POSTTRAUMATIC STRESS DISORDER SYMPTOMS AND INTIMATE PARTNER VIOLENCE PERPETRATION: EVIDENCE FOR THE ROLE OF SHAME PROCESSING BIAS

A Thesis in Psychology by Lauren M. Sippel

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Individuals with posttraumatic stress disorder (PTSD) are thought to experience internal “threats to the self,” characterized by negative, internal appraisals that generate the emotional shame response. Shame is also theoretically and empirically linked to perpetration of intimate partner violence (IPV). Little is known about early-stage processing of shame-relevant information and its influence on aggressive behavior within individuals with PTSD. Forty-seven community-recruited participants completed clinical interviews for PTSD symptoms, a self-report measure of IPV perpetration, and an emotional Stroop task. Partner reports of IPV were also obtained. Shame-relevant and neutral stimuli for the Stroop task were presented supraliminally (i.e., until vocal response) and subliminally (i.e., below threshold of conscious awareness, established through an individualized pretest). Results supported the primary hypotheses, as faster color-naming of shame compared to neutral words (thought to reflect congruence between shame words and self-schemas) mediated the relationship between PTSD and IPV perpetration. The mediation results for the subliminal presentation condition suggest that biased processing of shame-relevant information may occur without conscious awareness, which could set into motion a theorized series of processes (i.e., misinterpretation of ambiguous social stimuli as representing imminent rejection, avoidance and/or externalization of negative affect to protect self-image) that ultimately lead to IPV perpetration. Results suggest that psychotherapeutic approaches to PTSD and IPV should incorporate processing of shame.
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Chapter 1

INTRODUCTION

PTSD is a chronic, disabling psychological disorder that results from exposure to trauma. The overall lifetime prevalence of PTSD in the United States is 6.8% (NCS-R; Kessler, Berglund, Demler, Jin, & Merikangaset, 2005). Individuals suffering from PTSD encounter a variety of problems, including psychological comorbidity, occupational impairment, and elevated health care costs (Hofmann, Litz, & Weathers, 2002; Kessler, 2000; Walker et al., 2003). Many recent studies have focused on the “social ecology” of PTSD, or how social phenomena influence the development, maintenance, and recovery from PTSD (Charuvastra & Cloitre, 2008). For example, PTSD is related to relationship distress and reductions in social support (King, Taft, King, Hammon, & Stone, 2006; Riggs, Byrne, Weathers, & Litz, 1998).

Notably, PTSD is associated with elevated risk of intimate partner violence (IPV) perpetration in a variety of samples (Marshall, Panuzio, & Taft, 2005; Stuart, Moore, Gordon, Ramsey, & Kahler, 2006; Teten et al., 2010), and longitudinal and prospective studies of trauma-exposed children suggest a causal relationship (e.g., Fang & Corso, 2008). Furthermore, PTSD symptoms have been found to mediate the link between trauma severity and IPV perpetration in adults (Taft, Vogt, Marshall, Panuzio, & Niles, 2007).

IPV is a serious national public health problem. Representative community studies demonstrate that at least 1 in 5 couples in the United States experiences IPV each year (e.g., Schafer, Caetano, & Clark, 1998), with men and women exhibiting similar rates of IPV perpetration (Archer, 2000). IPV victimization is associated with increased risk of physical and mental health problems (Coker et al., 2002), and annual costs of IPV exceed $5.8 billion each year (National Center for Injury Prevention and Control, 2003). PTSD has not yet been
adequately incorporated into theories of IPV perpetration, which generally have mixed empirical support, particularly among community samples on whom research is sparse (Bell & Naugle, 2008). Conclusions about IPV based on clinical samples are also not necessarily generalizable to all populations manifesting IPV behaviors (O’Leary, 2000). Understanding of mechanisms underlying the relationship between PTSD and IPV perpetration in general and particularly among community samples remains limited.

Contemporary conceptualizations of the causal link between trauma, PTSD symptoms, and IPV perpetration are primarily based on information processing models adapted for social information, which posit that individuals with PTSD exhibit overgeneralized threat appraisals of socially threatening information (e.g., Chemtob, Novaco, Hamada, Gross, & Smith, 1997). In the context of intimate relationships, individuals with PTSD may be hypervigilant to ambiguous social cues and apt to misperceive benign partner behaviors as indicating probable social threat (e.g., rejection). Such misperceptions could strengthen hyperarousal, which impairs adaptive reappraisal of social cues and inhibits the individual’s ability to control aggressive responses. Preliminary research suggests that later-stage deficits in social information processing (i.e., SIP), including misattribution of partners’ behavior to partners’ negative intentions and decision making processes in response to negative marital interactions, mediate the direct relationship between PTSD and male-perpetrated IPV (Taft, Schumm, Marshall, Panuzio, & Holtzworth-Munroe, 2008). Further understanding of early-stage information processing factors that elicit social threat and contribute to IPV within PTSD is warranted.

