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The Infrequency-Posttraumatic Stress Disorder Scale (Fptsd) for the MMPI–2: Development and Initial Validation With Veterans Presenting With Combat-Related PTSD

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Researchers have identified difficulties associated with the use of traditional Minnesota Multiphasic Personality Inventory–2 (MMPI–2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) validity scales with survivors of traumatic events. A new scale, the Infrequency-Posttraumatic Stress Disorder scale (Fptsd), was created from MMPI–2 items that were infrequently endorsed by 940 male combat veterans presenting for treatment at the posttraumatic stress disorder (PTSD) clinics of 2 Veterans Affairs Medical Centers. A variety of statistical methods were implemented that preliminarily established Fptsd's validity with a validation sample of 323 additional PTSD-diagnosed combat veterans. Results indicate that, relative to previously established validity and overreporting scales (F, Fb, and Fp), Fptsd was significantly less related to psychopathology and distress and better at discriminating simulated from genuinely reported PTSD. Clinical implications are discussed concerning the use of Fptsd to assess disability-seeking veterans suspected of overreporting PTSD symptoms.

In addition to assessing various forms of psychopathology, the Minnesota Multiphasic Personality Inventory–2 (MMPI–2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) includes validity scales that measure a respondent's test-taking attitude. In particular, a number of symptom overreporting scales have been created. The Infrequency scale (F), one of the original validity scales included in the MMPI (Hathaway & McKinley, 1943), measures the extent to which respondents endorse infrequent and atypical responses (i.e., endorsed by fewer than 10% of the general population). It includes content areas such as bizarre sensations, thoughts and experiences, feelings of alienation, and unlikely beliefs and expectations (Dahlstrom, Welsh, & Dahlstrom, 1972). Later, additional scales were created based on F's rationale to identify exaggerated response sets. For instance, Gough's Dissimulation index (F – K; Gough, 1950) is a calculation of the raw scores of F minus the Correction scale (K). The Infrequency-Back Side scale (Fb) assesses infrequent responses that occur primarily on the second half of the test.

Additional MMPI–2 overreporting scales have been created as well, including the Dissimulation scale (Ds_2; Gough, 1950) and its revised version ($Ds\text{-}r_2$; Gough, 1957), reflecting maladjustment not typically endorsed by patients. The Koss and Butcher (1973), as well as Lachar and Wrobel (1979), critical items were developed from face valid items that were considered to be of psychological concern, with the sum of items on either of these scales serving as an index of malingering (KBSUM and LWSUM, respectively). Last, the total difference between the

Weiner and Harmon obvious and subtle items (Weiner, 1948), known as O–S, has also received attention as an index of symptom exaggeration.

In particular, the F scale has served for many years as the most effective predictor of malingered response sets (Berry, Baer, & Harris, 1991; Rogers, Sewell, & Salekin, 1994), contributing to the MMPI–2's development as a standard assessment for detecting fabricated symptoms (Greene, 1997). However, interpretation of high scores on F and its derivative scales as evidence of malingering is confounded by the fact that high scores also indicate (a) a mostly true or random response set and (b) extreme genuine distress and/or psychopathology (Greene, 2000). Although the MMPI–2 has validity indicators that can detect a mostly true or random response set (TRIN and VRIN, respectively), differentiating an overreported response set from a genuinely symptomatic one remains difficult.

Because F and Fb are sensitive to both genuine and malingered psychopathology, the Infrequency Psychopathology scale (Fp; Arbisi & Ben-Porath, 1995) was designed. Fp was created as a group of items that were infrequently endorsed not only within the MMPI–2 normative sample but also with a Veterans Affairs Medical Center (VAMC) sample of psychiatric inpatients, with the intent of finding an F scale specifically for psychiatric inpatients. Thus, Fp can provide an index of symptom overreporting while controlling for the confounding influence of genuine psychopathology. In fact, its authors (Arbisi & Ben-Porath, 1995, 1998) recommended that, especially when a setting's psychiatric disorder base rate is high, Fp should be used in conjunction with F because it may improve the ability to detect if an elevated (but consistent) F score is due to overreported symptoms or actual psychopathology (Arbisi & Ben-Porath, 1998).

