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Focus Article

The effects of shame on subsequent reactions to a trauma analog

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ABSTRACT

The current study examined the effects of experimentally-induced shame on subsequent reactions to a trauma analog. Participants were 88 college-aged women randomly assigned to a shame prime condition or to a control (neutral) condition. Participants then were presented with an analog trauma audiotape depicting dating violence. Participants reported intrusive thoughts relating to the trauma analog in the two days following the procedure. Negative (shame, guilt) and positive (pride, positive affect) emotions were monitored throughout the procedure. Results indicated that the shame prime successfully increased shame in the Shame condition alone. After the trauma analog, increases in shame were noted in both conditions. In contrast, guilt reduced in the Shame condition, while this emotion increased in the Control condition, contrary to hypothesis. Shame and guilt were somewhat volatile for participants in the Shame condition in the two days following the lab procedure, while individuals in the Control condition reported steadily decreasing levels of these emotions. No between-condition differences were noted in the frequency of intrusions in the two days following the laboratory procedure, contrary to hypothesis. Results are discussed in light of our current understanding of shame and its role in PTSD, with suggestions to guide future research.

1. Introduction

With publication of the Diagnostic and Statistical Manual fifth edition (DSM-5; American Psychiatric Association, 2013), posttraumatic stress disorder (PTSD) was re-classified from an anxiety disorder to a condition related to trauma and stressor exposure. This change included an expanded array of negative emotions in PTSD, such as shame, anger, and guilt. These emotions have been hypothesized to be particularly relevant for the emotional aftermath of interpersonal trauma (e.g., intimate partner violence [IPV], sexual assault), as traumatic events that are perpetrated by other people appear to be accompanied by a different social ecology, relative to non-interpersonal trauma (Charuvastra & Cloitre, 2008). The current report will focus on shame, which has been defined as a negative emotional state derived from negative self-evaluation (e.g., "I am bad"; Lewis, 1971). Shame has been shown to be correlated with PTSD symptoms in help-seeking samples of veterans (Leskela, Dieperink, & Thuras, 2002) and women who have experienced IPV (Beck, McNiff, Clapp, Olsen, Avery, & Hagewood, 2011; Street & Arias, 2001). Although shame has been recognized as relevant following interpersonal trauma, there has been little laboratory investigation of shame in a trauma context. Shame has been assessed within the script-driven imagery paradigm, but this methodology typically is used to examine central (e.g., Shin et al., 2000) or peripheral (e.g.,McDonagh-Coyle et al., 2001) nervous system responding. Additional laboratory work is needed to understand how shame impacts cognitive and emotional symptoms tied to PTSD. This is the research gap that the current report will begin to address, in a proof of concept study (Kazdin, 2017).

Shame has received some attention within theoretical discussions of PTSD. A prominent cognitive model of PTSD (Ehlers & Clark, 2000) hypothesizes that negative emotions may stem from perceptions of threat to the person's sense of self (e.g., "I deserve that bad things happen to me" or "I'm dead inside"; Ehlers & Clark, 2000, p. 322). Shame is particularly relevant in this model, given that this emotion stems from a generalized negative evaluation of the self (Lewis, 1971). Presumably, shame contributes to the aversiveness of the trauma memory and can account for enduring negative emotions and potentially, an increase in intrusive thoughts about the event. A report by Robinaugh and McNally (2010) supported this association, noting that individuals who recalled an event in their life that induced shame also

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reported memories of this event that were high in vividness and perceived to be central to their identity.

Considering the expanded definition of negative emotions that may be associated with PTSD, feelings of guilt may also follow trauma and may co-occur with shame. Unlike shame, which invokes negative affect about the person as a whole (e.g., "I am not competent"), feelings of guilt have been defined as stemming from critical self-evaluations of a specific action (either taken or not taken; e.g., "I should have known better than to date him" may be endorsed by a victim of IPV). Research consistently shows medium-sized correlations between cross-sectional measures of shame and guilt (Beck et al., 2011; Leskela et al., 2002; Street & Arias, 2001), suggesting the importance of assessing guilt alongside shame. Because shame appears more psychologically toxic than guilt (Robinaugh & McNally, 2010), in this study we experimentally induced shame prior to presentation of a trauma analog.

The trauma analog paradigm was used in the current study to examine the impact of laboratory-induced shame on subsequent responding to an analog trauma stimulus. This paradigm originally was developed by Horowitz (1969) and has been used effectively to study the development of negative emotions and intrusive thoughts as these processes contribute to post-trauma psychopathology. As reviewed by James et al. (2016), the trauma analog paradigm involves presenting participants with an analog trauma, typically films depicting traumatic events such as car accidents or sexual assault. Responses to the analog are thought to mirror symptoms experienced after an actual trauma and can include negative emotions and intrusive thoughts about the analog stimulus. Strengths of this paradigm include random assignment of participants to experimental conditions (preceding or in conjunction with the trauma analog stimulus) and control over extraneous variables. In the present study, the trauma analog was a previously-validated script that described a violent dating relationship (Rhatigan, Shorey, & Nathanson, 2011). Rhatigan and colleagues (2011) documented that this script produces moderate levels of shame and guilt. Because films depicting IPV are specific with respect to the abusive events and the characteristics of the victim, we selected a previously-validated script, delivered as an audiotape, as the trauma analog, as it would permit participants to imagine their personal involvement.