Ehlers and Clark (2000) theorize that PTSD becomes persistent when individuals process trauma in a way that leads to a sense of current external (i.e., physical) and/or internal threat (i.e., threats to the view of oneself as a capable and acceptable person). In the context of trauma,
“threats to the self” are negative, internal evaluative appraisals of one’s ability to defend against or cope with trauma and its aftermath (Foa & Rothbaum, 1998), which are theorized to generate shame (Dunmore, Clark, & Ehlers, 2001). Individuals with PTSD exhibit elevated levels of self-reported shame (Leskela, Dieperink, & Thuras, 2002) and post-trauma shame predicts PTSD symptoms over time (Andrews, Brewin, Rose, & Kirk, 2000). Namely, these evaluative threats to one’s activated self-schema are theorized to increase one’s propensity to perceive negative evaluation from others (Gilbert, Pehl, & Allan, 1994) and appraise ambiguous events as representing probable rejection (Claesson & Sohlberg, 2002). Shame therefore has a highly socially threatening nature (Lewis, 1974). In the context of relationships, “threats to the self” and shame can result in negative behaviors, perhaps due to feelings of inadequacy to perform in a needed manner and a desire to hide the incompetent self from others (Covert, Tangney, Maddux, & Heleno, 2003).

Individuals with PTSD may be especially prone to using maladaptive strategies to control “threats to the self” and shameful cognitions (e.g., avoidance; Roemer, Litz, Orsillo, & Wagner, 2001), which can occur automatically and with little awareness (Dunmore et al., 2001; McClelland, Koestner, & Weinberger, 1989). Under conditions in which individuals “bypass” (i.e., fail to acknowledge or avoid) shame and its associated cognitions, shame is theorized to lead to the deflection of self-blame and hostility toward the source of expected rejection in order to protect one’s pride and self-image and prevent further vulnerability (Elison, Pulos, & Lennon, 2006; Lewis, 1974). Consistent with this proposition, self-reported shame is associated with self-directed hostility, direct and displaced aggression, and IPV perpetration (Dutton, van Ginkel, & Starzomski, 1995; Tangney, Wagner, Hill-Barlow, Marschall, & Gramzow, 1996).
Because “bypassed” shame may be most relevant to IPV perpetration, however, implicit measurement of shame-related processes may be more valid for investigating the role of shame in the PTSD-IPV relationship. Psychopathology-related processes may be triggered by information that is too weak to produce verbal recognition and report (Nisbett & Wilson, 1977). In fact, behavioral responses to shame have been found to occur preemptively and without individuals’ explicit recognition that anticipation of shame influenced their behaviors (Schoeleber & Berenbaum, 2010). Shame is often experienced covertly and/or avoided in order to prevent increased negative affect (Elison et al., 2006), further compromising the use of self-report scales, which are also prone to the influence of social desirability and place heavy demands on respondents’ ability to identify painful cognitions (Kugler & Jones, 1992). Finally, implicit measures indicate activation of associations stored in memory without reflecting the individual’s belief in the strength of the associations, which may be especially relevant for measuring socially undesirable cognitions (Gawronski & Bodenhausen, 2006).

Cognitive psychology paradigms, which operate under the principle that concerns and expectations dispose individuals to selectively process information from their environments, have been used to isolate PTSD-related information processing abnormalities without relying on participants’ self-reports (Constans, 2005). Evidence suggests that emotionally significant and schema congruent content are prioritized in the competition for cognitive processing resources (Compton, 2003). Because trauma-exposed individuals’ self-schemas are characterized by shame (Dutra, Callahan, Forman, Mendelsohn, & Herman, 2008) and associative networks including previous shame experiences may make shame representations readily accessible by subtle cues (Dalgleish, 1994), an individual who experiences more covert shame may preferentially process shame-relevant stimuli implicitly. Such implicit processing could facilitate negative appraisals of
ambiguous social situations and serve as an initial step in a cascade of processes that contribute to IPV perpetration.

The emotional analog of the Stroop task (Stroop, 1935) is the most frequently used paradigm for investigating psychopathology-related processing biases (Williams, Mathews, & MacLeod, 1996). In the original Stroop task, participants are asked to name the ink colors of words denoting color (e.g., “red,” “yellow”). Participants typically respond faster on trials in which ink color is congruent with word content (e.g., “red” printed in red) than trials in which ink color is incongruent with word content (e.g., “red” printed in yellow), suggesting that the task measures efficiency of processing compatible, versus incompatible, information (MacLeod & MacDonald, 2000). In the emotional Stroop task, participants are asked to name the ink color of emotionally significant and neutral words (Williams et al., 1996). For individuals for whom the word meanings are most salient, reaction time performance on the task of naming the colors differs according to word content. Given that shame words are thought to be congruent with trauma-exposed individuals’ self-schemas, it is expected that PTSD symptom severity will be associated with facilitated processing of shame words, operationalized as faster color-naming of shame words compared to neutral words. Increased effort in color-naming, leading to facilitated processing of emotional words, has been conceptualized as avoidance of the semantic content in order to avoid becoming overwhelmed by intrusive thoughts related to it (Constans, McCloskey, Vasterling, Bailey, & Mathews, 2004). Because avoidance has been identified as a primary maintenance factor in PTSD and as a means for coping with shame (Elison et al., 2006), this effect may be especially prominent in participants with more severe PTSD symptoms.

