RUNNING HEAD: Comparison of MMPI-2 and PAI validity indicators

Comparison of MMPI-2 and PAI validity indicators to detect feigned depression and PTSD symptom reporting

Rael T. Lange[a,b]*, Karen A. Sullivan[c], and Clinton Scott[c]

[a]Department of Research, BC Mental Health and Addiction Services, Vancouver, Canada
[b]Department of Psychiatry, University of British Columbia, Vancouver, BC, Canada
[c]Department of Psychology, Queensland University of Technology, Brisbane, Australia

*Please address correspondence to Rael T. Lange, Ph.D., BC Mental Health and Addiction Services, PHSA Research and Networks, Suite 201, 601 West Broadway, Vancouver, BC, V5Z 4C2, Canada. Phone: (604) 707-6374. Fax: (604) 707-6399. Email: rlange@bcmhs.bc.ca

Abstract

The purpose of this study was to compare the clinical utility of PAI and MMPI-2 validity indicators to detect exaggeration of psychological symptoms. Participants were 49 (75.5% female) Australian university students who completed the MMPI-2 and PAI under one of three conditions: Control [i.e., honest responding (n = 20)], Feign Post Traumatic Stress Disorder [PTSD (n = 15)], or Feign Depression (n = 14). Participants instructed to feign depression or feign PTSD had significantly higher scores on the majority of MMPI-2 and PAI validity indicators compared to controls. The Meyers Validity Index, the Obvious-Subtle index, and the Response Bias Scale were the most accurate MMPI-2 validity indicators. Diagnostic-specific MMPI-2 validity indicators, such as the Infrequency-PSTD scales and Malingered Depression scale, were not effective at detecting participants instructed to feign those conditions. For the PAI, the most accurate validity indicator was the MAL index; however, detection rates using this validity indicator was modest at best. The MMPI-2 validity indicators were clearly superior to those on the PAI at identifying feigned versus honest responding in this sample.

Key Words: MMPI-2; PAI; Symptom exaggeration; PTSD; Depression; Malingering.

1.0 Introduction

Careful evaluation of exaggeration and malingering is an essential component of every civil forensic psychological or psychiatric assessment. While researchers have developed a large number of tests to specifically evaluate poor cognitive effort [e.g., Computerized Assessment of Response Bias (Allen, Conder, Green, & Cox, 1997); Test of Memory Malingering (Tombaugh, 1996)], there are fewer published tools and methods specifically designed for detecting exaggeration of psychological symptoms (for exceptions see the Malingering Probability Scale (MPS; Silverton & Gruber, 1998), and the Structured Inventory of Malingered Symptomatology (SIMS; Smith & Burger, 1997). Purpose built tests for detecting malingered psychopathology, such as the SIMS, have received relatively little attention in the research literature, consequently the most popular method of detecting malingered psychopathology remains the use of indices derived from the Minnesota Multiphasic Personality Inventory-Second Edition [MMPI-2; (Butcher, Graham, Ben-Porath, Tellegen, & Kaemmer, 1989)].

For decades, the MMPI-2 (and the original MMPI) has been one of the most commonly used personality inventories by psychiatrists and psychologists in clinical practice (Camara, Nathan, & Puente, 2000; Lees-Haley, Smith, Williams, & Dunn, 1996; Rabin, Barr, & Burton, 2005). The MMPI-2 is commonly used in the forensic/personal litigation setting and is well accepted as a valuable tool for assessing exaggeration of symptomatology in this context (Iverson & Lange, 2006; Lees-Haley, Iverson, Lange, Fox, & Allen, 2002). The popularity of the MMPI-2, in the context of personal injury litigation or disability claims, is probably at least partly due to the substantial growing research literature dedicated to the development and evaluation of methods of detecting symptom exaggeration using this inventory (for reviews see Greene, 1999; Iverson & Lange, 2006; Rogers, Sewell, Martin, & Vitacco, 2003). These methods now extend to the development of MMPI-2 *diagnosis-specific* validity indicators designed to detect exaggerated symptoms of

particular clinical conditions such as post-traumatic stress disorder (Elhai et al., 2002) and depression (Steffan, Clopton, & Morgan, 2003).

The PAI (Morey, 1991), a more recently developed clinical tool for assessing psychological symptomatology, is a popular alternative to the MMPI-2. Because these inventories measure similar constructs, clinicians do not typically administer both tests and must decide which inventory to use. When compared to the MMPI-2, the PAI has a number of potential advantages that make this inventory appealing: (a) decreased administration time, (b) no item overlap on the scales, (c) items are answered on a 4-point Likert scale as opposed to a true/false format, and (d) ease of interpretation. Although the PAI has fewer validity indicators than the MMPI-2, there is a small body of literature supporting the use of the PAI as a tool for assessing psychological exaggeration (e.g., Calhoun, Earnst, Tucker, Kirby, & Beckham, 2000; Liljequist, Kinder, & Schinka, 1998; Rogers, Ornduff, & Sewell, 1993; Rogers, Sewell, Morey, & Ustad, 1996).

To date, only a handful of studies have directly compared PAI and MMPI-2 validity indictors to detect exaggeration of psychological symptoms in the same sample. The findings from these studies are mixed. Some researchers have found that certain PAI validity indicators (e.g., Rogers' Discriminant Function) were more effective than MMPI-2 validity scales at detecting malingering in 45 coached and uncoached college students instructed to feign psychiatric symptoms from 75 psychiatric patients (Bagby, Nicholson, Bacchiochi, Ryder, & Bury, 2002). In contrast, other researchers have found that selected MMPI-2 validity scales (e.g., F-K, Fp, Fb, Ds-R) were more sensitive than PAI validity indicators in detecting 52 college students instructed to fake bad from 432 psychiatric inpatients (Blanchard, McGrath, Pogge, & Khadivi, 2003), and 85 undergraduate students instructed to feign PTSD compared to clinical and non-clinical controls (Eakin, Weathers, Benson, Anderson, & Funderburk, 2006).

The purpose of this study was to evaluate and compare the MMPI-2 and PAI validity indicators to detect exaggeration of psychological symptoms. Using an analogue malingering design, this study aimed to expand on past research by (a) comparing all validity indicators from the PAI and MMPI-2, including a number of recently developed scales, and (b) instructing exaggerators to feign specific psychological problems (i.e., depression and PTSD) rather than unspecified psychological distress.

2.0 Method

2.1. Participants

Participants were 49 (75.5% female) undergraduate student volunteers from the subject pool of two metropolitan universities in Brisbane, Australia. All students who enrolled and completed the study received course credit for their participation. The mean age was 22.7 years (*SD* = 8.2).

This sample was derived from a larger pool of 66 participants who completed the study. Seventeen participants were excluded because they met one or more of the following criteria: (a) treatment for mental health problems in the past [*n* = 1], (b) random response styles as indicated by VRIN scores of >80T on the MMPI-2 [*n* = 4] or ICN scores of ≥73T on the PAI [*n* = 3], (c) INF scores of >75T on the PAI [*n* = 8], and (d) were taking medication and/or receiving treatment for a mental health disorder [*n* = 5]. Exclusion criteria also consisted of TRIN scores of >80T or Cannot Say scores of >5 on the MMPI-2, however no one was excluded using these criteria.

