Exaggerated MMPI-2 symptom report in personal injury litigants with malingered neurocognitive deficit

Glenn J. Larrabee

Suite 202, 630 South Orange Avenue, Sarasota, FL 34236, USA

Accepted 25 April 2002

Abstract

Traditional MMPI-2 validity scales, the Lees-Haley Fake Bad Scale (FBS), and the Arbisi and Ben Porath Infrequency Psychopathology Scale (F(p)) were evaluated in 33 personal injury litigants who had failed forced-choice symptom validity testing and other measures of effort in patterns consistent with the Slick, Sherman, and Iverson (1999) criteria for definite and probable malingered neurocognitive deficit (MND). The FBS was more sensitive to symptom exaggeration than F, Fb, and F(p). The definite and probable MND litigants also produced mean elevations on MMPI-2 scales 1, 3 and 7 that were significantly higher than those produced by various clinical groups including non-litigating severe closed head injury, multiple sclerosis, spinal cord injury, chronic pain, and depression. These data suggest that MMPI-2 profiles characteristic of malingered injury differ from those associated with malingered psychopathology.

© 2002 National Academy of Neuropsychology. Published by Elsevier Ltd. All rights reserved.

Keywords: FBS; MND; MMPI-2

Malingering is the intentional distortion or exaggeration of symptomatic complaints for external incentives, such as financial reward in personal injury litigation or avoidance of prosecution in the criminal courts (Iverson & Binder, 2000). In neuropsychological practice, malingering can occur in three patterns: (1) exaggeration of symptomatic complaint, (2) intentionally poor performance on neuropsychological testing, and (3) both exaggeration of complaint and intentionally poor performance (Iverson & Binder, 2000; Larrabee, 2000).
Malingering of neuropsychological test performance can be assessed by specialized tests of effort that utilize forced-choice methodology, such as the Portland Digit Recognition Test (PDRT; Binder & Willis, 1991), and by determination of neurologically atypical patterns of performance, such as poor attention co-occurring with normal memory (Mittenberg, Azrin, Millsaps, & Heilbronner, 1993). Forced-choice tests of effort, such as the PDRT, can be scored in two manners: (1) for the presence of significantly worse-than-chance performance, and (2) for the presence of atypically low performance relative to a group of non-litigating patients with medically-documented brain damage (Iverson & Binder, 2000; Larrabee, 2000). The second method of scoring usually sets a performance cut-off that minimizes false positive diagnosis in the legitimate patient group. Obviously, cut-offs that eliminate false positives or “zero percentile” levels (worse than 100% of non-litigating brain injured subjects), identify fewer malingerers than more liberal cut-offs. Binder and Kelly (1996) identified 30% of litigating minor closed-head-injured (CHI) as motivationally impaired using a zero percentile cut-off on the PDRT total score versus 43% using a second percentile cut-off (i.e., performance worse than 98% of non-litigating brain injured subjects). Fewer litigants are identified by a criterion of significantly worse-than-chance performance.

The presence of symptom exaggeration traditionally has been evaluated with the MMPI-2 F scale and Fb (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989), as well as with the newer Arbisi and Ben Porath Infrequency Psychopathology Scale (F(p)) (Arbisi & Ben-Porath, 1995). Berry et al. (1995) demonstrated the validity of F, Fb and F(p) for detection of exaggerated responding on the MMPI-2 for both non-injured persons dissimulating head trauma, and for compensation-seeking CHI patients. The highest clinical scale elevations for the compensation-seeking CHI patients occurred on MMPI-2 scales 1, 2, 3, 7, and 8.

Despite the results reported by Berry et al. (1995), and the long history supporting the use of the F scale and its derivatives in evaluating malingering (Graham, 2000), the F scale may not be the most sensitive MMPI-2 scale in personal injury settings. The F scale is particularly suited to detection of exaggerated psychopathology or “acting crazy,” which may be a less frequent occurrence in personal injury settings wherein illness behavior is exaggerated and the litigant “acts hurt.” The F scale, and F(p) are particularly suited for detection of exaggerated psychopathology, due to the significant correlations of these measures with items on scales 6 and 8 (Arbisi & Ben-Porath, 1995). By contrast F and F(p) show much lower correlations with scales 1 and 3 (Arbisi & Ben-Porath, 1995), the MMPI-2 scales most susceptible to exaggeration of physical and medical illness (note: Table 5 of Arbisi & Ben-Porath shows that F and F(p) correlate, at .84 and .56, respectively with scale 8, but correlate at only .22 and .03 with scale 3). In this regard, there is only one F scale item on either scale 1 or 3 (Larrabee, 1998).