Since its creation, research has demonstrated the effectiveness of Fp in detecting malingered from genuine psychopathology (Bagby, Rogers, Buis, et al., 1997; Bagby, Rogers, Nicholson, et al., 1997; Nicholson et al., 1997; Rogers, Sewell, & Ustad, 1995; Strong, Greene, & Schinka, 2000; Wetter, Baer, Berry, & Reynolds, 1994) and has provided support for Fp's ability to discriminate those who are and are not seeking financial compensation for a psychiatric disability (Frueh, Gold, & de Arellano, 1997). In some cases, it has been reported to have greater utility than F (Arbisi & Ben-Porath, 1995, 1998; Storm & Graham, 2000). However, although research has identified a clear and specific need to detect malingered posttraumatic stress disorder (PTSD; Resnick, 1997), little is known about Fp's ability to do so. Whereas Elhai, Gold, Sellers, and Dorfman (2001) found that Fp outperformed F in detecting malingered from genuine civilian PTSD, Elhai, Gold, Frueh, and Gold (2000) demonstrated that Fp failed to outperform F in detecting malingered from genuine combat PTSD. Both of these studies provided some support for F and Fp individually in detecting malingered PTSD. However, Fp's incremental validity still remains unclear in malingered PTSD detection.

F AND F-RELATED SCALE ELEVATIONS IN SURVIVORS OF TRAUMATIC EVENTS

In general, literature suggests that F and its related scales are especially problematic in detecting symptom fabrication among traumatized individuals, as these symptomatic participants often are mistakenly classified as exaggerators of psychiatric symptoms. For example, in a review of research in psychological assessment with trauma survivors, Briere & Elliott (1997) argued that survivors of interpersonal trauma (i.e., rape or physical attack) often yield MMPI–2 validity and overreporting scale scores (especially F) that are very elevated and therefore less useful. Survivors of combat-related trauma with PTSD have also been reported to yield extreme validity scale elevations (Frueh et al., 1997; Hyer, Fallon, Harrison, & Boudewyns, 1987).

In particular, it has been suggested that nonmalingering trauma survivors often obtain extreme elevations on F because of acute psychological distress, such as intrusive dissociative symptomatology (Briere, 1997; Elhai, Klotz Flitter, Gold, & Sellers, 2001), genuine PTSD, and other mood disturbances (Briere & Elliott, 1997; Klotz Flitter, 1999; Jordan, Nunley, & Cook, 1992; D. W. Smith & Frueh, 1996). In fact, the F scale shares five items with the MMPI–2 Keane PTSD scale (PK; Keane, Malloy, & Fairbank, 1984) and four items with the MMPI–2 Schlenger PTSD scale (PS; Schlenger & Kulka, 1989; three of these F items overlap with both PTSD scales). Elliott (1993) indicated that twice as many traumatized inpatients had invalid (i.e., extreme F elevated) MMPIs as nontraumatized inpatients. Additionally, several associated features often found in trauma survivors may contribute to F or F – K elevations, including poor family-of-origin environments (Klotz Flitter, 1999; Klotz Flitter, Elhai, & Gold, in press), increased somatic complaints (Glenn et al., 2002), the presence of severe trauma such as sexual assault and/or combat exposure (Glenn et al., 2002; D. W. Smith, Frueh, Sawchuk, & Johnson, 1999), and physiological reactivity to traumatic imagery (Orr et al., 1990).

In addition to the inherent difficulties that exist in using MMPI–2 validity and overreporting scales with trauma survivors, two issues increase the significance of this problem: (a) there is a relatively high prevalence of traumatic events and PTSD in the general population (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995), and (b) the malingering of PTSD frequently occurs in certain clinical settings (Resnick, 1997). Therefore, in this study we aimed to improve the ability of existing scales to detect malingered PTSD. Toward this end, we created a validity scale called the Infrequency-Posttraumatic Stress Disorder scale, or Fptsd. This new scale was derived from examining MMPI–2 items that were infrequently endorsed within the MMPI–2 normative sample and a sample of PTSD-diagnosed combat trauma survivors seeking treatment. We modeled this study after Arbisi

and Ben-Porath's (1995) study in which they created Fp and McGrath et al.'s (2000) study that marked the creation of Fp-A, a Fp scale for the MMPI–Adolescent version (Butcher et al., 1992).

HYPOTHESES

To evaluate the validity of Fptsd, four hypotheses were tested as outlined by Arbisi and Ben-Porath (1995) and McGrath et al. (2000). First, according to Hypothesis 1, individuals with PTSD should score lower on Fptsd than on the previously established F and its related scales, as Fptsd should be less sensitive to the genuine reporting of PTSD psychopathology. Second, according to Hypothesis 2, scale correlations should demonstrate Fptsd to be less related to content and clinical scales measuring distress, psychopathology, and maladjustment than previous F-related scales. According to Hypothesis 3, when comparing PTSD and normative samples, there should be a smaller magnitude of difference for Fptsd than for F-related scales, as Fptsd should be less related to the genuine reporting of PTSD-related psychopathology. Last, Hypothesis 4 states that Fptsd should incrementally add to the ability of F-related scales in discriminating instructed PTSD simulators from genuine PTSD patients.