2.2. Measures

Minnesota Multiphasic Personality Inventory-Second Edition (MMPI-2). Measures of interest from the MMPI-2 were (a) nine of the 10 clinical scales (all except Masculine-Feminine scale), (b) two PTSD-specific supplementary scales (i.e., PTSD-Keane [Pk] and PTSD-Schlenger [Ps]), (c) 10 general validity indicators, and (d) two diagnosis-specific validity indicators. The MMPI-2 general validity indicators were: (i) Infrequency scale [F] (Hathaway & McKinley, 1989), (ii) F minus K

index [F-K] (Gough, 1947, 1950; Hathaway & McKinley, 1989), (iii) Back Infrequency Scale [Fb] (Hathaway & McKinley, 1989), (iv) Infrequency-Psychopathology scale [Fp] (Arbisi & Ben-Porath, 1995), (v) Obvious minus Subtle index [O-S] (Wiener, 1948; Wiener & Harmon, 1946), (vi) Meyers Validity Index [MVI] (Meyers, Millis, & Volkert, 2002)], (vii) Fake Bad Scale [FBS] (Lees-Haley, English, & Glenn, 1991), (viii) Dissimulation Scale-Revised [Ds-R] (Gough, 1957; Greene, 1999), (ix) Ego Strength scale [Es] (Barron, 1956), and (x) Response Bias Scale [RBS] (Gervais, Ben-Porath, Wygant, & Green, 2007). The two diagnosis specific validity indicators were the Infrequency-Posttraumatic Stress Disorder scale [Fptsd] (Elhai et al., 2002) and the Malingered Depression scale [Md] (Steffan et al., 2003).

Personality Assessment Inventory (PAI). Measures of interest from the PAI included (a) the 11 clinical scales, (b) one PTSD-related clinical subscale (i.e., anxiety related disorders-traumatic stress [ARD-T]), and (c) four validity indicators. The PAI validity indicators of interest were: (i) NIM (Morey, 1991) (ii) MAL (Morey, 1996), (iii) RDF (Rogers et al., 1996), and (iv) CDF (Cashel, Rogers, & Sewell, 1995).

2.3. Procedure

Participants were required to complete both the MMPI-2 and the PAI. The order of administration was counterbalanced such that equal numbers of participants in each condition completed either the PAI or the MMPI-2 first. Prior to completing both personality inventories, participants received written instructions for their experimental conditions, informed consent was obtained, and an opportunity was provided for participants to ask questions about the experiment. Testing was carried out in one three hour session. Participants were encouraged to take a break between tests if necessary.

Participants were randomly assigned to one of three conditions: (a) Control [i.e., genuine responding], (b) Feign Post Traumatic Stress Disorder [PTSD], and (c) Feign Depression. Control

participants were given standard test instructions. Experimental group participants were given instructions designed to assist them to feign PTSD or depression prior to completion of the MMPI-2 and PAI. These instructions comprised three elements: (a) reading of a case scenario that described the motivations for faking (see Appendix), (b) a study phase exposing participants to diagnostic criteria for PTSD or Major Depression that could be readily found on the internet, and (c) a test phase during which participants completed an eight item true/false test of information about PTSD or Major Depression to ensure they had sufficient understanding of the disorder about which they were instructed to feign. Participants who were unable to correctly answer all eight test items were provided with a brief one-on-one instruction regarding their incorrect responses before they were allowed to complete personality inventories. The mean score (maximum score = eight) on the eight item questionnaire was 7.8 (*SD* = 0.4, range = 6 to 8) for the Feign PTSD group and 7.7 (*SD* = 0.6, range = 7 to 8) for the Feign Major Depression group. In both groups, the majority of participants correctly answered all eight items (Feign PTSD = 85.7%; Feign Depression = 78.6%), demonstrating that they had sufficient understanding of the conditions they were asked to feign.

An incentive was incorporated in this study to encourage realistic performance in each of the three conditions. All participants were informed they could win a cash prize of AUD $400 depending on their performance. Control participants were informed that the prize would be awarded for honest responses. Participants in experimental conditions were informed that winners would be selected on the performance quality (i.e., the extent to which they feigned depression or PTSD in a believable manner) and were specifically instructed *not* to respond honestly. In reality, prize-winners were determined randomly based on a lottery system, consistent with ethical guidelines.

After completion of the PAI and MMPI-2, participants received a brief post-experiment questionnaire designed to: (a) evaluate their understanding of the instructions, (b) rate their ability

to simulate PTSD or depression, and (c) document strategies used to simulate depression/PTSD. Prior to administration of the post-experiment questionnaire, written instructions were provided advising them that questionnaire responses would not be used to determine prize eligibility. This was considered particularly important for participants in the experimental conditions; these participants received explicit instructions to stop feigning and were asked to respond honestly to items on the post-experimental questionnaire. At the completion of testing, participants were debriefed using a project information sheet.

3.0. Results

3.1. Comprehension of Experimental Instructions

For both groups of feigned responders, 100% of participants reported that they understood the study instructions. More than half of the participants (Feign PTSD = 57.1%, Feign Depression = 64.3%) reported that their level of understanding of the instructions was “very good”, and approximately one third (35.7% both groups) reported that their level of understanding was “good”. The majority of the Feign Depression group rated their ability to simulate depression as “very good” (21.4%), “good” (35.7%), or “average” (28.6%). The majority of the Feign PTSD group rated their ability to simulate PTSD as “good” (50.0%) or “average” (42.9%). No one from this group reported that their ability to simulate PTSD was “very good”.

3.2. Comparison of Clinical Scales

To explore the effect of experimental condition on the MMPI-2 and PAI scales, a series of one-way ANOVAs were conducted using the MMPI-2 and PAI scales as dependent variables and experimental condition as the independent variable (i.e., Control, Feign Depression, Feign PTSD). Descriptive statistics, ANOVA results, and effect sizes (Cohen, 1988) for the MMPI-2 and PAI clinical scales, and selected MMPI-2 and PAI PTSD-specific scales, is presented in Table 1.

< TABLE 1 ABOUT HERE >

The probability of Type 1 error increases when multiple statistical comparisons are made, so the reader should have the most confidence in findings that are below $p < .01$. For the MMPI-2, there were significant main effects on all scales (all $p < .001$), with the exception of the Ma scale ($p = .375$). Post hoc comparisons revealed that participants in the Feign Depression and Feign PTSD group had consistently higher scores on the Hs, D, Hy, Pd, Pa, Pt, Sc, Si, Pk, and Ps scales compared to the Control group (all $p < .001$; Effect size range: $d = 1.50$ to $d = 6.11$, very large effect sizes). There were no differences on the majority of clinical scales or on the two PTSD-specific supplementary scales (i.e., Pk and Ps) between the Feign Depression and Feign PTSD group, with the exception of the Pd and Si clinical scales in which the Feign Depression group scored higher than the Feign PTSD group ($d = .98$ and $d = 1.05$ respectively, large effect sizes).