As noted, the role of shame as a prospective contributor to negative emotions and intrusive memories in a trauma context currently is unclear. Some of this lack of clarity stems from the fact that although shame may serve as a feature of PTSD, it may also precede a traumatic experience. For example, an individual may have feelings of shame stemming from a distal event (e.g., childhood neglect). Survey research suggests that upwards of 61% of children and youth will experience or witness victimization each year (e.g., Finkelhor, Turner, Ormrod, & Hamby, 2009), indicating that it would not be uncommon for an individual to experience feelings of shame prior to subsequent trauma exposure. However, as the role of shame has not been examined in an experimental or longitudinal context, it has been impossible to delineate the impact of shame on post-trauma functioning. Given this gap in the literature, laboratory research could be helpful in dismantling the role of shame before and after a trauma analog. In the current study, we randomly assigned participants to either a shame prime or a control (neutral) condition, prior to presentation of the audiotape describing IPV. Procedures used by deHooge, Zeelenberg, and Breugelmans (2007)) and Ketelaar and Au (2003) were used in designing the shame manipulation; specifically, participants were asked to write about a situation in their lives about which they currently felt ashamed. As noted in related studies, priming feelings of shame can influence subsequent negative responses, including dissociation, although in some cases, no differences have been noted among different variants of shame primes (e.g.,Dorahy et al., 2017). It is unknown whether priming feelings of shame will amplify shame immediately after a trauma analog, which might suggest that shame is an important peritraumatic response. Alternatively, shame may play a larger role in the days following trauma and be accompanied by shifts in post-trauma perceptions of oneself.

In the current study, we selected female participants who had not experienced IPV or sexual assault, to avoid potential confounds. Given that the purpose of the trauma analog paradigm is to provide a laboratory analog that permits examination of factors that prospectively shape trauma response, incorporating shame into this approach is a next step in the use of this paradigm. Because most previous studies examining shame following trauma have utilized cross-sectional data (e.g., Robinaugh & McNally, 2010), the current study represents a novel approach to prospectively exploring the association of shame with related emotions and trauma-related intrusions.

1.1. Aims and hypotheses

The current study had two aims. These two aims were examined using a laboratory design which included three phases. Parsing a complex design into three phases allowed a hypothesis-driven analytic strategy to be used. For the first aim, we were interested in the effect of the shame prime on both negative and positive emotions, before and after presentation of the trauma analog. Inclusion of both negative and positive emotional states allowed tracking of convergent (shame, guilt) and discriminant (pride, positive affect) state emotions across time.

Hypotheses for the first aim were mapped onto the three phases of the design. The first phase contrasted affect before versus after the shame manipulation. We hypothesized that individuals who received the shame prime would show increases in shame, relative to those in the control condition. Guilt was hypothesized to show a similar pattern as shame, given the observation of medium-sized correlations between guilt and shame. We hypothesized that positive affect and pride would show reductions in response to the shame condition, relative to the control condition. The second phase contrasted affect after the shame manipulation with affect after the trauma analog. We hypothesized that in response to the trauma analog, participants in both conditions would show an increase in shame and guilt and a decrease in positive affect and pride. No between-condition differences were anticipated in this phase. Although this hypothesis may seem counterintuitive, there was no a-priori reason to hypothesize that the shame prime would differently impact emotional responding immediately after the trauma analog, relative to the control condition. Instead, it was expected that shame and guilt would increase for both conditions immediately following the trauma analog, particularly given that previous research has found the analog used in the current study moderately increases feelings of shame and guilt (Rhatigan et al., 2011). The third phase examined affect immediately following the trauma analog and for each of the two days afterwards. We hypothesized that participants in the shame condition would experience elevations in shame and guilt in the two days following the laboratory procedure, relative to the control condition, reflecting data that documents shame as a negative emotion of long duration (e.g., Dorahy, Peck, & Huntjens, 2016; Robinaugh & McNally, 2010). No between-condition differences were hypothesized for positive affect and pride.

The second aim of this study was to examine the effect of the shame prime on intrusive thoughts about the trauma analog, in the two days following the experimental procedure. As reviewed by James et al. (2016), this is the typical interval of assessment in the trauma analog paradigm. Based on previous work (James et al., 2016) and the speculated role of shame in psychopathology, we hypothesized that individuals who had received the shame prime might report higher levels of intrusive thoughts about the trauma analog, relative to individuals in the control condition. If shame contributes to the aversiveness of the trauma memory and hence, drives an increase in intrusive thoughts (Ehlers & Clark, 2000), this hypothesis should be supported. This hypothesis is exploratory, given lack of previous work in this area. As well, we hypothesized that the number of intrusions would be more pronounced in the first day relative to the second day post-procedure owing to natural decay of responding over time (e.g.,

Table 1
Description of the sample.

	Total Sample		Control Group $n = 44$		Shame Group $n = 44$	
	n	%	*n*	%	*n*	%
Race						
Caucasian	40	45.5	25	56.8	15	34.1
African American	37	42.0	16	36.4	21	47.7
Hispanic	1	1.1	0	0.0	1	2.3
Asian	2	2.3	0	0.0	2	4.5
Other	8	9.1	3	6.8	5	11.4
Year in College						
First Year	54	61.4	26	59.1	28	63.6
Second Year	20	22.7	9	20.5	11	25.0
Third Year	11	12.5	6	13.6	5	11.4
Fourth Year	2	2.3	2	4.5	0	0.0
Fifth Year	1	1.1	1	2.3	0	0.0
Family Income						
Below 10,000	5	5.7	1	2.3	4	9.1
10–20,000	12	13.6	6	13.6	6	13.6
20–30,000	15	17.0	6	13.6	9	20.5
30–40,000	11	12.5	6	13.6	5	11.3
40–50,000	8	9.1	4	9.1	4	9.1
Over 50,000	37	42.1	21	47.8	16	36.4
			Mean	SD	Mean	SD
BDI-II			7.8	6.86	10.3	8.86
PCL-5			9.3	9.39	9.8	9.81

Note: BDI - II = Beck Depression Inventory-II; PCL-5 = PTSD Checklist-5.

