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Assessment 2005; 12; 79
DOI: 10.1177/1073191104273515

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Susceptibility of the MMPI-2 Clinical, Restructured Clinical (RC), and Content Scales to Overreporting and Underreporting

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The authors examined and compared the susceptibility of three Minnesota Multiphasic Personality Inventory–2 (MMPI-2) scale sets (Clinical, Restructured Clinical [RC], and Content) to over- and underreporting using five analog samples. Two samples of 85 and 191 undergraduate students, respectively, took the MMPI-2 under underreporting versus standard instructions. Three samples consisting of 42 undergraduates, 73 psychiatric inpatients, and 84 medical patients took the MMPI-2 under overreporting versus standard instructions. A comparison of the effect sizes across the three sets of scales indicated that Clinical Scale scores are not less susceptible to distortion than the Content or RC Scales. An apparent lesser susceptibility to underreporting for the Clinical Scales was an artifact of the subtle items’ effect on these scales.

Keywords: MMPI-2; overreporting; malingering; underreporting; personality assessment

For various reasons, individuals undergoing a psychological assessment may overreport or underreport problems. Common examples include test takers who feign psychopathology to receive financial compensation or avoid criminal prosecution and others who cover up psychological difficulties in pre-employment screening or child custody evaluations. As the stakes involved in a psychological evaluation increase, so does the likelihood that the individual will distort his or her responses (Rogers, 1997).

The Minnesota Multiphasic Personality Inventory–2 (MMPI-2; Butcher et al., 2001) contains several validity scales designed to detect over- and underreporting. Considerable research has been conducted to examine these scales’ utility. In general, this research has demonstrated that the MMPI-2 validity scales are effective at detecting response distortion. Rogers and his colleagues (Rogers, Sewell, Martin, & Vitacco, 2003; Rogers, Sewell, & Salekin, 1994) reported the results of two meta-analyses that examined overreporting on the MMPI-2. They con-
cluded that several MMPI-2 validity indices, especially F and F(p), are effective in identifying people who engage in overreporting in general as well as malingering of specific mental disorders. The MMPI-2 validity scales have also been found to be effective in detecting individuals who were coached in the faking of mental disorders using both undergraduate students (e.g., Storm & Graham, 2000) and psychiatric inpatients (e.g., Bagby, Nicholson, Bacchiochi, Ryder, & Bury, 2002).

A meta-analysis by Baer and Miller (2002) indicated that the MMPI-2 validity scales designed to identify underreporting are also effective; however, they are less able to identify participants who have been coached (i.e., being instructed on the existence of validity scales and how they worked). Bagby et al. (1997) found that psychiatric patients were as able to “fake good” as undergraduate college students. These authors also found that the Wiggins (1959) Social Desirability Scale was the best predictor of underreporting in both samples.

No published research has examined whether some MMPI-2 scales are more susceptible to distortion than others. Graham (2000) has suggested that the Content Scales may be more susceptible to faking than the Clinical Scales because of their greater face validity. He therefore cautions about interpreting the Content Scales if distortion is suspected but not confirmed. Although it is intuitively sensible, as mentioned, the assumption that the Content Scales are more susceptible to distortion than the Clinical Scales has not been tested empirically.

A similar possibility has been raised for the recently introduced MMPI-2 Restructured Clinical (RC) Scales. The RC Scales were developed to remove a common Demoralization factor that saturates the original Clinical Scales and improve their discriminant and convergent validity (Tellegen et al., 2003). Demoralization was conceptualized through Tellegen’s (1985) framework of positive and negative emotionality as corresponding to the pleasantness-unpleasantness vector between these two orthogonal affective dimensions. Tellegen’s model links depression to low positive emotionality and anxiety to high negative emotionality. Therefore, Demoralization markers were identified based on factor analyses of Clinical Scales 2 and 7. The next step in developing the RC Scales involved identifying the unique core components of each Clinical Scale after Demoralization items had been removed. This was followed by analyses designed to maximize the distinctiveness of each core component and identify items throughout the MMPI-2 pool that are related uniquely to this core. The final set of RC Scales includes a Demoralization measure along with eight restructured scales corresponding to the original Clinical Scales (excluding Scales 5 and 0).1 Tellegen et al. (2003) showed that in comparison with the Clinical Scales, the RC Scales are more homogeneous and less intercorrelated, resulting in generally improved convergent and discriminant validity. The method used to develop the RC Scales resulted in identification of more transparent or obvious items than the empirical keying method, and Tellegen et al. (2003) note that this potentially could make the restructured scales more vulnerable to deliberate response distortion than the Clinical Scales.

