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The MMPI-2 Fake Bad Scale: Concordance and Specificity of True and Estimated Scores

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A number of recent studies have supported the use of the MMPI-2 Fake Bad Scale (FBS) as a measure of negative response bias, the scale at times demonstrating greater sensitivity to negative response bias than other MMPI-2 validity scales. However, clinicians may not always have access to True FBS (T-FBS) scores, such as when True-False answer sheets are unavailable or published research studies do not report FBS raw scores. Under these conditions, Larrabee (2003a) suggests a linear regression formula that provides estimated FBS (E-FBS) scores derived from weighted validity and clinical T-Scores. The present study intended to validate this regression formula of MMPI-2 E-FBS scores and demonstrate its specificity in a sample of non-litigating, clinically referred, medically intractable epilepsy patients. We predicted that the E-FBS scores would correlate highly (>.70) with the T-FBS scores, that the E-FBS would show comparable correlations with MMPI-2 validity and clinical scales relative to the T-FBS, and that the E-FBS would show an adequate ability to match T-FBS scores using a variety of previously suggested T-FBS raw score cutoffs. Overall, E-FBS scores correlated very highly with T-FBS scores ($r = .78$, $p < .0001$), though correlations were especially high for women ($r = .85$, $p < .0001$) compared to men ($r = .62$, $p < .001$). Thirty-one of 32 (96.9%) comparisons made between E-FBS/T-FBS correlates with other MMPI-2 scales were nonsignificant. When matching to T-FBS "high" and "low" scores, the E-FBS scores demonstrated the highest hit rate (92.5%) through use of Lees-Haley's (1992) revised cutoffs for men and women. These same cutoffs resulted in excellent overall specificity for both the T-FBS scores (92.5%) and E-FBS scores (90.6%). The authors conclude that the E-FBS represents an adequate estimate of T-FBS scores in the current epilepsy sample. Use of E-FBS scores may be especially useful when clinicians conduct the MMPI-2 short form, which does not include all of the 43 FBS items but does include enough items to compute each of the validity and clinical T-*Scores. Future studies should examine E-FBS sensitivity in compensation-seekers with incomplete effort.*

Introduction

The MMPI-2 Fake Bad Scale (FBS; Lees-Haley, English, & Glenn, 1991) has previously shown promise as a symptom validity measure in the context of forensic psychology.

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Designed for use with personal injury claimants, the FBS consists of 43 MMPI-2 test items that were deemed to be especially relevant for use with the aforementioned cohort. The measure was intended to remain sensitive to the paradoxical nature of potential malingerers' presentations, which may simultaneously consist of both feigned impairment and exaggerated ability. Using a raw score cutoff of 20 or greater, Lees-Haley and colleagues were able to effectively classify simulating malingerers and non-malingering claimants, yielding a sensitivity of 96% and a specificity of 90%. Subsequently, Lees-Haley (1992) compared the FBS scores of 55 claimants with potentially fraudulent PTSD symptoms to a group of 64 credible claimants with alleged psychological impairment. Use of an FBS cutoff of 24 for men resulted in a sensitivity of 75% and a specificity of 96%, while a cutoff of 26 for women resulted in a sensitivity of 74% and a specificity of 92%. Since its original development, a variety of FBS raw score cutoffs (ranging from 20 to 27) have been applied or suggested (Cramer, 1995; Fox, Gerson, & Lees-Haley, 1995; Greiffenstein, Baker, Gola, Donders & Miller, 2002; Iverson, Henrichs, Barton, & Allen, 2002; Larrabee, 2003a; Larrabee, 2003b; Larrabee, 2003c; Larrabee, 2003d; Miller & Donders, 2001; Posthuma & Harper, 1998; Rogers, Sewell, & Ustad, 1995; Ross, Millis, Krukowski, Putnam, & Adams, 2004; Tsushima & Tsushima, 2001).