METHOD

Participants

Archival data were drawn from the records of male patients with PTSD (age 18 and above) who consecutively presented to an outpatient specialty program for combat-related PTSD evaluation and treatment at VAMCs in the Southeastern United States. Each patient completed a full clinical evaluation, but only those diagnosed with PTSD were included in our study. Sample 1 (PTSD initial sample) included patients from two VAMCs and served as the initial scale development sample, consisting of 243 patients with PTSD evaluated between September 1995 and September 1999 at the Charleston, South Carolina VAMC and 800 patients with PTSD evaluated between early 1992 and February 1998 at the Durham, North Carolina VAMC (total n = 1,043). Sample 2 (PTSD validation sample) served as the scale validation sample, consisting of 344 patients with PTSD evaluated from February 1998 to February 2000 at the Durham, North Carolina VAMC. (The VAMC samples were completely independent of those used in Arbisi and Ben-Porath's, 1995, Fp study.)

All VAMC patients with PTSD were diagnosed according to criteria from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [*DSM–IV*]; American Psychiatric Association, 1994) or *DSM–III–R* (3rd ed., rev.; American Psy-

chiatric Association, 1987) when it was standard. Diagnosis was made by the VAMCs' PTSD clinical teams consisting of a psychiatrist, clinical psychologist, clinical psychology intern, and postdoctoral fellow (as well as a clinical social worker for Charleston and psychology technician for Durham). PTSD diagnoses were reached by team consensus after a thorough evaluation, which included a chart review, psychosocial history interview, military history interview, and structured PTSD clinical interview. Charleston patients were administered the Clinician-Administered PTSD Scale (CAPS–1; Blake et al., 1990), whereas the Durham patients were administered either the CAPS–1 or the PTSD module of the Structured Clinical Interview for *DSM–III–R* (SCID; Spitzer, Williams, Gibbon, & First, 1990).

Initial PTSD combat veteran sample. For the PTSD initial sample, additional (nonmutually exclusive) Axis I diagnoses were provided based on nonstandardized clinical interviews for the Charleston patients (n = 243) and included major depressive disorder (85.1%), current substance abuse disorders (34.0%), and anxiety disorders other than PTSD (23.9%; comparable to other combat PTSD samples; Keane & Wolfe, 1990). SCID major depressive disorder diagnoses were available for a subset (n = 327) of this sample's Durham patients, with 74.0% meeting major depressive disorder criteria. Age ranged from 21 to 87 years, with a mean of 48.97 (SD = 8.84). Number of years of education completed ranged from 4 to 22 (M = 12.84, SD = 2.26). Race was primarily White (56.5%) or African American (41.0%). Slightly less than half (46.3%) were employed. Most had served in Vietnam (78.3%) and a minority in the Gulf War (9.6%). General disability compensation-seeking status was available for a subset of this sample's Charleston patients only, with 116 veterans reporting having applied or planning to apply for any form of disability compensation and 41 veterans reporting no intent to apply for disability compensation.

PTSD validation sample. For the PTSD validation sample, SCID major depressive disorder diagnoses were available, with 60% meeting major depressive disorder criteria. Age ranged from 21 to 83 years, with a mean of 51.32 (SD = 9.81). Years of education ranged from 4 to 20 (M = 12.97, SD = 2.24). Race was mainly White (57.1%) and African American (37.0%). Slightly less than half (46.1%) were employed. Most had served in Vietnam (75.4%) or the Gulf War (9.3%).

Instructed PTSD simulators. The third data set was drawn from Elhai, Gold, et al.'s (2001) sample of 85 students (27 men; 58 women) enrolled in four introductory psychology courses who were instructed to malinger PTSD. These students were at least age 18 and attending a community college in the suburbs of a Southeastern U.S. city. Age ranged from 18 to 69 years, with a mean of 29.7 (SD = 9.8). Number of years of education completed ranged from 9 to 22, with an average

of 13.6 years (*SD* = 1.8). Most were White (45.9%), African American (31.8%), or Hispanic (14.1%). Additionally, most participants (89.3%) were employed.

MMPI–2 normative sample. The fourth data set consisted of the entire MMPI–2 normative sample (Butcher et al., 1989) comprising 2,600 adults (1,138 men; 1,462 women) between the ages of 18 and 90. The MMPI–2 manual indicates that participants were contacted mainly by direct mail in seven states to reflect the 1980 U.S. Census demographic parameters.

Instruments and Procedure

Participants in the VAMC PTSD samples completed the MMPI–2 (paper-and-pencil version) as part of their standard evaluation for treatment. Standard administration instructions were given.

