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SHAME AND GUILT MEDIATE THE RELATIONSHIP BETWEEN ADULT
ATTACHMENT STYLE AND PTSD SEVERITY AMONG COMBAT VETERANS

by

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A Thesis

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

Major: Psychology

The University of Memphis

August 2019

Abstract

Posttraumatic Stress Disorder (PTSD) is associated with the expression of various social emotions, including shame and guilt. Although relations between shame, guilt, and PTSD have been researched extensively in terms of clinical relevance, the mechanisms underlying the relationships are still generally unknown. Adult attachment style is a social bonding mechanism that is related to both social emotions and PTSD severity. The present study investigates relations among adult attachment style, PTSD severity, shame, and guilt in a sample of 208 US military veterans and active duty personnel who served in combat zones. The study tested a mediational model, such that shame and guilt were investigated mediators of the relationship between adult attachment style and PTSD severity. Measures include PTSD Checklist for DSM-5 (PTSD Severity), the Experiences in Close Relationships Scale (Adult Attachment Style), and the Differential Emotions Scale-IV (Shame and Guilt). The project is a secondary analysis of data collected from a cross-sectional study that included self-report measures through an online survey. Researching this topic area has the potential to shed light on the distinct mechanisms involved in the relationship between adult attachment, social emotion regulation, and PTSD.

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Shame and Guilt Mediate the relationship between Adult Attachment Style and PTSD Severity
among Combat Veterans

Shame, Guilt, and PTSD

When considering Posttraumatic Stress Disorder (PTSD) using the biopsychosocial model, social cognition and emotional processes are potentially key mechanistic factors in understanding the disorder (Charuvastra & Cloitre, 2008; Christopher, 2004; Nietlisbach & Maercker, 2009; Sharp, Fonagy, & Allen, 2012; van der Kolk, 1988). Shame and guilt are two of the most studied emotions associated with PTSD (Lee, Scragg, & Turner, 2001; Leskela, Dieperink, & Thuras, 2002; Wilson, Droždek, & Turkovic, 2006). Both shame and guilt can be conceptualized as social, negatively valenced, moral emotions (Blum, 2008; Tangney, Stuewig, & Mashek, 2007). Due to the similarities between shame and guilt, they are difficult to empirically differentiate (Dearing, Stuewig, & Tangney, 2005). Although there is not a consensus on their distinction, shame appears to be associated with having a fundamental negative social identity, whereas guilt is focused on negative self social behavior (Tangney, Stuewig, & Mashek, 2007). Brown (2012) distinguished the two emotions colloquially with the eloquently simple phrase, “Shame is ‘I am bad.’ Guilt is ‘I did something bad.’” The two emotions have been theorized to function for social reparations, in that they signal to an individual’s social group that they are apologetic for their negative social behavior (Blum, 2008; Tangney, Stuewig, & Mashek, 2007). Social emotion research has examined shame-motivated and guilt-motivated social decision-making as well (Pulcu, Zahn, & Elliott, 2013; Tangney, Stuewig, & Mashek, 2007). To date the mechanisms linking shame and guilt to PTSD are unclear, but they likely involve changes in emotion regulation and social cognition (Sharp, Fonagy, & Allen, 2012; Wilson, Droždek, & Turkovic, 2006; Nietlisbach & Maercker, 2009).

Most of the research on the relations between shame, guilt, and PTSD has been clinically oriented. Shame-Based PTSD and Guilt-Based PTSD are two distinct clinical models that were developed for treatment of the disorder (Lee, Scragg, & Turner, 2001). Both models analyze the etiology and prognosis of PTSD in the context of cases where shame and/or guilt are highly salient and appear to be central to how the disorder presents (Lee, Scragg, & Turner, 2001). Budden (2009) described a model placing shame as the central factor in the development of the disorder in general. This model is based on research findings that shame underlies peri-traumatic and post-traumatic experiences that lead to the development of the disorder, looking at the factors of status inferiority and failure to conform to normative expectations (Budden, 2009).