Lees-Haley and colleagues have developed an MMPI-2 validity scale for use in personal injury settings, the Lees-Haley Fake Bad Scale (FBS; Lees-Haley, 1992; Lees-Haley, English, & Glenn, 1991). There is mounting evidence that the FBS may be more sensitive to exaggerated symptom report in personal injury settings than F, Fb or F(p). Slick, Hopp, Strauss, and Spellacy (1996) found a greater number of significant correlations between FBS and performance on the Victoria Symptom Validity Test, than were demonstrated with the traditional F scale. Millis, Putnam, and Adams (1995), found that the FBS was a more efficient scale
than F in discriminating the MMPI-2 profiles of probable malingerers from those produced by persons with moderate and severe closed head injury. Larrabee (1998) found that the FBS was more sensitive to the presence of exaggerated physical complaints than the F scale, Fb and F(p), and proposed preliminary criteria for somatic malingering (FBS > 23 males/25 females with scale 3 > T79 for liberal criteria, and scales 1 and 3 > T79 for conservative criteria).

Recently, Tsushima and Tsushima (2001) compared MMPI-2 validity scales, including FBS, F, Fb, F(p) and Ds-2 for three subject groups: (1) litigating/compensation-seeking patients; (2) non-litigating clinical patients, with possible psychological and/or psychophysiological disorders; and (3) non-litigating job applicants with no suspected medical or psychological conditions, evaluated as part of a screening process for employment. Only the FBS significantly discriminated the litigating from clinical patients. Both the litigants and clinical patients scored significantly higher than the job applicants on FBS, F, Fb, and Ds-2. Data in Table 2 of Tsushima and Tsushima can be used to calculate effects sizes (i.e., Hedge’s $g$, the difference between group means in pooled standard deviation units), contrasting FBS, F, Fb, and Ds-2 scores for the 120 litigating patients, with the mean scores produced by the 43 job applicants. These effect sizes are the largest for the FBS, $g = 1.66$, with $g = 1.06$ for F, $g = .79$ for Fb, and $g = 1.09$ for Ds-2. The effect size for F(p) was $g = .51$. These data further support greater sensitivity of the FBS to MMPI-2 exaggeration in personal injury settings than is associated with scores on the F, Fb, and F(p) scales.

The purpose of the present study is to investigate the sensitivity of F, Fb, F(p) and FBS to malingering, in a sample of litigants without evidence for medical or neurological impairment, and who failed the PDRT at one of three levels of performance: (1) significantly worse-than-chance, (2) zero percentile cut-off (below the performance of 100% of non-litigating brain injured patients), and (3) second percentile cut-off (below the performance of 98% of non-litigating brain injured patients). Additionally, motivationally-impaired performance on other measures of effort such as the Test of Memory Malingering (TOMM; Tombaugh, 1996), as well as motivationally-impaired patterns of performance on standard clinical tests such as the WAIS-R (Mittenberg, Theroux-Fichera, Zielinski, & Heilbronner, 1995), was evaluated. The litigants’ PDRT scores, performance on other measures of effort and additional criteria for malingered neurocognitive deficit (MND) from those proposed by Slick et al. (1999) were used to identify two groups of subjects: (1) definite malingered neurocognitive deficit (definite MND) for persons scoring significantly worse-than-chance on the PDRT; and (2) probable MND (scoring below the zero or second percentile on the PDRT cut-offs, plus showing motivationally-impaired performance on at least one other measure of effort).

Given prior reports of elevations on MMPI-2 scales 1, 2, 3, 7, and 8 in probable malingers (Berry et al., 1995; Larrabee, 1998; Millis et al., 1995; Suhr, Tranel, Wefel, & Barrash, 1997), scores for the subjects with definite and probable MND on the basic MMPI-2 clinical scales will be compared to mean MMPI-2 scores for groups of patient who have history of chronic pain (Keller & Butcher, 1991), depression (Suhr et al., 1997), spinal cord injury (Rodevich & Wanlass, 1995), multiple sclerosis (Connor, Ogden, Walker, Cullum, & Frohman, 1998; Nelson & Do, 1998), and non-litigants with moderate and severe closed head injury (Millis et al., 1995; Suhr et al., 1997; Youngjohn, Davis, & Wolf, 1997).
1. Methods

1.1. Subjects

Case files were reviewed to identify subjects with definite negative response bias (Slick et al., 1999), who scored significantly worse-than-chance on the PDRT, \( n = 14 \). Additionally, a group of probable negative response bias was formed by selecting subjects who scored at either the second percentile (\( n = 7 \)) or zero percentile (\( n = 12 \)) on the PDRT, and who performed in a motivationally-impaired manner on either the Rey 15-Item Test (score < 10; Greiffenstein, Baker, & Gola, 1994), Warrington Recognition Memory Test for Words (score < 29; Millis, 1992); TOMM (score < 45 on either Trial 2 or on Retention; Tombaugh, 1996); Reliable Digit Span (score < 8; Greiffenstein et al., 1994), or had positive probabilities for malingering on either the WAIS-R (Mittenberg et al., 1995) or Wisconsin Card Sorting Test (Suhr & Boyer, 1999). One subject who scored below the zero percentile cut-off on the PDRT did not fail these other malingering indicators. This subject did show evidence of motivationally inconsistent performance on standard testing, recalling words at delayed recall that were never provided on learning trials, and showing evidence of impaired attention but above average memory, meeting the Slick et al. (1999) inconsistency criterion for discrepancy between test data and known patterns of brain functioning.

