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Evaluation of the Atypical Response scale of the Trauma Symptom Inventory-2 in detecting simulated posttraumatic stress disorder

Matt J. Gray[a,*], Jon D. Elhai[b], John Briere[c]

[a] Department of Psychology, University of Wyoming, 1000 E University Ave., Laramie, WY 82071, United States
[b] University of Toledo, United States
[c] University of Southern California, United States

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ABSTRACT

This investigation evaluated the Atypical Response (ATR) scale of the Trauma Symptom Inventory – 2nd edition (TSI-2) in terms of its ability to distinguish genuine symptoms of posttraumatic stress disorder (PTSD) from simulated PTSD. Seventy-five undergraduate students were trained to simulate PTSD and were given monetary incentives to do so. Their responses on the PTSD Checklist (PCL), TSI-2 ATR, and Personality Assessment Inventory (PAI) validity scales were compared to responses of 49 undergraduate students with genuine symptoms of PTSD instructed to respond honestly on testing. Results indicate that the revised version of the ATR is superior to the original version in detecting malingered PTSD. Discriminant Function Analyses revealed correct classification of 75% of genuinely distressed individuals and 74% of PTSD simulators.

The lifetime prevalence of posttraumatic stress disorder (PTSD) in the United States is estimated to be 7–14% (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). Yet, it is not an inevitable outcome for trauma-exposed individuals. Although slightly over half of the United States population reports at least one event that potentially could elicit PTSD, less than 10% go on to develop the disorder (Kessler et al., 1995). The symptoms of PTSD, which include nightmares and flashbacks, effortful avoidance and emotional numbing, and autonomic hyperarousal (American Psychiatric Association, 2000), can result in significant ongoing distress and psychosocial dysfunction, and represents a significant mental health hazard for combat veterans, victims of interpersonal violence, and those exposed to disasters (Briere, 2004).

Although PTSD is a serious psychological outcome, symptoms of PTSD may be feigned, for example, for financial gain (e.g., to obtain disability payments, personal injury litigation settlements, etc.) or to reduce criminal charges (Resnick, West, & Payne, 2008). Some studies estimate that PTSD malingering (including intentional exaggeration of bona fide symptoms) may occur in as much as 20–30% of personal injury litigation contexts (Lees-Haley, 1997) and in 20% of compensation-seeking combat veterans (Frueh, Hamner, Cahill, Gold, & Hamlin, 2001), although such determinations are often difficult to make with certainty and prevalence rates vary from study to study (Marshall & Bagby, 2006; Rogers, 1997). Although good data are lacking with respect to the economic impact of malingered PTSD, the estimated prevalence of this variant of feigned psychiatric distress suggests that associated costs to society may be significant. Moreover, mental health resource and personnel limitations in certain clinical settings (e.g., VA Medical Centers) increase the importance of differentiating genuine from feigned or exaggerated posttraumatic distress.

At present, no "gold standard" assessment strategy for detecting malingered PTSD exists. Several clinical interviews and questionnaires have been designed to distinguish genuine psychiatric distress from feigned distress; yet these measures (e.g., the Personality Assessment Inventory; PAI) include scales designed to detect nonspecific exaggerated distress as opposed to malingered PTSD specifically. Although many scales have been shown to successfully differentiate genuine and feigned PTSD cases, none is definitive and most have difficulty differentiating malingerers from those experiencing extreme, authentic distress (for an excellent review of PTSD malingering detection approaches and relevant research, see Taylor, Frueh, & Asmundson, 2007).

One of the most commonly used instruments that assess long-term effects of trauma (including but not limited to posttraumatic stress) is the Trauma Symptom Inventory (TSI; Briere, 1995). In addition to clinical scales, it includes an Atypical Response (ATR) scale, designed to detect symptom overreporting. In a previous study, the first two of the current authors reported that although PTSD simulators scored significantly higher than true PTSD patients on the ATR, overall classification rates were not particularly impressive (Elhai et al., 2005), corroborating other similar findings (Rosen et al., 2006). This result was not surprising in that the ATR was

* Corresponding author. Tel.: +1 307 766 2927; fax: +1 307 766 2926.
E-mail address: gray@uwyo.edu (M.J. Gray).

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not designed to detect PTSD malingering specifically, and symptom exaggeration measures generally tend to perform more poorly when used to detect the malingering of specific disorders (e.g., PTSD; Taylor et al., 2007). Rather than focusing solely on malingering, the original ATR included items designed to tap any one of a number of reasons why the TSI might not be valid, including presence of psychosis, random responding, tendency for a variety of reasons to endorse unlikely symptoms, and so forth (Briere, 1995).