Recent investigations of the FBS have found the scale to be even more sensitive to symptom amplification among compensation seeking (CS) patients than other MMPI-2 validity indicators (Greiffenstein et al., 2002; Larrabee, 1998; Larrabee, 2003a; Larrabee, 2003b; Ross et al., 2004; Tsushima & Tsushima, 2001). Larrabee (1998) observed a sample of 12 CS patients with alleged head injury, who also presented with negative medical/neurological histories, and further demonstrated objective evidence of poor cognitive effort on a number of symptom validity tests. He found that while only 3 (25%) of the participants showed elevations on the F Scale, 11 of the 12 (91.7%) showed elevated FBS scores. He concluded that "somatic malingering" may be present when MMPI scales 1 and 3 are greater than T = 80, *and* when the FBS is elevated. In a later study, Larrabee (2003a) found the FBS to be significantly more sensitive and specific than the MMPI-2 scales F, Fb, F(p), Meyers' Index, F-K, Ds-r, Subtle-Obvious, and Es in a sample of pre-identified malingerers and moderate-to-severe closed head injury patients. In fact, he found that the F, Fb, And F(p) scales were relatively insensitive to patients' attempts to feign cognitive symptoms. Larrabee (2003b) also found the FBS to more adequately identify malingerers than F, Fb, and F(p) in a sample of 33 litigants who had previously exhibited suspect cognitive effort.

In a similar study, Tsushima and Tsushima (2001) examined MMPI-2 profiles among 120 litigants, 208 clinical patients, and 43 individuals without substantiated cognitive impairment. They found the FBS to be superior to the F scale, the Fb scale, the Fp scale, and the Ds-2 scale in differentiating litigants from the clinical groups. The authors note that the observed FBS elevations might have been at least partially related to the untoward duress of the litigation process. Nevertheless, they conclude that the FBS is a valuable addition to the overall assessment of symptom amplification.

Greiffenstein and associates (2002) suggested that, "if the FBS is of any value, it should demonstrate predictive validity greater than that obtained by standard MMPI validity scales" (p. 1593). They compared "atypical" minor head injury litigants with moderate-to-severe closed head injury patients and found the FBS to be superior to the F and F-K scales in differentiating the litigating group from the clinical group. In response to their findings, the authors suggest that exaggeration of symptoms may be most likely present when FBS scores exceed 20 and when patients claim to have severe disabilities despite a history of minor injury. These results concur with Ross and colleagues (2004) who observed FBS scores in a CS mild head injury group and a non-CS head injury group. They found that an FBS cutoff score of 21 or more had a sensitivity of 90% and a specificity of 90%, and these classifications were superior to those of the F scale and the F-K scale.

Miller and Donders (2001) found that CS patients with mild head injury were nearly twice as likely to demonstrate FBS scores suggestive of symptom magnification than mild head injury patients who were not CS. Further, these authors yielded excellent specificity in their moderate-severe head injury group who were not CS (96%) with use of FBS raw score cutoffs of >23 for men and >25 for women. Although the authors did find that mild head injury was predictive of elevated FBS scores apart from CS status, the authors conclude that, "an elevated FBS index score on the MMPI-2 may serve as an indicator that alerts the clinician to examine pre-morbid or co-morbid difficulties that can contribute to maintenance of symptoms in patients with mild [traumatic head injury] more closely" (p. 302).

The notion that the FBS may be sensitive to symptom exaggeration is also supported by studies observing the scale's correlational relationships with other symptom validity tests. Slick, Hopp, Strauss, and Spellacy (1996), for instance, investigated relationships between Victoria Symptom Validity Test (VSVT) scores and MMPI-2 validity scales, including the FBS. They found the FBS to be moderately (negatively) correlated with VSVT easy and difficult items, and moderately (positively) correlated with easy and difficult response latencies. These results are consistent with those of Larrabee (2003a) who found a significant negative relationship between the FBS and the Portland Digit Recognition Test (PDRT; Binder & Willis, 1991), and those of Greiffenstein et al. (2002) who found significant relationships among the FBS and measures of insufficient effort (e.g., PDRT-27, Rey-15, Rey Word List). Other authors have observed significant correlations among the FBS and other MMPI-2 validity scales (e.g., Butcher, Arbisi, Atlis, and McNulty, 2003; Fox, et al., 1995; Larrabee, 2003a). These studies further support the convergent validity of the FBS as a symptom validity measure.