Carleton, Sikorski, & Asmundson, 2010).

2. Method

2.1. Participants

The sample included 88 female students, recruited from Introduction to Psychology classes in exchange for course credit. To qualify, women needed to be between the ages of 18 and 25, not currently using psychotropic medication, not involved in psychotherapy, English speaking, and have no history of IPV exposure or sexual assault. As well, potential participants were screened for elevated PTSD symptoms and suicidal ideation, to reduce the risk from exposure to a trauma analog depicting IPV. The sample ranged in age from 18 to 23 (mean age = 18.9, SD = 1.29) and was largely Caucasian (45.5%, n = 40) and African American (42%, n = 37). Most were in their first (61.4%, n = 54) or second (22.7%, n = 20) year of undergraduate studies. The sample endorsed exposure to an average of 1.8 adverse events on the Traumatic Events Questionnaire (see below, SD = 1.34, range 0 to 6). Sample characteristics are shown in Table 1. Seventy-four additional participants were excluded from the study due to a past history of relationship abuse or sexual assault (n = 65) or reporting elevated PTSD symptoms (n = 9). An additional 9 participants dropped out of the study immediately following the laboratory procedure; their data are not included in the current sample.

2.2. Measures

2.2.1. Inclusion/exclusion measures

2.2.1.1. Trauma history. The Traumatic Events Questionnaire (TEQ; Blake et al., 1990) is a 19-item self-report measure, which includes a checklist of various traumatic life events. Each item has a response that best describes the individual's exposure to that event (e.g., experienced event directly). This measure was used to screen participants who had experienced a sexual assault or IPV.

2.2.1.2. Depression. The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) was used to assess symptoms of depression and potential suicidality. The BDI-II is a 21-item self-report scale that assesses affective, motivational, cognitive, and somatic symptoms of depression over the past two weeks using a 4-point Likert scale ranging from 0 (e.g., *I do not feel sad*) to 3 (e.g., *I am so sad or unhappy that I can't stand it*). Past research has supported the reliability and convergent and discriminant validity of the BDI-II (Sprinkle et al., 2002). Reliability for the scale in the current study was good (alpha = .90). The BDI-II was used to determine whether a potential participant was experiencing elevated suicidal ideation; a score of 2 or higher on the suicidal ideation item led to disqualification from participation. No participants were disqualified for elevated suicidal thoughts.

2.2.1.3. Posttraumatic stress disorder. Symptoms of PTSD (based on DSM-5) were measured with the PTSD Checklist – 5 (PCL-5; Weathers, Marx, Friedman, & Schnurr, 2014). The PCL-5 is a 20-item self-report measure that assesses PTSD symptoms on a 5-point Likert scale ranging from 0 (*Not at all*) to 4 (*Extremely*). In this study, the PCL-5 was referenced to any experienced trauma. Past research has supported the internal consistency, test-retest reliability, and convergent and discriminant validity of the PCL-5 (Weathers et al., 2014). Reliability in this sample was good (alpha = .89). A score of 38 or higher led to disqualification from the study as this cut-off suggested notably elevated levels of PTSD symptoms; this cut-off score was intended to ensure inclusion of participants with a range of PTSD symptoms, rather than serve as a diagnostic cut-score for possible PTSD (Blevins, Weathers, Davis, Witte, & Domino, 2015). The sample scores ranged from 0 to 37, with a sample mean of 9.6 (SD 9.55), indicating generally low levels of PTSD symptoms.

2.3. Outcome measures

2.3.1. Shame, guilt, and pride

The State Shame and Guilt scale (SSGS; Marschall, Sanftner, & Tangney, 1994) is a 15-item measure that assesses current feelings of shame, guilt, and pride with three 5-item subscales. Examples of shame items are "I want to sink to the floor and disappear" and "I feel like I am a bad person". Examples of guilt items are "I feel remorse, regret" and "I feel bad about something that I have done". Examples of pride items are "I feel good about myself" and "I feel worthwhile, valuable". The scale uses a 6-point Likert scale ranging from 0 (*Not feeling this way at all*) to 5 (*Feeling this way very strongly*). The SSGS was administered at five separate time points (see Procedure). Across time points, coefficient alpha for the shame subscale in this sample ranged from .69 to .92; coefficient alpha for the guilt subscale ranged from .80 to .95, while coefficient alpha for the pride subscale ranged from .89 to .93.

2.3.2. Positive and negative affect

The Positive and Negative Affect Scale (Watson, Clark, & Tellegen, 1988) consists of 10 items measuring state positive affect (PANAS-PA) and 10 items measuring state negative affect (PANAS-NA) on a 5-point Likert scale ranging from 1 (Not at all) to 5 (Extremely). Only the PANAS-PA was used in this report. Convergent and discriminant validity, as well as internal consistency and test–retest stability, have been demonstrated with the PANAS (Watson et al., 1988). The PANAS was administered at five separate time points (see Procedure). Across time points, coefficient alpha for the PANAS-PA subscale in this sample ranged from .88 to .93.

