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# Psychometric Properties of the Posttraumatic Cognitions Inventory (PTCI): A Replication With Motor Vehicle Accident Survivors

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This study examined the factor structure, internal consistency, concurrent validity, discriminant validity, and discriminative validity of the Posttraumatic Cognitions Inventory (PTCI; E. B. Foa, A. Ehlers, D. M. Clark, D. F. Tolin, & S. M. Orsillo, 1999) in a sample of 112 individuals who had experienced a serious motor vehicle accident. Results generally supported the 3-factor structure of the PTCI: (a) Negative Cognitions About Self, (b) Negative Cognitions About the World, and (c) Self-Blame. Subscales reflecting negative thoughts of the self and world showed adequate internal consistency, as well as good concurrent, discriminant, and discriminative validity. However, difficulties with the subscale representing self-blame emerged, specifically poor concurrent and discriminant validity. Potential reasons for this finding are discussed. The PTCI seems to be a promising measure of negative and dysfunctional posttrauma cognitions, which deserves continuing attention.

Current accounts of posttrauma recovery place considerable emphasis on the role of negative and dysfunctional cognitions in the etiology and maintenance of posttraumatic stress disorder (PTSD). For example, Foa and colleagues (Foa & Riggs, 1993; Foa & Rothbaum, 1998) have theorized that specific thoughts about the dangerousness of the world and one's own incompetence mediate the development of PTSD in the aftermath of sexual assault in women. Likewise, Ehlers and Clark (2000) emphasized the importance of negative appraisals of the traumatic event and one's reactions during the event as salient in PTSD. According to these authors, these negative appraisals help to create a sense of threat, which perpetuates PTSD symptomatology and heightens anxiety. Similar accounts have been presented by Resick and Schnicke (1993) and McCann and Pearlman (1990), indicating some convergence across writers concerning the importance of specific types of dysfunctional thoughts in PTSD, particularly thoughts about one's perceived weaknesses and the dangerousness of the world.

Despite apparent agreement about the importance of dysfunctional thoughts in the origins and maintenance of PTSD, measurement of this domain has lagged behind other forms of assessment. As reviewed by Norris and Riad (1997), the field has concentrated in large part on self-report instruments to assess the symptoms of PTSD as outlined in the *Diagnostic and Statistical Manual of Mental Disorders—IV* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994). Although important, a broader scope of measurement instruments is needed, particularly for studies that focus on the psychopathology and treatment of PTSD. Fortunately, the development and validation of measures to assess other important aspects of PTSD has begun to receive increased attention. One such measure, the Posttraumatic Cognitions Inventory (PTCI; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999) was designed to assess trauma-related thoughts and beliefs and is the focus of the current study.

In its development, the PTCI has undergone a rigorous process. The initial sample included 600 participants: 110 patients who were seeking treatment for trauma-related symptoms, 190 community volunteers, and 300 undergraduate students. Sixty-five percent of the sample ($n = 392$) reported experiencing a trauma that involved perceived or actual threat of serious injury or death and evoked fear, intense terror, horror, or helplessness (American Psychiatric Association, 1994), and the remainder of the sample did not report such an experience. Included among the trauma experiences were accidents ($n = 78$), nonsexual assault ($n = 39$), sexual assault ($n = 38$), and child sexual abuse ($n = 19$). A subsample of 170 participants was classified as experiencing PTSD on the basis of their scores on the Posttraumatic Stress Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997). The preliminary item pool ($N = 114$) was generated by experts in the field and submitted to an exploratory factor analysis. The resulting three factors represent negative cognitions about the self (21 items), negative cognitions about the world (7 items), and self-blame (5 items). Excellent internal consistency was noted for each factor ($\alpha = 0.86–0.97$), as well as moderate to high correlations with the PDS ($rs = 0.57–0.78$). The three subscales of the PTCI together correctly classified 86% of the sample into those with and without PTSD, suggesting that this inventory appears to assess three specific types of dysfunctional cognitions that are associated with PTSD.

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Thus, initial development and validation efforts for the PTCI indicate that the instrument possesses sound psychometric properties. However, it is important for these features to be examined in an independent sample of trauma survivors, for several reasons. First, because the sample used by Foa et al. (1999) was varied and included undergraduate volunteers, it is possible that the initial psychometric data for the PTCI may have been influenced by this sample diversity. For example, the fact that 35% of the sample denied experiencing a trauma that satisfied the initial criterion of the *DSM–IV* definition of PTSD may have influenced the nature of the obtained factors and their interrelationship with measures of PTSD severity, anxiety, and depression. In particular, because current theories postulate that the specific negative and dysfunctional thoughts assessed by the PTCI are unique to trauma survivors, inclusion of nontraumatized participants may have altered the obtained factor structure. Second, because sexual assault survivors were overrepresented within the PTSD subsample in Foa et al. (1999), relative to the non-PTSD subsample ($p < .05$), it is possible that cognitive aspects of sexual assault-related PTSD may have been overrepresented within this scale. As noted by Koss, Figueredo, and Prince (2002), self-blame is a particularly salient cognitive feature of PTSD stemming from sexual assault. Although various writers have hypothesized that differences exist in the negative or dysfunctional cognitions associated with different types of trauma (e.g., Freyd, 1996; van der Kolk, 1996), at this point there are no empirical data about this issue. Refinement of cognitive measurement instruments, such as the PTCI, thus has the potential also to contribute to our understanding of common and unique cognitive features of PTSD after different types of trauma, particularly enhancing our knowledge of whether features such as self-blame are associated with other types of traumas, such as motor vehicle accidents (MVAs).