The present investigation was designed to examine the susceptibility of the MMPI-2 Clinical, Content, and RC Scales to over- and underreporting. Because, similar to the Content Scales, the RC Scales contain more obvious item content than the heterogeneous Clinical Scales, scores on these two sets of scales might be more susceptible to disimulation by the test taker. If this is the case, it could be because the Clinical Scales’ items are less transparent but generally equally valid indicators of underlying constructs. Alternatively, the presence of subtle items on the Clinical Scales, which have been found to be generally invalid (e.g., Weed, Ben-Porath, & Butcher, 1990), may artifactually mask the effects of response distortion on Clinical Scale scores. This possibility is also explored in this investigation.

METHOD

Participants

Data from five archival analog samples used in previous investigations were analyzed for this study. To eliminate non-content-based invalid MMPI-2 profiles in each of these samples, we used exclusionary criteria of Cannot Say Raw score ≥ 30, or TRIN or VRIN T score ≥ 80.

To examine underreporting, a sample collected by Bagby, Rogers, Buis, and Kalemba (1994) consisting of 85 college students from a North American university was examined. After applying the exclusionary criteria, the final sample consisted of 17 male and 63 female college students. These participants had a mean age of 23.93 (SD = 5.62), with a range of 19 to 52. They were mostly Caucasian, although this information was not directly gathered.

A second underreporting sample was collected by Lim and Butcher (1996) and consisted of 197 undergraduate students from a university in the upper Midwest. After invalid MMPI-2 profiles were excluded, 70 male and 121 female participants remained. These individuals had an average age of 23.10 (SD = 6.89), with a range of 18 to 51. The racial composition was 95% Caucasian, 3% Asian American, and 2% African American. Most students were single/never married.

Three samples were used to examine overreporting. One of these was collected by Graham, Watts, and
Timbrook (1991) and included 50 undergraduate students. After exclusionary criteria were applied, the final sample consisted of 24 male and 18 female participants. These individuals were on average 20.05 (SD = 13.38) years old, with a range of 18 to 34. Most participants were freshmen or sophomores (92.9%) and were single/had never married (97.6%).

A second sample used for investigating overreporting consisted of 86 psychiatric inpatients, collected by Arbisi and Ben-Porath (1998). The final sample (after validity scale exclusions) consisted of 64 male and 9 female participants. These individuals had a mean age of 43.44 (SD = 12.29), with a range of 19 to 85. The racial composition of the participants was 88.0% Caucasian, 9.0% African American, 1.0% Asian American, and 1.0% Native American.

A final sample consisting of unpublished data was gathered by P. A. Arbisi and included 92 male medical patients from the Minneapolis VA medical center. After applying exclusionary criteria, the final sample ranged in age from 31 to 85 (M = 61.00, SD = 11.62) years old and was predominantly Caucasian (91.3%), with a mean years of education of 13.71 years (SD = 4.72). The sample was predominantly married (53.6%), with 17.9% never married, 21.4% divorced, 3.6% separated, and 1.2% widowed.

**Procedures**

In all samples, participants were randomly assigned (to the extent possible) to a condition, with the exception of Graham et al. (1991) in which participants took the MMPI-2 twice. Also, instructions for honest conditions were standard MMPI-2 instructions unless otherwise noted.

In the Bagby et al. (1994) sample, participants in the fake-good condition were informed that the researchers were conducting a study in which they were trying to identify individuals who were faking. They described different examples in which underreporting might occur, such as during child custody evaluations, release from a psychiatric hospital, or application for a desirable job. Participants were paid for their time and also entered into a lottery for people who produced an undetectable fake-good profile. The participants in the honest condition were also reimbursed for their efforts.