Although many of the available studies have demonstrated the FBS's *sensitivity*, some authors have expressed concern over the scale's *specificity* outside of the personal injury setting. Iverson and colleagues, (2002) recently examined FBS specificity in a sample of prison inmates (half who were instructed to "malinger"), inpatients, and medical outpatients. They found that while the original FBS cutoff of 20 was able to correctly classify most of the "malingering" inmates, this same cutoff resulted in "unacceptably high rates of presumed false positive classifications" (p. 135). Likewise, Butcher and associates (2003) have recently criticized the FBS for its high rate of false positives with patients from various clinical settings, and concluded that the scale "is likely to classify an unacceptably large number of individuals who are experiencing genuine psychological distress as malingerers" (p. 473). Though the Butcher et al. investigation suffered from serious methodological limitations including failure to screen their clinical sample for presence/absence of compensation-seeking/receiving and did not test for malingering independent of the MMPI-2 (Greve & Bianchini, 2004; Larrabee, 2003b; Lees-Haley & Fox, 2004), their data nevertheless raise the question of the FBS's reliability in clinical settings.

In short, with the exception of some studies that have questioned its validity in clinical settings, most of the existing literature seems to support the use of the FBS as an additional MMPI-2 indicator of negative response bias. However, there are instances when clinicians and researchers do not have access to true FBS (T-FBS) scores. Recently, Larrabee (2003a) proposed a regression formula to generate estimated FBS (E-FBS) scores from MMPI-2 validity and clinical scale T-scores. He suggests that this formula may be employed when clinicians have access to MMPI-2 validity and clinical scale T-scores, but do not have access to computed T-FBS scores (e.g., in the case of published studies that do not report T-FBS scores but do report scale T-scores; when original True-False answer sheets are not available). Additionally, assuming that E-FBS scores appropriately reflect T-FBS scores, we suggest that they might also be computed when the short form of the MMPI-2 is administered since all of the validity and clinical scale items are contained within the first 370 items, but *not* all of the 43 items are contained in the first 370 items. We are not aware of any studies that have examined whether these E-FBS scores are valid estimates of the T-FBS scores.

The present study has two objectives. First, we attempt to validate the Larrabee (2003a) E-FBS regression equation. We suggest that in order to be valid, the E-FBS scores should: 1) demonstrate a large, statistically significant correlational relationship with T-FBS scores (i.e., >.7; Cohen, 1983), 2) demonstrate comparable correlational magnitudes with other MMPI-2 validity and clinical scales relative to the T-FBS scores, and 3) demonstrate a consistent ability to match “high” and “low” T-FBS scores using previously suggested cutoffs in a sample of medically intractable, noncompensation seeking (NCS) epilepsy patients. Second, as per the concerns of others regarding the FBS and its questionable use in clinical samples (e.g., Butcher et al., 2003; Iverson et al., 2002), we will examine the ability of T-FBS and E-FBS to accurately identify true negative classifications (specificity) in a sample of medically intractable, NCS epilepsy patients. We reason that in order to be meritorious as symptom validity measures, both the E-FBS and T-FBS should show high levels of specificity in the current NCS epilepsy sample, a group with known significant cognitive and psychosocial dysfunction (Ettinger & Kanner, 2001).