Although the TSI ATR scale was not intended to evaluate malingering, per se, this measure's frequent use in forensic contexts, and the requirement that malingering be ruled out when diagnosing PTSD (American Psychiatric Association, 2000), suggested the need to revisit the TSI's approach to assessing symptom misrepresentation. In response, the second edition of the Trauma Symptom Inventory (TSI-2; Briere, 2010) includes a substantively revised ATR scale. Instead of assessing willingness to endorse bizarre or extreme symptomatology (as in the first ATR), the new ATR scale includes items that seeming index posttraumatic stress, but, in fact, are unlikely to be endorsed by "true" posttraumatic stress sufferers – either by virtue of the extremity of the response or because the item reflects how someone without posttraumatic stress might misinterpret PTSD symptoms. A typical TSI-2 ATR item, for example, is "Having flashbacks many times a day, every day, for several weeks at a time."

Because the TSI-2 is a new, as yet unpublished psychological test, information on its psychometric characteristics is incomplete. Specifically, there are no published data on the new ATR scale regarding its ability to distinguish genuine from feigned posttraumatic stress. As a first test of this scale, undergraduate psychology students in the current study were screened for exposure to traumatic events and PTSD symptoms. Those deemed to be largely free of posttraumatic stress symptoms were invited to participate in the next phase of the study which required them to learn about PTSD and attempt to feign the disorder when completing questionnaires of psychiatric symptoms for monetary incentives. Their responses were compared to the genuine responses of students who reported significant symptoms of posttraumatic distress during the screening phase. It was hypothesized that the revised version of the TSI-2 ATR would successfully differentiate genuine from feigned PTSD symptoms and would compare favorably to other established measures of malingering detection.

1. Method

1.1. Participants

PTSD simulation group. A sample of 75 participants (47 women, 28 men) enrolled in introductory psychology courses served as subjects for the PTSD simulation condition. These students were at least age 18 and attending college at one of the two medium-sized universities in the Midwestern and Western United States. Participants were recruited in groups from their departmental research pool in exchange for research credit. Participants qualified for, and were invited to participate in this study as simulators, if they endorsed no trauma exposure history using the Life Events Checklist (LEC; Gray, Litz, Hsu, & Lombardo, 2004) and/or no symptoms of PTSD on the PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993). Demographic characteristics of the simulator group were as follows: age ranged from 18 to 40 years (M = 19.5, SD = 2.84), educational level ranged from 12 to 16 years, with an average of 12.64 (SD = 1.19), modal race was Caucasian/white (92.6%), and the majority was unemployed (62%) or working part-time (32%).

Genuinely distressed group. The genuine posttraumatic distress group was similarly recruited from introductory psychology courses, based on their responses on the LEC and PCL. Participants were included in this group if they both (a) endorsed a PTSD qualifying traumatic experience on the LEC, per the Diagnostic and Statistical Manual of Mental Disorders – 4th edition – Text Revision's (DSM-IV-TR; American Psychiatric Association, 2000) PTSD criteria, and (b) scored above the empirically derived PTSD diagnostic cut-score of 44 on the PCL (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). Demographics, of the 49 participants who met these criteria were as follows: age ranged from 18 to 31 years (M = 20.3, SD = 2.68), educational level ranged from 12 to 17 years (M = 20.3, SD = 2.68), modal race was Caucasian/white (88%), and the majority was unemployed (62%) or working part-time (32%).

1.2. Measures

The Trauma Symptom Inventory 2nd edition (*TSI*-2). The TSI-2 is one of the newest psychological instruments measuring symptoms of PTSD and other sequelae of traumatic event exposure. The original TSI has been used extensively in research and clinical contexts and demonstrates strong psychometric properties. Reliability is excellent (alpha values range from .84 to .87 across studies) as is predictive validity – victims of interpersonal trauma score higher than control subjects on all scales, and 91% of patients diagnosed with PTSD are correctly classified using the TSI (Briere, Elliott, Harris, & Cotman, 1995; Edens, Otto, & Dwyer, 1998). The original TSI consists of 10 clinical scales and 3 validity scales, including the ATR. The TSI-2 is scheduled for release in late 2010 and, at the time of the present investigation, a few clinical scales were still undergoing validation and refinement. The 8-item TSI-2 ATR scale was finalized and available for validation research and was therefore used in the present study. The clinical TSI-2 scales most closely representing DSM-IV-TR (American Psychiatric Association, 2000) PTSD symptom criteria – Intrusive Experiences (IE), Defensive Avoidance (DA), and Anxious Arousal (AA) scales – were also used in the present investigation in order to assess the degree to which PTSD simulators approximate symptoms reported by those experiencing genuine posttraumatic stress symptoms.