Thus, the current study had five aims. First, we were interested in examining whether the factor structure of the PTCI would replicate in an independent sample of trauma survivors. All of the participants in the current study had experienced the same trauma, specifically a serious motor vehicle accident that had involved perceived or actual injury to themselves or another, accompanied by intense fear, helplessness, and/or the perception that they might die. Given concerns about factorial stability of the PTCI, it was important to examine this issue in a homogeneous sample of traumatized individuals that satisfied current diagnostic definitions of a traumatic experience. In the current study, participants were evaluated with a well-recognized diagnostic interview to assess PTSD, a methodological improvement over the initial report of the PTCI. The second aim of the current study was to examine the internal consistency of the obtained subscales. The third aim was to explore the concurrent validity of the PTCI using measures of PTSD severity, anxiety, and depression, as well as variables that are associated with posttrauma distress, specifically quality of life, social support, and dimensions of perceived thought control. The fourth aim was to examine the discriminant validity of the scale with regard to a measure of social desirability. The last aim centered on the ability of the obtained subscales of the PTCI to differentiate between individuals with and without PTSD, which was included in an effort to replicate Foa et al. (1999) and to examine discriminative validity. Survivors of a serious MVA were felt to be a good study sample for this effort, given that MVAs are among the leading causes of PTSD in the general population (Norris, 1992), with prevalence estimates ranging from 8% (Mayou, Bryant, & Duthie, 1993) to 39% (Blanchard, Hickling, Taylor, & Loos, 1995). As well, self-blame has not been uniquely underscored as a cognitive feature of PTSD after an MVA (e.g., Blanchard & Hickling, 1997), thus expanding the understanding of the cognitive sequelae of different forms of trauma through focus on this study sample.

## Method

### *Participants*

The sample included 112 individuals who sought assessment and possible treatment for mental health problems following their MVA. Participants were recruited from pain clinics, a local trauma center, physical therapists, and specialists in rehabilitation and internal medicine, as well as public service announcements. Individuals qualified for assessment if they had experienced an MVA involving actual or threatened death or serious injury and their emotional response included intense fear, helplessness, horror, or the perception that they would die (American Psychiatric Association, 1994). These features were evaluated during initial phone contact with the project and using the MVA Interview (see below). Individuals involved in accidents that did not satisfy Criterion A of the diagnostic criteria for PTSD were not evaluated. The sample consisted of 79 women (70.5%) and 33 men (29.5%) and ranged in age from 18 to 65 ($M = 41.7$, $SD = 10.79$). Ninety participants (80%) were Caucasian, 17 (15%) were African American, 4 (4%) were Hispanic, and 1 (1%) was Asian. The majority of patients ($n = 79$, 70.5%) reported ongoing pain complaints from injuries sustained during the MVA. In these cases, pain caused significant lifestyle limitations (e.g., inability to work), impairment (e.g., use of prescription pain medications at least 3 days/week), or significant distress (e.g., continued health care utilization for pain). Average elapsed time after the MVA was 28.5 months ($SD = 44.94$), with a range from 1 to 255 months. The majority of the sample ($n = 73$, 65%) was engaged in MVA-related litigation. Data from individuals presenting with neurological impairment, substance dependence and abuse in the 6 months preceding the assessment, psychotic symptoms, or acute suicidality were excluded. All participants provided informed consent prior to participation.

### *Measures*

#### *The PTCI*

The PTCI is a 33-item scale, which is rated on a Likert-type scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). Scale scores are formed for the three subscales, which show a high degree of intercorrelation ($r$s = .57–.75). Internal consistency appeared sound for the three subscales (Negative Cognitions About the Self, $\alpha = .97$; Negative Cognitions About the World, $\alpha = .88$; Self-Blame, $\alpha = .86$) in the original article. Test–retest reliability for a 1-week interval ranged from .75 to .89 and for a 3-week interval ranged from .80 to .86 for the three subscales. Convergent validity with two other scales that measure trauma-related cognitions appears promising, as does the ability of the PTCI to differentiate individuals with and without PTSD (sensitivity = .78, specificity = .93; Foa et al., 1999).

#### *PTSD Measures*

To assure that all participants had experienced a serious MVA, the MVA Interview was administered (Blanchard & Hickling, 1997). This interview includes questions about the individual's emotional response to the accident, including feelings of fear, helplessness, danger, being out of control, and perceptions that they might die, which were necessary to determine whether the MVA qualified as a traumatic event. Each of these emotional

responses to the MVA was rated on a Likert-type scale ranging from 0 (*not at all*) to 100 (*extreme*). Additionally, participants were asked to rate their perception of responsibility for the accident, using a scale ranging from 0 (*not responsible*) to 100 (*completely responsible*).

PTSD symptomatology was assessed with both clinician and self-report measures. The Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990), a structured interview that assesses the symptoms of PTSD identified in the current *DSM–IV*, was used as the diagnostic tool for PTSD. The CAPS includes standardized questions to determine symptom frequency and intensity. Symptoms were assessed in the preceding month, using a 5-point Likert-type scale ranging from 0 (the symptom does not occur or does not cause distress) to 4 (the symptom occurs nearly every day or causes extreme distress and discomfort). The total severity score for the CAPS (CAPS Total) is computed by summing the frequency and intensity ratings for each symptom (range = 0–136). Probes were added to the interview to determine whether each PTSD symptom was attributable to pain (e.g., if a patient reported difficulty sleeping, the clinician assessed whether this symptom was due to pain. If so, the symptom was not scored on the CAPS).

The CAPS was administered by eight trained clinicians who were advanced doctoral students in clinical and counseling psychology. All clinicians received extensive training in use of the CAPS. Interviews from a larger sample ($N = 277$) that included the 112 participants in this study were videotaped and 29% ($n = 81$) were randomly selected and reviewed by an independent clinician to establish diagnostic reliability. Interrater agreement in PTSD diagnosis, reflected by the kappa statistic, was strong for PTSD ($\kappa = 0.93$). As reviewed by Weathers, Keane, and Davidson (2001), the CAPS has excellent support for its reliability, with alpha coefficients generally ranging from .73 to .98. Two- to 3-day test–retest reliability was found to range from .78 to .87 (Weathers et al., 2001), and the CAPS has been shown to be sensitive to the detection of PTSD in individuals following an MVA (Blanchard & Hickling, 1997).