Procedures for participants in the PTSD simulation group are discussed in detail elsewhere (Elhai, Gold, et al., 2001). To summarize these procedures, student participants (in testing groups of 15 to 30) were given 30 min to read and study training materials on PTSD. Participants were informed that those who passed a quiz about PTSD would be eligible to complete the (paper-and-pencil) MMPI–2, with instructions to respond as if they suffered from PTSD without being detected as feigners. As an incentive to feign PTSD in a believable manner, prizes of $50 (first place), $30 (second place), and $10 (third place) were guaranteed to the three best simulators per testing group.

In the MMPI–2 normative sample participants completed Form AX, a 704-item experimental paper-and-pencil version of the MMPI that contained all of the items from which the MMPI–2 was later created. Participants were given standard administration instructions.

Statistical Analyses

Following Arbisi and Ben-Porath's (1995) methods, MMPI–2 data from participants in the PTSD initial, PTSD validation, and PTSD simulation samples were excluded if at least one of the following conditions was present: (a) True Response Inconsistency scale (TRIN) T scores ≥ 100, (b) Variable Response Inconsistency scale (VRIN) T scores ≥ 80, or (c) Cannot Say raw scores ≥ 15. These criteria resulted in the exclusion of 103 PTSD initial sample patients, 21 PTSD validation sample patients, and 24 PTSD simulators. The MMPI–2 normative sample only included individuals who obtained fewer than 40 item omissions and yielded an F or Fb raw score of less than 20 (Butcher et al., 1989). Thus, the remaining 940 PTSD initial sample men, 323 PTSD validation sample men, 61 student PTSD simulators

(15 men; 46 women), and 2,600 normative individuals (1,138 men; 1,462 women) served as the overall sample for this study.

First we present descriptive statistics for F, Fb, and Fp in the initial sample with combat PTSD to demonstrate their elevated nature in combat trauma patients. Next, we present the results facilitating the construction of Fptsd. Last, we present results from the preliminary validation of Fptsd.

RESULTS

Elevated F, Fb, and Fp Scores in the Combat PTSD Initial Sample

Table 1 presents means and standard deviations for F, Fb, and Fp in the combat PTSD initial sample. Data for the PTSD simulation sample are also provided for comparison purposes. It can be inferred from this table that the overendorsement of infrequent items on these scales appears to be a serious problem among combat PTSD patients. Close to one third of patients with PTSD scored 120 or higher on F, and almost 20% scored 90 or higher on Fp.

Items with the highest frequency of endorsement (greater than 50%) for F and Fb in the combat PTSD initial sample were examined for item content. Interestingly, several of these items seem to coincide with the intrusive reexperiencing of traumatic events from *DSM–IV* Criterion B for PTSD, specifically including nightmares (Item 30) and dissociation (Items 168, 311). Other items appear to

TABLE 1
Means, Standard Deviations, and Frequencies for F, Fb, and Fp at Selected Cut Off Scores for the Combat PTSD Initial[a] and PTSD Simulation[b] Samples

				T Scores (%)					
Scale	*Sample*	*M*	*SD*	*≥ 70*	*≥ 80*	*≥ 90*	*≥ 100*	*≥ 110*	*≥ 120*
F	PTSD initial	92.1	22.3	86.7	76.1	65.0	53.3	43.6	32.1
	PTSD simulation	111.5	17.9	95.1	90.2	86.9	83.6	78.7	73.8
Fb	PTSD initial	94.5	23.6	80.7	69.1	58.9	45.7	38.1	28.5
	PTSD simulation	110.4	20.1	90.2	88.5	85.2	83.6	78.7	73.8
Fp	PTSD initial	69.6	20.8	45.4	23.9	18.2	8.8	6.7	4.9
	PTSD simulation	97.7	27.4	77.0	75.4	62.3	57.4	55.7	50.8

Note. Percentages are cumulative (i.e., the 76.1% of patients with combat PTSD who scored 80 or higher on F are also included among those who scored 70 or higher). PTSD = posttraumatic stress disorder; F = Infrequency scale; Fb = Infrequency-Back Side scale; Fp = Infrequency Psychopathology scale.

[a]$n = 940$. [b]$n = 61$.

overlap conceptually with the avoidance and emotional numbing symptoms of PTSD (Criterion C) including social detachment (Items 281, 306, 349), anhedonia (Items 12, 48, 516), and the sense of a foreshortened future (Item 454). Additional frequently endorsed F and Fb items include alcohol use (which could represent the avoidance of trauma-related memories; Item 264) and occupational impairment (Item 517), consistent with chronic PTSD.