For the PAI, there were significant main effects on the ARD-T subscale and seven of the 11 clinical scales (all $p < .001$), with the exception of MAN, ANT, ALC, and DRG ($p = .147$ to $p = .740$). Post hoc comparisons revealed that participants in the Feign Depression and Feign PTSD group had consistently higher scores on the SOM, ANX, ARD, DEP, PAR, SCZ, BOR scales compared to the Control group (all $p < .001$; effect size range: $d = 1.85$ to $d = 6.31$, very large effect sizes). For the DEP and PAR scales, the Feign Depression group scored higher than the Feign PTSD group ($d = 1.54$ and $d = .86$ respectively, large effect sizes). For the ARD scale and ARD-T subscale, the Feign PTSD group scored higher than the Feign Depression group ($p < .001$, $d = 1.00$ and $d = 1.01$ respectively, large effect size).

3.3. Comparison of Validity Indicators

To explore the effect of experimental condition on the validity indicators of the MMPI-2 and PAI, a series of one-way ANOVAs were conducted using the MMPI-2 and PAI validity indicators as dependent variables, and experimental condition as the independent variable (i.e., Control, Feign Depression, Feign PTSD). Descriptive statistics, ANOVA results, and effect sizes (Cohen, 1988) for

the MMPI-2 and PAI general validity indicators, and MMPI-2 diagnosis-specific validity indicators, stratified by group is presented in Table 2.

< TABLE 2 ABOUT HERE >

For the MMPI-2, there were significant main effects on all 10 general validity indicators (all <.001), but not on the two diagnosis-specific validity indicators (Fpstd, p = .674; Md, p = .891). Post hoc comparisons revealed that, compared to controls, participants in the Feign Depression and Feign PTSD group had consistently higher scores on eight of the 10 general validity indicators (F, Fb, Fp, FBS, Ds-R, O-S, MVI, and RBS; all p <.001; Cohen's d = 1.61 to d = 4.44, very large effect sizes), and consistently lower scores on Es (p <.001, d = 2.84 to d = 3.11, very large effect sizes). While the Feign PTSD and Feign Depression groups also had higher scores on F-K compared to the Control group (p <.001, d = 2.85 and 2.70 respectively, very large effect sizes), significantly higher scores on F-K scale were found in the Feign Depression group compared to the Feign PTSD group (p <.05, d = .71, medium effect). When comparing all validity indicators, the largest effect sizes were for RBS (Controls vs. Feign Depression [d = 4.44] and Feign PTSD [d = 3.17]), MVI (Controls vs. Feign Depression [d = 3.18] and Feign PTSD [d = 3.74]), and the F scale (Controls vs. Feign Depression [d = 3.93] and Feign PTSD [d = 3.21]).

For the PAI, there were significant main effects on all the validity indictors (all p <.001), with the exception of CDF (p = .761). Post hoc comparisons revealed that participants in the Feign Depression and Feign PTSD group had consistently higher scores on the NIM and MAL scales compared to the Control group (all p< .001; Effect size range: d = 1.73 to d = 2.28, very large effect sizes). For RDF, the Feign Depression group scored higher on this scale compared to the Feign PTSD and Control group (p <.001, d = 1.61 and d = 1.00 respectively, large effect sizes) but there were no significant differences between the Control group and the Feign PTSD group on this scale (p >.05). The largest effect sizes were for NIM (Controls vs. Feign Depression [d = 2.28] and Feign

PTSD [*d* = 1.74]) and MAL (Controls vs. Feign Depression [*d* = 2.23] and Feign PTSD [*d* = 1.73]).

3.4. Detection of Feigned Responding: Depression vs. PTSD

To compare the effectiveness of PAI and MMPI-2 general validity indicators and diagnosis-specific validity indicators to identify participants instructed to Feign Depression versus Feigned PTSD from genuine responding, results from a clinical outcomes analysis using test-operating characteristics are presented in Table 3 (i.e., MMPI-2) and Table 4 (i.e., PAI). These tables present the sensitivity, specificity, positive predictive power (PPP), and negative predictive power (NPP) values of the MMPI-2 general and diagnosis-specific validity indicators and PAI validity indicators to identify feigned responding, by group, using various cutoff scores. Because the calculation of PPP and NPP is influenced by the base rate of the condition/behaviour under consideration, PPP and NPP values were calculated using a hypothetical base rates of 30% for comparative purposes [for a further discussion of the necessity to calculate PPP and NPP values for hypothetical base rates, see (Curtis, Greve, Bianchini, & Brennan, 2006; Greve, Bianchini, Love, Brennan, & Heinly, 2006; Heinly, Greve, Bianchini, Love, & Brennan, 2005; Slick, 2006)]. For the majority of measures, more than one cutoff score was evaluated due to the lack of consensus in the literature regarding which cutoff scores are most effective, even for well established indexes (e.g., F, Fb, Fp, FBS). For some of the more recently developed indexes (e.g., MVI, RBS, Md), a range of cutoff scores above and below the recommended cutoff score was evaluated. However, only selected cutoff scores are presented combined with the recommended cutoff score.

<TABLES 3 & 4 ABOUT HERE>

Optimal cut-off scores were identified on each scale by an examination of sensitivity, specificity, and predictive power values in each group separately. The selection of optimal cut-off scores was biased towards the correct identification of malingering (i.e., PPP ≥ .90). For the MMPI-2 validity indicators, optimal cutoff scores for both groups were as follows: (a) O-S ≥ 100T, (b) Es

≤ 30T, (c) Ds-R ≥ 90T, (d) FBS ≥ 25, (e) F-K ≥ 10, (f) Fb ≥ 110T, (g) Fp ≥ 90T, (h) F ≥ 90T, (i) RBS ≥ 9, and (j) MVI ≥ 4. The one exception was the MMPI-2 RBS scale for the Feign Depression group, whereby a higher cutoff score of ≥12 was considered optimal. For the PAI validity indicators, optimal cutoff scores for both groups were as follows: (a) NIM ≥ 80T, (b) MAL ≥ 3, and (c) RDF ≥ 1.80. Comparison of the overall ability of the MMPI-2 general validity indicators to detect Feigned Depression versus Feigned PTSD revealed comparable specificity, PPP, and NPP between experimental conditions (i.e., Specificity: Feign Depression = .90 to 1.0, Feign PTSD = .90 to 1.0; PPP: Feign Depression = .81 to 1.0, Feign PTSD = .80 to 1.0; NPP: Feign Depression = .84 to 1.0, Feign PTSD = .81 to 1.0). However, sensitivity values of the validity indicators varied across groups. The validity indicators with the greatest variation in sensitivity values were the O-S index (absolute difference between Feign Depression and Feign PTSD sensitivity values = .29), MVI (diff = .14), F scale (diff = .13), Fp (diff = .10), FBS (diff = .10) and Ds-R (diff = .10). For these validity indicators, higher sensitivity values were found in the Feign Depression group when using MVI, F, Fp, and Ds-R, and in the Feign PTSD group when using O-S and FBS.