Method

Participants

Fifty-three patients with intractable epilepsy were administered the MMPI-2 as a part of their pre-surgical neuropsychological evaluation. All patients were diagnosed with epilepsy by a team of board-certified epileptologists at Rush University Medical Center (RUMC). As part of their pre-surgical workup, all patients underwent inpatient video-EEG monitoring for diagnosis of their seizures. All patients were fluent in English and most spoke English as a first language. None of the patients were in litigation. Fifteen of the 53 patients (28.3%) supported themselves (at least partially) through disability income in relation to their seizures. However, no statistically significant differences were observed on any of the validity scales between the patients seeking disability and those not seeking disability. Of the 53 patients, 47 were Anglo (88.7%), 3 (5.6%) were African American, 2 (3.8%) were Hispanic, and 1 (1.9%) was Asian. The mean age of the group was 33.7 (SD = 10.3) with a range of 16 to 54. The mean level of education was 14.1 (SD = 2.7) ranging from 8 to 20 years. Twenty-four (45.3%) were men and 29 (54.2%) were women.

The MMPI-2 profiles of each participant were retrospectively collected from an archival data set at RUMC. T-FBS scores were obtained by tallying the number of FBS items that patients endorsed on their True-False answer sheets. All other MMPI-2 data, including validity and clinical scale T-scores, were collected from computer-scored record sheets.

Results

Age and education were not significantly related to either T-FBS or E-FBS scores. However, a statistically significant gender difference was observed for E-FBS scores (t = 2.05, $p < .05$), and a slight trend toward significance for gender was observed for T-FBS scores (t = 1.61, p = .11). Women's E-FBS scores (M = 19.43, SD = 5.67) were significantly higher than men's (M = 16.4, SD = 4.9), and women's T-FBS scores (M = 18.28, SD = 5.22) were somewhat higher than the men's (M = 16.17, SD = 4.07). In light of these gender differences, post-hoc statistical analyses of gender were conducted for these variables. Table 1 shows mean scores for men and women on MMPI-2 validity and clinical scales.

E-FBS Validation

E-FBS scores were computed through use of Larrabee's (2003a, p. 61) linear regression equation: [–.028(L) + .051(F) – .032(K) + .127(Hs) + .106(D) + .169(Hy) – .176(Pd) + .017(Mf) + .083(Pa) + .049(Pt) – .002(Sc) – .004(Ma) – .015(Si) – 4.886]. Overall, the E-FBS scores correlated significantly with T-FBS scores (r = .78, $p < .0001$), with E-FBS/T-FBS score concordance being especially high for women (r = .85, $p < .0001$) and moderately high for men (r = .62, p = .001). When predicting T-FBS scores, the E-FBS yielded a standard error of estimate of 3.40. The mean difference between T-FBS and E-FBS scores for the sample was .85 (SD = 3.45), ranging from –8.32 to 6.88.

Table 2 shows calculations for tests of the difference between T-FBS and E-FBS correlates with MMPI-2 validity and clinical scales by gender. This calculation tested the hypothesis that T-FBS and E-FBS correlates (with MMPI-2 validity and clinical scales by gender) are equal. The z score transformation test (Fisher's r-to-z transformation) makes use of the sample size employed to obtain each coefficient. Z-scores were compared, in a 2-tailed fashion to the unit normal distribution (formula 2.8.5 from Cohen and Cohen, 1983, p. 54). By convention, values greater than 1.96 are considered significant if a 2-tailed test is performed. Of the 32 correlation pairs compared between T-FBS and E-FBS scores for men and women, 31 (96.9%) were nonsignificant. The only significantly different comparison between T-FBS and E-FBS MMPI-2 correlations was for men on Scale 3 (p = .02), while a trend toward significance was observed for women on Scale 3 (p = .09).

Classification correspondence between E-FBS and T-FBS was evaluated using each previously suggested cutoff. T-FBS scores that were equal to or greater than these cutoffs were designated as "high," while scores below the cutoffs were designated as "low." Agreement between E-FBS and T-FBS scores was noted and used to develop category scores. For instance, if both E-FBS and T-FBS scores were above a given cutoff (i.e., "high" scores), then the score was labeled a "true positive." If a T-FBS score was below a given cutoff (i.e., a "low" score), and the E-FBS score was above the given cutoff, then the score was labeled a "false positive." If both T-FBS and E-FBS scores were below a given cutoff, then a "true negative" was recorded. If the T-FBS score was above a cutoff and the corresponding E-FBS score was below the cutoff, a "false negative" was recorded. Classification accuracies, including sensitivities, specificities, positive and negative predictive validities were then derived from these category scores.