2.3.3. Intrusions

In keeping with many studies involving the trauma analog paradigm, intrusive thoughts about the violent dating vignette were recorded using a pen-and-paper diary (e.g., James et al., 2016). Participants were asked to note each occurrence of an intrusive memory of the audiotape as it occurred, during the two days following the laboratory procedure. To ensure that intrusive memories were an analogue of PTSD-based intrusions, participants were informed that these thoughts

needed to be spontaneous in occurrence and could take the form of words and phrases (described as "verbal thoughts") or a mental picture ("images") or both. Participants were asked to provide a brief description of the intrusion content (e.g., man grabbed woman's arm and pushed her down). A research assistant reviewed all participants' diary data to ensure that all entries satisfied the definition that was provided. Entries that involved intrusions that were not about the audiotape were excluded ($n = 1$). Data from this measure were calculated as total number of intrusions for Day 1 and for Day 2.

2.4. Procedure

All procedures were approved by the local Institutional Review Board. Each participant completed study procedures individually. Following the provision of informed consent, the participant was seated in a private room for the procedure. She completed the TEQ, PCL-5, and BDI-II as well as the baseline measure of the SSGS and the PANAS (Time 1). Eligible participants were then randomized to either the shame ($n = 44$) or the control ($n = 44$) condition. In the shame condition, participants were asked to write about a past experience that was currently causing feelings of shame. Shame was defined for participants. In the control condition, participants were asked to write about a typical day's schedule. The writings in both the shame and control conditions were checked by research personnel to ensure adherence with the experimental instructions; no deviations were noted. Each participant was given 10 min to complete this task by herself and then was asked to complete the SSGS and PANAS (Time 2). The participant then listened to the violent dating vignette by herself in the experimental chamber, using headphones. The audiotaped vignette lasted 5 min 33 s. Instructions asked participants to "imagine yourself experiencing the scene described next. Try to picture what this might be like and how you would respond if put in this position. It is important that you try to imagine that this is really happening to you". This vignette described a romantic relationship, beginning with when the couple first met and began dating, stated in the first person (e.g., "you met your current dating partner, Robert, several years ago …") and is available as supplementary material. The vignette described changes in Robert over time, wherein he becomes dominating, controlling, and psychologically abusive. The relationship devolves into physical abuse and the vignette ends with a description of the protagonist's thoughts about whether to leave Robert, how to function on her own, and whether her friends will believe her if she tells them that Robert has become abusive. This vignette was adapted from that used by Rhatigan et al. (2011), changing the social and family circumstances of the protagonist and her boyfriend to map onto the demographics of the study site. At the end of the violent dating vignette, the participant again completed the SSGS and PANAS (Time 3) and was instructed in the use of the intrusion diary. The participant was given a paper copy of the diary and asked to record intrusions as they occurred; she was asked to submit this information online via Survey Monkey at the end of each day. As well, participants completed the SSGS and PANAS in the evening of Day1 and Day2, when they entered their intrusion diary data. Participants who did not have access to a computer returned paper copies of these measures to the experimenter. At the completion of the procedure, participants were debriefed and thanked for their assistance.

2.5. Data analytic plan

Analyses were conducted in SPSS (version 24). As a first step, data were examined for univariate and multivariate outliers using guidelines from Tabachnick and Fidell (2012). Univariate outliers were assigned scores that were one point higher than the next most extreme score in their distribution. There were no multivariate outliers. Because the analytic approach is robust to deviations in skew and kurtosis with moderate sample sizes (Howell, 2009), data were not transformed.

The first aim focused on the four emotion measures. The design was parsed into three phases which were mapped onto the hypotheses. The first phase (contrasting affect before versus after the shame manipulation) used a Condition (Shame v Control) by Time (Time 1 v Time 2) ANOVA, with repeated measures on the last factor. In keeping with recommendations of Vasey and Thayer (1987), these analyses were run with the multivariate algorithm. The second phase (contrasting affect after the shame manipulation with after the trauma analog) used a Condition (Shame v Control) by Time (Time 2 v Time 3) ANOVA, with the same analytic approach as used for the first hypothesis. The third phase (examining affect immediately following the trauma analog and for each of the two days afterward) used a Condition (Shame v Control) by Time (Time 3 v Day 1 and v Day 2) ANOVA. In the event of a significant interaction (or main effect of Time for the third analysis), planned t-tests were used as they are robust in circumstances where assumptions of homogeneity are violated. We used Bonferroni correction, a conservative approach, to control the alpha level in all follow-up tests. Computation of effect size, using d, was included; values of 0.2, 0.5, and 0.8 were used as benchmarks for small, medium, and large effects, respectively (Cohen, 1988).

As noted, the second aim focused on intrusive thoughts about the trauma analog in the two days following the laboratory procedure. To examine this aim, a Condition (Shame v Control) by Time (Day 1 v Day 2) ANOVA was conducted, using the multivariate algorithm with a similar approach to dismantling significant effects as described previously.

3. Results

3.1. Equivalency of conditions

As noted in Table 1, comparison of the two conditions on sample characteristics did not reveal any reliable differences with respect to age (t (86) = 0.16, n.s.), race (χ^2 (5) = 6.71, n.s.), years in college (χ^2 (4) = 3.36, n.s.), or family income level (χ^2 (7) = 4.03, n.s.). As well, the two conditions did not differ with respect to scores on the BDI-II (t (80.94) = 1.45, n.s.) or PCL-5 (t (86) = 0.24, n.s.). This suggests that randomization was successful in producing two groups that did not reliably differ on these dimensions.

3.2. Aim 1: Examination of the effect of the shame prime on negative and positive emotions before and following a trauma analog

3.2.1. Phase 1: contrasting affect before versus after the shame prime (Time 1 v Time 2 by Condition)[2]

Shame (Fig. 1): Analysis of the shame variable revealed a significant Condition by Time interaction (F(1,85) = 9.39, p = .003). Follow-up tests were examined using Bonferroni-corrected t-tests (p = .013) which suggested no between-condition differences at Time 1 while the Shame condition reported significantly higher levels of shame at Time 2, relative to the Control condition (t (44.32) = 3.57, p = .001, d = .43). Within the Shame condition, Time 2 shame was significantly higher, relative to Time 1 (t (42) = 2.90, p = .006, d = .44). No significant between-time differences were noted in the Control condition.