Development of the Fptsd Scale

We first identified all MMPI–2 items that were endorsed as "true" or "false" by fewer than 20% of the combat PTSD initial sample. Next, we only retained items also endorsed in the "true" or "false" direction by fewer than 20% of men and women in the normative sample. This procedure resulted in the retention of a scale of 32 items of which 18 were keyed "true," and 14 were keyed "false," which we named Fptsd. Fptsd raw scores were calculated for men and women from the MMPI–2 normative sample, and means and standard deviations were used to transform raw scores to T scores for all samples included (see Appendix for items and T-score conversions). Linear T scores (uniform T scores for the clinical and content scales) were used in all subsequent analyses for all MMPI–2 scales presented. Fptsd shares 20 items with Fp, whereas Fptsd's remaining 12 items reflect family or social problems, antisocial behavior, morally righteous attitudes, and self-injurious behavior. In the PTSD initial sample, Fptsd is significantly correlated ($p < .01$) with F (.59), Fb (.51), and Fp (.81). In the PTSD initial sample, Fptsd's internal consistency (coefficient alpha) is .53, similar to that of Fp (.58).

Validation of Fptsd With the Combat PTSD Validation Sample

Evaluation of Hypothesis 1. Fptsd scores should be lower than F, Fb, and Fp scores in the combat PTSD validation sample because Fptsd should be less sensitive to the genuine reporting of PTSD-related psychopathology. For the PTSD validation sample, the mean Fptsd T score was 59.59 (SD = 16.43), which was significantly lower than that of Fp ($M = 68.48$, $SD = 21.20$), $t(322) = 12.78$, $p < .001$; Cohen's $d = .47$. Compared to Fptsd, higher mean scores were also obtained for F ($M = 91.94$, $SD = 21.97$) and Fb ($M = 93.33$, $SD = 23.40$; $p < .001$; Fptsd-F Cohen's $d = 1.68$; Fptsd-Fb Cohen's $d = 1.72$). Only 7.4% of the PTSD validation sample obtained a score of 90 or higher on Fptsd (compared to 16.4% for Fp), and 3.1% scored 100 or higher on Fptsd (compared to 9.6% for Fp), thus providing some evidence for Fptsd's expected decreased sensitivity to PTSD-related psychopathology.

Evaluation of Hypothesis 2. Compared to F, Fb, and Fp, among the combat PTSD validation sample Fptsd should be less related to psychopathology and distress and should therefore correlate less with MMPI–2 validity, clinical, and content scales. Table 2 indicates that Fptsd yielded lower Pearson correlations than F and Fb with the clinical, validity, and content scales. When compared to Fp, Fptsd also demonstrated lower overall correlations with these scales, consistent with this hypothesis. However, the Fp-Fptsd difference did not appear as marked as the F-Fptsd or Fb-Fptsd difference.

Evaluation of Hypothesis 3. The normative and combat PTSD validation groups should differ more on F than on Fptsd, as Fptsd should be less related to genuine PTSD psychopathology than F. A dummy-coded variable was created (normative sample coded 1; PTSD validation sample coded 2). This dummy-coded variable was first correlated with scores on F and Fptsd, with a positive Spearman correlation reflecting a higher mean score for the PTSD group. Using a *t* test for nonindependent correlations (Howell, 1997), Table 3 indicates that as expected, F scores correlated significantly higher with group status than Fptsd scores. Similarly, comparing Fp and Fptsd, Table 3 demonstrates that Fp also was positively associated with group status to a greater degree than Fptsd. These results further demonstrated that Fptsd seems to be less related to genuine PTSD psychopathology than F and Fp.

Evaluation of Hypothesis 4. Fptsd should perform better in discriminating genuinely reported from malingered PTSD. This hypothesis was evaluated first by assessing for significant differences in correlations. A second dummy-coded variable was created (PTSD validation sample coded 1; PTSD simulation sample coded 2). If Fptsd is a better discriminator of malingered PTSD, the combat and simulation PTSD groups should differ more on Fptsd than on F. Spearman correlations were computed for F and Fptsd, with positive correlations reflecting a higher mean score for the PTSD simulation group. A *t* test for nonindependent correlations demonstrated that Fptsd was significantly more positively related to group status than F (see Table 3). When comparing Fp with Fptsd, Table 3 demonstrates that Fptsd also was positively associated with group status to a greater degree than Fp. Thus in these analyses, Fptsd was the better indicator of malingered PTSD.

Next, a series of hierarchical regression analyses were conducted to test the incremental validity of Fptsd (PTSD validation group coded 1; PTSD simulation group coded 2). Fptsd was first tested for its incremental validity over F, entering F alone in the first block with Fptsd entered in the second block. In a separate analysis, Fptsd and F were entered in reverse order. Table 4 indicates that Fptsd incrementally contributed variance to F in predicting malingered PTSD; however, the reverse was true as well. Fptsd was the stronger predictor in the analysis, given the greater magnitude of its squared multiple correlation (R^2) and standardized regression (β) coefficient.

