, and have received research funds from the test publisher, the University of Minnesota Press.

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