In the Lim and Butcher (1996) sample, there were two types of faking instructions. One group was asked “to deny psychological adjustment problems,” whereas the other group was asked to “claim extreme virtue though presenting oneself in the superlative manner” (Lim & Butcher, 1996, p. 5). Because there were no statistically significant group differences on any of the scales (i.e., Clinical, Content, and RC Scales) used in the study across the two underreporting groups, they were merged to form one experimental group.

Procedures varied in the three samples that included overreporting instructions. In Graham et al. (1991), the participants were asked to complete the MMPI-2 twice, once under standard instructions and once under fake-bad instructions. The participants were asked to respond as though they wanted to give the impression of having serious psychological or emotional problems. The order of the conditions was counterbalanced.

In Arbisi and Ben-Porath’s (1998) study, psychiatric inpatients were asked to take the MMPI-2 during either an honest condition or a fake-bad condition. The instructions for the honest condition asked participants to be as open and honest as possible and indicated that they would be compensated for their efforts. They were also advised that their results would be used for research purposes only. The instructions for the fake-bad condition asked the participants to pretend that they had more problems than they actually did and that their present problems were more severe that they actually were. The participants were instructed to imagine trying to gain something by being dishonest with the test, such as disability benefits. Participants were compensated for their efforts and also entered into a drawing for additional compensation should they be able to “fool the test.”

Finally, in P. A. Arbisi’s VA sample, medical patients were randomly assigned to take the MMPI-2 under either overreporting or honest instructions. Participation was completely voluntary and was not part of the clinical assessment of these patients. Participants in the overreporting condition were asked to exaggerate current physical problems and emotional problems resulting from their exaggerated physical condition but avoid detection. They were instructed to pretend that they were applying for disability funds based on a physical injury they had previously sustained. Participants were all compensated for their efforts and also entered into a drawing for additional compensation should they be able to fake their symptoms while avoiding detection.

**Data Analysis**

We calculated effect sizes (Cohen’s d) for the differences in scores across the two conditions (i.e., faking vs. standard instructions) for each individual scale (using the pooled SD in the denominator) and compared the average effect sizes across the three sets of scales (Clinical, RC, and Content Scales). A greater effect size would indicate that a scale set is more susceptible to distortion. To examine whether the effect sizes were significantly different...
across conditions, we calculated 95% confidence intervals (CIs) around each effect size. Nonoverlapping CIs would indicate significantly different effect sizes. Clinical significance, defined typically as a 5 T-score difference on the MMPI-2 (e.g., Greene, 2000), was also considered if the Clinical Scales would fall within the normal range (T = 46-55) during a faking condition, whereas the RC or Content Scales would fall outside this normal range. Moreover, if differences in susceptibility to distortion were found, the Obvious and Subtle subscales of the Clinical Scales were examined to determine whether the difference was likely attributable to the attenuating effects of the invalid subtle items by comparing the effect sizes of the two sets and also by examining whether the Obvious subscales matched the pattern of the RC and Content Scales, whereas the Subtle subscales effect size would be closer to that of the Clinical Scales. Finally, we followed up by examining differences in susceptibility to distortion across individual scales. To optimize the susceptibility to distortion examination, we chose conceptually matching scales, which resulted in seven comparisons: 1-R1-HEA, 2-RC2-DEP, 4-RC4-ASP, 6-RC6-BIZ, 7-RC7-ANX, 8-RC8-BIZ, and 9-RC9-ANG.

RESULTS AND DISCUSSION

Table 1 reports the means, standard deviations, and mean effect size (Cohen’s d) on the Clinical (excluding Scale 5 and 0), Content, and RC Scales across conditions. In both underreporting samples, the Clinical Scales had a lower mean effect size than both the RC and Content Scales; however, the 95% CIs of the three effect sizes overlapped. Nonetheless, in terms of clinical significance, the Content and RC Scale means were more than 5 T-score points below the test norms, whereas the Clinical Scale means were within the norm range (46-55). This finding suggests that in these two nonclinical samples, the Clinical Scales were less susceptible to manipulation than the Content and RC Scales. Therefore, we performed post hoc analyses in which we examined the Obvious and Subtle subscales of the Clinical Scales. In the Bagby et al. (1994) sample, participants instructed to underreport (M = 43.67, SD = 7.42) had lower scores on the Obvious subscales than did those participants who took the MMPI-2 under standard instructions (M = 52.11, SD = 9.51) actually scored higher on the Subtle scales than