In addition to meeting the above performance criteria for definite and probable negative response bias, both groups met the Slick et al. (1999) criteria for presence of a substantial external incentive (Criterion A), and there was no evidence that the motivationally impaired test performance was the product of psychiatric, neurological, or developmental factors (Criterion D). This resulted in a group of 14 Ss with definite MND and 19 Ss with probable MND.

MANOVA comparing the definite MND and probable MND on age and education was non-significant, \( \lambda = .846, P < .081 \). Univariate ANOVA was significant for age, \( F(1, 31) = 4.78, P < .037 \), but non-significant for education with \( F(1, 31) = 1.336, P < .257 \). The two groups did not differ in proportion of males and females, chi square = .248, \( P < .719 \). MANOVA on the MMPI-2 (L, F, K, Fb, F(p), FbS, primary clinical scales) was non-significant, \( \lambda = .640, P < .95 \). The only univariate MMPI-2 difference that approached significance was on scale 3, with the definite MND average 86.0 (S.D. = 10.85) versus the probable MND average of 79.69 (S.D. = 9.80), \( P < .09 \). MANOVA on number of chronic pain complaints, maximum pain range (maximum minus minimum subjective intensity ratings on a 0–100 scale), and average maximum pain, was non-significant, \( \lambda = .974, P < .853 \).

Because the definite MND and probable MND did not differ on education, gender, MMPI-2 clinical or validity scales or pain complaints, all litigants were combined to form a single group. There were 20 females and 13 males. Mean age was 42.33 (S.D. = 10.00), and mean education was 12.18 (S.D. = 2.28). Mean score on PDRT easy items was 19.76 (S.D. = 3.44), mean score on PDRT hard items was 15.70 (S.D. = 5.52), and mean PDRT lowest correct out of 18 items was 6.48 (S.D. = 1.94). All subjects were either in litigation or pursuing Workman’s Compensation.

Twenty-six had alleged mild head injury (no documented loss of consciousness or post-traumatic amnesia; normal neurodiagnostic studies such as CT, MRI, EEG; no focal neurologic signs), and seven had alleged neurotoxic injury (no medical laboratory test abnormalities, no
neurologic or neurodiagnostic evidence of central or peripheral nervous system damage on procedures such as CT, MRI, nerve conduction velocity, or electromyography. As is typical of this type of patient group (Hartman, 1995; Lees-Haley & Brown, 1993; Uomoto & Esselman, 1993), all Ss had chronic pain complaints. The average number of complaints for the combined MND group was 2.76 (S.D. = 1.70), with 12 reporting one chronic pain complaint, and 21 reporting multiple areas of chronic pain (one-third had four or more complaints). Subjective pain intensity ratings on a 0–100 scale (0 = absolutely no pain, 100 = pain so severe that they would want to die to escape it), had an average range (maximum minus minimum) of 77.21 (S.D. = 22.63), and average maximum pain of 90.97 (S.D. = 15.36).

2. Results

Ten of 33 MND Ss had MMPI-2 F > T65, whereas only 2 had F > 100, the value typically associated with malingering (Graham, 2000). Thirteen of 33 MNDs had Fb > 65, whereas only 5 had Fb > 100. Six MNDs had F(p) > 65, whereas none had F(p) > 100, the cut-off recommended by Arbisi and Ben-Porath (1995). Four MNDs had VRIN > 65, but none scored higher than T69. No MND Ss scored higher than T65 on TRIN.

Three different cut-offs were evaluated on the FBS: (1) FBS > 19 (Lees-Haley et al., 1991); (2) FBS > 22 (Millis et al., 1995; Putnam, Millis, & Adams, 1998); and (3) FBS > 23 for males, and >25 for females (Lees-Haley, 1992). Thirty-one MNDs had FBS > 19, 25 MNDs had FBS > 22, and 18 had FBS > 23 for males/25 females.