The subliminal presentation Stroop paradigm, in which word stimuli are presented too quickly for conscious recognition (e.g., 60ms) such that participants cannot construct override
strategies based on knowledge of the material, may be a sensitive measure of unacknowledged shame bias, in that it is used to identify automatic cognitive biases and current concerns operating outside of awareness (e.g., Mogg, Bradley, Williams, & Mathews, 1993). There is mixed support for the emotional Stroop effect in response to subliminally presented trauma-related words in PTSD samples (Buckley, Blanchard, & Neill, 2000), and null findings (e.g., McNally, Amir, & Lipke, 1996) could be due to inappropriate stimulus presentation durations that are typically assigned without consideration of individual differences in visual processing speed.

Most studies in PTSD have focused on processing of consciously perceived (i.e., supraliminal) stimuli, which is thought to include a combination of automatic and strategic processes that occurs at the post-recognition stage of information processing (Buckley et al., 2000). Earlier stage social information processes (e.g., perception, appraisal) influence later stages (e.g., attributions, decision-making), so valid conclusions about relationships between processing of shame cues and IPV in the context of PTSD must include investigation of both early- and late-stage processing of shame stimuli. The current study will therefore include both supraliminal and subliminal word presentation conditions.

It is proposed that individuals with PTSD may be especially likely to preferentially process shame-relevant information in an implicit manner, expect negative evaluation and rejection in ambiguous situations with one’s partner, and engage in maladaptive avoidance strategies to minimize discomfort, thereby leading to intimate partner violence perpetration. The goal of the current study is to test the first step in this model by investigating whether individuals with PTSD exhibit preferential processing of shame-relevant information and whether this processing functions as a mediating factor in the expected PTSD-IPV perpetration relationship.
Hypotheses

Using the emotional Stroop task as a measure of preferential cognitive processing, the current study tested the following hypotheses: (a) PTSD symptoms will be positively associated with IPV perpetration; (b) PTSD symptoms will be negatively associated with shame processing speed (i.e., color-naming reaction time differences between shame and neutral words); (c) shame processing speed will be negatively associated with IPV perpetration; and (d) shame processing speed will mediate the association between PTSD symptoms and IPV perpetration. Relations with shame processing speed are expected to occur for both the subliminal and supraliminal conditions when examined separately.

The components of the proposed process are not theorized to differ as a function of gender. Most theoretical and empirical attention has been paid to the links between men’s shame and aggression in clinical samples; however studies with community samples suggest that both men and women experience posttraumatic shame (Andrews et al., 2000) and perpetrate IPV (e.g., Archer, 2000), predictors of men’s and women’s IPV do not differ (Carney, Buttell, & Dutton, 2007), and female-perpetrated IPV cannot be attributed solely to self-defense (DeKeseredy & Schwartz, 1998). Finally, threats to self-schemas have been found to be associated with shame and self-protective reactions across genders (Ferguson, Eyre, & Ashbaker, 2000). Therefore, analyses will be conducted on a sample composed of both men and women, but possible differences will be explored.
Chapter 2

METHOD

Participants

For inclusion in a larger study of PTSD and relationship functioning, couples were screened over the telephone for probable PTSD in either partner using the PTSD Checklist, Civilian Version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993). Each recruited couple included at least one partner who met screening criteria for PTSD (i.e., PCL-C cut-score of 44; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). A total of 276 couples contacted the lab about the study, 157 of which completed the initial screening, but were not invited to participate because neither partner met the PTSD screening cut-score (n = 124 couples), partners were no longer interested in participating after completing the screening (n = 27), partners’ combined income exceeded $100,000 per year and/or either partner had more than six years post-high school education (n = 5), or partners were not cohabiting (n = 1). Income and education restrictions were included in order to maintain a sample representative of individuals typically served by community clinics and to add to the sparse literature on rural couples (Shannon, Logan, Cole, & Medley, 2006). As such, few full-time students (n = 6) and no university faculty were included in the current sample.

In order to establish a sample with a broad range of PTSD symptom severity, the partner with the greater PTSD severity based on responses to the Clinician Administered PTSD Scale (CAPS; Blake, Weathers, Nagy, & Kaloupek, 1995) administered during the laboratory session was included in the current analyses. The final sample consisted of 47 individuals (36 female) with a mean age of 37.93 years (SD =12.75). Participants self-identified as Caucasian (84.8%), biracial/multiracial (6.5%), Hispanic/Latino (4.3%), or African-American (4.3%). Participants’
mean relationship length was 13.72 years (SD = 13.20 years) and participants had an average of 0.98 children (SD = 1.21). Mean individual income was $1299 per month (SD = $1190). Participants had an average of 14 years of education (SD = 2.07) and 63.4% were currently employed.

**Apparatus and Materials**

**PTSD diagnosis.** Current PTSD symptoms were confirmed using the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995). The CAPS, a structured interview that assesses the frequency and intensity of each symptom using standard prompt questions and explicit, behaviorally-anchored rating scales, is commonly considered to be the gold standard in PTSD assessment (Weathers, Keane, & Davidson, 2001). The CAPS has demonstrated high interrater reliability (.92 - .99), high internal consistency (.73 - .85) and high convergent validity with other PTSD measures (Weathers et al., 2001). In the current sample, the internal consistency reliability coefficient was .89.

**Traumatic events.** The Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000) was used to assist in the determination of the primary trauma to be assessed during the CAPS interview. The TLEQ lists 22 types of potentially traumatic events and asks respondents to indicate if they experienced each event, and if so, how many times. The TLEQ also includes queries about fear, helplessness, horror, and which trauma currently causes the most distress. The TLEQ has demonstrated adequate levels of test-retest reliability and good content validity (Kubany et al., 2000).