Although there is not extensive research examining the relations between shame, guilt, and PTSD at a mechanistic level, there is a potential underlying connection between the nature of social emotions and PTSD severity. The social ecology of PTSD is a clinical framework proposed by Charuvastra & Cloitre (2008), with the core idea that both the etiology and prognosis of PTSD are significantly shaped by social phenomena. Within this theoretical framework, trauma outcomes are analyzed in the context of social bonding, including attachment style as a key factor (Charuvastra & Cloitre, 2008). Basic research on social emotions has also pointed to attachment style being related to these processes as well (Vrticka & Vuilleumier, 2012; Vrticka et al., 2012).

Attachment Style and PTSD

Attachment style plays a key role in how individuals interact with and build relationships with other people (Ainsworth & Bell, 1970; Brennan, Clark, & Shaver, 1998; Bretherton, 1992). Adult attachment styles are generally described as either secure or insecure, and insecure attachment styles can be further categorized as avoidant or anxious (Ainsworth, 1991; Collins &

Read, 1990). Avoidant attachment style is associated with beliefs that one must remain independent, self-reliant, and disconnected from others, whereas anxious attachment style is associated with general worry that others, especially a partner, will not be available in times of need (Collins & Read, 1990; Mikulincer & Shaver, 2005).

Attachment style contributes to human stress regulation and has been researched mechanistically with analysis of the human attachment behavioral system (Bowlby, 1982; Bretherton, 1992; Charuvastra & Cloitre, 2008). This behavioral system involves innate processes that motivate humans to seek proximity to significant others in times of danger, stress, or novelty (Bowlby, 1982; Ainsworth et al., 1978). In the context of PTSD and the attachment behavioral system, individuals with secure attachment styles will respond to traumatic stress by seeking safety through the support of others (Charuvastra & Cloitre, 2008; Shaver, Mikulincer, Shaver, & Mikulincer, 2010). Conversely, insecure attachment can result in maladaptive stress regulation, potentially leading to social avoidance and anxiety, factors associated with PTSD (Charuvastra & Cloitre, 2008; Shaver, Mikulincer, Shaver, & Mikulincer, 2010). Avoidant attachment style involves deactivating strategies in social contexts, such as social avoidance, whereas anxious attachment style involves over activation strategies, such as hypervigilance in social situations (Vrticka & Vuilleumier, 2012; Vrticka et al., 2012). Sharp, Fonagy & Allen (2012) suggest that insecure attachment cognitive schemas will result in compromised metalizing of experienced trauma, and therefore cause a higher likelihood of developing PTSD. Overall attachment style is a key factor in stress regulation and social cognition following trauma, acting as a risk or protective factor with respect to PTSD.

The specific relationship between adult attachment style and PTSD has been analyzed in many populations, including veterans (Nye et al., 2008; Harari et al., 2009; Mikulincer, Ein-dor,

Solomon & Shaver, 2011; Woodhouse, Ayers, & Field, 2015). One longitudinal study of Israeli prisoners of war (POWs) assessed attachment style and PTSD symptoms for nearly two-decades (Mikulincer, Ein-dor, Solomon & Shaver, 2011). The project specifically involved having POW veterans complete self-report measures of anxious and avoidant attachment style and PTSD symptoms at three time points: 18, 30, and 35 years after the Yom Kippur War. The study broadly found that higher levels of insecure attachment (both anxious and avoidant styles) were associated with PTSD severity at each time point, beyond the effect of war captivity (Mikulincer, Ein-dor, Solomon & Shaver, 2011). Woodhouse, Ayers, & Field (2015) conducted a meta-analysis of 46 studies examining the relationship between adult attachment style and PTSD symptoms. The study found that secure attachment style was moderately, inversely associated with PTSD severity and that insecure adult attachment was moderately associated with PTSD severity (Woodhouse, Ayers, & Field, 2015). All the studies examined in the meta-analysis conceptualized adult attachment style between the anxious and avoidant categories. An interesting finding was that anxious attachment style was related to PTSD symptoms more than avoidant attachment style, potentially suggesting it having a larger role in PTSD severity (Woodhouse, Ayers, & Field, 2015).