Participants completed two self-report scales, the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) and the PTSD Symptom Scale—Self Report (PSS–SR; Foa, Riggs, Dancu, & Rothbaum, 1993). The IES contains 15 items rated on a Likert-type scale ranging from 0 (*not at all*) to 3 (*often*) and distributed across two subscales that assess intrusion (7 items) and avoidance (8 items). The IES has been shown to have high internal consistency with alpha coefficients of .78 for the Intrusion subscale and .82 for the Avoidance subscale in a sample of 66 outpatients (Horowitz et al., 1979). Split-half reliability of the total scale was .86 and the 1-week test–retest reliability was .89 for the Intrusion subscale and .79 for the Avoidance subscale (Horowitz et al., 1979). The PSS–SR contains 17 items, reflecting the *DSM–IV* symptoms of PTSD, which are rated on a 0–3 Likert-type scale ranging from 0 (*not at all*) to 3 (*5 or more times/week–almost always*). Items are summed to yield a total score. Foa et al. (1993) evaluated the psychometric properties of the PSS–SR with 46 female rape victims and 72 female nonsexual assault victims. In this sample, the PSS–SR showed high internal consistency ($\alpha = .91$) and good one-month test–retest reliability ($r = .74$). Concurrent validity of the PSS–SR with the IES and State–Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) also was demonstrated, with correlations ranging from .52 to .81 (Foa et al., 1993). Higher scores on both of these measures indicate the presence of more PTSD symptoms.

### *Anxiety Measures*

The STAI (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) is a well-recognized questionnaire, comprising a 20-item state (STAI-S) and a 20-item trait anxiety (STAI-T) subscale. The STAI was administered to examine the concurrent validity of the PTCI. Good internal consistency has been reported for the STAI ($\alpha = .86–.95$; Spielberger et al., 1983), and the scale's test–retest reliability ranges from .75 to .86 for intervals 30 days or less (Spielberger et al., 1983). Convergent validity of the STAI-T and other measures of trait anxiety has been noted (e.g., Bieling, Antony, & Swinson, 1998). Higher scores on both subscales indicate the presence of more anxiety.

### *Depression Measure*

The Beck Depression Inventory (BDI; Beck & Steer, 1993) was administered to examine the concurrent validity of the PTCI. As reviewed by Beck, Steer, and Garbin (1988), the 21-item BDI, used to evaluate current depressive symptoms, is highly reliable with a mean alpha coefficient of .86 for nonpsychiatric samples and .81 for psychiatric samples. The test–retest reliability for intervals ranging from 5 days to 4 months has been shown to range from .60 to .83 for psychiatric samples and .65 to .90 for nonpsychiatric samples (Beck et al., 1988). In considering the use of the BDI with this sample, where chronic pain is a common comorbid condition (e.g., Blanchard, Hickling, Mitnick, Taylor, & Loos, 1995), one choice is to remove somatic items when scoring the BDI. However, this procedure does not improve accuracy of the scale (e.g., Geisser, Roth, & Robinson, 1997). To facilitate comparison of the current data with previously published studies, the original scoring method was used. Higher scores on the BDI indicate greater levels of depression.

### *Social Desirability Measure*

The Marlowe-Crowne Social Desirability Scale (M-C) was developed to assess the tendency to self-report in a socially desirable manner (Crowne & Marlowe, 1960). The M-C is a 33-item questionnaire, answered in a true/false format. Based on the rationale for the Lie Scale of the MMPI (Meehl & Hathaway, 1946), the items for this measure were chosen from a set of behaviors that are culturally sanctioned but for which total compliance is improbable. Higher scores on the measure indicate increased defensiveness. In a sample of 10 male and 29 female undergraduates, the M-C was found to have good 1-month test–retest reliability ($r = .89$) and an internal consistency coefficient of .88 (Crowne & Marlowe, 1960).

### *Related Measures of Psychosocial Functioning*

Three measures were included in this category to assess quality of life, social support, and thought-control strategies. The Quality of Life Inventory (QOLI; Frisch, 1994) is a 16-item scale that assesses satisfaction with specific life domains, including health, relationships, and money. The importance of each domain is rated on a 3-point scale ranging from 1 (*not at all*) to 3 (*very*). The participant's satisfaction with each domain is rated on a 7-point scale, which ranges from 1 (*very dissatisfied*) to 7 (*very satisfied*). An overall life satisfaction score is derived by averaging the weighted satisfaction ratings from those life domains that are assigned a nonzero importance rating. The QOLI assesses satisfaction with a wide variety of life arenas, only one of which is work. As such, it seemed appropriate for use with this sample, where individuals may not be working owing to MVA-related injuries and chronic pain. Frisch, Cornell, and Villanueva (1992) examined the psychometric properties of the QOLI and found the scale to have alpha coefficients ranging from .77 to .89. The 2- to 3-week test–retest reliability was found to be .80 for a sample of undergraduates, and the one-month test–retest reliability of veterans enrolled in alcohol treatment was .91. This study also revealed positive correlations of the QOLI with several other measures of subjective well-being (Frisch et al., 1992). Higher scores on the QOLI indicate greater perceived quality of life.

The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988) is a 12-item scale which assesses the adequacy of one's perceived support network from family, friends, and significant others. Item scores range from 1 to 7, with subscale scores computed to reflect perceived social support with family, friends, and one's significant other. Zimet et al. (1988) reported good internal consistency of

the MSPSS in 275 undergraduate students ($\alpha$ = .88.). In a subset of 69 undergraduates, the two- to three-month test–retest reliability was found to be .85. Additionally, this study found that the MSPSS was negatively correlated with measures of anxiety and depression. Higher scores on the MSPSS subscales indicate greater levels of perceived social support.