Guilt (Fig. 1): Analysis of the guilt variable also revealed a significant Condition by Time interaction (F(1,84) = 35.186, p < .001). Follow-up tests suggested that no between-condition differences at Time 1, while the Shame condition reported significantly higher levels of guilt at Time 2, relative to the Control condition (t (44.77) = 6.29, p < .001, d = 1.34). Within the Shame condition, Time 2 guilt was

[2] The convergent state emotion data (shame, guilt) were re-analyzed, controlling for BDI-II scores, given a small, albeit nonsignificant, difference between the groups on this measure. The results of the re-analyses are identical to what is presented here. Interested readers may contact the first author for further details on the covariance analyses.

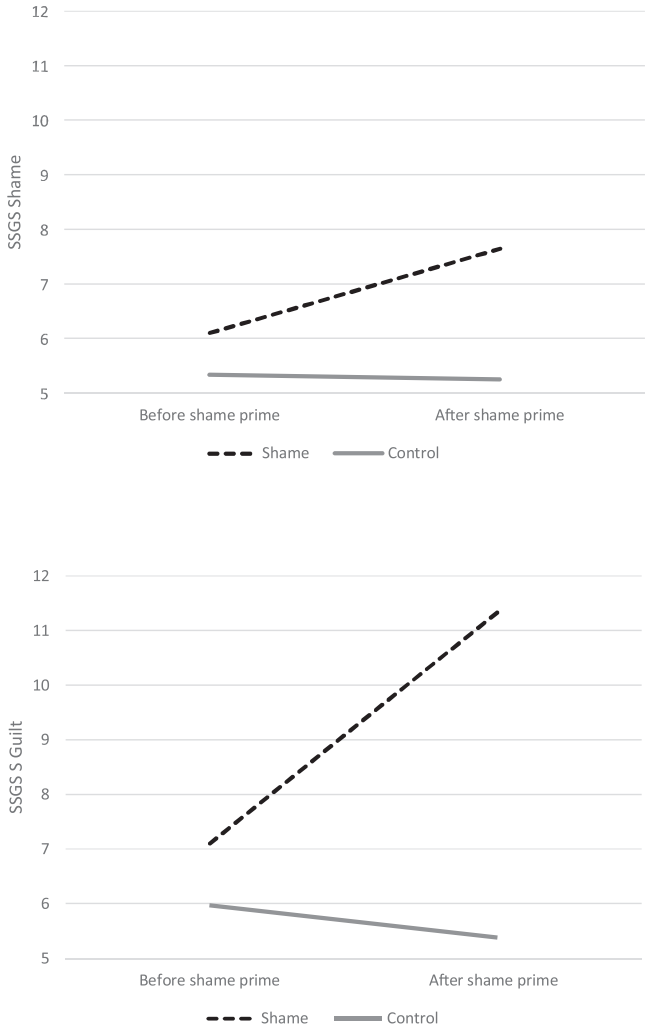

Fig. 1. Phase 1: Shame (top) and guilt (bottom) before and after the shame prime (Time 1 v Time 2 by Condition).

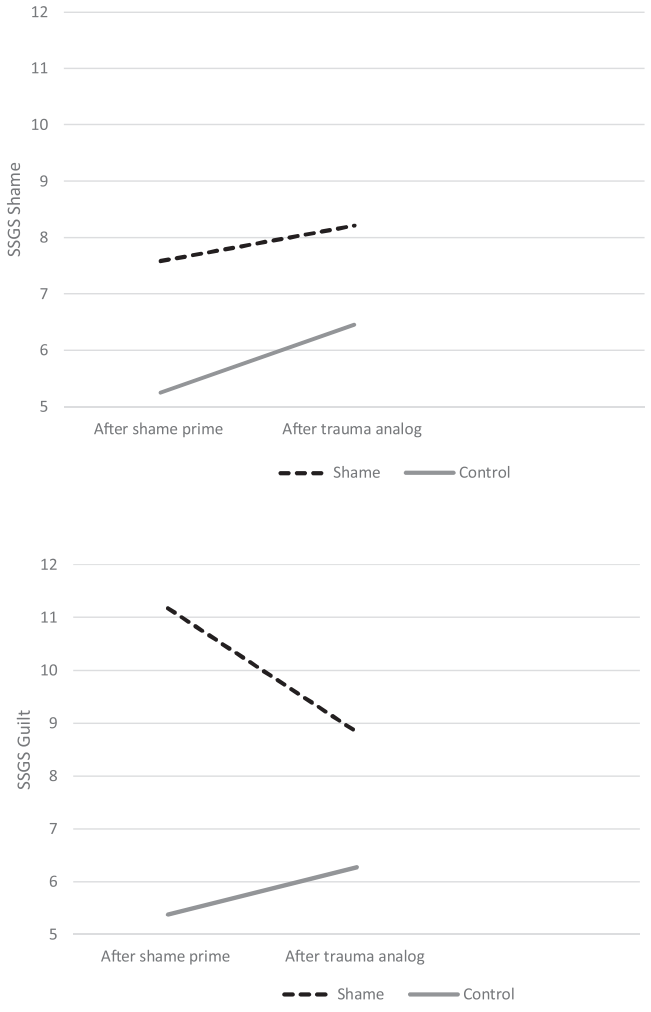

Fig. 2. Phase 2: Shame (top) and guilt (bottom) after the shame prime and after the trauma analog (Time 2 v Time 3 by Condition).

significantly higher, relative to Time 1 (t (41) = 5.27, $p <$ .001, d = .46). Within the Control condition, Time 2 guilt was significantly lower, relative to Time 1 (t (43) = 2.83, $p =$ .007, d = .43).