**Intimate partner violence.** The Revised Conflict Tactics Scale (CTS2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996) is currently the most widely used self-report measure of partner aggression. Only the 12-item physical aggression subscale was used in the current study.
Participants indicated how many times during the past year (ranging from "never" to "more than 20 times") each partner engaged in the 12 behaviors. The CTS2 physical aggression subscale has good internal consistency and test-retest reliability among a variety of samples (O’Leary & Williams, 2006; Vega & O’Leary, 2007), as well as convergent validity across a wide range of measures (Straus, 2004). The internal consistency reliability coefficient was .76.

**Test for colorblindness.** Three widely used Ishihara (1939) color-blindness schemes were administered on a computer using E-Prime software (Version 2.0; Schneider, Eschman, & Zuccolotto, 2007) to ensure that participants could accurately identify the four colors in the emotional Stroop task.

**Subliminal threshold pretest.** In order to establish individualized stimulus thresholds to ensure that participants were unaware of the word content on subliminal trials, participants completed a lexical decision task in which they were asked to press one of two response buttons to indicate whether a word (e.g., “apple”) or a nonword (e.g., “fump”) was present in each trial (Merikle & Reingold, 1990). An adaptive staircase procedure was used to determine the stimulus onset asynchrony (SOA; i.e., the time between the presentation of the stimulus word and a pattern mask, a randomly generated pattern composed of overlapping uppercase letters that preserve few of the letters’ visual features) necessary to identify stimuli at chance level (Breitmeyer & Ogmen, 2006). A 60ms threshold, based on the refresh rate of the monitor and previous studies of subliminal processing in PTSD (e.g., McNally et al., 1996), was assigned to participants for whom individual exposure durations could not be calculated because their performance across different presentation times did not rise above chance level ($n = 4$).

**Emotional Stroop stimuli.** Stimuli included six categories of words (i.e., neutral, guilt, non-interpersonal negative and positive, and physical threat), some of which were used for
another study. Positive words were included to prevent development of negative response sets and habituation to negatively valenced words. Shame words were generated by the authors and undergraduate research assistants and taken from literature on posttraumatic shame (e.g., Wilson, Drozdek, & Turkovic, 2006). Words were subjected to two stages of ratings in which five clinical psychology graduate students rated each word for its relevance to each category on a scale from 0 (does not represent the indicated category) to 10 (represents the indicated category perfectly). The first rating included 300 words, of which approximately 50 could have been broadly considered shame-relevant. Graduate students were provided with empirically-informed definitions of each category when rating a reduced list of the 200 words more specific to one category according to the first round of mean ratings. Final mean ratings were then computed. Highly rated shame words for which there were no lexical norms in the English Lexicon Project (ELP; Balota et al., 2007) were discarded. The final twelve words for the shame category were chosen according to an algorithm meant to balance mean rating within the shame category ($M = 5.43$; range $= 3.8 – 9.9$), meaningful differences in ratings across categories (i.e., mean minimum rating difference between shame and other categories $= 4.3$), and overall length and abstractness. Nine of the twelve shame words were appropriate for K-6th grade (Paynter, Bodrova, & Doty, 2005). Word length was used as a proxy for abstractness/difficulty for words that had no published grade equivalence (i.e., belittle, humiliated, and pathetic; Chall & Dale, 1995). To reduce likelihood of inflated reaction times to emotion words, which are typically longer and have lower frequency of use than neutral words, word length, frequency, and orthographic neighborhood information was obtained for shame words through the ELP (Balota et al., 2007; Larsen, Mercer, & Balota, 2006). The ELP then generated neutral words with matching lexical characteristics. Shame words were belittle, contempt, exposed, hide, humiliated, incompetent,
insult, mock, pathetic, reject, scorn, and shame. Neutral words were brands, caller, closet, dental, fixing, laying, plates, puzzle, raises, rental, sticks, and trucks.

**Emotional Stroop task.** The task started with a black screen and a white fixation point. Participants were asked to name the color of word stimuli presented centrally against a black background in capitalized 24-point bold Arial font by speaking into the microphone as quickly as possible. Words were randomly paired with four text colors (i.e., red, yellow, blue and green), each used in exactly 25% of the trials. In the supraliminal condition, word stimuli were displayed until vocal response. Subliminal trials included a backward masking procedure in which pattern masks of the same color as the stimulus word followed the target at a SOA equal to the duration established in the pre-test. The mask remained displayed until vocal response. Words were presented in a fully randomized manner, and the supraliminal and subliminal presentation conditions were randomly intermixed. Each of the 72 word stimuli (including 12 shame and 12 neutral words) was presented twice in both conditions for a total of 288 trials (96 trials included in the current study). The fixed inter-trial interval was 500 ms. Vocal responses were recorded with a voice-activated dynamic microphone that was connected to the computer via a 5-button PST Serial response box (Psychology Software Tools, Pittsburgh, PA). E-Prime software (Schneider et al., 2007) calculated the delay between the onset of the stimulus word and the detection of the participant’s verbal response.