TABLE 2
Correlations Between F, Fb, Fp, and Fptsd and the MMPI–2 Validity, Clinical, and Content Scales for the Combat PTSD Validation Sample

Scale	*F*	*Fb*	*Fp*	*Fptsd*
L	–.18	–.17	–.09	.01
K	–.44	–.45	–.30	–.16
1(Hs)	.44	.41	.30	.28
2(D)	.51	.55	.25	.18
3(Hy)	.33	.36	.21	.22
4(Pd)	.58	.50	.36	.36
5(Mf)	.25	.29	.18	.16
6(Pa)	.48	.49	.31	.17
7(Pt)	.63	.69	.44	.38
8(Sc)	.84	.80	.62	.55
9(Ma)	.39	.32	.42	.38
0(Si)	.63	.63	.42	.32
ANX	.62	.69	.39	.29
FRS	.41	.50	.45	.38
OBS	.64	.69	.47	.39
DEP	.75	.84	.50	.39
HEA	.56	.53	.42	.37
BIZ	.80	.72	.71	.57
ANG	.61	.60	.42	.30
CYN	.44	.37	.34	.20
ASP	.42	.32	.40	.33
TPA	.45	.41	.38	.29
LSE	.71	.76	.53	.49
SOD	.55	.50	.36	.26
FAM	.66	.61	.54	.50
WRK	.73	.77	.48	.38
TRT	.76	.80	.54	.41
M	.57	.57	.42	.35

Note. *N* = 323. F = Infrequency scale; Fb = Infrequency-Back Side scale; Fp = Infrequency Psychopathology scale; Fptsd = Infrequency-Posttraumatic Stress Disorder; MMPI–2 = Minnesota Multiphasic Personality Inventory–2; PTSD = posttraumatic stress disorder; L = Lie; K = Correction; Hs = Hypochondriasis; D = Depression; Hy = Hysteria; Pd = Psychopathic Deviate; Mf = Masculinity–Femininity; Pa = Paranoia; Pt = Psychasthenia; Sc = Schizophrenia; Ma = Hypomania; Si = Social Introversion; ANX = Anxiety; FRS = Fears; OBS = Obsessiveness; DEP = Depression; HEA = Health Concerns; BIZ = Bizarre Mentation; ANG = Anger; CYN = Cynicism; ASP = Antisocial Practices; TPA = Type A Behavior; LSE = Low Self-Esteem; SOD = Social Discomfort; FAM = Family Problems; WRK = Work/Interference; TRT = Negative Treatment Indicators; *M* = Mean correlation with all clinical and content scales.

TABLE 3
Correlations Between Group Status (Normative, PTSD Validation, and PTSD Simulation Groups) and F, Fp, and Fptsd

Comparison	*F*	*Fptsd*	*F-Fptsd*[a]	*t*[b]
Normative versus PTSD validation[c]	.50	.23	.56	17.69*
PTSD validation versus PTSD simulation[d]	.36	.49	.65	3.36*
Normative versus PTSD validation[c]	.29	.23	.78	5.23*
PTSD validation versus PTSD simulation[d]	.38	.49	.87	4.89*

Note. PTSD = posttraumatic stress disorder; F = Infrequency scale; Fp = Infrequency Psychopathology scale; Fptsd = Infrequency-Posttraumatic Stress Disorder scale.
[a]Correlation between the two overreporting scale variables. [b]*t* test for the difference between nonindependent correlations. [c]$n = 2{,}923$.[d]$n = 384$.
$^*p < .001$.

TABLE 4
Regression Analyses: Discriminating PTSD Simulation and PTSD Validation Groups

Step	*Variable*	*R*	R^2	$p\Delta$	*Final* β
1	F	.32	.10	< .001	–.14
2	Fptsd	.63	.39	< .001	.71
1	Fptsd	.62	.38	< .001	.71
2	F	.63	.39	.01	–.14
1	Fp	.43	.19	< .001	–.40
2	Fptsd	.65	.42	< .001	.96
1	Fptsd	.62	.38	< .001	.96
2	Fp	.65	.42	< .001	–.40

Note. PTSD = posttraumatic stress disorder; F = Infrequency scale; Fptsd = Infrequency-Posttraumatic Stress Disorder scale; Fp = Infrequency Back-Side scale; $F\Delta$ = *F* statistic for the incremental increase in multiple correlation; $p\Delta$ = statistical significance for $F\Delta$.

Because of F's negative regression coefficient, it may be explaining variance in Fptsd more than in the dummy-coded criterion variable, acting as a suppressor variable in the presence of Fptsd (R. L. Smith, Ager, & Williams, 1992).