Comparison of the overall ability of the PAI validity indicators to detect Feigned Depression versus Feigned PTSD also revealed similar overall specificity, PPP, and NPP values between groups when compared to the MMPI-2 general validity indicators (Specificity: Feign Depression = .55 to 1.0, Feign PTSD = .55 to 1.0; PPP: Feign Depression = .21 to 1.0, Feign PTSD = .31 to 1.0; NPP: Feign Depression = .64 to .87, Feign PTSD = .83 to .71). However, sensitivity values of the validity indicators again varied. The validity indicators with the greatest variation were the NIM scale (absolute difference between Feigned Depression and Feigned PTSD sensitivity values = .31), RDF (diff = .22), and CDF (diff = .18). For these validity indicators, higher sensitivity values were found in the Feign Depression group when using NIM and RDF, but higher values were found in the feign PTSD group when using CDF.

Findings for diagnosis-specific MMPI-2 validity indicators revealed that the Fptsd scale failed to adequately detect participants instructed to feign feigned PTSD using any of the three cutoff scores (e.g., Fpstd ≥ 90T: sensitivity = .33, specificity = .70, PPP = .32, NPP = .71). Similarly, the Md scale failed to adequately detect participants instructed to feign Depression using the recommended cutoff score or any other cutoff score examined (e.g., > 22: sensitivity = .57, specificity = .55, PPP [30% base rate] = .35, NPP [30% base rate] = .75).

4.0 Discussion

There are several important findings of this study. First, with few exceptions, all of the MMPI-2 validity indicators were superior at detecting feigned responding than any of the PAI validity indicators. While all PAI and MMPI-2 validity indicators showed high specificity, PPP, and NPP values, it was the sensitivity values that differentiated the effectiveness of the validity indicators; a finding consistent with previous research (Blanchard et al., 2003). In this study, sensitivity refers to the true positive rate of the validity indicators to detect feigned responders. While high PPP, NPP, and specificity values are very desirable and enable the clinician to have great confidence that a patient is exaggerating symptoms when detected by a certain validity indicator, a validity indicator with low sensitivity will only be successful in detecting a small percentage of all patients who are actually exaggerating symptoms and is therefore of limited clinical use. As such, the most effective validity indicators are those with high sensitivity values, together with high PPP, NPP, and specificity values. At first glance the most effective validity indicators appear to be the MMPI-2 RBS, O-S, and MVI validity indicators, and the PAI NIM and MAL validity scales. These indicators all have high specificity, PPP and NPP. However, when consideration is given to the sensitivity of these measures, only the MMPI-2 validity indicators demonstrated adequate sensitivity (i.e., for use in clinical settings).

These results are consistent with previous research which has found that the MMPI-2 was superior in detection of feigned responding compared to the PAI (Blanchard et al., 2003; Eakin et al., 2006). Eakin and colleagues speculated that the superior performance of the MMPI-2 compared to the PAI may be due to two reasons. These author's hypothesized that (a) because the PAI items have higher face-validity compared to the MMPI-2, this may enable successful feigned responding by enhancing "the ability of coached feigners to recognize and endorse items that are associated with the disorder being feigned" (p.153), and (b) because the response format on the MMPI-2 is based on a dichotomous True-False response (as opposed to the four-option likert style response format on the PAI), this may make it more difficult to moderate responding. Our findings are consistent with Eakin and colleagues' first hypothesis; we found that individuals instructed to feign depression and PTSD were more successful at feigning diagnosis specific scales on the PAI (DEP, ARD-T) but not the MMPI-2 (i.e., D, Pk, Ps).

The second important finding from this study is that correct classification rates of the feigned responders varied depending on whether participants were instructed to feign depression versus PTSD. Overall, a greater percentage of participants who feigned depression were correctly identified compared to participants feigning PTSD. While this was true for the majority of validity indicators on the MMPI-2 (i.e., MVI, F, Fp, and Ds-R) and PAI (i.e., NIM and RDF), the reverse was true for a handful of validity indicators on these tests (i.e., O-S and FBS on the MMPI-2 and CDF on the PAI). It is difficult to explain why these differences in rates of detection emerged between the two diagnostic groups. These findings are somewhat contradictory to previous research that has found that individuals who were instructed to feign depression were *less likely to* be detected compared to individuals instructed to feign schizophrenia on the MMPI-2 (Bagby et al., 1997) and PAI (Rogers et al., 1993). Bagby and colleagues (1997) hypothesized that the reduced probably of detecting individuals feigning depression may be due to the greater likelihood that

individuals would be familiar, and perhaps have had experience, with depressive symptoms that may provide them with a "personal phenomenological template" as a basis for responding to the MMPI-2 items (p. 660). However, because the symptoms of schizophrenia are very different to those of PTSD, and there is no research to date that has compared the detection rates between feigned depression and PTSD, it is not possible to understand the relationship of these results to the current study. Further, although we were unable to identify diagnosis-specific patterns of responding on clinical indicators from both tests, it may be the case that rather than a general "fake bad" effect of our coaching, the performance of groups differed in ways yet to be identified and this may have impacted on classification rates. In any case, this study has clearly demonstrated that future research must include careful consideration of the instructional set used to induce malingering as instructions to fake specific disorders may result in classification statistics that do not generalize across psychopathologies.

The findings from this study, and those from previous work comparing diagnostic specific instructions to feign responses, suggest that there may be a need for diagnosis specific validity indicators. However, application of two diagnosis-specific MMPI-2 validity indicators revealed no significant difference between (a) participants instructed to feign PTSD versus controls on the Fptsd scale, and (b) participants instructed to feign Depression versus Controls on the Md scale. Although our results failed to support this conclusion, this does not necessarily mean that diagnosis-specific validity indicators are not useful. Although recent research evaluating the clinical utility of the Fpstd and Md scales have not been promising to date (Elhai et al., 2004; Marshall & Bagby, 2006; Sweet, Malina, & Ecklund-Johnson, 2006), further research is required to develop and evaluate the usefulness of diagnostic specific validity indicators for these tests.

The third important finding from this study is that the two new MMPI-2 scales were very effective at detecting exaggeration. Of the three most accurate MMPI-2 validity indicators, both of

the two new scales were in this group. These findings suggest that the MVI and RBS represent two significant advancements in MMPI-2 interpretation and detection of malingering. However, when compared to recommended cutoff scores for these indices (i.e., ≥5), we found that lower cutoff scores yielded improved accuracy. Using an MVI cutoff score of ≥4, accuracy was *marginally* improved with an increase in sensitivity compared to the recommended cutoff score, but only for the Feign Depression group. For the RBS, although the recommended cutoff score of ≥17 yielded high specificity, PPP, and NPP values, the sensitivity of this cutoff to correctly identify feigned responders was only moderate for both groups (i.e., feign PTSD = .47; feign depression = .71). As the cutoff score was decreased, the overall predictive accuracy of the measure improved. An optimum cutoff score of ≥9 yielded the most accurate predictive statistics in the Feign PTSD group; though a higher cutoff score of ≥12 was optimum for the feigned depression group. These cutoff scores should be viewed with some caution as the sample size used in this study was small. Replication of these findings in a larger group is recommended to determine the stability of the lower cutoff scores we identified.

Other limitations of this study, in addition to sample size, include the use of an analogue malingering design and the large number of statistical comparisons we performed. In an attempt to counteract these factors we: (a) employed procedures suggested to maximize the validity of simulation designs, and (b) have used and recommended a conservative alpha level for group statistics, as well as reporting effect sizes. However, these factors must still be borne in mind when interpreting our findings.