**Self-referential encoding task.** To confirm that shame stimuli sufficiently reflected participants’ self-schemas, participants were asked to indicate whether each of the words described him or her by pressing the appropriate key (i.e., “yes” or “no”). The task began with a fixation point presented for 500ms on a computer screen. Each trial consisted of the prompt "Describes me?" presented for 500 ms, followed by a 250 ms pause, presentation of a word from
the Stroop task in capitalized letters, and removal of the word from the screen after the participant’s response. The inter-trial interval was 1000 ms.

**Procedure**

Participants in the present sample were recruited from the community using newspaper and internet advertisements (71%), postcards and/or flyers placed in local businesses (22%), and postcards placed in a local outpatient mental health clinic (7%). Recruitment materials indicated that heterosexual couples in which at least one partner experienced a stressful life event should contact the laboratory.

The current study was part of a larger study conducted in one eight-hour session or in two four-hour sessions. All participants completed tasks in the current report during the first session. Men completed study procedures in the following order: CAPS, pretest (90 minutes later), and emotional Stroop and self-referential encoding tasks (consecutively administered 42 minutes later). Women completed procedures in the following order: pretest, emotional Stroop and self-referential encoding tasks (16 minutes later), and CAPS (90 minutes later).

**Data Analysis**

Continuous PTSD scores were used for the analyses because they improve statistical power, are more stable over time, display higher levels of reliability and validity, and yield a greater amount of clinically relevant information than straightforward categorical measures of psychopathology (Cohen, 1992; Watson, 2005; Widiger & Clark, 2000). Furthermore, taxometric analyses suggest that PTSD is a dimensional, rather than a categorical, disorder and PTSD may be more accurately conceptualized as an extreme reaction to traumatic life events than a discrete clinical syndrome (Broman-Fulks et al., 2006).
The couples’ highest report (i.e., either male or female partner report) of both partners’ IPV perpetration on the CTS2 was used to avoid under-reporting. CTS2 IPV perpetration scores were positively skewed, so logarithm transformations were pursued to normalize the data so parametric tests would be suitable (Judd, McClelland, & Culhane, 1995).

Only responses that were made between 100 ms and 4 s after word presentation were included in emotional Stroop analyses. A total of 75 (1.7%) shame and neutral trials were discarded. Stroop processing speed was calculated for each participant by subtracting the mean reaction time for neutral words from the mean reaction time for shame words (Mogg et al., 1993). Negative processing speed scores suggest faster color-naming of shame words than neutral words. Positive processing speed scores indicate slower color naming of shame words than neutral words. Separate processing speed scores were calculated for subliminal, supraliminal, and combined (subliminal and supraliminal) conditions, leading to three processing speed scores per participant. Of the 64 couples recruited into the study, 16 couples did not complete all study procedures due to technical difficulties and one participant’s data was not included because 25% of her trials had to be discarded.

Because of the strength of the directional hypotheses (Jones, 1952) and well-cited criticisms of null hypothesis testing (e.g., Cohen, 1994), particularly within small samples in which power is limited (Gardner & Altman, 1986), one-tailed tests were used to maximize power to detect small effects (Cohen, 1992). Bivariate correlations and a simple mediator model using Preacher and Hayes’ (2004) method, which provides greater statistical power for detecting effects in small samples than Baron and Kenny’s (1986) method, were examined. Preacher and Hayes’ method requires only that (1) there exists an effect to be mediated and (2) the indirect effect be statistically significant in the direction predicted by the mediation hypothesis. A
confidence interval for the indirect effect was obtained using a bootstrap approach (Bollen & Stine, 1990) based on Preacher and Hayes’ (2004) SPSS macro, which is a resampling technique for hypothesis testing that does not hold assumptions of normality of the sampling distribution. Possible gender differences were explored by investigating gender as a moderator of both paths in the simple mediation model simultaneously. This model offers the greatest power to detect conditional indirect effect (Preacher, Rucker, & Hayes, 2007).
Chapter 3

RESULTS

Descriptive Statistics

Descriptive statistics are displayed in Table 1. CAPS severity scores ranged from 13 to 102 ($M = 53.26$, $SD = 20.03$), indicating that a few participants with more severe PTSD symptoms than their partners were currently experiencing only mild symptoms of PTSD. Most participants reported moderate to severe symptoms of PTSD and twenty-eight participants (60%) met full DSM-IV criteria for PTSD. The seventeen participants (36% of the sample) who engaged in physical aggression according to either husband or wife highest report perpetrated an average of 12.12 physically aggressive acts in the past year ($SD = 21.11$). The mean subliminal threshold for participants who successfully completed the pretest was 56.37 ms ($SD = 22.58$). No individuals in the current sample were color-blind.

Associations Between Study Variables

Bivariate correlations are displayed in Table 1. As predicted, PTSD symptoms as indicated by CAPS severity score were significantly positively correlated with IPV perpetration ($r = .37$, $p < .01$). CAPS severity scores demonstrated a significant negative relationship with combined condition Stroop processing speed ($r = -.41$, $p < .01$) and processing speed in the subliminal ($r = -.35$, $p < .01$) and supraliminal conditions ($r = -.29$, $p < .05$). Combined condition processing speed was significantly negatively correlated with IPV perpetration ($r = - .31$, $p < .05$), as was processing speed in the subliminal condition ($r = -.36$, $p < .01$). Processing speed in the supraliminal condition demonstrated a statistically nonsignificant negative relationship with IPV perpetration ($r = -.12$, $ns$). There were significant positive relationships between the number of shame words labeled as self-referential and CAPS severity scores ($r =$...
.53, \( p < .001 \) and IPV perpetration \( (r = .31, p < .05) \). The number of self-referential shame words and combined \( (r = -.48, p < .001) \), subliminal \( (r = -.42, p < .01) \), and supraliminal \( (r = -.33, p < .05) \) processing speed were significantly negatively correlated, indicating that the more shame words endorsed as self-descriptive, the faster shame words were color-named in relation to neutral words.