As per the above data, the Fb scale identified more MNDs than F or F(p) using either a conservative cut-off of >T100, 5 Ss, or a liberal cut-off of >T65, 13 Ss. Consequently, the sensitivity of Fb was compared directly to the sensitivity of the FBS, with McNemar’s test for correlated proportions (Guilford & Fruchter, 1973). Using conservative cut-offs (Fb > T100, FBS > 23 males/25 females), FBS was significantly more sensitive to malingering than Fb, Z = 3.87, P < .0001. Fifteen of 33 Ss failed FBS but passed Fb, whereas no subject failed Fb and passed FBS. Using liberal cut-offs (Fb > T65, FBS > 19), FBS was significantly more sensitive to malingering than Fb, Z = 4.24, P < .0001. Using these liberal cut-offs, 18 of 33 Ss failed FBS but passed Fb, whereas no subject failed Fb and passed FBS.

Fifteen MNDs met liberal criteria for somatic malingering (scale 3 > 79; FBS > 23 males/25 females, Larrabee, 1998), increasing to 19 using FBS > 22, and 20 using FBS > 19. Twelve MNDs met conservative criteria for somatic malingering (scales 1 and 3 > 79; FBS > 23 males/25 females), increasing to 14 using FBS > 22, and 15 using FBS > 19.

The subjective pain intensity ratings (number of complaints, maximum to minimum range on the 0–100 scale, and average maximum pain) were correlated with the MMPI-2 validity scales (L, F, K, Fb, F(p), FBS) and the primary clinical scales. None of the correlations were significant; indeed, only two approached significance: FBS with maximum pain (r = .294, P < .096), and scale 1 (Hs) with number of pain complaints (r = .316, P < .073).

Table 1 displays the MMPI-2 basic scale T scores for the MNDs, and for a pooled sample of 47 Ss with history of moderate and severe closed head injury (CHI) who were not in litigation (Millis et al., 1995; Suhr et al., 1997; Youngjohn et al., 1997); 42 Ss with spinal cord injury
Table 1
Mean basic MMPI-2 scales for probable malingerers, closed head injury, spinal cord injury, and multiple sclerosis

<table>
<thead>
<tr>
<th>MMPI-2 scale</th>
<th>Subject group</th>
<th>Probable malingerers&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Closed head injury&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Spinal cord injury&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Multiple sclerosis&lt;sup&gt;d&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>M (S.D.)</td>
<td>57.6 (11.8)</td>
<td>55.7 (12.0)</td>
<td>49.7 (8.2)</td>
<td>53.8 (10.5)</td>
</tr>
<tr>
<td>F</td>
<td>M (S.D.)</td>
<td>66.5 (16.7)</td>
<td>61.5 (16.8)</td>
<td>52.3 (8.1)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>56.6 (12.5)&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td>K</td>
<td>M (S.D.)</td>
<td>49.3 (11.2)</td>
<td>49.3 (10.7)</td>
<td>51.8 (9.4)</td>
<td>51.2 (9.4)</td>
</tr>
<tr>
<td>1</td>
<td>M (S.D.)</td>
<td>82.0 (8.5)</td>
<td>58.4 (12.9)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>66.0 (10.2)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>72.0 (9.8)&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td>2</td>
<td>M (S.D.)</td>
<td>82.4 (11.2)</td>
<td>67.9 (15.9)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>55.6 (12.5)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>67.4 (14.5)&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td>3</td>
<td>M (S.D.)</td>
<td>82.4 (10.6)</td>
<td>60.4 (12.3)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>60.8 (10.8)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>71.4 (11.6)&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td>4</td>
<td>M (S.D.)</td>
<td>63.0 (11.6)</td>
<td>62.2 (13.7)</td>
<td>54.9 (11.4)</td>
<td>54.7 (10.6)</td>
</tr>
<tr>
<td>5</td>
<td>M (S.D.)</td>
<td>52.2 (9.1)</td>
<td>51.7 (12.5)</td>
<td>46.4 (9.3)</td>
<td>51.8 (9.9)</td>
</tr>
<tr>
<td>6</td>
<td>M (S.D.)</td>
<td>62.2 (15.7)</td>
<td>60.9 (13.4)</td>
<td>52.6 (11.3)</td>
<td>55.4 (11.6)</td>
</tr>
<tr>
<td>7</td>
<td>M (S.D.)</td>
<td>74.6 (11.8)</td>
<td>63.1 (11.6)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>52.0 (10.8)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>60.4 (10.7)&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td>8</td>
<td>M (S.D.)</td>
<td>75.9 (13.5)</td>
<td>65.7 (13.7)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>58.2 (11.0)&lt;sup&gt;**&lt;/sup&gt;</td>
<td>65.5 (12.4)&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td>9</td>
<td>M (S.D.)</td>
<td>55.4 (11.5)</td>
<td>53.8 (10.8)</td>
<td>54.8 (11.3)</td>
<td>52.4 (10.5)</td>
</tr>
<tr>
<td>0</td>
<td>M (S.D.)</td>
<td>57.8 (10.7)</td>
<td>55.4 (12.1)</td>
<td>44.5 (10.3)</td>
<td>51.6 (10.8)</td>
</tr>
</tbody>
</table>

Note. MMPI-2 = Minnesota Multiphasic Personality Inventory-2. All probability values are one-tailed and reflect significant differences between probable malingerers and each of the other subject samples.