Table 1
MMPI-2 Clinical and Validity Scales for Men and Women Subjects

MMPI-2	scale	Men[a]	Women[b]	*p*
L				
	M (SD)	58.2 (10.8)	52.9 (9.2)	.06
F				
	M (SD)	54.8 (12.5)	60.9 (15.3)	.12
K				
	M (SD)	52.6 (8.2)	50.3 (11.8)	.42
F-K				
	M (SD)	–10.5 (5.2)	– 8.3 (8.7)	.30
Fb				
	M (SD)	54.3 (10.7)	59.0 (17.1)	.25
O-S				
	M (SD)	30.8 (49.9)	45.2 (82.2)	.46
T-FBS				
	M (SD)	16.2 (4.1)	18.3 (5.2)	.11
E-FBS				
	M (SD)	16.4 (4.9)	19.4 (5.7)	.05
1 (Hs)				
	M (SD)	57.4 (12.6)	65.1 (14.2)	.04
2 (D)				
	M (SD)	63.0 (12.8)	70.0 (15.4)	.08
3 (Hy)				
	M (SD)	59.1 (15.2)	65.0 (13.8)	.15
4 (Pd)				
	M (SD)	54.1 (11.0)	57.1 (11.0)	.32
5 (Mf)				
	M (SD)	48.7 (12.1)	54.8 (9.9)	.05
6 (Pa)				
	M (SD)	57.0 (12.7)	56.6 (11.0)	.91
7 (Pt)				
	M (SD)	60.6 (13.7)	65.0 (12.7)	.23
8 (Sc)				
	M (SD)	62.8 (12.2)	65.5 (16.1)	.50
9 (Ma)				
	M (SD)	54.7 (10.1)	58.0 (10.7)	.25
0 (Si)				
	M (SD)	54.4 (11.5)	52.1 (10.2)	.44

[a]n = 24.
[b]n = 29.

E-FBS matches with "high" and "low" T-FBS scores, as represented by specificities, sensitivities, positive and negative predictive validities, are presented in Table 3. Lees-Haley's (1992) cutoff of ≥24 for men and ≥26 for women resulted in the most optimal overall hit rate (92.5%). Further, in matching to T-FBS scores, these same cutoffs for men and women resulted in the highest specificity for the E-FBS scores (94.0%).

Table 2
Calculations for Tests of the Difference between T-FBS and E-FBS Correlates with MMPI-2 Validity and Clinical Scales by Gender

	Men[a]			Women[b]		
MMPI-2 Scale	True FBS	Estimated FBS	p^c	True FBS	Estimated FBS	p^c
L	–.08	.21	.35	–.23	–.19	.88
F	.31	.16	.61	.64**	.66**	.90
K	–.11	.27	.22	–.52*	–.44	.71
F-K	.31	–.08	.20	.65**	.61**	.81
O-S	.33	.55*	.38	.75**	.67**	.56
Fb	.22	.13	.76	.63**	.56**	.70
Hs	.62**	.84**	.12	.77**	.87**	.26
D	.42	.60**	.43	.75**	.87**	.20
Hy	.45	.85**	.02	.65**	.85**	.09
Pd	.45	.28	.53	.42	.40	.93
Mf	.39	.63**	.29	–.27	–.14	.63
Pa	.45	.51	.80	.58**	.47	.59
Pt	.65**	.81**	.26	.61**	.74**	.39
Sc	.65**	.70**	.77	.57**	.63**	.74
Ma	.35	.26	.75	–.03	.04	.80
Si	.16	.13	.92	.62**	.53*	.63