**Mediation Analyses**

As displayed in Figure 1, the direct effect of CAPS severity scores on combined condition shame processing speed was statistically significant (\( \beta = -.41, p < .01 \)), the direct effect of combined condition shame processing speed on IPV perpetration was statistically significant (\( \beta = -.31, p < .05 \)), and the direct effect of CAPS severity scores on IPV perpetration was statistically significant (\( \beta = .37, p < .05 \)).¹ In addition, the effect of CAPS severity scores on IPV perpetration was reduced when accounting for the effect of shame processing speed (\( \beta = .029, ns \)). Results of the bootstrap analysis indicate that mediation was present (\( M = .0052, SE = .0043; 95\% CI = .0046-.0127 \)). When examined separately, mediation was present for the subliminal condition (\( \beta = .28, ns, M = .0058, SE = .0054; 95\% CI = .0048 -.0165 \)) and partial mediation was present for the supraliminal condition (\( \beta = .37, p < .05, M = .0004, SE = .0033; 95\% CI = .0003 -.0060 \)). As expected, the mediation model was not moderated by gender, as neither the interaction between CAPS severity and shame processing speed (\( B = .02, ns \)) nor between shame processing speed and IPV perpetration (\( B = .01, ns \)) was statistically significant.

¹ Expectation-maximization (EM) estimation was used to impute missing data for 17 participants. The pattern of results remained the same.
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<th>Variable</th>
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<td>1. CAPS severity score</td>
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<td>2. CAPS-B</td>
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<td>3. CAPS-C</td>
<td>.91***</td>
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<td>4. CAPS-D</td>
<td>.79***</td>
<td>.37**</td>
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<td>5. IPV perpetration</td>
<td>.37**</td>
<td>.23</td>
<td>.39**</td>
<td>.26*</td>
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<td>6. Combined presentation</td>
<td>-.41**</td>
<td>-.22</td>
<td>-.42**</td>
<td>-.34*</td>
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<td>7. Subliminal presentation</td>
<td>-.35**</td>
<td>-.13</td>
<td>-.39**</td>
<td>-.31*</td>
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<td>8. Supraliminal presentation</td>
<td>-.29*</td>
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<td>9. SRE words</td>
<td>.53***</td>
<td>.41**</td>
<td>.51***</td>
<td>.36**</td>
<td>.31*</td>
<td>-.48***</td>
<td>-.42**</td>
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*M* 53.26  15.23  21.09  16.94  .75  3.31  -8.93  15.94  3.19

*SD* 20.03  7.17  10.06  6.95  1.24  56.08  73.63  69.01  3.03

Range 13-102  1-31  3-41  2-32  0-4.64  -146-108  -254-138  -207-176  0-10

*Notes. N = 47. CAPS severity score = Clinician Administered PTSD Scale; CAPS-B = PTSD reexperiencing symptoms; CAPS-C = PTSD avoidance symptoms; CAPS-D = PTSD hyperarousal symptoms; IPV perpetration = CTS2 physical aggression scale, square root variety score, highest report; Processing speed = mean reaction time (RT) on shame words – mean RT on neutral words; SRE words = number of shame words endorsed as self-descriptive. *p < .05, **p < .01, ***p < .001, all one-tailed
Figure 1. Mediating effect of sham processing speed on the relation between PTSD and IPV perpetration.

Note. IPV = severity weighted, log-transformed physical aggression perpetration frequency—highest report; Shame processing speed = mean reaction time (RT) on shame words – mean RT on neutral words. β = standardized beta. Results consistent with imputation of missing data. *p < .05, **p < .01, all one-tailed.
Chapter 4

DISCUSSION

This study provides preliminary evidence that preferential processing of shame cues plays a role in the relationship between PTSD symptoms and IPV perpetration. As predicted, PTSD symptoms were positively associated with IPV perpetration and this relationship was mediated by facilitated processing of shame words across stimulus presentation conditions. The results for the subliminal condition are especially notable, in that they suggest that individual differences in the processing of shame cues occurs without conscious awareness and that this effect can be empirically measured. Overall, the findings of this study suggest that processing of shame stimuli warrants further investigation in the context of PTSD and IPV.

How Biased Shame Processing May Function in the PTSD-IPV Relationship

These preliminary findings are considered in light of a number of theoretical considerations. Results are consistent with and extend Taft and colleagues’ (2008) findings that biases in social information processing serve as mechanisms in the relationship between PTSD and IPV perpetration. While Taft and colleagues’ study included measurement of attributions and decision-making, this study was focused on an earlier social information processing variable, namely preferential processing of shame cues that may activate self-schemas and elicit social threat. Shame processing may serve as an early-stage warning of impending negative self-appraisals, rejection, and negative affect, which theoretically impair further adaptive cognitive processing, elicit avoidance strategies to manage distress, and increase likelihood of IPV perpetration.