The Thought Control Questionnaire (TCQ; Wells & Davies, 1994) contains 30 items designed to assess strategies for controlling unwanted and unpleasant thoughts. Items are rated on a 4-point scale, with respect to how often the individual uses specific strategies to control unwanted thoughts. Five replicable factors have been found: Distraction, Social Control, Worry, Punishment, and Reappraisal (Reynolds & Wells, 1999; Wells & Davies, 1994). Items on the Distraction subscale of the TCQ reflect both cognitive and behavioral distraction (e.g., "I think about something else"). Items on the Social Control subscale reflect seeking social validation about the thought and speaking with others (e.g., "I talk to a friend about the thought"). The Worry subscale describes invoking worry about other topics to cope with a negative thought (e.g., "I dwell on other worries"). Items on the Punishment subscale reflect the use of self-castigation as a coping strategy (e.g., "I get angry at myself for having the thought"). Last, the Reappraisal subscale contains items describing adaptive methods for coping with distress produced by unwanted thoughts (e.g., "I analyze the thought rationally"). Internal consistency appears good, with $\alpha$ ranging from .64 to .79 across the five subscales. Test–retest coefficients across a 6-week interval were adequate (Distraction subscale, $r$ = .68; Punishment subscale, $r$ = .67; Reappraisal subscale, $r$ = .83; Worry subscale, $r$ = .72; Social Control subscale, $r$ = .83). Support for concurrent validity has been provided by Wells and Davies (1994) as well as Reynolds and Wells (1999). Higher scores on each of the subscales of the TCQ indicate greater use of specific thought-control strategies.

### *Procedure*

All procedures were reviewed by the Institutional Review Board at the University at Buffalo—State University of New York. All participants were interviewed individually and then completed the self-report measures.

### *Analytic Strategy*

In the first step, the PTCI was submitted to confirmatory factor analysis (CFA) to determine whether the original factor structure would be replicated (Foa et al., 1999). Although the sample size might appear too small for a CFA, recent discussion by MacCallum, Widaman, Zhang, and Hong (1999) suggests otherwise. In particular, these authors argue against the use of invariant rules for determination of sample size for a factor analysis and, instead, present a mathematical framework for computing the necessary sample size based on the size and variability of the obtained communalities and whether factors are overdetermined. In the case of the present data, with five or more items per factor, moderate to high expected communalities based on past exploratory factor analyses, and a sample size of 112, the approximate value of the congruence coefficient (which reflects the degree of correspondence between sample and population factors) was .98, which is excellent within MacCallum et al.'s (1999) framework. This indicates that the sample size in the present study was adequate. In the second step, coefficient alpha was computed for each obtained subscale.

The third data-analytic step involved provision of descriptive statistics and consideration of zero-order correlations to examine concurrent validity. Intercorrelations among the obtained subscales were computed to determine potential overlap in variance. Correlations of each subscale with measures of PTSD, anxiety, and depression were calculated to ascertain the relationships between posttrauma cognitions and measures related to PTSD psychopathology (concurrent validity). To examine the unique variance accounted for by the PTCI subscales in PTSD severity, two sets of partial correlations were computed, the first controlling for state anxiety and the second controlling for depression. These analyses were included to determine whether the PTCI subscales were assessing phenomena that transcended more basic dimensions of anxiety and depression, respectively. Additionally, zero-order correlations were computed with each subscale and related measures of psychosocial functioning to examine the extent to which posttrauma cognitions corresponded with reduced quality of life, impairment in perceived social support, and strategies that were used by participants to control unwanted thoughts. In the fourth analytic step, correlations between the obtained subscales and the M-C were computed to examine the discriminant validity with regard to a measure of social desirability. The last analytic step involved comparison of individuals with differing levels of PTSD symptomatology with respect to their scores on the PTCI subscales, in an effort to examine discriminative validity. As part of this analytic step, a discriminant function analysis was included to examine the extent to which the PTCI could categorize correctly participants with and without PTSD and to determine which subscale(s) contributed to this classification.

## Results

### *Factor Analyses: Posttraumatic Cognitions Inventory*

We performed a CFA using maximum-likelihood estimation with mean adjusted chi-square and robust standard errors because of nonnormal distributions of the variables, using Mplus version 2.12 (Muthén & Muthén, 2001). Models are thought to fit the data well when the chi-square/$df$ ratio ($\chi^2/df$) is less than 3, the comparative fit index (CFI) is greater than .96, and the root-mean-square error of approximation (RMSEA) is less than .06 (Hu & Bentler, 1999; Kline, 1998). The initial CFA specified a three-factor model with 21 items indicating the Negative Cognitions About Self factor (SELF), 7 items indicating the Negative Cognitions About the World factor (WORLD), and 5 items indicating the Self-Blame factor (BLAME). This model provided a poor fit to the data, $\chi^2(492, N = 112) = 823.81$, $p < .001$; $\chi^2/df = 1.67$; CFI = 0.81; RMSEA = 0.08, and some of the standardized factor loadings were small (<.40). Modification indices indicated that several items cross-loaded on two factors (Items 2, 4, 24, and 29, all of which originally were part of the SELF subscale). Elimination of the cross-loading items resulted in a model that approached an adequate fit to the data, $\chi^2(374, N = 112) = 540.52$, $p < .00001$; $\chi^2/df = 1.45$; CFI = 0.88; RMSEA = 0.06, and all standardized factor loadings were substantial (>.45). In this revised model, the SELF subscale had 17 items, and the other two subscales were identical to those reported by Foa et al. (1999). Scores for the revised SELF subscale (and the other two subscales) were computed as the mean item response, following the original scoring procedure. The three subscale scores were summed to yield the PTCI Total score. Table 1 displays the standardized factor loadings for the final model.

### *Internal Consistency*

Alpha coefficients for each subscale are shown in Table 2 and appeared adequate.