The Life Events Checklist (*LEC*). The LEC (Blake et al., 1995) is a self-report survey assessing prior exposure to 16 potentially traumatic events. Participants are asked to indicate whether a given event happened to them, if they witnessed it occurring to others, or learned about it occurring to someone close to them. It exhibits good temporal stability, converges strongly with other measures of trauma exposure and is predictive of PTSD symptomatology in college students and combat veterans (Gray et al., 2004).

The PTSD Checklist (*PCL*). The PCL is a 17-item, Likert-type measure of DSM-IV PTSD symptoms. It exhibits adequate internal consistency and temporal stability (Blanchard et al., 1996) and correlates strongly with other validated measures of PTSD among college students (Ruggiero, Del Ben, Scotti, & Rabalais, 2003). For the present investigation, a cut-score of 44 (Blanchard et al., 1996) was used as the qualifying criterion for the PTSD group.

The Personality Assessment Inventory (*PAI*) *validity scales*. The PAI (Morey, 1991) is a self-report measure for assessing personality, psychopathology and treatment-related issues. For the present study, the 46 items that collectively make up the 4 primary validity scales were extracted from the instrument and administered. The *Negative Impression Management* (*NIM*) scale is comprised of 9 items reflecting bizarre and rarely endorsed symptoms, and is designed to assess a tendency to portray oneself in a negative light (e.g., malingering). It has been shown to distinguish malingerers and non-malingerers in a number of studies (e.g., Morey & Lanier, 1998). The *Positive Impression Management* (*PIM*) is a 9-item scale that detects efforts to present a favorable impression by denying common faults and foibles. It has been shown to successfully discriminate positive dissimulators from honest responders (Fals-Stewart, 1996). The 8-item *Infrequency* (*INF*) scale consists of items

very rarely endorsed in clinical and normal samples and that are unrelated to psychological distress. Elevations on this scale reflect highly idiosyncratic thinking and carelessness. The INF scale satisfactorily detects bizarre and random responders (Morey, 1996). Finally, the *Inconsistency* (*INC*) scale consists of 10 pairs of items with matching content that should be endorsed in a similar fashion. Malingerers may therefore be more prone to inconsistent responding on these paired items. Though not routinely used in malingering studies, this scale has been shown to adequately identify random responders (Morey, 1996).

1.3. Procedure

For the PTSD simulation group, individuals not endorsing significant trauma histories or symptoms of PTSD during initial testing were sent electronic invitations to participate in a subsequent study. This second study was conducted in separate groups ranging from 15 to 30 students. Following informed consent procedures, PTSD training materials and survey packets printed with pre-coded subject numbers were distributed. The packets consisted of the LEC and PCL (to confirm absence of trauma exposure and PTSD development since initial testing), followed by training materials, a 10-item PTSD quiz to ensure mastery of PTSD knowledge as a result of training, and the TSI-2 and PAI validity scales.

The training materials consisted of textbook information on PTSD available to laypersons, as well as a worksheet to help master the information and to assist in passing the quiz about PTSD. (Interested parties may contact the first author to request a copy of the training materials.) Participants were informed that in addition to receiving research credit, a monetary incentive would be offered to the three individuals (in each group of 15–30 participants) who were best able to feign PTSD: $50 (1st place), $30 (2nd place), or $20 (3rd place) awards. The amounts of the monetary incentives are consistent with those used in current malingering research studies, with numerous published studies awarding high incentives (e.g., Bagby, Buis, & Nicholson, 1995), and several other recent studies awarding low incentives (e.g., Rogers, Sewell, & Ustad, 1995). After allotting 25 min to read and study the training materials, and to complete the PTSD worksheet, participants completed the 10-question true–false quiz about PTSD. It was determined a priori that individuals failing to score at least 70% on this quiz would not be deemed to have sufficient mastery of PTSD knowledge and would therefore not be considered adequate PTSD simulators. Though 70% is somewhat arbitrary, we deemed this level of mastery to be indicative of adequate familiarity with PTSD and would exclude those who did not sufficiently acquaint themselves with study materials. This level of performance has also been used successfully in past malingering studies (e.g., Elhai et al., 2005). No participants failed the quiz. Following completion of the PTSD knowledge quiz, TSI-2 test booklets and PAI validity scale items were distributed with pre-coded subject numbers. Standardized instructions were given, asking participants to feign PTSD on these measures, and participants were again reminded about cash awards for those whose responses most closely resembled responses of individuals experiencing legitimate symptoms of PTSD.