In summary, this study suggests that the currently available MMPI-2 validity indicators are superior to the PAI validity indicators at detecting feigned responding. However, it is important to bear in mind that the PAI is a relatively new test (developed in 1991) when compared to the MMPI (originally developed in 1942 and revised in 1989). As such, there is considerably less research

focused on the PAI and less effort has been made to develop and refine relevant validity indicators. There is no reason to believe that with adequate time and research that validity indicators on the PAI could not be created that will match the efficacy of the current MMPI-2 scales. However, it remains to be seen whether the higher face-validity and the increased number of response choices on the PAI will lend itself to the development of equally effective validity indexes on this inventory when compared to the MMPI-2. In a setting in which detection of exaggerated response style is paramount; the MMPI-2 currently offers clinicians a particular advantage over the PAI. Our initial results suggest the MVI and RBS are promising tools that potentially represent a significant advancement in the assessment of exaggerated response style on the MMPI-2. Overall, this study provides important information about the relative utility of a comprehensive suite of validity indicators for two leading tests of psychopathology; information of particular importance to those clinicians who conduct civil forensic psychological evaluations.

Acknowledgements

This study was supported in part by a research grant from the Queensland University of Technology (QUT), Brisbane, Australia.

We would like to thank Professor David Shum and Dr. Mark Chappell who assisted in providing access to the Griffith University participant pool.

Ethical clearance for this project was provided by the QUT and Griffith University (GU) Human Research Ethics Committees (QUT Ref No 3755H; GU Ref No PSY/70/05/HREC).

References

Allen, L. M., Conder, R. L., Green, P., & Cox, D. R. (1997). *CARB 97 manual for the computerized assessment of response bias*. Durham, NC: CogniSyst.

Arbisi, P. A., & Ben-Porath, Y. S. (1995). An MMPI-2 infrequent response scale for use with psychological populations: The infrequency-psychopathology scale, F(p). *Psychological Assessment, 9*, 102-105.

Bagby, R. M., Nicholson, R. A., Bacchiochi, J. R., Ryder, A. G., & Bury, A. S. (2002). The predictive capacity of the MMPI-2 and PAI validity scales and indexes to detect coached and uncoached feigning. *J Pers Assess, 78*(1), 69-86.

Bagby, R. M., Rogers, R., Buis, T., Nicholson, R. A., Cameron, S. L., Rector, N. A., et al. (1997). Detecting feigned depression and schizophrenia on the MMPI-2. *Journal of Personality Assessment, 68*(3), 650-664.

Barron, F. (1956). An ego strength scale which predicts response to psychotherapy. *Journal of Consulting Psychology, 19*, 239-245.

Blanchard, D. D., McGrath, R. E., Pogge, D. L., & Khadivi, A. (2003). A comparison of the PAI and MMPI-2 as predictors of faking bad in college students. *J Pers Assess, 80*(2), 197-205.

Butcher, J. N., Graham, J. R., Ben-Porath, Y. S., Tellegen, A., & Kaemmer, B. (1989). *Minnesota Multiphasic Personality Inventory-2: Manual for administration, scoring, and interpretation (rev.ed)*. Minneaplois, MN: University of Minnesota Press.

Calhoun, P. S., Earnst, K. S., Tucker, D. D., Kirby, A. C., & Beckham, J. C. (2000). Feigning combat-related posttraumatic stress disorder on the personality assessment inventory. *Journal of Personality Assessment, 75*(2), 338-350.

Camara, W. J., Nathan, J. S., & Puente, A. E. (2000). Psychological test usage: Implications in professional psychology. *Professional Psychology: Research and Practice, 31*, 141-154.

Cashel, M. L., Rogers, R., & Sewell, K. (1995). The Personality Assessment Inventory (PAI) and the detection of defensiveness. *Assessment, 2*(4), 333-342.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. Hillsdale, NJ: Lawrence Erlbaum Associates. .

Curtis, K. L., Greve, K. W., Bianchini, K. J., & Brennan, A. (2006). California verbal learning test indicators of Malingered Neurocognitive Dysfunction: sensitivity and specificity in traumatic brain injury. *Assessment, 13*(1), 46-61.

Eakin, D. E., Weathers, F. W., Benson, T. B., Anderson, C. F., & Funderburk, B. (2006). Detection of feigned posttraumatic stress disorder: A comparison of the MMPI-2 and PAI. *Journal of Psychopathology and Behavioral Assessment., 28*(3), 145-155.

Elhai, J. D., Naifeh, J. A., Zucker, I. S., Gold, S. N., Deitsch, S. E., & Frueh, B. C. (2004). Discriminating malingered from genuine civilian posttraumatic stress disorder: a validation of three MMPI-2 Infrequency scales (F, Fp, and Fptsd). *Assessment, 11*(2), 139-144.

Elhai, J. D., Ruggiero, K. J., Frueh, B. C., Beckham, J. C., Gold, P. B., & Feldman, M. E. (2002). The Infrequency-Posttraumatic Stress Disorder scale (Fptsd) for the MMPI-2: development and initial validation with veterans presenting with combat-related PTSD. *Journal of Personality Assessment, 79*(3), 531-549.

Gervais, R. O., Ben-Porath, Y. S., Wygant, D. B., & Green, P. (2007). Development and validation of a Response Bias Scale (RBS) for the MMPI-2. *Assessment, 14*(2), 196-208.

Gough, H. G. (1947). Simulated patterns on the MMPI. *Journal of Abnormal and Social Psychology, 42*, 215-225.

Gough, H. G. (1950). The F minus K dissimulation index for the MMPI. *Journal of Consulting Psychology, 14*, 408-413.

Gough, H. G. (1957). *California Psychological Inventory manual*. Palo Alto, CA: Consulting