<sup>a</sup> Current study; <i>n</i> = 33.

<sup>b</sup> Millis et al. (1995), Suhr et al. (1997), Youngjohn et al. (1997), <i>n</i> = 47.

<sup>c</sup> Rodevich and Wanlass (1995), <i>n</i> = 42.

<sup>d</sup> Connor et al. (1998), Nelson and Do (1998), <i>n</i> = 66.

<sup>**</sup> <i>P</i> < .001.

(Rodevich & Wanlass, 1995); and a pooled sample of 66 Ss with multiple sclerosis (Connor et al., 1998; Nelson & Do, 1998). Table 2 displays the MMPI-2 basic scale <i>T</i> scores for the PMs, for a sample of 30 Ss with depression (Suhr et al., 1997), and for a pooled sample of 502 chronic pain patients (Keller & Butcher, 1991).
Directional t-tests, utilizing a conservative probability of <.005, were used to contrast scores of MNDs with the other clinical groups on the MMPI-2 F scale and scales 1, 2, 3, 7 and 8. As can be seen in Tables 1 and 2, MNDs had significantly higher scores on F in comparison to Ss with chronic pain, spinal cord injury and multiple sclerosis. MNDs differed significantly

Table 2
Mean basic MMPI-2 scales for probable malingerers, chronic pain, and depression

<table>
<thead>
<tr>
<th>MMPI-2 scale</th>
<th>Probable malingerers(a)</th>
<th>Chronic pain(b)</th>
<th>Depression(c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (M) (S.D.)</td>
<td>57.6 (11.8)</td>
<td>54.3 (9.8)</td>
<td>56.2 (8.9)</td>
</tr>
<tr>
<td>F (M) (S.D.)</td>
<td>66.5 (16.7)</td>
<td>54.3 (12.2)(∗∗)</td>
<td>71.0 (21.1)</td>
</tr>
<tr>
<td>K (M) (S.D.)</td>
<td>49.3 (11.2)</td>
<td>48.9 (10.5)</td>
<td>47.3 (13.5)</td>
</tr>
<tr>
<td>1 (M) (S.D.)</td>
<td>82.0 (8.5)</td>
<td>74.4 (10.9)(∗∗)</td>
<td>72.2 (16.1)(∗∗)</td>
</tr>
<tr>
<td>2 (M) (S.D.)</td>
<td>82.4 (11.2)</td>
<td>68.9 (13.2)(∗∗)</td>
<td>78.9 (13.1)</td>
</tr>
<tr>
<td>3 (M) (S.D.)</td>
<td>82.4 (10.6)</td>
<td>75.4 (13.2)(∗)</td>
<td>72.4 (15.9)(∗)</td>
</tr>
<tr>
<td>4 (M) (S.D.)</td>
<td>63.0 (11.6)</td>
<td>58.8 (11.9)</td>
<td>61.6 (12.9)</td>
</tr>
<tr>
<td>5 (M) (S.D.)</td>
<td>52.2 (9.1)</td>
<td>48.1 (9.0)</td>
<td>50.1 (9.4)</td>
</tr>
<tr>
<td>6 (M) (S.D.)</td>
<td>62.2 (15.7)</td>
<td>57.3 (13.0)</td>
<td>64.2 (16.2)</td>
</tr>
<tr>
<td>7 (M) (S.D.)</td>
<td>74.6 (11.8)</td>
<td>62.4 (13.2)(∗∗)</td>
<td>65.1 (13.6)(∗)</td>
</tr>
<tr>
<td>8 (M) (S.D.)</td>
<td>75.9 (13.5)</td>
<td>60.3 (13.0)(∗∗)</td>
<td>72.3 (16.7)</td>
</tr>
<tr>
<td>9 (M) (S.D.)</td>
<td>55.4 (11.5)</td>
<td>51.7 (11.0)</td>
<td>50.4 (8.6)</td>
</tr>
<tr>
<td>0 (M) (S.D.)</td>
<td>57.8 (10.7)</td>
<td>52.6 (11.5)</td>
<td>64.8 (11.9)</td>
</tr>
</tbody>
</table>

Note: MMPI-2 = Minnesota Multiphasic Personality Inventory-2. All probability values are one-tailed and reflect significant differences between probable malingerers and each of the other subject samples.

* Current study; \(n = 33\).
*\(b\) Keller and Butcher (1991), \(n = 502\), males and females combined.
*\(c\) Suhr et al. (1997), \(n = 30\).
*\(∗\) \(P < .005\).
*\(∗∗\) \(P < .001\).
from all five subject groups on scales 1, 3, and 7, and differed significantly from all but the depressed subjects on scales 2 and 8.