### *Concurrent Validity*

#### *Descriptive Statistics and Within Scale Correlations*

Means and standard deviations for each of the measures are presented in Table 2. Means for the CAPS Total, IES, PSS–SR,

Table 1
*Standardized Factor Loadings for the Final 29-Item Model of the Posttraumatic Cognitions Inventory (PTCI)*

| Item | Factor loading | Critical ratio |
|---|---|---|
| Negative Self subscale | | |
| 3 I am a weak person. | 0.578 | — |
| 5 I can't deal with even the slightest upset. | 0.597 | 5.04 |
| 6 I used to be a happy person but now I am always miserable. | 0.768 | 6.41 |
| 9 I feel dead inside. | 0.661 | 5.53 |
| 12 I am inadequate. | 0.588 | 7.39 |
| 14 If I think about the accident, I will not be able to handle it. | 0.494 | 5.14 |
| 16 My reactions since the accident mean that I am going crazy. | 0.531 | 4.79 |
| 17 I will never be able to feel normal emotions again. | 0.751 | 6.51 |
| 20 I have permanently changed for the worse. | 0.695 | 7.13 |
| 21 I feel like an object, not like a person. | 0.784 | 6.38 |
| 25 I have no future. | 0.728 | 5.99 |
| 26 I can't stop bad things from happening to me. | 0.471 | 5.08 |
| 28 My life has been destroyed by the accident. | 0.732 | 6.28 |
| 30 My reactions since the accident show that I am a lousy coper. | 0.750 | 7.32 |
| 33 I feel like I don't know myself anymore. | 0.822 | 6.58 |
| 35 I can't rely on myself. | 0.706 | 6.45 |
| 36 Nothing good can happen to me anymore. | 0.695 | 6.39 |
| Negative World subscale | | |
| 7 People can't be trusted. | 0.754 | — |
| 8 I have to be on guard all the time. | 0.787 | 11.82 |
| 10 You can never know who will harm you. | 0.633 | 8.45 |
| 11 I have to be especially careful because you never know what can happen next. | 0.608 | 8.69 |
| 18 The world is a dangerous place. | 0.459 | 6.06 |
| 23 I can't rely on other people. | 0.670 | 10.60 |
| 27 People are not what they seem. | 0.696 | 10.60 |
| Self-Blame subscale | | |
| 1 The accident happened because of the way I acted. | 0.699 | — |
| 15 The accident happened to me because of the sort of person I am. | 0.678 | 9.38 |
| 19 Somebody else would have stopped the accident from happening. | 0.561 | 8.17 |
| 22 Somebody else would not have gotten into this situation. | 0.647 | 8.42 |
| 31 There is something about me that made the accident happen. | 0.826 | 10.15 |

*Note.* Deleted items include Items 2 "I can't trust that I will do the right thing," 4 "I will not be able to control my anger and will do something terrible," 24 "I feel isolated and set apart from others," and 29 "There is something wrong with me as a person." Dashes indicate that factor loadings were not estimated, as they were set to 1. Posttraumatic Cognitions Inventory items from "The Posttraumatic Cognitions Inventory (PTCI): Development and Validation," by E. B. Foa, A. Ehlers, D. M. Clark, D. F. Tolin, and S. M. Orsillo, 1999, *Psychological Assessment, 11,* p. 313. Copyright 1999 by the American Psychological Association.

STAI, and BDI resemble those reported in separate samples of individuals with and without PTSD following an MVA (e.g., Blanchard & Hickling, 1997). Pearson correlations were computed to examine the relationships within the obtained subscales of the PTCI. As shown in Table 2, the observed correlation between the SELF and the WORLD subscales was high ($r = .57$, $p < .0001$), the correlation between the SELF and BLAME subscales was moderate ($r = .26$, $p < .005$), and the correlation between the WORLD and BLAME subscales ($r = .13$, *ns*) was low. In each case, these obtained correlations between subscales of the PTCI were significantly lower ($p < .05$) than those reported by Foa et al. (1999).

### *Correlation With Measures of PTSD, Anxiety, and Depression*

The next step involved computation of the zero-order correlations between each PTCI subscale and measures of PTSD, anxiety, and depression. As noted in Table 2, the SELF and WORLD subscales showed significant correlations ($p < .05$) with the CAPS Total score, the Intrusion and Avoidance subscales of the IES, and the PSS–SR. In all cases, these correlations were moderate to high. In contrast, the BLAME subscale did not correlate significantly with any of the PTSD measures. Correlations between the total score on the PTCI and the PTSD measures were significant ($p < .05$), as expected.

A similar pattern was observed for the anxiety and depression measures. The SELF and WORLD subscale showed moderate to high correlations with the State and Trait scales of the STAI and the BDI ($p < .05$). Only the Trait scale showed a significant correlation with the BLAME subscale. Correlations between the total score on the PTCI and the anxiety and depression measures were all significant ($p < .05$, see Table 2). Comparison of these obtained correlations with those reported by Foa et al. (1999) indicated that in the present study, correlations between the

Table 2
*Means, Standard Deviations, Alpha Coefficients, and Zero-Order Correlations Among Obtained Posttraumatic Cognitions Inventory (PTCI) Subscales and Measures of Posttraumatic Stress Disorder (PTSD), Anxiety, and Depression*

| Measure | Negative self | Negative world | Self-blame | Total | *M* | *SD* | $\alpha$ |
|---|---|---|---|---|---|---|---|
| PTCI | | | | | | | |
| Negative Self | — | | | | 2.89 | 1.32 | .93 |
| Negative World | **.57** | — | | | 4.21 | 1.32 | .84 |
| Self-Blame | **.26** | .13 | — | | 1.88 | 1.26 | .81 |
| Total | **.83** | **.77** | **.62** | | 8.98 | 2.89 | .93 |
| PTSD measures | | | | | | | |
| CAPS Total | **.50** | **.38** | −.05 | **.38** | 46.61 | 24.44 | .93 |
| IES-Intrusion | **.43** | **.42** | −.06 | **.36** | 16.64 | 11.04 | .91 |
| IES-Avoidance | **.50** | **.40** | −.01 | **.41** | 17.72 | 11.11 | .87 |
| PSS–SR | **.59** | **.54** | .01 | **.52** | 22.06 | 13.60 | .93 |
| Anxiety measures | | | | | | | |
| STAI-State | **.66** | **.36** | .13 | **.52** | 44.17 | 16.59 | .97 |
| STAI-Trait | **.79** | **.56** | **.22** | **.71** | 46.36 | 12.72 | .94 |
| Depression measure | | | | | | | |
| BDI | **.73** | **.55** | .08 | **.62** | 16.92 | 10.29 | .91 |

*Note.* Values listed in boldface are significant ($p < .05$). CAPS = Clinician-Administered PTSD Scale; IES = Impact of Event Scale; PSS–SR = PTSD Symptom Scale—Self-Report; STAI = State–Trait Anxiety Inventory; BDI = Beck Depression Inventory.