Psychologists Press.
Greene, R. L. (1999). *The MMPI-2: An interpretive manual (2nd Ed.)*. Boston, MA: Allyn and Bacon.
Greve, K. W., Bianchini, K. J., Love, J. M., Brennan, A., & Heinly, M. T. (2006). Sensitivity and specificity of MMPI-2 validity scales and indicators to malingered neurocognitive dysfunction in traumatic brain injury. *Clin Neuropsychol, 20*(3), 491-512.
Hathaway, S. R., & McKinley, J. C. (1989). *Minnesota Multiphasic Personality Inventory-2*. Minnesota, MN: University of Minnesota Press.
Heinly, M. T., Greve, K. W., Bianchini, K. J., Love, J. M., & Brennan, A. (2005). WAIS digit span-based indicators of malingered neurocognitive dysfunction: classification accuracy in traumatic brain injury. *Assessment, 12*(4), 429-444.
Iverson, G., & Lange, R. T. (2006). Detecting exaggeration and malingering in psychological injury claims. In W. J. Koch, K. S. Douglas, T. L. Nichols & M. L. O'Neill (Eds.), *Psychological Injuries: Forensic Assessment, Treatment, and Law* (pp. 76-112). New York, NY: Oxford University Press.
Lees-Haley, P. R., English, L. T., & Glenn, W. J. (1991). A Fake Bad Scale on the MMPI-2 for personal injury claiments. *Psychological Reports, 68*, 167-203.
Lees-Haley, P. R., Iverson, G., Lange, R. T., Fox, D. D., & Allen, L. M. (2002). Malingering in Forensic Neuropsychology: Daubert and the MMPI-2. *Journal of Forensic Neuropsychology, 3*(1/2), 167-203.
Lees-Haley, P. R., Smith, H. H., Williams, C. W., & Dunn, J. T. (1996). Forensic neuropsychological test usage: An emprical study. *Archives of Clinical Neuropsychology, 11*, 45-51.
Liljequist, L., Kinder, B. N., & Schinka, J. A. (1998). An investigation of malingering posttraumatic stress disorder on the Personality Assessment Inventory. *Journal of Personality Assessment, 71*(3), 322-336.
Marshall, M. B., & Bagby, R. M. (2006). The incremental validity and clinical utility of the MMPI-2 infrequency posttraumatic stress disorder scale. *Assessment, 13*(4), 417-429.
Meyers, J. E., Millis, S. R., & Volkert, K. (2002). A validity index for the MMPI-2. *Arch Clin Neuropsychol, 17*(2), 157-169.
Morey, L. C. (1991). *Personality Assessment Inventory: Professional Manual*. Odessa, FL: Psychological Assessment Resources.
Morey, L. C. (1996). *An interpretive guide to the Personality Assessment Inventory (PAI)*. Odessa, FL: Psychological Assessment Resources.
Morey, L. C., & Lanier, V. W. (1998). Operating chracteristics of six response distortion indicators for the Personality Assessment Inventory. *Assessment, 5*(3), 203-214.
Rabin, L. A., Barr, W. B., & Burton, L. A. (2005). Assessment practices of clinical neuropsychologists in the United States and Canada: a survey of INS, NAN, and APA Division 40 members. *Arch Clin Neuropsychol, 20*(1), 33-65.
Rogers, R., Ornduff, S. R., & Sewell, K. W. (1993). Feigning specific disorders: a study of the Personality Assessment Inventory (PAI). *Journal of Personality Assessment, 60*(3), 554-560.
Rogers, R., Sewell, K. W., Martin, M. A., & Vitacco, M. J. (2003). Detection of feigned mental disorders: a meta-analysis of the MMPI-2 and malingering. *Assessment, 10*(2), 160-177.
Rogers, R., Sewell, K. W., Morey, L. C., & Ustad, K. L. (1996). Detection of feigned mental disorders on the personality assessment inventory: a discriminant analysis. *Journal of Personality Assessment, 67*(3), 629-640.
Silverton, L., & Gruber, C. (1998). *Malingering Probability Scale (MPS)*. Los Angeles, CA: Western Psychological Services.

Slick, D. (2006). Psychometrics in neuropsychological assessment. In E. Strauss, E. M. S. Sherman & O. Spreen (Eds.), *A compendium of neuropsychological tests: Administration, norms, and commentary* (pp. 3-43). New York, NY: Oxford University Press.

Smith, G. P., & Burger, G. K. (1997). Detection of malingering: validation of the Structured Inventory of Malingered Symptomatology (SIMS). *Journal of the American Academy of Psychiatry and the Law, 25*(2), 183-189.

Steffan, J. S., Clopton, J. R., & Morgan, R. D. (2003). An MMPI-2 scale to detect malingered depression (Md scale). *Assessment, 10*(4), 382-392.

Sweet, J. J., Malina, A., & Ecklund-Johnson, E. (2006). Application of the new MMPI-2 Malingered Depression scale to individuals undergoing neuropsychological evaluation: relative lack of relationship to secondary gain and failure on validity indices. *Clin Neuropsychol, 20*(3), 541-551.

Tombaugh, T. N. (1996). *Test of Memory Malingering*. North Tonawanda, NY: Multi-Health Systems.

Wiener, D. N. (1948). Subtle and obvious keys for the MMPI. *Journal of Consulting Psychology, 12*, 164-170.

Wiener, D. N., & Harmon, L. (1946). *Subtle and obvious keys for the MMPI: Their development* Minneapolis, MN: Regional Veterans Administration Office.

Table 1.
Descriptive statistics, ANOVA results, and effect sizes for the MMPI-2 and PAI scales by group.

	Controls		Feign DEP		Feign PTSD				Cohen's effect size		
	M	SD	M	SD	M	SD	p	Post hoc	Ctrl vs. DEP	Ctrl vs. PTSD	DEP vs. PTSD
MMPI-2											
Hs	50.7	7.9	79.1	16.7	78.9	17.2	<.001	Ctrl < DEP & PTSD	2.47	2.37	0.01
D	48.3	6.9	97.8	9.8	90.3	12.8	<.001	Ctrl < DEP & PTSD	6.11	4.46	0.66
Hy	49.1	9.3	75.6	15.5	77.9	18.5	<.001	Ctrl < DEP & PTSD	2.23	2.18	0.14
Pd	55.0	10.2	83.1	13.8	71.0	11.3	<.001	Ctrl < PTSD < DEP	2.41	1.50	0.98
Pa	50.0	10.9	81.9	19.4	82.5	20.8	<.001	Ctrl < DEP & PTSD	2.21	2.15	0.03
Pt	53.8	9.8	87.0	10.0	87.1	12.0	<.001	Ctrl < DEP & PTSD	3.36	3.10	0.01
Sc	58.3	11.9	101.9	19.1	95.5	16.7	<.001	Ctrl < DEP & PTSD	2.93	2.67	0.36
Ma	56.8	10.4	53.9	11.0	52.1	7.8	.375	--	--	--	--
Si	45.4	8.5	83.3	7.1	75.2	8.3	<.001	Ctrl < PTSD < DEP	4.78	3.54	1.05
Pk	53.4	10.4	96.7	11.3	90.3	7.9	<.001	Ctrl < DEP & PTSD	4.02	3.96	0.67
Ps	52.6	10.1	91.6	12.4	88.3	9.5	<.001	Ctrl < DEP & PTSD	3.53	3.63	0.30
PAI											
SOM	48.4	6.9	72.2	18.7	78.5	17.8	<.001	Ctrl < DEP & PTSD	2.02	2.64	0.35
ANX	51.7	9.7	79.1	12.5	86.7	11.9	<.001	Ctrl < DEP & PTSD	2.53	3.30	0.62
ARD	51.5	12.1	70.9	17.2	85.6	12.5	<.001	Ctrl < DEP < PTSD	1.37	2.78	1.00
DEP	51.4	10.6	106.1	5.9	91.7	12.6	<.001	Ctrl < PTSD < DEP	6.31	3.52	1.54
MAN	52.1	11.1	45.3	11.5	47.8	6.6	.147	--	-	-	-
PAR	49.3	7.4	82.4	18.5	69.0	12.8	<.001	Ctrl < PTSD < DEP	2.77	2.05	0.86
SCZ	47.7	8.8	83.3	11.9	80.5	17.1	<.001	Ctrl < DEP & PTSD	3.53	2.69	0.19
BOR	55.0	8.0	73.9	12.1	71.2	9.9	<.001	Ctrl < DEP & PTSD	1.95	1.85	0.25
ANT	57.7	12.0	54.3	14.8	55.8	10.8	.740	--	--	--	--
ALC	52.7	11.2	57.7	23.1	55.7	12.3	.648	--	--	--	--
DRG	52.6	10.1	60.0	23.6	53.9	11.3	.370	--	--	--	--
ARD-T	56.8	15.0	81.1	16.0	92.1	6.2	<.001	Ctrl < DEP < PTSD	1.58	3.14	1.01