Table 3 displays the effect sizes obtained by contrasting select MMPI-2 scale scores for PMs versus those obtained by the other clinical groups. The effect sizes for contrasting PMs with clinical groups, arranged in order beginning with largest mean effect size (averaged across all five clinical groups) are scale 1 (1.27), scale 3 (1.24), scale 7 (1.19), scale 2 (1.14), scale 8 (.89) and F (.57).

3. Discussion

The present investigation extends previous findings in showing that the Lees-Haley FBS is more sensitive than F, Fb, or F(p) to the presence of malingering in personal injury settings (Larrabee, 1998; Millis et al., 1995; Tsushima & Tsushima, 2001). Depending on the cut-off employed, the FBS identified anywhere from 94% (FBS > 19) to 54% (FBS > 23 for males and >25 for females) of litigants with MND.

The current investigation also extends previous findings showing that MNDs produce MMPI-2 scale elevations on 1, 2, 3, 7, and 8 (Berry et al., 1995; Boone & Lu, 1999; Larrabee, 1998; Millis et al., 1995; Suhr et al., 1997). The elevations on these five scales in the current sample, in particular, the elevations on scales 1 and 3, are lower than values previously reported by Boone and Lu (1999), and by Larrabee (1998). This is likely due to differences in composition of the MND samples; that is, Boone and Lu (1999), and Larrabee (1998), both required failure of symptom validity tests and clinically significant (T > 65) elevations on scales 1 and 3, whereas the only determinant of MND group membership in the present investigation was unusually poor performance on the PDRT, combined with additional evidence of motivational impairment (cf. Slick et al., 1999).

Comparisons of the MNDs with other clinical groups, including depression, chronic pain, non-litigating severe closed head injury, multiple sclerosis, and spinal cord injury, demonstrated consistently significant differences, with the MNDs scoring higher than all other groups on scales 1, 3, and 7. Effect sizes were also the largest for scales 1, 3, and 7, in contrasts of
MNDs with all other clinical groups. Indeed, the average effect sizes for scales 1, 3, and 7, collapsed over comparisons of MNDs with all clinical groups, exceed 1.0 and fall beyond the value of .8 characteristic of a large effect size (Cohen, 1988).

The average FBS for the current sample of MNDs, 25.64 (S.D. = 4.57) could not be contrasted with FBS scores for the clinical samples in Tables 1 and 2, since the FBS scores were not computed in these prior studies. The current mean FBS is nearly identical to the mean FBS for non-injured simulators reported by Lees-Haley et al. (1991; $M = 25.0$, S.D. = 8.5), but is lower than values reported by these authors for a group of subjects malingering emotional distress ($M = 27.6$, S.D. = 4.65). The mean FBS in the present investigation is also lower than reported by Lees-Haley (1992) for pseudo-post traumatic stress disorder (PTSD) claimants ($M = 27.2$, S.D. = 5.2), and values reported by Larrabee (1998) for neuropsychological MNDs ($M = 30.5$, S.D. = 4.0), and by Millis et al. (1995) for neuropsychological MNDs ($M = 29.0$, S.D. = 5.1).

The present data also support the existence of at least two types of malingering on the MMPI-2: (1) malingered injury/illness and (2) malingered psychopathology. Malingered injury/illness appears to be characterized by elevations on the Lees-Haley FBS and MMPI-2 scales 1, 3, and 7 (current study), whereas malingered psychopathology is characterized by pronounced elevations on F, and on scales 6 and 8 (Graham, Watts, & Timbrook, 1991).

Recent research on the PDRT has raised questions about low sensitivity (Vickery, Berry, Inman, Harris, & Orey, 2001). This suggests the possibility that the results from the present sample may be representative of those litigants with more blatant demonstration of poor effort, resulting in an artificially-inflated sensitivity of the FBS. This does not appear to be a factor, however, given that the average FBS of the current sample is in the low end of the range of values reported by Larrabee (1998), Lees-Haley (1992), Lees-Haley et al. (1991), and Millis et al. (1995). Moreover, subsequent to the appearance of the paper by Vickery et al. (2001), Bianchini, Mathias, Greve, Houston, and Crouch (2001) reported PDRT sensitivity of .77 and specificity of 1.00, noting that past research has seriously underestimated the sensitivity of the PDRT.

Although the size of the current sample, 33, limits generalizability, the present sample appears to be representative of the typical litigant presenting in neuropsychological settings with cognitive, affective, and pain complaints. Moreover, the current data are consistent with the growing body of research on the sensitivity of the FBS to exaggeration of symptoms in personal injury litigants (Larrabee, 1998; Millis et al., 1995; Tsushima & Tsushima, 2001). What is particularly needed is research optimizing cutting scores for both sensitivity and specificity. Absent a comparison group of non-litigating patients with bonafide closed head injury and/or neurotoxic injury, the current study could only address sensitivity, but not specificity.