These results also broadly support propositions that processing and regulation of shame may predict IPV perpetration in the context of trauma exposure. Dutton (1988) proposed that
trauma-exposed perpetrators of IPV are prone to interpreting ambiguous social cues as predicting rejection and abandonment (Dutton & Holtzworth-Munroe, 1997). Such biases are thought to be especially insensitive to reality and activated even when such threats are minimal (Russell, 2003). The subliminal results in particular support Lewis’s (1974) proposition that “bypassed” (i.e., unacknowledged) shame leads to externalization of blame and aggression toward the individual viewed as disapproving and rejecting (i.e., the intimate partner). According to these theories, results suggest the possibility that subtle hints of a partner’s negative evaluation could set into motion processes that contribute to aggression without the perpetrator’s conscious recognition of the cues or their mode of coping with distress.

**Implications for the Conceptualization of PTSD**

This is the first study to include measurement of implicit cognitive bias toward shame-relevant stimuli in PTSD. The results broadly support Ehlers and Clark’s (2000) assertion that PTSD is associated with internal “threats to the self,” which include shame-related cognitions and can generate shame and maladaptive strategies for coping with it. Results for the subliminal condition in particular suggest that preferential processing of shame-relevant cues may be especially subtle and difficult to identify. Past studies have demonstrated that post-trauma shame contributes to the course of PTSD symptoms (Andrews et al., 2000), and that the effects of shame are independent of fear, helplessness, and horror during trauma (Brewin, Andrews, & Rose, 2000). Despite these findings, “threats to the self” and shame have traditionally been neglected from diagnostic conceptualizations of PTSD. Assessing for shame in the aftermath of trauma could facilitate identification of those at elevated risk of severe reactions and problematic behaviors (e.g., IPV) and identify variables that could be targeted in therapy (Andrews et al., 2000).
Facilitated processing of shame-relevant stimuli, however, may not be specific to PTSD given that cognitive biases are thought to underlie most psychological disorders and shame is not specific to PTSD. Associations between degree of psychopathology and shame processing bias may be exhibited by individuals who present with psychological difficulties that are highly correlated with PTSD and typically include negative self-evaluative cognitions (e.g., depression, borderline personality disorder). PTSD, however, may serve as the prototype for the behavioral outcomes of this process given high rates of avoidance, social difficulties, and aggression in PTSD.

**Strengths, Limitations, and Future Directions**

The current study replicated the PTSD-IPV association that had previously been found in a mixed-gender community sample (Christopher, Pflieger, Canary, Guerrero, & Holtzworth-Munroe, 2008), among women arrested for IPV (Stuart et al., 2006), community and clinical samples of husbands (Taft et al., 2008; Taft et al., 2007), and male veterans (Marshall et al., 2005). While the use of a community sample suggests that these findings may not generalize to clinical samples, these results speak more generally to the phenomena of PTSD and shame processing and their possible influence on intimate relationships. Furthermore, this is the first study to link PTSD and IPV perpetration in a mixed-gender community sample using the CAPS. The few previous studies that investigated the PTSD-IPV relationship in community samples of adults used brief self-report inventories of PTSD symptoms (Christopher et al., 2008; Taft et al., 2008), which are typically intended to be used as screening, not diagnostic, instruments and do not demonstrate better positive predictive power than assessments of general distress (Shalev, Freedman, Peri, Brandes, & Sahar, 1997). These results therefore offer stronger evidence that
PTSD symptoms, rather than general distress, are related to IPV perpetration in community samples.

This study’s novel method for investigating shame sets it apart from studies with PTSD populations that included only self-report measures (e.g., Leskela et al., 2002) and brief open-ended questions (Andrews et al., 2000). This study also addressed methodological limitations in past Stroop studies, such as non-individualized presentation durations and lack of consideration for lexical characteristics of stimuli. Furthermore, PTSD symptom severity was associated with the number of shame words identified as self-descriptive, suggesting that the stimuli sufficiently represented participants’ self-schemas. These methodological considerations strengthen our confidence that results can be attributed to implicit cognitive processing of shame stimuli rather than design artifacts.

Statistical support for a mediation model based on cross-sectional data, however, does not allow for causal conclusions and the directionality of the model could function differently than hypothesized in this study (Preacher & Hayes, 2004). For example, shame could lead to PTSD. Individuals prone to making negative, internal appraisals might be more likely to experience “threats to the self” after trauma, thereby increasing risk for PTSD (Ehlers & Clark, 2000). A recent study found that trait shame predicted PTSD symptom severity, but its cross-sectional design limits causal conclusions (Robinaugh & McNally, 2010). Another possibility is that IPV perpetration leads to shame. As noted, however, the affective shame response is not thought to be synonymous with facilitated processing of shame relevant information, which may be a defensive cognitive process that has an adaptive function in some interpersonal contexts after trauma exposure (Shackman, Shackman, & Pollak, 2007). Therefore it far less likely that perpetrating IPV would lead to facilitated processing of shame stimuli. Future studies should
include experimental, prospective, and longitudinal designs to validate the temporal precedence and functional directionality of the factors in the proposed model.