N = 49; Controls (Ctrl; *n* = 20), Feign Depression (DEP; *n* = 14), Feign PTSD (PTSD; *n* = 15). All scores are T-scores. Cohens effect sizes = small (0.2), medium (0.5), large (0.8). MMPI-2 clinical scale abbreviations: Hypochondriasis (Hs), Depression (D), Hysteria (Hy), Psychopathic Deviate (Pd), Paranoia (Pa), Psychasthenia (Pt), Schizophrenia (Sc), Mania (Ma), Social Introversion-Extraversion (Si), PTSD-Keane (Pk), and PTSD-Schlenger (Ps). PAI clinical scale abbreviations: somatic complaints (SOM), anxiety (ANX), anxiety related disorders (ARD), depression (DEP), mania (MAN), paranoia (PAR), schizophrenia (SCZ), borderline features (BOR), antisocial features (ANT), alcohol problems (ALC), drug problems (DRG), and ARD-Traumatic Stress (ARD-T) .

Table 2.
Descriptive statistics, ANOVA results, and effect sizes for the MMPI-2 and PAI validity indicators by group.

	Controls		Feign DEP		Feign PTSD				Cohen's effect size		
	M	SD	M	SD	M	SD	p	Post hoc	Ctrl vs. DEP	Ctrl vs. PTSD	DEP vs. PTSD
MMPI-2											
F	57.1	12.5	113.3	16.9	106.4	19.2	<.001	Ctrl < Dep & PTSD	3.93	3.21	0.38
Fb	57.4	20.6	119.4	11.5	109.3	18.3	<.001	Ctrl < Dep & PTSD	3.68	2.65	0.67
Fp	58.9	14.0	96.6	31.5	87.0	22.0	<.001	Ctrl < Dep & PTSD	1.78	1.61	0.36
F-K*	-9.5	7.0	20.1	15.2	11.6	8.9	<.001	Ctrl < PTSD < Dep	2.85	2.70	0.71
FBS*	11.7	3.9	25.7	4.9	27.8	7.5	<.001	Ctrl < Dep & PTSD	3.25	2.96	0.34
Ds-R	55.0	13.5	92.7	16.9	89.3	12.9	<.001	Ctrl < Dep & PTSD	2.53	2.59	0.23
Es	52.2	8.8	17.4	17.2	15.1	16.1	<.001	Ctrl < Dep & PTSD	2.84	3.11	0.14
O-S*	11.5	62.1	205.6	91.8	187.1	53.8	<.001	Ctrl < Dep & PTSD	2.61	3.00	0.26
MVI	0.7	1.5	9.4	4.5	10.0	3.8	<.001	Ctrl < Dep & PTSD	3.18	3.74	0.14
RBS	5.2	2.2	18.1	3.9	16.4	5.3	<.001	Ctrl < Dep & PTSD	4.44	3.17	0.36
Fptsd	73.9	22.4	68.9	23.1	76.4	24.2	.674	--	--	--	--
Md*	18.6	10.6	20.3	11.9	19.5	8.9	.891	--	--	--	--
PAI											
NIM	50.5	9.1	89.3	28.4	77.3	23.8	<.001	Ctrl < Dep & PTSD	2.28	1.74	0.46
MAL	0.6	0.7	2.8	1.4	2.4	1.5	<.001	Ctrl < Dep & PTSD	2.23	1.73	0.28
RDF	-0.6	1.2	1.2	1.0	0.2	1.0	<.001	Ctrl & PTSD < Dep	1.61	0.72	1.00
CDF	143.0	13.2	138.7	23.8	142.8	16.7	.761	--	--	--	--

Total $N = 49$; Controls (Ctrl; $n = 20$), Feign Depression (Dep; $n = 14$), Feign PTSD (PTSD; $n = 15$). All scores are T-scores unless otherwise indicated. *raw scores. Cohens effect sizes = small (0.2), medium (0.5), large (0.8). MMPI-2 validity scale abbreviations: F = Infrequency; F-K = F minus K index, Fb = Back Infrequency; Fp = Infrequency-Psychopathology; O-S = Obvious minus Subtle, FBS = Fake Bad Scale; Ds-R = Dissimulation Scale-Revised; Es = Ego Strength, MVI = Meyers et a1. (2002) Validity Index; RBS = Response Bias Scale; Fptsd = Infrequency Post-traumatic stress scale; Md = Malingered Depression scale. PAI malingering index abbreviations: NIM = Negative Impression Management; MAL = Malingering Index; RDF = Roger's Discriminant Function; CDF = Cashel's Discriminant Function.

Table 3.
Sensitivity, specificity, and predictive power values for MMPI-2 validity indicators to detect feigned responding: Comparison of Feigned PTSD and Feigned Depression conditions.

		Feign PTSD				Feign Depression			
	Cutoff	Sen	Spec	PPP .30	NPP .30	Sen	Spec	PPP .30	NPP .30
General Validity Indicators									
MVI	≥4	.79	.95	.87	.91	.93	.95	.89	.97
	≥5[a]	.79	.95	.87	.91	.87	.95	.88	.94
RBS	≥9	1.0	.95	.90	1.0	1.0	.95	.90	1.0
	≥12	.73	1.0	1.0	.90	1.0	1.0	1.0	1.0
	≥17[a]	.47	1.0	1.0	.81	.71	1.0	1.0	.89
F	≥75	.87	.80	.65	.93	.93	.80	.67	.96
	≥90	.73	1.0	1.0	.90	.86	1.0	1.0	.94
	≥110	.53	1.0	1.0	.83	.64	1.0	1.0	.87
Fp	≥75	.73	.85	.68	.88	.64	.85	.65	.85
	≥90	.47	1.0	1.0	.81	.57	1.0	1.0	.84
	≥110	.13	1.0	1.0	.73	.50	1.0	1.0	.82
Fb	≥75	.93	.85	.73	.97	1.0	.85	.74	1.0
	≥90	.93	.90	.80	.97	1.0	.90	.81	1.0
	≥110	.53	.95	.82	.83	.86	.95	.81	.96
F-K[b]	≥1	.93	.90	.80	.97	.93	.90	.80	.97
	≥10	.60	1.0	1.0	.85	.64	1.0	1.0	.87
FBS[d]	≥25	.67	1.0	1.0	.88	.57	1.0	1.0	.84
	≥30	.60	1.0	1.0	.85	.21	1.0	1.0	.75
Ds-R[b]	≥75	.87	.90	.79	.94	.86	.90	.79	.94
	≥90	.47	1.0	1.0	.81	.57	1.0	1.0	.84
Es[b]	≤30	.80	1.0	1.0	.92	.71	1.0	1.0	.89
	≤20	.60	1.0	1.0	.85	.50	1.0	1.0	.82
O-S[c]	≥100	1.0	.95	.90	1.0	.71	.95	.86	.89
	≥150	.67	.95	.85	.87	.64	.95	.85	.86
Diagnosis Specific Validity Indicators									
Md	20	--	--	--	--	.64	.55	.38	.78
	22[a]	--	--	--	--	.57	.55	.35	.75
	24	--	--	--	--	.57	.60	.38	.77
	26	--	--	--	--	.50	.65	.38	.75
	28	--	--	--	--	.43	.75	.42	.75
Fptsd	≥75	.40	.50	.26	.66	--	--	--	--
	≥90	.33	.70	.32	.71	--	--	--	--
	≥110	.13	.95	.53	.72	--	--	--	--