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Means, Standard Deviations, and Effect Sizes for Scale Sets Under Faking and Standard Instructions Across Five Faking Samples</th>
</tr>
</thead>
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<tr>
<td>Scales</td>
<td>Faking Instructions</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Underreporting</td>
<td></td>
</tr>
<tr>
<td>Bagby, Rogers, Buis, and Kalemba (1994) sample</td>
<td>Clinical Scales&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Content Scales</td>
</tr>
<tr>
<td></td>
<td>RC Scales</td>
</tr>
<tr>
<td>Lim and Butcher (1996) sample</td>
<td>Clinical Scales&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Content Scales</td>
</tr>
<tr>
<td></td>
<td>Restructured Clinical Scales</td>
</tr>
<tr>
<td>Overreporting</td>
<td></td>
</tr>
<tr>
<td>Graham, Watts, and Timbrook (1991) sample</td>
<td>Clinical Scales&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Content Scales</td>
</tr>
<tr>
<td></td>
<td>RC Scales</td>
</tr>
<tr>
<td>Arbisi and Ben-Porath (1998) psychiatric sample</td>
<td>Clinical Scales&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Content Scales</td>
</tr>
<tr>
<td></td>
<td>RC Scales</td>
</tr>
<tr>
<td>Arbisi medical sample</td>
<td>Clinical Scales&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Content Scales</td>
</tr>
<tr>
<td></td>
<td>RC Scales</td>
</tr>
</tbody>
</table>

NOTE: CI = confidence interval; RC = Restructured Clinical.
<sup>a</sup> Scales 5 and 0 are not included in these analyses.
did the participants who took the test under standard instructions ($M = 48.85, SD = 8.73$), producing a Cohen's $d$ of –.36 (95% CI ranging from –1.80 to 0.09), whose CI did not overlap with that of the Obvious subscales or any other scale set. In the Lim and Butcher (1996) sample, underreporters ($M = 41.88, SD = 7.29$) had lower scores on the Obvious subscales than did honest participants ($M = 50.98, SD = 9.38$), with a Cohen's $d$ of 1.07 (95% CI ranging from 0.77 to 1.37). As in the Bagby sample, underreporters ($M = 55.18, SD = 8.38$) scored higher on the Subtle subscales than did the honest participants ($M = 50.34, SD = 9.59$), yielding a Cohen's $d$ of –.77 (95% CI ranging from –1.06 to –.47), again, significantly different from the Obvious subscales. The reverse findings for the Subtle subscales in both samples are consistent with the common “paradoxical effect” that some Subtle subscales actually move in the opposite direction when participants are asked to underreport and likely indicates that some “subtle” items are actually obvious but keyed in the wrong direction (Hollrah, Schlottmann, Scott, & Brunetti, 1995; Mihura, Schottmann, & Scott, 2000).

Finally, we explored the susceptibility to underreporting of the Clinical, RC, and Content Scales at the individual scale level. We did not find any differences at the individual scale level in the Bagby et al. (1994) sample. However, we found several differences in the Lim and Butcher (1996) sample. We summarized the scales for which we found significant differences in Table 2, which indicates that Clinical Scales 1, 2, 4, and 9 are less susceptible to underreporting than their restructured counterparts and, in some cases, corresponding Content Scales. An examination of the Obvious and Subtle scales (see Table 2), whose effect size CIs do not overlap in any of the comparisons, revealed that the Subtle subscales’ effect sizes were lower than or similar to those of their parent Clinical Scales, whereas the Obvious subscales’ effect sizes mirrored the patterns of the corresponding RC and Content Scales. It is noteworthy that the effect size differences for the individual scales in the Bagby et al. (1994) sample mirrored those in the Lim and Butcher (1996) sample, but the former sample lacked sufficient power to reach statistical significance.