[a]n = 24.
[b]n = 29.
*p < .01.
**p < .001.
Note. [c]This calculation tested the hypothesis that T-FBS and E-FBS correlates (with MMPI-2 validity and clinical scales by gender) are equal. The z score transformation test (Fisher's r-to-z transformation) makes use of the sample size employed to obtain each coefficient. Z-scores were compared, in a 2-tailed fashion to the unit normal distribution (used formula 2.8.5 from Cohen and Cohen, 1983, p. 54). By convention, values greater than 1.96 are considered significant if a 2-tailed test is performed.

E-FBS Classification

Table 4 shows specificities for selected MMPI-2 validity scales for men and women. The Lees-Haley (1992) revised cutoffs for men (≥24) and women (≥26) showed very good overall specificities for both T-FBS (92.5%) and E-FBS (90.6%), and these specificities were comparable to other MMPI-2 validity scales.

Discussion

The purpose of this study was to demonstrate concordance between T-FBS and E-FBS scores, and to further demonstrate their specificities in the current clinically referred epilepsy sample. As predicted, E-FBS scores correlated very highly (.78) with T-FBS scores, with T-FBS/E-FBS correspondence being especially high for women (.85) compared to men (.62). Further, 96.9% of the comparisons made between T-FBS and E-FBS correlates

Table 3
E-FBS/T-FBS "High" and "Low" Score Matches Represented As Specificity, Sensitivity, Positive Predictive Accuracy, Negative Predictive Accuracy, and Overall Hit Rates

FBS Raw Score Cutoff	Sp	Sn	PPV	NPV	HR
≥20	76.9%	71.4%	52.6%	88.2%	75.5%
(Lees-Haley, 1991)	(30/39)	(10/14)	(10/19)	(30/34)	
≥21	82.9%	66.7%	53.3%	89.5%	79.3%
(Ross et al., in press)	(34/41)	(8/12)	(8/15)	(34/38)	
≥22	82.6%	100%	46.7%	100%	84.9%
(Larrabee, 2003a, c, d)	(38/46)	(7/7)	(7/15)	(38/38)	
≥23	91.3%	100%	63.6%	100%	92.5%
(Larrabee, 2003b)	(42/46)	(7/7)	(7/11)	(42/42)	
≥24	93.6%	83.3%	62.5%	97.8%	92.5%
(Miller & Donders, 2001)	(44/47)	(5/6)	(5/8)	(44/45)	
≥24 men/≥26 women	94.0%	66.7%	40.0%	97.9%	92.5%
(Lees-Haley, 1992)	(47/50)	(2/3)	(2/5)	(47/48)	

N = 53. Sp = Specificity = [True Negatives/ (True Negatives + False Positives)]; Sn = Sensitivity = [True Positives/ (True Positives + False Negatives)]; PPV = Positive Predictive Validity = [True Positives/ (True Positives + False Positives)]; NPV = Negative Predictive Validity = [True Negatives/ (True Negatives + False Negatives)]; HR = Overall Hit Rate = [(True Positives + True Negatives) / N].

of MMPI-2 validity and clinical scales were non-significant, suggesting that E-FBS and T-FBS scores usually correlate with MMPI-2 scales at statistically comparable magnitudes. E-FBS scores also showed a very good ability to accurately predict true "high" and "low" FBS scores, with Lees-Haley's (1992) revised cutoffs (≥24 for men, ≥26 for women) resulting in excellent overall hit rates (92.5%). Use of these same cutoffs for men and women also resulted in very good specificity for both the T-FBS and E-FBS (92.5% and 90.6%, respectively) in the overall sample. The standard error of estimate (3.40) in the present study is also very similar to the Larrabee (2003a) value (3.67). These results generally support the use of Larrabee's (2003a) FBS regression equation to estimate MMPI-2 FBS scores. E-FBS and T-FBS scores also appear to show adequate specificities in the current intractable epilepsy sample, a group whose seizure frequency and/or intensity is often associated with significant psychological sequelae.