N = 49 (Controls, *n* = 20; Feigned Depression, *n* = 14; Feign PTSD, *n* = 15). Abbreviations: F = Infrequency; F-K = F minus K index, Fb = Back Infrequency; Fp = Infrequency-Psychopathology; O-S = Obvious minus Subtle, FBS = Fake Bad Scale; Ds-R = Dissimulation Scale-Revised; Es = Ego Strength, MVI = Meyers et a1. (2002) Validity Index; RBS = Response Bias Scale; Fptsd = Infrequency Post-traumatic stress scale; Md = Malingered Depression scale. Sens. = Sensitivity; Spec. = Specificity; PPP = Positive predictive power; NPP = Negative predictive power.
Footnotes: [a]cutoff score recommended by original scale developers; [b]cutoff scores as recommended by Meyers et al. (2002); [c]cutoff scores as recommended by Greene (1999); [d]cutoff scores as recommended by Lees-Haley (1992)

Table 4.
Sensitivity, specificity, and predictive power values for PAI validity indicators to detect feigned responding: Comparison of Feigned PTSD and Depression groups.

		Feign PTSD				Feign Depression			
	Cutoff	Sen	Spec	PPP	NPP	Sen	Spec	PPP	NPP
				.30	.30			.30	.30
NIM[a]	≥70	.53	.95	.82	.83	.71	.95	.86	.89
	≥75	.40	.95	.77	.79	.71	.95	.86	.89
	≥80	.33	1.0	1.0	.78	.64	1.0	1.0	.87
	≥85	.33	1.0	1.0	.78	.50	1.0	1.0	.82
	≥92	.33	1.0	1.0	.78	.43	1.0	1.0	.80
	≥110	.13	1.0	1.0	.73	.29	1.0	1.0	.77
MAL[b]	≥2	.73	.90	.76	.89	.79	.90	.77	.91
	≥3	.53	1.0	1.0	.83	.50	1.0	1.0	.82
	≥4	.13	1.0	1.0	.73	.36	1.0	1.0	.78
	≥5	.07	1.0	1.0	.71	.14	1.0	1.0	.73
RDF[c]	≥0.124	.53	.70	.43	.78	.86	.70	.55	.92
	≥1.80	.07	1.0	1.0	.71	.29	1.0	1.0	.77
	≥0.57	.40	.80	.46	.76	.79	.80	.63	.90
CDF[d]	≥148.4	.47	.55	.31	.71	.29	.55	.21	.64

N = 49 (Controls, n = 20; Feigned Depression, n = 14; Feign PTSD, n = 15). Abbreviations: NIM = Negative Impression Management; MAL = Malingering Index; RDF = Roger's Discriminant Function; CDF = Cashel's Discriminant Function. Sens. = Sensitivity; Spec. = Specificity; PPP = Positive predictive power; NPP = Negative predictive power. Footnotes: [a]six cutoff scores were evaluated; two that have been previously described in the literature (Blanchard et al., 2003; Morey, 1991;), and four new ones included for exploratory purposes; [b]two standard cutoff scores were evaluated (≥3 and ≥5; Morey, 1996). Four additional cutoff scores were included for exploratory purposes (i.e., >1, >2, >4, and >6) but not all are included in this table; [c]cutoff scores as recommended by (Blanchard et al., 2003; Gervais et al., 2007; Morey & Lanier, 1998; Rogers et al., 1996)]; [d]cutoff scores as recommended by Morey and Lanier (1998).

APPENDIX
Experimental Group Instructions

Feign PTSD Case Scenario

In this experiment, we are interested in how well people can fake symptoms of Post Traumatic Stress Disorder (PTSD). I want you to imagine that you have been involved in a motor vehicle accident. The car you were driving had a head on collision with a car that was attempting to pass a truck around a blind corner. You were not at fault in the accident. The accident occurred because the driver of the oncoming car was driving recklessly. You did not sustain a head injury and did not lose consciousness. You can clearly recall the details before and after the accident and also the impact of the collision. You sustained a number of physical injuries (i.e., 3 fractured ribs, a fractured left arm, and a fractured left ankle) and was transferred to hospital and admitted for treatment. You required orthopedic surgery for your ankle injury in which you had two stabilizing pins placed. You were discharged from hospital after 6 days and your physical recovery over the next few months was good. However, you were unable to return to work for the next 3 months and did not get paid during that time. In addition, you had to pay for physiotherapy treatment 2 times per week over this 3 month period. After 3 months you are able to return to work. After 6 months you were, more-or-less, fully recovered from your physical injuries. The accident did not affect your emotional and psychological well-being. Because the accident was not your fault, you consult a lawyer to seek financial compensation for loss of income and the physiotherapy treatment costs. You calculate that these costs are $20,000 and seek compensation for this amount. Your lawyer informs you that you should have no problem receiving the $20,000 based on your physical injuries. However, your lawyer tells you that you could receive a larger sum of money if you "pretend" to have Post Traumatic Stress Disorder resulting from the accident. Thinking that this is a good idea, you decide to take your lawyers advice and formally seek compensation not just for the financial loss resulting from your physical injuries (e.g., loss of income, physiotherapy bills), but also for "ongoing and persisting symptoms of Post Traumatic Stress Disorder" as a result of your accident. However, your solicitor impresses on you that it is very important to show your problems in a believable manner, otherwise it may become apparent that you are feigning symptoms and you could potentially get no financial compensation even for your physical injuries. As part of your compensation claim, you are referred to a psychologist for assessment. Because you want to make sure that you are knowledgeable and fully prepared to feign symptoms of Post Traumatic Stress Disorder, you search the internet and find diagnostic criteria for Post Traumatic Stress Disorder. These symptoms are described in the attached sheet. Prior to your assessment, you carefully study these symptoms. As part of your assessment, you are required to complete two personality inventories; the MMPI-2 and PAI. In a moment, you will be given diagnostic criteria for Post Traumatic Stress Disorder that was obtained from the internet. Before completing the MMPI-2 and PAI, you will be given 15 minutes to study this information. After the 15 minutes, you will be required to take a simple test to evaluate your knowledge of these symptoms. Remember, please DO NOT ANSWER HONESTLY to these tests. We would like you to answer the items on the MMPI-2 and PAI by trying to fool the psychologist that you have Post Traumatic Stress Disorder.

Note: For illustrative purposes, the case scenario for the PTSD experimental group is shown. The case scenario for the Feign-Depression group mirrors that which is presented here, with the exception that Depression is substituted for PTSD.