BLAME subscale and the BDI, STAI-S, and STAI-T were significantly lower ($p < .05$). As well, correlations between the total PTCI score and the BDI and STAI-S subscale were significantly lower ($p < .05$) than those reported by Foa et al. (1999).

### *Correlations Controlling for State Anxiety and Depression*

To examine whether there is a relationship between the PTCI and PTSD severity when anxiety is controlled, partial correlations were calculated between the PTCI subscales and the CAPS Total score, partialling out STAI-S scores. The same pattern was observed, specifically significant partial correlations between the SELF subscale ($pr = .35$, $p < .05$), the WORLD subscale ($pr = .28$, $p < .05$), and PTCI Total score ($pr = .22$, $p < .05$) and the CAPS Total score, and the partial correlation between the BLAME subscale remained nonsignificant ($pr = -.11$, *ns*). A similar analysis, examining whether the relationship between the PTCI and PTSD severity remained once variation in depression (BDI) was controlled, revealed a different pattern. The partial correlation between the SELF subscale and CAPS Total score remained significant ($pr = .27$, $p < .05$), while the remaining partial correlations were nonsignificant (WORLD, $pr = .16$, *ns*; BLAME, $pr = -.09$, *ns*; PTCI Total, $pr = .13$, *ns*).

### *Correlation With Related Measures of Psychosocial Functioning*

*Quality of life.* Examination of correlations between the obtained subscales of the PTCI and the QOLI indicated moderate to strong interrelationships between negative thoughts about the self and the world and reduced quality of life (see Table 3).

*Perceived social support.* As noted in Table 3, significant negative correlations were noted between each of the PTCI subscales and total scores and the three MSPSS subscales reflecting social support from family, friends, and significant others ($p < .05$).

*Thought control strategies.* As shown in Table 3, negative thoughts about the self were negatively correlated with the use of distraction and social control, and positively correlated with self-punishment and worry ($ps < .05$). The Reappraisal subscale of the TCQ did not correlate with the SELF subscale. The WORLD subscale of the PTCI was negatively correlated with the Distraction subscale and positively with both the Self-Punishment and Worry subscales of the TCQ. The Social Control and Reappraisal subscales of the TCQ did not correlate significantly with the WORLD subscale. The BLAME subscale of the PTCI correlated significantly only with the Self-Punishment subscale of the TCQ ($p < .05$). The total score of the PTCI correlated significantly with the Distraction, Social Control, Self-Punishment, and Worry subscales of the TCQ ($ps < .05$). As noted in Table 3, internal consistency was not high for the Self-Punishment and Reappraisal subscales of the TCQ.

### *Discriminant Validity: Social Desirability*

The correlation between each obtained subscale of the PTCI and the M-C was examined, as shown in Table 3. Only the correlation between the BLAME subscale and the M-C was significant ($p < .05$). To explore this association further, two hypotheses were examined. First, a partial correlation was computed between the BLAME subscale and the M-C, controlling for ratings of responsibility for the accident as assessed in the MVA Interview (sample $M = 14.05$, $SD = 28.32$). This analysis was undertaken to examine whether an individual's perception of being responsible for the accident explained a notable amount of variance in the association

Table 3
*Means, Standard Deviations, Alpha Coefficients, and Zero-Order Correlations Among Obtained Posttraumatic Cognitions Inventory (PTCI) Subscales and Measures of Quality of Life, Social Support, Perceived Thought Control, and Social Desirability*

| Measure | Negative self | Negative world | Self-blame | Total | *M* | *SD* | α |
|---|---|---|---|---|---|---|---|
| Quality of life | | | | | | | |
| QOLI | **−.65** | **−.45** | −.14 | **−.56** | 0.89 | 1.77 | .85 |
| Social support | | | | | | | |
| MSPSS-Family | **−.33** | **−.33** | **−.21** | **−.40** | 5.18 | 1.46 | .91 |
| MSPSS-Friends | **−.42** | **−.48** | **−.26** | **−.52** | 5.49 | 1.14 | .87 |
| MSPSS-Significant Other | **−.28** | **−.31** | **−.34** | **−.41** | 5.77 | 1.45 | .94 |
| Thought control | | | | | | | |
| TCQ-Distraction | **−.40** | **−.20** | −.10 | **−.32** | 15.52 | 3.57 | .82 |
| TCQ-Social | **−.27** | −.15 | −.16 | **−.26** | 12.24 | 4.22 | .84 |
| TCQ-Punishment | **.38** | **.26** | **.27** | **.41** | 9.32 | 2.42 | .58 |
| TCQ-Worry | **.42** | **.31** | .15 | **.40** | 9.45 | 2.80 | .77 |
| TCQ-Re-appraisal | −.14 | −.07 | −.14 | −.16 | 13.06 | 2.99 | .65 |
| Social desirability | | | | | | | |
| M-C | −.10 | −.07 | **−.21** | −.17 | 18.38 | 5.62 | .82 |

*Note.* Values listed in boldface are significant ($p < .05$). QOLI = Quality of Life Inventory; MSPSS = Multidimensional Scale of Perceived Social Support; TCQ = Thought Control Questionnaire; M-C = Marlowe–Crowne Social Desirability Scale.

between social desirability and the BLAME subscale[1] and revealed a nonsignificant partial correlation ($pr = -.17$), suggesting that perceptions of responsibility influence the discriminant validity of the BLAME subscale. Second, the role of litigation was examined to determine whether this variable influenced scores on the BLAME subscale, presumably by reducing participants' willingness to acknowledge their own role in the MVA. A *t* test, which contrasted participants who were involved in litigation ($n = 73$) with those who were not ($n = 32$) was not significant, $t(103) = -1.34$, *ns*[2].