Larrabee (2003a) suggested that E-FBS scores generated on the basis of his weighted MMPI-2 *T* score regression equation could be useful to clinicians in two instances: when clinicians do not have access to original True-False answer sheets; and when researchers wish to calculate FBS estimates from published data sets that do not report T-FBS scores. We suggest that a third application of the E-FBS is its use with the MMPI-2 short form (370-item version). Ten of the 43 FBS items are found beyond item 370 of the MMPI-2, so T-FBS scores cannot be derived from the MMPI-2 short form. However, all of the MMPI-2 validity and clinical scale *T* scores can be calculated within the first 370 items, and clinicians can therefore calculate E-FBS scores based on the first 370 items alone using the Larrabee regression formula.

It is noteworthy that women demonstrated significantly higher E-FBS scores than men in the present study. This is congruent with other studies, which have found that

Table 4
Specificities of Selected MMPI-2 Scales at Various Cutoffs in a Sample of Non Compensation Seeking Epilepsy Patients

MMPI-2 scale	Sp Overall[a]	Sp For Men[b]	Sp For Women[c]
T-FBS ≥ 20	73.6%	87.5%	62.1%
T-FBS ≥ 21	77.4%	87.5%	69.0%
T-FBS ≥ 22	86.8%	95.8%	79.3%
T-FBS ≥ 23	86.8%	95.8%	79.3%
T-FBS ≥ 24	88.7%	95.8%	82.8%
T-FBS ≥ 25	90.6%	95.8%	86.2%
T-FBS ≥ 26	92.5%	95.8%	89.7%
T-FBS ≥ 27	92.5%	95.8%	89.7%
T-FBS ≥ 24 m/26f	92.5%	–	–
E-FBS[d] ≥ 20	56.6%	75.0%	55.2%
E-FBS ≥ 21	64.1%	83.3%	62.1%
E-FBS ≥ 22	71.7%	83.3%	62.1%
E-FBS ≥ 23	79.3%	83.3%	75.9%
E-FBS ≥ 24	83.0%	91.7%	79.3%
E-FBS ≥ 25	88.7%	91.7%	86.2%
E-FBS ≥ 26	94.3%	100%	89.7%
E-FBS ≥ 27	96.2%	100%	93.1%
E-FBS ≥ 24 m/26f	90.6%	–	–
L ≥ 65T	79.3%	66.7%	89.7%
L ≥ 70T	90.6%	92.5%	96.6%
L ≥ 80T	98.1%	98.1%	100%
F ≥ 65T	69.8%	87.5%	75.5%
F ≥ 70T	83.1%	95.8%	84.9%
F ≥ 80T	92.5%	95.8%	94.3%
K ≥ 65T	90.1%	95.8%	86.2%
K ≥ 70T	92.5%	95.8%	90.7%
K ≥ 80T	100%	100%	100%
F-K ≥ 0	84.9%	95.8%	75.9%
F-K ≥ 10	100%	100%	100%
F-K ≥ 15	100%	100%	100%
Fb ≥ 65T	79.3%	91.7%	69.0%
Fb ≥ 70T	83.0%	91.7%	75.9%
Fb ≥ 80T	92.5%	91.7%	89.7%
O-S ≥ 0	24.5%	29.2%	20.7%
O-S ≥ 100	81.1%	95.8%	69.0%
O-S ≥ 200	100%	100%	100%

[a]N = 53.
[b]n = 24.
[c]n = 29.
[d]Predicted using Larrabee (p. 61, 2003a) regression equation of FBS.

women tend to show higher T-FBS scores than men (e.g., Lees-Haley et al., 1991; Lees-Haley, 1992; Butcher et al., 2003). Regarding T-FBS scores, previous studies have concluded that clinicians may wish to interpret women's T-FBS scores with more discretion (i.e., a higher threshold for clinical significance) than men. Similarly, the current findings support the use of separate cutoffs for men and women in the case of E-FBS scores. Although the original cutoff of ≥20 showed suboptimal specificity for both T-FBS (73.6%) and E-FBS scores (53.6%), use of Lees-Haley's (1992) revised cutoffs of ≥24 for men and ≥26 for women increased specificity in the current sample for both T-FBS and E-FBS scores. These results are similar to the findings of Iverson et al. (2002) who observed much better specificity with the revised cutoffs compared to the original cutoff of ≥20, though the revised cutoffs resulted in diminished sensitivities in their study.