Overall, the Clinical Scales’ Obvious subscales’ pattern mirrored the RC and Content Scales, whereas the Subtle subscales’ pattern was closer to that of the Clinical Scales, which indicates that the Clinical Scales apparent diminished susceptibility to underreporting is an artifact produced by the subtle items. Several studies (Burkhart, Gynther, & Fromuth, 1980; Gynther, Burkhart, & Hovanitz, 1979; Snyder & Graham, 1984; Weed et al., 1990) have demonstrated that the subtle items are not valid predictors of external criteria, and in fact, they attenuate the Clinical Scales’ validity. Thus, that portion of Clinical Scale score variance that is less susceptible to manipulation is also mostly invalid.

Table 1 also provides the means, standard deviations, and mean effect size (Cohen’s $d$) on the Clinical, Content, and RC Scales in the three samples used to examine

### Table 2

<table>
<thead>
<tr>
<th>Scale</th>
<th>Underreporting Instructions ($n = 89$)</th>
<th>Standard Instructions ($n = 102$)</th>
<th>$d$</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Scale 1</td>
<td>46.48</td>
<td>49.83</td>
<td>.45</td>
<td>.16–.74</td>
</tr>
<tr>
<td>RC1</td>
<td>40.16</td>
<td>48.49</td>
<td>1.05</td>
<td>.75–1.35</td>
</tr>
<tr>
<td>HEA</td>
<td>38.92</td>
<td>49.69</td>
<td>1.38</td>
<td>1.05–1.69</td>
</tr>
<tr>
<td>Clinical Scale 2</td>
<td>43.47</td>
<td>49.30</td>
<td>.72</td>
<td>.42–1.01</td>
</tr>
<tr>
<td>RC2</td>
<td>38.17</td>
<td>48.64</td>
<td>1.34</td>
<td>1.02–1.65</td>
</tr>
<tr>
<td>DEP</td>
<td>40.09</td>
<td>50.42</td>
<td>1.18</td>
<td>.87–1.48</td>
</tr>
<tr>
<td>Obvious</td>
<td>55.89</td>
<td>50.34</td>
<td>.77</td>
<td>(−.106)–(.47)</td>
</tr>
<tr>
<td>Clinical Scale 4</td>
<td>48.31</td>
<td>53.00</td>
<td>.59</td>
<td>.30–.88</td>
</tr>
<tr>
<td>RC4</td>
<td>39.30</td>
<td>51.24</td>
<td>1.49</td>
<td>1.16–1.80</td>
</tr>
<tr>
<td>ASP</td>
<td>42.29</td>
<td>51.34</td>
<td>1.02</td>
<td>.71–1.32</td>
</tr>
<tr>
<td>Subtle</td>
<td>52.17</td>
<td>53.38</td>
<td>.13</td>
<td>.15–.42</td>
</tr>
<tr>
<td>Obvious</td>
<td>40.53</td>
<td>50.97</td>
<td>1.27</td>
<td>.95–1.57</td>
</tr>
<tr>
<td>Clinical Scale 9</td>
<td>52.71</td>
<td>52.11</td>
<td>.07</td>
<td>(−.35)–.22</td>
</tr>
<tr>
<td>RC9</td>
<td>44.73</td>
<td>51.46</td>
<td>.66</td>
<td>.37–.95</td>
</tr>
<tr>
<td>ANG</td>
<td>38.79</td>
<td>47.95</td>
<td>1.12</td>
<td>.81–1.42</td>
</tr>
<tr>
<td>Subtle</td>
<td>56.19</td>
<td>50.05</td>
<td>.70</td>
<td>(−.99)–(−.41)</td>
</tr>
<tr>
<td>Obvious</td>
<td>44.60</td>
<td>52.76</td>
<td>.86</td>
<td>.56–1.16</td>
</tr>
</tbody>
</table>

NOTE: CI = confidence interval; HEA = Health Concerns; DEP = Depression; ASP = Antisocial Practices; ANG = Anger.
overreporting. Effect sizes were comparable across the three sets of scales and well within each of the three samples’ 95% CIs. These results indicate that the Clinical Scales are not less susceptible to overreporting than other scales with more obvious content. For all three sets of scales, the mean score for the overreporting participants exceeded the cutoff for clinically significant elevation (i.e., $T = 65$); therefore, no post hoc analyses were conducted with the Obvious subscales. We further examined whether there were any differences in susceptibility to overreporting at the individual scale level. Across the three samples, we did not find any significant differences in any of the seven scale comparisons mentioned above.