### *Discriminative Validity: Differences Between Individuals With and Without PTSD*

To examine whether the obtained subscales of the PTCI would discriminate between individuals with varying levels of symptom severity of PTSD, a series of analyses of variance were conducted. These analyses included individuals with full-syndrome PTSD, as well as individuals who met diagnostic criteria in two of the three symptom clusters, defined as subsyndromal PTSD (Asmundson, Norton, Allerdings, Norton, & Larsen, 1998). Three groups of patients were formed: (a) full-syndrome PTSD (PTSD+, $n = 54$), (b) subsyndromal PTSD (sub-PTSD, $n = 29$), and (c) no PTSD (PTSD−, $n = 29$). Scores for each obtained subscale and the total score of the PTCI were computed for these three groups (see Table 4). Significant between-groups differences were noted on the SELF subscale, $F(2, 109) = 11.87$, $p < .0001$; the WORLD subscale, $F(2, 109) = 3.26$, $p < .05$; and the PTCI Total score, $F(2, 109) = 3.58$, $p < .05$. Follow-up tests, using the Bonferroni procedure, indicated that the PTSD+ group scored significantly higher than the sub-PTSD and PTSD− groups on the SELF subscale. On the WORLD subscale and the PTCI Total score, the PTSD+ group scored significantly higher than the PTSD− group.

Because the groups differed with respect to their use of psychotropic medication, $\chi^2(2, N = 112) = 7.45$, $p < .05$, and the presence of pain complaints, $\chi^2(2, N = 112) = 7.14$, $p < .05$, the analyses were repeated using analysis of covariance to control for these variables. When controlling for medication use (coded as *yes*/*no*), the covariate did not affect the obtained group differences on the SELF subscale, $F(2, 108) = 10.28$, $p < .0001$, and the PTCI Total score, $F(2, 108) = 3.00$, $p < .05$, although the WORLD subscale was no longer significant, $F(2, 108) = 2.43$, $p = .09$. When controlling for the presence of pain complaints (coded also as *yes*/*no*), a similar pattern was noted. The covariate did not affect the group differences on the SELF subscale, $F(2, 108) = 10.98$, $p < .0001$, and the PTCI Total score, $F(2, 108) = 3.79$, $p < .02$, although the WORLD subscale was no longer significant, $F(2, 108) = 2.51$, $p = .08$.

Last, a discriminant function analysis was conducted to examine the specificity and sensitivity of the obtained PTCI subscales in identifying individuals with and without PTSD. For this analysis, the sub-PTSD and PTSD− groups were combined. The three obtained PTCI factors loaded on one function which classified 76% of this sample correctly into those with and without PTSD, Wilks's $\lambda = .77$; $\chi^2(3, N = 112) = 28.47$, $p < .0001$. Sensitivity was .70, and specificity was .81. The structure matrix of correlations between discriminating variables and the one discriminant function suggested that the SELF subscale ($r = .84$), relative to the WORLD subscale ($r = .31$) and the BLAME subscale ($r = -.18$), provided the best contribution to the one obtained function.

[1] This hypothesis was explored, in part, because of the observation of a significant correlation ($r = 0.53$) between perceptions of responsibility and the BLAME subscale, although perceptions of responsibility did not correlate significantly with the M-C ($r = -0.06$).

[2] A similar analysis with the SELF and WORLD subscales likewise revealed nonsignificant differences between participants who were involved in litigation versus those who were not, $t(103) = 1.39$, *ns*, and $t(103) = 0.12$, *ns*, respectively.

Table 4
*Posttraumatic Cognitions Inventory (PTCI) Scores for Participants With Full-Syndrome Posttraumatic Stress Disorder (PTSD), Subsyndromal PTSD (Sub-PTSD), and No PTSD (PTSD−)*

| | Full-syndrome PTSD ($n$ = 54) | | Sub-PTSD ($n$ = 29) | | PTSD− ($n$ = 29) | | |
|---|---|---|---|---|---|---|---|
| PTCI Subscale | *M* | *SD* | *M* | *SD* | *M* | *SD* | *p* |
| Negative Self | 3.46 | $1.28_{a}$ | 2.46 | $1.06_{b}$ | 2.27 | $1.20_{b}$ | .001 |
| Negative World | 4.44 | $1.20_{a}$ | 4.30 | $1.28_{a,b}$ | 3.69 | $1.45_{b}$ | .05 |
| Self-Blame | 1.76 | 1.12 | 2.01 | 1.21 | 1.99 | 1.55 | *ns* |
| Total | 9.66 | $2.60_{a}$ | 8.76 | $2.55_{a,b}$ | 7.94 | $3.44_{b}$ | .05 |

*Note.* Means within a row that share common subscripts do not differ ($p < .05$).

## Discussion

This study examined the factor structure, internal consistency, concurrent validity, discriminant validity, and discriminative validity of the PTCI using a sample of individuals who had experienced a serious MVA. Results generally supported the three-factor structure of the PTCI: (a) Negative Cognitions About Self, (b) Negative Cognitions About the World, and (c) Self-Blame. However, the Negative Cognitions About the Self subscale was shortened by four items to yield a model that approached an adequate fit to the data. Internal consistency was adequate for the three obtained subscales. Although each obtained subscale correlated significantly with the total score of the PTCI, the correlation between the WORLD and BLAME subscales was low and nonsignificant. Examination of correlations between the obtained subscales and measures of PTSD suggested a lack of concurrent validity with the BLAME subscale, although the other two subscales showed adequate associations with both self-report and clinician measures of PTSD. Similar findings were noted for self-report measures of anxiety and depression, although the BLAME subscale did correlate significantly with the Trait subscale of the STAI. The interrelationship between the obtained subscales of the PTCI and PTSD severity held when anxiety was controlled using partial correlations, indicating that the PTCI subscales accounted for unique variance in PTSD severity above and beyond state anxiety. When controlling for depression, only the SELF subscale continued to significantly correlate with PTSD severity, suggesting that the WORLD and BLAME subscales may share notable variance with depression in their association to the severity of posttrauma symptoms. Consideration of discriminant validity indicated that the BLAME subscale appeared to significantly correlate with a well-known social desirability measure, although this association was nonsignificant when a partial correlation was computed, controlling for perceptions of responsibility for the MVA. No difference was noted, however, when comparing scores on the BLAME subscale in participants who were involved in MVA-related litigation versus those who were not. When examining discriminative validity, the SELF and WORLD subscales were able to discriminate between individuals with and without PTSD. A discriminant function analysis indicated that the obtained subscales in combination are fairly accurate in discriminating between these subsamples, although only the SELF and WORLD subscales appear to be salient in this equation.