Pride: Analysis of the pride variable revealed a significant Condition by Time interaction (F(1,85) = 8.45, $p =$ .005). Follow-up tests were examined using Bonferroni-corrected t-tests ($p =$ .013) which suggested no significant between-condition effects at either Time 1 or Time 2. Within the Shame condition, Time 2 pride was significantly lower (mean 15.67, *SD* 5.96), relative to Time 1 (t (42) = 2.98, $p =$ .005; mean 17.30, *SD* 5.45). No significant within-time differences were noted in the control condition (Time 1: mean 17.47, *SD* 5.09, Time 2 17.81, *SD* 5.19).

Positive affect: Analysis of the positive affect variable revealed only a significant Time effect (F(1,86) = 4.15, $p =$ .045), indicating that positive affect at Time 1 (mean 29.80, *SD* 8.66) was significantly higher, relative to Time 2 (mean 28.78, *SD* 9.45; d = .11).

3.2.2. Phase 2: contrasting affect after the shame manipulation with affect after the trauma analog (Time 2 v Time 3 by Condition)[2]

Shame (Fig. 2): Analysis of the shame variable revealed only a significant Time effect (F(1,86) = 8.06, $p =$ .006), indicating that shame at Time 2 (mean 6.42, *SD* 3.27) was significantly lower, relative to Time 3 (mean 7.34, *SD* 3.88; d = .26).

Guilt (Fig. 2): Analysis of the guilt variable revealed a significant Condition by Time interaction (F(1,86) = 26.40, $p <$ .001). Follow-up tests were examined using Bonferroni-corrected t-tests ($p =$ .013) which suggested that the Shame condition reported higher levels of guilt at Time 2 (t (44.78) = 6.29, $p <$ .001, d = 1.34) and at Time 3 (t (57.24) = 3.12. $p =$ .003, d = .67), relative to the Control condition. Within the Shame condition, Time 3 guilt was significantly lower than Time 2 guilt (t (43) = 4.2, $p <$ .001, d = .42). Within the Control condition, guilt at Time 3 was significantly higher than at Time 2 (t (43) = 3.06, $p =$ .004, d = .56).

Pride: Analysis of the pride variable revealed a significant Time effect (F(1,86) = 13.48, $p <$ .001), indicating that pride at Time 2 (mean 17.39, *SD* 5.24) was significantly higher, relative to Time 3 (mean 16.76, *SD* 5.65; d = .28).

Positive Affect: Analysis of the positive affect variable also revealed a significant Time effect (F(1,86) = 20.35, $p <$ .001), indicating that positive affect at Time 2 (mean 28.78, *SD* 9.45) was significantly higher, relative to Time 3 (mean 26.00, *SD* 9.61; d = .29).

3.2.3. Phase 3: Contrasting affect immediately following the trauma analog with each of the two days afterward (Time 3 v Day 1 and v Day 2 by Condition)[2]

Shame (Fig. 3): Analysis of the shame variable revealed a significant Condition by Time interaction (F(2, 83) = 3.118, p = .05). Follow-up tests were examined using Bonferroni-corrected t-tests (p = .007) which suggested that the Shame condition reported significantly higher levels of shame at Day 2, relative to the Control condition (t (46.55) = 3.63, p = .001, d = .78). Within the Shame condition, the

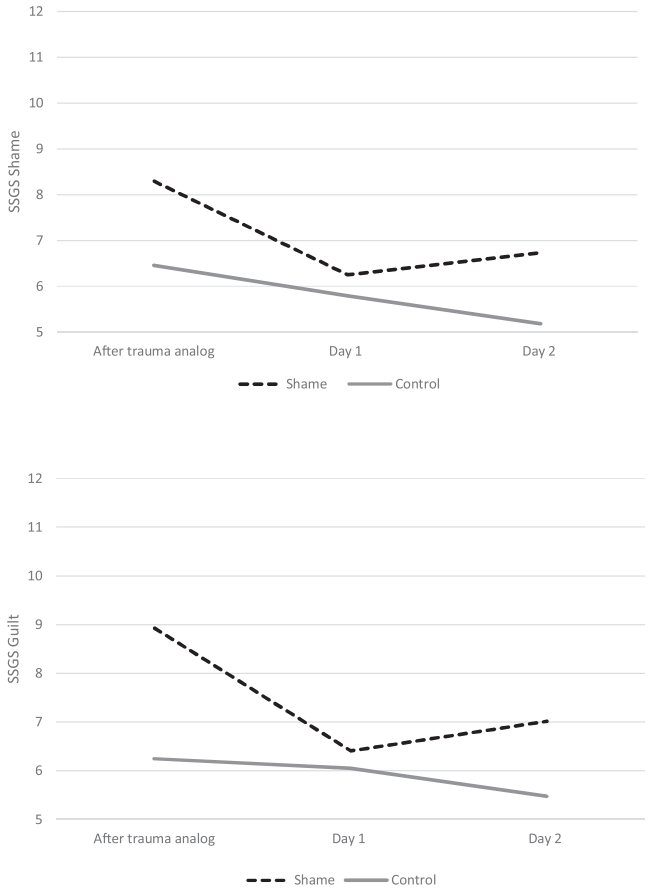

Fig. 3. Phase 3: Shame (top) and guilt (bottom) after the trauma analog and in the two days following the lab procedure (Time 3 v Day 1 and v Day 2 by Condition).

level of shame at Time 3 was significantly higher relative to Day 1 (t (42) = 3.13, p = .003, d = .55). Within the Control condition, the level of shame at Time 3 was significantly higher, relative to Day 2 (t (42) = 3.14, p = .003, d = .67).