Noteworthy is that the effect sizes across the various overreporting samples are quite different in magnitude. This difference stems from the use of three types of samples, college students, psychiatric inpatients, and medical patients, which have different base rates of psychopathology. Thus, when asked to exaggerate, the psychiatric inpatients will not differ as much from the standard condition compared to college students with virtually no baseline psychopathology. Similarly, a reason why the effect sizes are smaller in the underreporting samples is because they are composed of college students, who do not have much psychopathology to hide.

Overall, our findings indicate that when over- or underreporting are suspected, MMPI-2 users should exercise equal caution when interpreting the three sets of scales included in these analyses. There is no reason to place greater emphasis on the Clinical Scale scores over others under these circumstances. The Clinical Scales’ apparent lesser susceptibility to underreporting is an artifact of the random measurement error generated by the subtle items. This artifact likely did not play the same role in overreporting because, overall, this is a stronger, more distorting response set, as evidenced by the far greater effect sizes in the overreporting samples.

This study has some limitations. Four of the five sample sizes were relatively small, decreasing the power of the statistical analyses. However, consistent findings across the five samples provide a partial remedy for this limitation. Another limitation is that only undergraduate samples were available for the underreporting analyses, and therefore, these results need to be interpreted with caution until further data have been generated with (larger) clinical samples and/or comparison groups. However, the findings do suggest clinically significant effects for the Content, RC, and the Obvious subscales of the Clinical Scales. Moreover, the original instructions did not incorporate some of the more recent features of validity scales effectiveness research (e.g., manipulation checks). However, our focus was not on detection of over- and underreporting per se but rather on the general effects of these test-taking procedures on these sets of MMPI-2 scales. Follow-up research using samples in which incentives and manipulation checks are applied could focus more precisely on the effects of over- and underreporting on specific MMPI-2 scales scores.

NOTES
1. A comprehensive description of the conceptualization and development of the Restructured Clinical (RC) scales can be found in the RC Scales monograph (Tellegen et al., 2003).
2. Data from this sample have not been previously published.
3. In an effort to conserve space, we do not show the results for the scale comparisons for which we found no differences. These data are, however, available from the first author upon request.

REFERENCES


**Martin Sellbom, M.A.,** is a clinical psychology doctoral student at Kent State University. His research interests primarily concern personality conceptualizations of various forms of psychopathology (especially psychopathy and affective disorders) with the Minnesota Multiphasic Personality Inventory–2 (MMPI-2). Other interests include examining the construct validity and clinical utility of the MMPI-2 Restructured Clinical Scales and forensic applications of the MMPI-2.

**Yossef S. Ben-Porath, Ph.D.,** is a professor in the Department of Psychology at Kent State University. He has been involved in the development of several MMPI-2 scales and is co-author of the current MMPI-2 manual. He also participated in the development of the Minnesota Multiphasic Personality Inventory–Adolescent (MMPI-A) and is coauthor of the test manual.

**John R. Graham, Ph.D.,** is a professor in the Department of Psychology at Kent State University. His research interests include objective personality assessment (MMPI-2 and MMPI-A). His practice is limited to forensic assessment consultation.

**Paul A. Arbisi, Ph.D.,** is a staff psychologist at the Minneapolis Veterans Affairs Medical Center and an associate professor in the Departments of Psychiatry and Psychology at the University of Minnesota. His research interests include detection of response bias with the MMPI-2 in psychiatric and medical settings and the development of contemporary MMPI-2 interpretive strategies for use in psychiatric settings.

**R. Michael Bagby, Ph.D., C. Psych,** is a professor in the Department of Psychiatry at the University of Toronto, and is the director of the Clinical Research Department, as well as the codirector of the Psychological Assessment Service at the Centre for Addiction and Mental Health. He has a wide range of clinical and research interests, including an active program of research in the assessment of malingering and socially desirable responding. Other interests include the relation between personality and depression, and the use of the Five Factor Model of personality in the assessment of personality pathology.