Comparison of the present results with the original development of the PTCI (Foa et al., 1999) yields a mixed picture. On one hand, the factorial structure of the PTCI was supported in this independent replication, with only minor modification to the SELF subscale. Indeed, Foa et al. (1999) suggested that this aspect of the PTCI probably could be shortened, a speculation that is supported by our data. Examination of the subscales representing negative thoughts about the self and about the world indicated adequate internal consistency and good concurrent, discriminant, and discriminative validity. On the other hand, the subscale representing self-blame did not show good concurrent validity, appeared to be potentially influenced by social desirability effects, and did not contribute to the categorization of individuals with and without PTSD.

It is possible that the BLAME subscale performed poorly owing to the nature of the sample used in this study. In particular, the original validation sample contained individuals who had experienced a sexual assault, a trauma that is particularly likely to result in reactions characterized by self-blame (Koss et al., 2002). As documented by other authors, thoughts of self-blame are a central cognitive aspect of rape and are linked in important ways to the development of maladaptive beliefs and social difficulties following sexual assault (e.g., Frazier, 2000; Frazier & Schauben, 1994). In Foa et al.'s (1999) initial report on the PTCI, individuals who had experienced a sexual assault scored significantly higher on the original three subscales, suggesting that inclusion of this group of trauma survivors may have influenced the psychometric qualities of the PTCI. The present sample did not include individuals who were experiencing posttrauma problems from a sexual assault and, as such, did not appear to be experiencing excessive self-blame. It is possible that the perceived lack of responsibility for the MVA in this sample was motivated by the presence of litigation, although examination of the role of litigation did not reveal differences between subgroups. That litigation status did not differentiate subgroups in this sample of MVA survivors generally is consistent with findings from other research groups examining the role of litigation in MVA-related PTSD (e.g., Bryant & Harvey, 2003). Alternatively, it may be that the participants in the sample were, in fact, not responsible for their MVAs and, therefore, did not blame themselves for the accident. As noted in Table 4, the Self-Blame subscale did not differentiate between individuals with and without PTSD following an MVA, indicating that this is not a central

cognitive feature of posttrauma recovery in this sample of road traffic accident participants. It would be interesting to compare cognitive features of PTSD following differing forms of trauma, to explore this hypothesis. This effort potentially could include other forms of negative cognitions, such as thoughts of betrayal and lack of trust (Freyd, 1996), as well as attributional style (e.g., Wenninger & Ehlers, 1998).

This study extends the available knowledge about the PTCI through inclusion of related measures of psychosocial functioning, specifically quality of life, social support, and thought-control strategies. The subscales reflecting negative thoughts about the self and about the world showed the expected pattern of relationships with the quality of life and social support measures. Likewise, the Self-Blame subscale showed the expected pattern of relationship with the social support measure. Consideration of the interrelationship between the obtained PTCI subscales and perceived thought control revealed some interesting findings. In particular, negative thoughts about the self were negatively correlated with the use of distraction and social control as methods of thought control. In contrast, self-punishment and worry were positively related to negative thoughts about the self among MVA survivors. A similar pattern was noted with the PTCI negative thoughts about the WORLD subscale (with the exception of a nonsignificant correlation with the social thought control subscale), suggesting similar approaches to controlling these two forms of maladaptive thoughts among MVA survivors. As expected, no correlation was noted between adaptive reappraisal and any of the three obtained subscales of the PTCI, as the adaptive Reappraisal subscale was designed to assess positive coping with dysfunctional thoughts (e.g., Reynolds & Wells, 1999). In contrast, self-punishment and worry have been noted to represent negative forms of thought control and to be associated with measures of anxiety in clinical samples (Reynolds & Wells, 1999). The significant correlations between these subscales of the TCQ and the PTCI reported here further support the negative function of these approaches to controlling negative thoughts. Although data are mixed with respect to the positive or negative function of distraction and social control as thought-control strategies (Wegner, 1989; Wells & Mathews, 1994), our data suggest that these approaches may be somewhat helpful for individuals who have experienced a serious MVA and are struggling with maladaptive trauma-related thoughts.

As with any empirical study, this study has certain limitations. Although we selected individuals who had experienced one of the more prevalent traumatic events, it is possible that the present results are unique to individuals who have experienced a serious MVA. Although a homogeneous sample represents a good methodological choice for a replication effort, future work of this type should involve more diverse clinical samples. Additionally, although we used CFA, modification indices were used to reduce the number of observed items. This exploratory technique provided improvement in model fit and yielded a revised model, which should be confirmed in an independent sample. As well, the majority of participants were Caucasian and female. Additional studies of the psychometric properties of the PTCI would be greatly enhanced by examination of the potential impact of ethnicity, particularly as racial differences have been reported on psychological measures among combat veterans with PTSD (e.g., Frueh, Smith, & Libet, 1996; Ruef, Litz, & Schlenger, 2000). It would also be useful to examine other parameters of the PTCI, such as its sensitivity to treatment-based changes, particularly interventions that are designed to address negative and dysfunctional cognitions (e.g., Resick & Schnicke, 1993).

In light of the importance of cognitive factors in the genesis and maintenance of PTSD, the PTCI represents an important addition to the measurement of posttrauma functioning. This measure appears somewhat robust from a psychometric perspective, although in the present study the subscale representing self-blame did not perform well. Refinement of this scale might include examination of the role of trauma type on the amount and degree of self-blame and whether this dimension impacts the psychometric qualities of the PTCI. At present, the PTCI appears to be a promising measure that deserves continuing attention.

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