Guilt (Fig. 3): Analysis of the guilt variable revealed a significant Condition by Time interaction (F(2,83) = 3.64, p = .03). Follow-up tests suggested that at Time 3, guilt scores in the Shame condition were significantly higher than those in the Control condition (t (57.24) = 3.12, p = .003, d = .67). Within the Shame condition, guilt scores at Time 3 were significantly higher, relative to Day 1 (t (42) = 3.42, p = .001, d = .64). No significant between-time differences were found for the Control condition.

Pride: Analysis of the pride variable revealed only a significant Time effect (F(2,83) = 9.78, p < .001), indicating that lower levels of pride were reported at Time 3 (mean 15.08, SD 6.04)[3] relative to Day 1 (t (86) = 4.21, p < .001, mean 17.01, SD 5.57; d = .32) and relative to Day 2 (t (86) = 3.43, p = .001, mean 16.84, SD 5.79; d = .30).

Positive Affect: Analysis of the positive affect variable failed to return any significant effects.

3.3. Aim 2: Examination of the effect of the shame prime on intrusive thoughts about the trauma analog in the two days after the laboratory procedure

Analysis of the number of intrusive thoughts revealed only a significant Time effect (F(1,84) = 13.59, p < .001), indicating the number of intrusions was higher in Day 1 (mean 1.36, SD 1.91), relative to Day 2 (t (85) = 3.71, p < .001, mean 0.84, SD 1.63; d = .29).

4. Discussion

In this study, we examined the role of experimentally-induced shame on subsequent reactions to a trauma analog, focusing on negative emotions (shame, guilt), positive emotions (pride, positive affect), and intrusive thoughts about the trauma analog following the laboratory procedure. A sample of college women were selected who reported low levels of trauma-related symptoms and had not experienced IPV or sexual assault. For the affect measures, data were parsed into three phases. Results of the first phase (contrasting affect before versus after the shame prime) indicated that the shame manipulation was successful. Participants in the Shame condition reported significantly higher levels of shame and guilt and significantly lower levels of pride and positive affect after the shame manipulation, relative to participants in the Control condition. Results of the second phase (contrasting affect after the shame manipulation with affect after the trauma analog) were somewhat unexpected. Participants in both conditions reported a significant increase in shame following the trauma analog, relative to the previous time point. Guilt showed a different pattern of results. Participants in the Shame condition reported significantly reduced guilt after the trauma analog, relative to following the shame prime. Contrary to hypothesis, participants in the control condition reported significantly increased guilt during this interval. Participants in the Shame condition reported significantly higher levels of guilt at both time points, relative to the participants in the Control condition. Reports of pride and positive affect decreased after the trauma analog, relative to reported levels after the shame manipulation. These results suggest differing trajectories for shame and guilt following the trauma analog, depending on whether shame had been evoked beforehand. In particular, shame showed the hypothesized increase with no between-condition differences, while guilt reduced for individuals who had experienced shame before the trauma analog. Results of the third phase (contrasting affect immediately following the trauma analog with each of the two days afterward) suggested that feelings of shame and guilt were somewhat volatile for participants in the Shame condition, with a significant reduction on Day 1 followed by an increase on Day 2. Participants in the Control condition reported steady (or slightly decreasing) levels of shame and guilt over time. Feelings of pride increased during this interval for participants in both conditions. These results suggest that the combination of shame evocation followed by an analog trauma is associated with persistent and fluctuating feelings of shame and guilt. In contrast, exposure to the trauma analog alone was associated with lower, more consistent levels of shame and guilt. Contrary to hypothesis, reports of intrusive thoughts about the trauma analog did not show between-condition differences, although the frequency of intrusions decreased on Day 2, relative to Day 1.

This study represents an initial effort to explore the role of shame using the trauma analog paradigm, to examine basic emotional and cognitive processes that contribute to post-trauma psychopathology. Contrary to hypothesis, no differences were noted in the frequency of intrusions between the Shame and Control conditions. There are several possible explanations for this unexpected finding. First, shame may influence posttraumatic stress symptoms without impacting the occurrence of intrusions. Feelings of shame could potentially increase avoidance of trauma-related thoughts or foster reduction of social contacts, both of which have been shown to be relevant in the development and maintenance of PTSD (e.g., Ehlers, Mayou, & Bryant, 1998; Woodward et al., 2018). Additionally, examination of shame-related cognitions (such as “I deserved this trauma”) as well as other negative emotions such as fear, sadness, and anger, could enhance our understanding of how negative emotions and cognitions influence other areas of functioning following exposure to a trauma analog. If correct, these

[3] The mean and standard deviation for Time 3 is slightly different in this analysis, relative to values reported for Phase 2, owing to missing data in the analysis for Phase 3 (n = 86)".

speculations suggest that considering other post-trauma outcomes in addition to intrusive trauma-related thoughts would be important to integrate into the trauma analog paradigm. One previous study considered the association between shame and reactive dissociation, noting a lack of differences between experimentally-induced shame and the frequency of shame-related intrusions (Dorahy et al., 2017, Study 2). Together with the current study, these results suggest that we should consider alternative ways in which feelings such as shame, disgust, anger, and guilt may contribute to the development and maintenance of PTSD. Another possible explanation rests on the study methodology. Because the shame prime was unrelated in content to the trauma analog, it is possible that participants were able to compartmentalize these two experimental manipulations. Perhaps, as participants were selected based on their lack of experience with IPV or sexual assault, the audiotaped account of dating violence may not have been personally relevant, allowing participants to distance themselves from this account. As well, we utilized an audiotape as the trauma analog; previous studies with this paradigm have relied on films, which may be more relevant for intrusive thoughts (James et al., 2016). It is possible that the length of the audiotape could have contributed to the obtained results; future studies may wish to use a longer audiotaped stimulus, to ensure greater immersion. Because this is the first study to examine the role of shame in post-trauma symptoms, careful examination of these methodological features is needed.