We were not able to assess E-FBS or T-FBS sensitivity in the current study, and this is one limitation of the present findings. Since the current sample did not include CS patients who scored above suggested FBS cutoffs, the base rate for the number of patients who might be considered as "somatic malingerers" (Larrabee, 1998) was minimal. Further, no significant differences were observed between patients seeking disability and those not seeking disability on any of the MMPI-2 validity scales, which further supports the notion that few of the present patients may have been malingering. Thus, although specificity appears to be adequate in the present group, the question of E-FBS *sensitivity* remains somewhat unclear. For those epilepsy patients who did perform above cutoffs, it appears that E-FBS was able to consistently "match" to these scores (e.g., 7/7 of patients at or above T-FBS 23 were also identified above this cutoff on E-FBS). Nevertheless, we suggest that future studies investigate T-FBS/E-FBS correspondence in samples with known intention of seeking compensation for injuries/disability, and observe how well E-FBS scores fair in comparison to T-FBS scores in distinguishing NCS patients from CS patients who might be considered to be malingering. The present study included patients referred for neuropsychological evaluation as part of their pre-surgical workup for epilepsy, and although 15 of the 53 were already supporting themselves through disability income or other form of income in relation to their seizures, we did not have access to other symptom validity data (e.g., VSVT scores) that might inform us of whether the patients may be trying to malinger. Future studies that include T-FBS and E-FBS within a comprehensive battery of effort measures would be especially useful.

At the same time, the current results regarding T-FBS and E-FBS specificity are similar to those of Grote and colleagues (2000). Using patients from the same clinical background (i.e., intractable epilepsy), the authors found that despite their chronic histories of seizures, they did not demonstrate poor performances on the VSVT relative to a CS group with cognitive complaints attributed to head injury. Indeed, the former group tended to show VSVT scores that were within normal limits. Similarly, despite evidence that they were experiencing significant symptoms of psychological distress in relation to their illnesses (e.g, the mean T-score for women on scale 2 was 70), the present sample still did not for the most part exhibit elevated E-FBS or T-FBS scores. However, it is not clear what relationship exists between E-FBS scores and VSVT scores, and we recommend that future researchers observe this relationship in the same way that others have observed T-FBS/VSVT relationships. For instance, previous studies have indicated that T-FBS scores are at least moderately related to measures of cognitive effort (e.g., Larrabee, 2003a; Larrabee, 2003b; Slick et al, 1996). Whether E-FBS scores demonstrate similar relationships with effort measures remains to be observed. The question of whether clinicians can substitute E-FBS scores for T-FBS scores in the litigation context is important, considering that Lees-Haley's et al. (1991) original development of the FBS was intended for use in the personal injury setting. For now, it is recommended that clinicians exercise caution when interpreting E-FBS scores in any patient setting. Conclusions regarding whether patients may be feigning psychological or neuropsychological impairment should be made only in the presence of numerous sources of additional objective data.

In conclusion, this preliminary investigation supports the use of MMPI-2 E-FBS scores in clinical practice. Of course, it is always most desirable to access and interpret true scores whenever possible. However, in those cases when true scores are unavailable to clinicians, it appears that E-FBS scores may offer quite reliable estimates of the T-FBS scores. Further, both T-FBS and E-FBS scores appeared to show specificities that were as good, and at times superior to, other commonly applied MMPI-2 validity scales.

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