In a subsequent hierarchical analysis, Fptsd was tested for incremental validity over Fp, entering Fp alone in the first block, followed by Fptsd in the second block. Then, Fptsd and Fp were entered in reverse order. Table 4 demonstrates that Fptsd incrementally contributed variance to Fp in predicting malingered PTSD, and the reverse was also true. Fptsd was the stronger predictor here, given its larger squared multiple correlation and regression coefficient and the finding that Fp's negative regression coefficient may also reflect suppressor variable properties in this analysis.

Last, a receiver operating characteristics (ROC) analysis was conducted to compare Fptsd with F and Fp in their ability to discriminate between malingered

and genuinely reported PTSD. Statistical analyses were performed using ROCKIT 0.9B (Metz, Herman, & Roe, 1998). Sensitivity and false positive rates were calculated for each cut point for these scales. Area under the curve (AUC) and standard error (*SE*) values were calculated for F, Fp, and Fptsd using the maximum likelihood estimation program (Dorfman & Alf, 1969), with a univariate *z*-score test of differences between AUCs implemented. Figure 1 displays the ROC curves and demonstrates that F, Fp, and Fptsd depart from the "line of no information" (the point at which a test does not have the ability to discriminate between two conditions) in a positive direction, with Fptsd appearing to yield better discriminative power. Fptsd's AUC (.88; $SE = .03$) was significantly larger than that of F (.78; $SE = .03$, $p < .05$) and Fp (.79; $SE = .04$, $p < .001$), thus providing additional support for Fptsd's utility in predicting malingered PTSD.

DISCUSSION

This article highlights the difficulties in using traditional MMPI–2 overreporting scales with survivors of traumatic events given that a variety of features commonly associated with trauma and PTSD can contribute to elevations on these scales. Table 1 provides evidence for the elevated nature of traditional F-related validity and overreporting scales among trauma survivors with combat-related PTSD. Examination of F and Fb items with the highest frequency of endorsement among PTSD-diagnosed combat veterans suggests that many seem to directly reflect symptoms and associated features of PTSD.

In response to the difficulties associated with using validity and overreporting scales among trauma survivors, a new MMPI–2 infrequency scale, Fptsd, was cre-

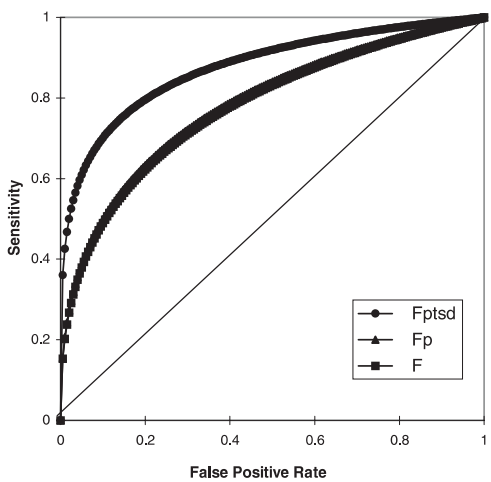

FIGURE 1 Receiver operating characteristics curve for discriminating between combat posttraumatic stress disorder (PTSD) validation and PTSD simulation groups. Fptsd = Infrequency-Posttraumatic Stress Disorder scale; Fp = Infrequency-Back Side scale; F = Infrequency scale.

ated to minimize sensitivity to PTSD-related psychopathology. This new scale was designed by selecting MMPI–2 items infrequently endorsed by combat veterans with PTSD and by participants in the MMPI–2 normative sample. Results provide initial support for the construct validity of Fptsd in a number of ways.

First, Fptsd revealed lower scores than traditional F-related overreporting scales among PTSD-diagnosed combat veterans, suggesting a lowered sensitivity to genuine PTSD psychopathology. Second, Fptsd was discovered to obtain lower correlations with MMPI–2 clinical, content, and validity scales than traditional F-related scales (although not as marked for Fp), providing evidence that Fptsd shares less of a relationship with measures of distress than F-related scales. Interestingly, Arbisi and Ben-Porath (1995) showed that, when compared to F and Fb, Fp was much less related to scales of distress than scales measuring severe psychopathology. In this study, Fptsd did not seem to evidence such a difference. That is, Fptsd seemed to consistently demonstrate lower correlations than F, Fb, and Fp with measures of distress and severe psychopathology.

Third, the normative and combat PTSD validation groups were revealed to differ more on F and Fp than on Fptsd, demonstrating that Fptsd seems less related to genuine PTSD psychopathology than F and Fp. Fourth, and consistent with Hypothesis 4, Fptsd revealed better sensitivity than F and Fp in discriminating malingered from genuine PTSD. Evidence of Fptsd's incremental validity also supported Fptsd as a better predictor of malingered PTSD than the F-related scales.