One interesting facet that deserves discussion is the pattern of effects noted for shame and guilt in this study. In the current study, shame and guilt evinced similar patterns in response to the shame prime. However, these two measures showed different patterns of response in the second phase of this set of analyses, contrary to hypothesis. When participants had received the shame prime, their level of guilt reduced following the trauma analog, whereas their level of shame increased. In contrast, shame and guilt showed the same pattern of responding for the control condition, suggesting that the shame prime interrupted the parallel response patterns noted between shame and guilt. Shame and guilt showed more similar patterns in the third phase of the analyses, which compared responding after the trauma analog with responding in the two days following the lab procedure. Similarities in the patterns of responding for shame and guilt are not surprising, as past studies have obtained medium-sized correlations between cross-sectional measures of shame and guilt in trauma-exposed samples (e.g., Beck et al., 2011; Leskela et al., 2002; Street & Arias, 2001). As such, the divergence in responding between these two measures during the interval spanning the shame manipulation and trauma analog may suggest that evocation of shame interrupts this association and seems to reduce guilt in the immediate aftermath of stress exposure. As trauma research expands to incorporate a broad set of negative emotions as presented in DSM-5 (American Psychiatric Association, 2013), it seems important that we begin to dismantle the delicate interplay between some of these negative emotions. It is possible that the association between shame and guilt may differ, depending on one's previous experience, the type of trauma experienced, or on-going feelings of shame prior to a traumatic experience. In the current study, inclusion of discriminant state emotion (pride, positive affect) tracking helped to validate the shame induction and the traumatic audiotaped IPV scenario. Continued investigation of negative emotion within the trauma analog paradigm can expand our understanding of basic affective processes and how these may impact post-trauma symptoms.

Another interesting facet of these results is the finding that the shame prime appeared to be associated with greater volatility in feelings of shame and guilt following the trauma analog, relative to the control prime. These results might suggest a possible pathway through which shame becomes associated with PTSD, specifically that pre-trauma exposure shame may sensitize the person to heightened experiences of shame and guilt following a trauma. Theoretical models of PTSD suggest that perceptions of threat to the person's sense of self may undergird the disorder (Ehlers & Clark, 2000), yet we have little understanding of the underlying mechanisms. The current findings suggest one potential influence (pre-trauma shame) that could be important to study further. Incorporation of discriminant state emotion measures allows us some certainty in determining that these results are not the outcome of general reductions in positive affect, as there were no differences on this dimension between the Shame and Control prime conditions following the trauma analog.

Although the current study expands available knowledge of the role of shame on related emotional processes following an analog trauma, limitations need to be acknowledged. The trauma analog paradigm has an extensive literature to support its use (e.g., James et al., 2016), yet it is unclear to what extent results from this paradigm can be generalized to the experience of an actual trauma. Second, this study selected a sample of psychologically healthy college women. Although this sample permitted a methodologically sound examination of the impact of shame on subsequent responses to a trauma audiotape, it is unknown if a similar pattern of responses would be seen in a clinical sample of trauma-exposed patients or in males. Third, it is possible that use of a shame prime which was unrelated to the trauma analog may have impacted the results of the current study. For example, Semb, Strömsten, Sundbom, Fransson, and Henningsson (2011)) reported that event-related shame significantly intermediated symptoms in a sample of 35 individuals who were the victim of a violent crime. Future work examining shame stemming from the traumatic event would be informative. Methodological refinement to permit use of a personally-relevant trauma analog could assist in this research domain. Lastly, future work could benefit from consideration of trait shame and trait guilt, particularly the effects that these stable traits play following trauma exposure.

At present, clinical understanding of the role of shame in PTSD is slow to accumulate. One recent report noted that changes in shame and guilt appear to precede and predict changes in PTSD symptoms in a session-by-session analysis of Prolonged Exposure therapy (Øktedalen, Hoffart, & Langkaas, 2015). Related studies have noted reductions in guilt following Cognitive Processing Therapy, an intervention which focuses extensively on self-blame (e.g., Resick, Nishith, Weaver, Astin, & Feuer, 2002). At present, one treatment has been developed expressly for female survivors of IPV, termed Cognitive Trauma Therapy (CTT; Kubany & Ralston, 2008). CTT focuses on guilt and self-blame, in addition to exposure, relaxation training, assertion training, and other interventions that have been used to treat PTSD. Results from a randomized clinical trial (Kubany et al., 2004) were replicated by Beck et al. (2016) using a multiple baseline design. Beck and colleagues noted that significant reductions in shame, guilt, and negative post-trauma cognitions were observed pre- to post-treatment. As empirical understanding of shame and guilt grows, it will become important to include measures of these negative emotions as outcome variables in treatment studies, to expand knowledge of the broader emotional impact of treatments. Changes to the nosological status of PTSD in DSM-5 afford the opportunity to widen our perspective on emotional processes that undergird PTSD, in both basic and applied research.

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Appendix A. Supplementary data

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