Other authors have addressed the sensitivity and specificity of the FBS. Millis et al. (1995) reported a 90% specificity and sensitivity of 95% for an FBS cut-off >22 in discriminating 20 mild head injury litigants performing below chance on forced-choice testing, from 20 patients with moderate and severe closed head injury. Lees-Haley et al. (1991) reported a sensitivity of 96% and specificity of 90% in discriminating 25 personal injury claimants diagnosed as malingering emotional distress from 20 claimants diagnosed as having genuine psychological injury, using an FBS cut-off of 20 or more. Lees-Haley (1992) reported correct classification of 75% for 32 male litigants with pseudo-PTSD, and 96% for 27 male litigants with legitimate
psychologic injury using an FBS cut-off of 24 or higher. Lees-Haley (1992) reported correct classification rates of 74% for 23 female litigants with pseudo-PTSD, and 92% for 37 female claimants with legitimate injury, using a cut-off of 26 or higher.

Recently, Meyers, Millis, and Volkert (2002) have developed a weighted validity index for the MMPI-2, including F–K, F, F(p), Ds–r, Es, sum of the obvious minus subtle T score differences, and the FBS. These scores were given weights based on the rarity of particular score elevations in published research (e.g., F of 75–89 was assigned a weight of 1, and F of 90+ was assigned a weight of 2; FBS of 25–29 was weighted 1, and FBS of 30+ was weighted 2). The MMPI-2 scores of two groups of clinical patients were evaluated: (1) 100 non-litigating chronic pain patients and (2) 100 litigating chronic pain patients. Both groups had also undergone neuropsychological evaluation for cognitive complaints secondary to either chronic pain or cognitive impairment. A significant percentage of each clinical sample had neurologic histories such as head trauma with loss of consciousness or seizure disorder. Meyers et al. (2002) also evaluated the MMPI-2 scores of 30 non-injured informed actors, selected from physicians, nurses, case managers and therapists, who had daily contact with chronic pain patients and who were instructed to complete the MMPI-2 and “exaggerate” their symptoms so that they could obtain Workman’s Compensation for permanent total disability due to chronic pain.

Meyers et al. (2002) found that only 16 of 100 non-litigating chronic pain patients had an FBS of 25–29 (84% specificity), and none had an FBS of 30 or higher. By contrast, 27 of 100 litigating chronic pain patients had an FBS of 25–29, and 15 had an FBS of 30 or more.

Data provided by Meyers (personal communication, April 16, 2002), allows evaluation of the frequency distribution of FBS scores for the 100 non-litigating chronic pain patients, 100 litigating chronic pain patients, and 30 informed actors. Three different FBS cut-offs were evaluated: 20 or higher (Lees-Haley et al., 1991); 23 or higher (Millis et al., 1995); and 24 or higher for males, and 26 or higher for females (Lees-Haley, 1992). An FBS cut-off of 20 or higher identified 29 of 30 informed actors (97% sensitivity), 48 of 100 non-litigants (specificity of 52%), and 67 of 100 litigating chronic pain patients. An FBS cut-off of 23 or higher identified 27 of 30 informed actors (90% sensitivity), 34 of 100 non-litigants (66% specificity), and 50 of 100 litigating chronic pain patients. FBS cut-offs of 24 or greater for males, and 26 or greater for females identified 22 of 30 informed actors (73% sensitivity), 17 of 100 non-litigating chronic pain patients (83% specificity), and 43 of 100 litigating chronic pain patients.

As noted earlier, no non-litigating chronic pain patient scored 30 or higher on the FBS, whereas 15 of 100 litigating chronic pain patients had an FBS score of 30 or more. Eleven of 30 informed actors scored 30 or more on the FBS. Hence, an FBS of 30 or higher would have 100% specificity based on a large, non-litigating chronic pain sample, indicating that FBS scores in this range would have 100% positive predictive value (i.e., only pain patients with exaggeration suggestive of malingering would score in this range).