The determination of prize winners was conducted by examining an index of TSI-2 scale scores (the sum of the Intrusive Experiences, Defensive Avoidance, and Anxious Arousal scales) that closely correspond to the 3 symptom criteria of PTSD (criteria B–D, respectively). Simulators' index scores were compared with those of the PTSD group's mean index score. Individuals in the genuinely distressed group were not given PTSD training materials nor did they complete the PTSD knowledge quiz. They simply completed a demographics form, the TSI-2, and the PAI validity scales, and were asked to complete all measures as honestly as possible.

Table 1
PTSD simulators and genuinely distressed participants' clinical and validity scale scores.

Scale	PTSD simulators ($n = 75$)		Genuinely distressed ($n = 47$)		t	d
	M	SD	M	SD		
Intrusive Experiences	19.67	4.12	13.33	5.72	7.08*	1.29
Defensive Avoidance	18.96	4.17	14.96	6.72	4.03*	.73
Anxious Arousal	16.71	4.41	14.41	5.12	2.61*	.48
Atypical Response (ATR)	10.76	5.37	5.13	4.83	5.84*	1.10
PAI NIM	9.73	4.86	1.96	2.22	10.46*	2.19
PAI PIM	9.68	3.75	18.17	4.14	11.76*	2.15
PAI INF	4.57	2.69	7.53	2.73	5.87*	1.09
PAI INC	13.77	4.02	9.02	2.86	6.88*	1.38

* $p < .01$

2. Results

First, we compared PTSD simulators to genuinely distressed participants on the TSI-2 Intrusive Experiences, Defensive Avoidance, and Anxious Arousal clinical scales, as well as on all validity scales (TSI-2 ATR, PAI NIM, PAI PIM, PAI INF, and PAI INC). All analyses were conducted using SPSS Version 16. As can be seen in Table 1, groups differed significantly on all variables. Simulators over-endorsed symptoms on TSI-2 clinical scales (IE, DA, AA), validity scales designed to detect exaggerated distress (ATR, NIM), and inconsistent responses (INC). They scored lower than genuinely distressed individuals on the PIM and INF scales of the PAI.

Next, two discriminant function analyses (DFA) were conducted to compare the relative classification accuracy of the ATR and the PAI's optimal malingering detection scale – the NIM. In the first DFA, ATR was entered as a single predictor variable with group status as the criterion variable (1 = PTSD simulators, 2 = genuinely distressed). Overall, the model yielded a canonical correlation of .47 ($p < .01$), indicating that it accounted for 22% of the variance in discriminating PTSD simulators from genuinely distressed individuals. In terms of group classification, the DFA correctly classified 74.7% of simulators (sensitivity) and 73.5% of non-simulators (specificity), for an overall correct classification rate of 74.2%.

The PAI NIM was entered as a single predictor variable in the next DFA. Once again, group status served as the criterion variable. The model yielded a canonical correlation of .69 ($p < .01$), indicating that 47.6% of the variance in discriminating simulators from non-simulators is accounted for by the NIM scale. In terms of classification rates, the DFA correctly classified 80% of simulators (sensitivity) and 87.8% of non-simulators (specificity) for an overall correct classification rate of 83.1%.

Finally, we calculated diagnostic efficiency statistics (Table 2) for the ATR. The optimal cut-off score for overall accuracy of classification was an ATR score of 7. As can be seen, this cut-score correctly classifies 74% of malingerers and 77% of genuinely distressed individuals for an overall correct classification rate of 75%.

Table 2
Classification accuracy for the Atypical Response Scale (TSI-2) in detecting PTSD simulators and genuinely distressed individuals.

Sensitivity	.74
Specificity	.77
Positive predictive power (PPP)	.83
Negative predictive power (NPP)	.65
Overall correct classification (OCC)	.75

Sensitivity = true positives/(true positives + false negatives); Specificity = true negatives/(true negatives + false positives); PPP = true positives/(true positives + false positives); NPP = true negatives/(true negatives + false positives); OCC = (true positives + true negatives)/(true positives + true negatives + false positives + false negatives).

Utilizing a higher cut-score (i.e., 8) increased accurate classification of non-malingerers (83%) at the expense of correct identification of malingerers (65%) and lowered the overall correct classification rate (72%). Similarly, lowering the cut-score to 6, increased correctly classified malingerers (77%) slightly, but resulted in a lower accurate classification rate of genuinely distressed individuals (66%), and also lowers the correct classification rate overall (73%). These effects become more pronounced the greater the departure from a cut-score of 7 on the ATR.