Limitations

Several limitations apply to this investigation. First, Fptsd shares significant item overlap with Fp. Although results did provide support for Fptsd's unique contribution above Fp, the similarities between the two scales must be acknowledged. As an afterthought, we conducted analyses with a modified version of Fptsd, which we labeled Fptsd-Unique, consisting of the 12 Fptsd items that do not overlap with Fp. Fptsd-Unique was assessed to examine whether the nonoverlapping items of Fptsd demonstrate incremental validity over Fp in the PTSD validation sample. Very similar findings resulted, with strong but smaller values for Fptsd-Unique's R^2 (.30) and regression coefficient (.42) than in the original analysis. The incremental validity of Fptsd's unique items therefore provides further support for the use of Fptsd over Fp in malingered PTSD detection.

Similar to Fp, Fptsd shares a number of items with the Lie (L) scale. Thus, if an individual is underreporting symptoms by endorsing a number of L items, she or he may elevate Fptsd. However, Fptsd was designed for use with patients evaluated for PTSD, a population that tends to have a "cry for help" trend, elevating

fake-bad rather than fake-good scales. Nonetheless, when interpreting Fptsd (as with any MMPI–2 profile interpretation), a full case conceptualization should take L scale elevations into account.

It should also be emphasized that Fptsd should only be interpreted with consistently endorsed MMPI–2 profiles. If a test examinee's TRIN or VRIN scores suggest inconsistent item endorsement, MMPI–2 interpretation should cease at that point, and thus Fptsd should not be interpreted.

Another limitation is that because Fptsd was normed only on male combat veterans with PTSD, it is unclear if Fptsd will prove useful in discriminating malingered from genuine civilian PTSD. In fact, the combat sample was a predominantly older sample of male participants, the majority of whom identified traumatic experiences that had occurred decades ago, thus further restricting our ability to predict Fptsd's generalizability to other PTSD-diagnosed civilian trauma samples. Although recent evidence revealed that PTSD-diagnosed samples of combat veterans and adult survivors of child sexual abuse score similarly on the MMPI–2 (Elhai, Frueh, Gold, Gold, & Hamner, 2000), and although gender and age effects are negligible on MMPI–2 overreporting scales (Greene, 2000), future research with Fptsd should examine its utility with younger civilian trauma samples that include women.

Presenting another limitation, there is a high incidence of comorbidity in the PTSD patient samples, with a major depressive disorder diagnosis alone carried by 60% to 85% of PTSD patients. In fact, high rates of comorbidity are quite common in PTSD-diagnosed combat veteran samples (Keane & Wolfe, 1990), with substance abuse, mood, and other anxiety disorders most prevalent across all PTSD populations (Davidson & Fairbank, 1993). Nonetheless, it should be emphasized that this study's PTSD sample is not a "pure" PTSD sample.

Furthermore, we cannot be certain that this study's PTSD sample included only nonmalingering PTSD patients, thus decreasing internal validity. Data suggest that the availability of disability benefits influences the way in which veterans describe their emotional difficulties, leading to apparent exaggeration of symptoms on tests such as the MMPI–2 (Frueh, Hamner, Cahill, Gold, & Hamlin, 2000; Gold & Frueh, 1999).

Clinically, it has been noted that 69% to 94% of veterans seeking treatment for PTSD within the Veterans Affairs system apply for a psychiatric disability (Fontana & Rosenheck, 1998; Frueh, Smith, & Barker, 1996). Furthermore, MMPI–2 validity scale scores of both disability-seeking and nondisability-seeking veterans are quite high, thus complicating the evaluation process (Frueh et al., 2000). Therefore, more accurate discrimination of genuine from fabricated PTSD is crucial to provide proper treatment and other practical assistance to veterans genuinely presenting with PTSD. Further investigation of the validity and usefulness of Fptsd could potentially lead to such improved prediction.

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APPENDIX

MMPI–2 Fptsd Scoring Key

True = 114, 162, 216, 240, 252, 270, 291, 294, 312, 322, 323, 332, 336, 371, 431, 478, 530, 555. False = 6, 29, 34, 51, 77, 90, 93, 102, 139, 183, 186, 192, 260, 276

T-Score Conversion Table

Raw Score	*Men*	*Women*	*Raw Score*	*Men*	*Women*
0	40	40	8	85	86
1	46	45	9	90	92
2	51	51	10	96	97
3	57	57	11	102	103
4	62	63	12	107	109
5	68	69	13	113	115
6	74	74	14	118	120
7	79	80	≥15	120	120

Note. Raw scores can range from 0 to 32. Fptsd = Infrequency-Postraumatic Stress Disorder scale.

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