More recently, Butcher, Arbisi, Atlis, and McNulty (in press) have reported data related to the validity of the FBS. Butcher et al. also attempted to address the sensitivity and specificity of the FBS. These authors performed a subjective content analysis of the 43 FBS items, creating five groups: (1) somatic symptoms (14 items); (2) sleep disturbance (2 items); (3) tension or stress (4 items); (4) low energy/anhedonia (8 items); and (5) denial of deviant attitudes or
behaviors (15 items). Six subject samples were evaluated. Four subject samples were obtained from the NCS database (profiles sent in by clinicians for NCS scoring/interpretation), including psychiatric inpatients, correctional facility, general medical, and chronic pain. Another sample was from a large tertiary care VA Medical Center, with a sixth sample that included personal injury litigants. Chronbach’s alpha for these samples (males and females combined) ranged from .47 to .85, with a median value of .62. Interestingly, Chronbach’s alpha was the highest for the personal injury sample, .85, suggesting that the five separate FBS content areas identified by Butcher et al. are highly inter-related in personal injury litigants, compared to the lower alpha values in chronic pain (.47) and general medical patients (.58). The size of the median Chronbach alpha for the FBS for all samples, .62, is quite similar to the Chronbach alpha for the F scale for males, .64, and for females of .63, reported in the MMPI-2 manual (Table D-7, p. 97, Butcher et al., 1989).

Table 4 of Butcher et al. (in press) shows that the FBS correlated most strongly with scales 1, 2, 3, 7, and 8, which are the clinical scales that are the most-elevated in personal injury probable malingerers (current study; Berry et al., 1995; Boone & Lu, 1999; Larrabee, 1998; Millis et al., 1995). Conversely, the FBS correlated less strongly with F, Fb, and F(p), scales that are sensitive to exaggerated psychopathology on the MMPI-2 (Graham, 2000).

Lastly, Butcher et al. (in press) reported data on the percent of cases in each of the six samples that exceeded various cut-offs on the FBS (e.g., 20 or higher, 22 or higher, 24 or higher, and 26 or higher). It is noteworthy that Butcher et al. did not report the percent of patients involved in litigation or compensation actions in the psychiatric, chronic pain, general medical or VA samples. They also did not report the context in which the correctional facility MMPI-2s were conducted (e.g., competency to proceed to trial; criminal responsibility; consideration for early release). Hence, specificity values based on true false positives cannot be computed, nor can sensitivity values be computed for the correctional facility sample, particularly without independent criteria for identification of the presence of malingering. Regarding the personal injury sample, sensitivity values cannot be computed, because there was no independent measure of malingering. Rather, the percent of the personal injury sample exceeding various FBS cut-offs can only yield data on the baserate of malingering, if one assumes that the FBS is a valid measure of post-accident symptom exaggeration. In this vein, the rates of exaggeration of 24.1% for males (FBS of 24 or higher), and 37.9% for females (FBS of 26 or higher) reported by Butcher et al. (in press) for their litigating sample are well within previously-reported baserates of malingering in neuropsychological personal injury evaluations (59%, Greiffenstein et al., 1994; 42%, Grote et al., 2000; 49%, Meyers & Volbrecht, 1998).

In closing, there is a growing body of research supporting the validity of the FBS in detecting exaggeration of symptom report on the MMPI-2 in personal injury litigants. The FBS is significantly more sensitive in this regard than F, Fb, or F(p) (the current study; Larrabee, 1998; Millis et al., 1995; Tsushima & Tsushima, 2001). Research continues on optimizing the cutting scores for discriminating exaggerating litigants from non-litigants. These cutting scores may vary, depending on the nature of the alleged injury (e.g., exaggerated vs. legitimate PTSD; exaggerated vs. legitimate closed head injury). Recent research critical of the sensitivity and specificity of the FBS by Butcher et al. (in press) is seriously limited, for the authors did not differentiate their patient groups on the basis of those seeking or receiving compensation,
and did not employ procedures for assessment of malingering that were independent of the MMPI-2.

Concluding that a litigant is malingering solely on the basis of an elevated FBS or, for that matter, solely on the basis of an elevated F on the MMPI-2 could result in a false positive error. FBS cut-offs of 23 or higher for evaluation of litigants claiming closed head injury, and 24 males/26 females for evaluation of litigants alleging PTSD, or litigants alleging chronic pain do result in cases of false positive identification (Lees-Haley, 1992; Meyers, personal communication April 16, 2002; Millis et al., 1995; Meyers et al., 2002). The presence of additional indicators of exaggeration and poor effort, such as evidence of failure of symptom validity tests (Vickery et al., 2001) or failure of malingering formulae on standard tests (Mittenberg et al., 1993) or presence of pain scale scores significantly exceeding those produced by chronic pain patients, reduces the chance of a false positive FBS score, and increases the certainty of the presence of malingering. In other words, requiring multiple criteria for malingering reduces the chance of making false positive errors (Iverson & Binder, 2000; Slick et al., 1999). FBS scores of 30 or more are unlikely to result in false positives in chronic pain samples with cognitive complaints (Meyers et al., 2002), and fall at or above the mean FBS scores produced by three separate samples of litigants performing poorly on SVTs (Larrabee, 1998; Millis et al., 1995).

Acknowledgments

The author acknowledges the assistance of Kristin Kravitz and Susan M. Towers in the preparation of this manuscript.

References