3. Discussion

The revised Atypical Response (ATR) scale in the forthcoming TSI-2 appears to represent a marked improvement in malingering detection relative to the initial version of the scale. Whereas the original ATR correctly classified only 59% of malingerers and non-malingerers in a study using a very similar methodology (Elhai et al., 2005), a discriminant function analysis using the revised ATR correctly classified 74.2% of participants in the current study. The optimal cut-score of 7 demonstrated good sensitivity and specificity, also improving upon similar indices demonstrated by the original ATR.

In the present study, simulators and non-simulators differed on all scales under investigation. Not surprisingly, simulators over-endorsed symptoms on scales mirroring PTSD symptoms and related phenomena (Intrusive Experiences, Defensive Avoidance, and Anxious Arousal), and also scored higher on both validity scales (PAI NIM and TSI-2 ATR) designed to detect malingering or symptom exaggeration, as well as the PAI response inconsistency (INC) scale. Simulators scored lower than genuinely distressed participants on the PAI's Positive Impression Management (PIM) and Infrequency (INF) scales. The degree of separation between simulators and non-simulators on the ATR was much larger than was the case in the validation study of the original version of the ATR. Specifically, simulators and non-simulators differed by more than a full standard deviation on the revised ATR in the present study, as compared to .48 of a standard deviation in previous research using the original ATR (Elhai et al., 2005).

Although the revised ATR appears to be functionally superior to the original version based on present analyses, this is the first time that the ATR scale (original or revised) has been compared to other validity scales. Despite performing reasonably well in differentiating malingerers from genuinely distressed individuals, the ATR does not appear to perform as well as at least two of the PAI validity scales (NIM and PIM) in this regard. Quite impressively, simulators and non-simulators scores differed by more than 2 standard deviations on each of these comparator scales. Because the NIM was the single best validity scale in differentiating these 2 groups based on Cohen's *d* scores, we performed a DFA with this scale as the predictor in classification of malingerers and non-malingerers in order to compare its accuracy to the ATR. As expected, it did exhibit a superior classification rate relative to the ATR though the improvement was relatively modest. The PAI NIM correctly classified 5% more simulators than did the ATR (80% and 75% respectively). Thus, technically, the NIM appears to be superior to the ATR in malingering detection. That said, the PAI is approximately 3 times as long as the forthcoming TSI-2 (344 items and 118 items, respectively), and contains a single PTSD scale (ARD-T), as opposed to the multiple trauma-specific scales of the TSI-2. Thus, the 5% improvement in malingering detection afforded by the PAI may not necessarily justify its additional length, administration time, and lesser trauma focus.

Several limitations of the present investigation must be noted. First, our sample was composed entirely of undergraduate students. It is not clear how their simulation performance compares to simulators in the community. Nevertheless, college student samples are routinely relied on for such studies, especially when validating new assessment measures and procedures (Butcher, Graham, & Ben-Porath, 1995). It may even be the case that use of college students provides a more conservative test of malingering detection. Though speculative, college students may be particularly adept at memorizing disorder-specific information and feigning that condition relative to the population at large, and, thus, potentially may be more sophisticated malingerers.

Another limitation is the use of a paper-and-pencil measure of PTSD (the PCL), as opposed to a clinical interview such as the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995). The PCL has good predictive validity with reference to the CAPS and other diagnostic interviews (e.g., Blanchard et al., 1996). However, it is widely recognized that such non-interview measures are only approximate measures of PTSD, and therefore it is possible that some individuals in the genuinely distressed group did not meet full diagnostic criteria for PTSD. Nevertheless, PCL scores above the empirically derived cut-score of 44 are typically viewed as reflecting significant symptomatology (Blanchard et al., 1996), and there is no obvious reason why participants in the distressed group would malinger on the PCL, since anonymity was maintained and no reward for symptom distortion was present. As a result, symptoms experienced by the genuinely distressed condition participants are likely to be legitimate and pronounced even in cases that do not meet full diagnostic criteria for PTSD.

In sum, both the PAI and the TSI-2 appear to perform well in identifying feigned distress and malingered PTSD. In an absolute sense, the PAI is the optimal measure for distinguishing simulators from genuine PTSD cases, and can be recommended without reservation. Nevertheless, classification rates yielded by the TSI-2 ATR are nearly as good, and the relative brevity and greater trauma symptom coverage of this instrument may render it preferable to the PAI in some contexts. Importantly, the revised version of the ATR appears to be much improved relative to its predecessor, thereby increasing its potential usefulness in forensic as well as clinical contexts.

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