This study was a preliminary investigation of the relationships between PTSD, processing of shame stimuli, and IPV, and did not include investigation of the theorized intermediate steps included in the overall model (e.g., propensity to experience and redirect shame in response to ambiguous social situations). Future studies could test whether facilitated shame processing predicts hostile responses to rejection oriented vignettes. Investigators could also use signal detection methodology to determine whether individuals with PTSD interpret ambiguous social cues as indicating negative evaluation and rejection. A recent study investigated shame aversion (i.e., the tendency to perceive shame as especially painful and undesirable), which could moderate the association between shame processing bias and IPV.

The current study also did not include examination of self-reported shame for aforementioned reasons. Future studies could include both implicit and explicit measures of shame, which likely would not strongly correlate and, as noted, are thought to measure different processes that may interact to generate behavior (Gawronski, LeBel, & Peters, 2007). It is possible that combinations of implicit shame processing and explicit recognition of shame may interact and differentially predict IPV. For example, individuals who do not exhibit preferential processing of shame stimuli but report shame may be more likely to exhibit withdrawal reactions to shame rather than redirection of self-hostility, whereas individuals who exhibit facilitated processing of shame stimuli and little endorsement of explicit shame might be most likely to behave aggressively (Lewis, 1974).

Mechanisms underlying the emotional Stroop task remain ambiguous despite its frequent usage for investigating cognitive bias in emotional disorders (de Ruiter & Brosschot, 1994).
Event-related potential (ERP) methodology provides sensitive measurement of the intensity and speed of cognitive processes proposed to underlie emotional Stroop performance (Thomas, Johnstone, & Gonsalvez, 2007), and could be used to directly investigate mechanisms underlying the processing bias observed in this study. ERPs would allow for determination of whether these effects are due to automatic sensory and word recognition processes (e.g., the N1 and P2 components; Naatanen, 1992; Sereno, Rayner, & Posner, 1998) versus more controlled and effortful stages of information processing (e.g., the P3 component; Luck, 2005). It has been proposed that reduced amplitude ERPs (e.g., P3) to threatening compared to neutral stimuli in PTSD samples may indicate extremely rapid cognitive avoidance initiated before any strategic shift of attention away from the stimulus (Holmes, Nielsen, & Green, 2008). Linking IPV perpetration and reduced P3 amplitude in response to shame words versus neutral words as a function of PTSD would further validate the proposed model.

The recruitment of participants through advertisements and flyers also poses potential problems of sample representativeness, in that couples may have responded to the advertisements because the study issues (i.e., “stressful life events and relationships”) had particular importance to them. While it is possible that screened individuals may have been more likely to endorse PTSD screening criteria in order to participate in the study, current results are based on structured clinical interviews (i.e., CAPS), not screening data. Few PTSD-IPV studies have been conducted with community samples, and future studies could attempt to replicate and extend the current findings with samples recruited through alternative recruitment methods.

It is also notable that the sample was composed of approximately 75% women, who are twice as likely to develop PTSD in their lifetimes (Kessler et al., 1995). This study is representative of studies of PTSD in the general population, which typically demonstrate higher
rates of PTSD in women (see Olff, Langeland, Draijer, & Gersons, 2007, for a review). Women’s greater susceptibility is proposed to be due, for example, to gender-specific exposure to traumas that are more likely to lead to PTSD or and gender-specific patterns of interactions between neuroendocrine functioning, cognitive appraisal, and coping (Olff et al., 2007). Power was insufficient in this study to examine findings by trauma type, but there is little evidence that trauma type is a major predictor for development of PTSD (Ozer, Best, Lipsey, & Weiss, 2003). It may be fruitful for future studies to include investigation of relationships between implicit shame bias and neuroendocrine responses to social threat and examine possible gender differences (Gruenewald, Kemeny, Aziz, & Fahey, 2004).

**Clinical Implications**

These results, while preliminary, support the proposition that shame-related processes serve as potential targets for therapy. Cognitive processing therapy for PTSD (CPT; Resick et al., 2008) incorporates processing of secondary emotions like shame. CPT may modify trauma-exposed individuals’ shame-laden appraisals of themselves, their trauma, and their post-trauma coping, which may attenuate preferential processing of shame stimuli. More generally, shame is associated with interpersonal problems, and IPV is only one notable indicator of the relationship distress and interpersonal problems faced by individuals with PTSD (Covert et al., 2003; Riggs et al., 1998). Reducing cognitive bias toward shame in couples therapy for PTSD could reduce PTSD symptoms could improve both relationship satisfaction, social support, and PTSD symptom severity (Tarrier & Humphreys, 2003; Zoellner, Foa, & Bartholomew, 1999).

Processing of shame could also be incorporated into standard interventions for IPV, which are most commonly based on the Duluth model and have shown only minimal influence on recidivism (Babcock, Green, & Robie, 2004). These programs have been criticized for their
limited theoretical consideration of proximal factors related to IPV (e.g., Whitaker et al., 2006). These findings suggest that consideration of early-stage processing biases toward shame as well as the more distal factor of perpetrators’ trauma histories, which may interfere with treatment, is warranted. For example, exposing, identifying, and modifying shameful cognitions in couples therapy for PTSD could modulate automatic processing of shame, serve to increase self-control, and reduce externalization of blame (Claesson & Sohlberg, 2002).
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