Attachment Style and Social Emotions

In the past two decades, the fields of social cognitive psychology and social neuroscience have made groundbreaking progress in understanding the mechanisms of social psychological traits in humans (Sanfey, 2007; Coan, 2008; Vrticka & Vuilleumier, 2012). In both clinical and non-clinical contexts, adult attachment style plays a central role in social cognition and social emotional processes (Bartz & Hollander, 2006; Coan, 2008; Vrticka & Vuilleumier, 2012; Cozolino, 2014). Specifically, differences in secure versus insecure attachment processes are

integral in the perception and regulation of social emotional information (Vrticka & Vuilleumier, 2012). Social emotions can be defined as affective states that occur when processing social information and are inherently dependent on the awareness of self and other individuals' cognitions, emotions, and behaviors (Tangney & Salovey, 1999; Hareli & Parkinson, 2008; Jankowski & Takahashi, 2014). Among these emotions are love, shame, guilt, embarrassment, jealousy, admiration, empathy, and pride (Hareli & Parkinson, 2008).

Social emotions are thought to have evolved to promote socially appropriate behaviors and discourage inappropriate ones (Jankowski & Takahashi, 2014). As referenced previously, it has been theorized that the human attachment behavioral system serves an evolutionary social function to acquire or sustain closeness and support from one's social group in stressful or threatening situations (Charuvastra & Cloitre, 2008; Vrticka & Vuilleumier, 2012). These mechanisms have also been conceptualized as a "tend and befriend" behavioral stress response in non-attachment literature (Taylor, 2006). These attachment processes are carried out in part through the regulation of social emotions (Vrticka & Vuilleumier, 2012). Research has shown that social emotion regulation strategies such as suppression or reappraisal are differentially altered by attachment style type (Vrticka & Vuilleumier, 2012; Vrticka et al., 2012). Mikulincer & Shaver (2007) has suggested that emotion regulation and attachment style are integrated to the point that, "the attachment system is, in itself, an emotion regulation device". Social emotion regulation strategies can be analyzed through insecure attachment styles as well. Avoidant attachment style is linked with the suppression of emotion regulation, which causes the attachment system to stay in a decreased activation state (Mikulincer and Shaver, 2007; Vrticka et al., 2012). This results in social impairments such as difficulty effectively signaling one's internal emotional state to others (Vrticka et al., 2012). Anxious attachment style is associated

with an emotion regulation strategy of negative reappraisal, where social emotions are intensified, especially after the evaluation of negative or ambiguous social signals (Griffin and Bartholomew, 1994; Mikulincer and Shaver, 2007; Vrticka et al., 2012).

Although there is not much literature on the topic, shame and guilt have been analyzed specifically in the context of adult attachment style as well. Both shame and guilt are associated with insecure adult attachment styles (Wagner & Tangney, 1991; Lopez, et al., 1997; Wei, Shaffer, Young, & Zakalik, 2005). Shame specifically is strongly correlated with both anxious and avoidant adult attachment styles (Wagner & Tangney, 1991; Wei, Shaffer, Young, & Zakalik, 2005). To date, this research has not examined the relationship between adult attachment style, shame, and guilt mechanistically. However, the previously discussed research on the mechanisms involved in the relationship between adult attachment style and social emotional regulation in general could begin to provide insight into the processes involved in shame and guilt when they are conceptualized more broadly as social emotions.

Shame and Guilt: Potential mechanisms of Adult Attachment Style & PTSD Severity

In light of the findings discussed so far, it is apparent that social emotional processing and regulation are strongly implicated in both adult attachment style and PTSD severity. The direct parallels between how the attachment behavioral system regulates both traumatic stress in PTSD and social emotions in basic psychological processes are clearly evident in the literature. The discussed findings have also highlighted the specific relationships that shame and guilt have in regard to the etiology and prognosis of PTSD, as well as the association with adult attachment style when conceptualizing them as social emotions. Therefore it is possible that adult attachment style and PTSD severity are mechanistically related via the regulation of shame and guilt. Since shame and guilt have been theorized to act as emotional signals to make social

reparations, these mechanisms could be tied to the attachment or “tend and befriend” behavioral responses to traumatic stress and explain why shame and guilt are associated with PTSD.

The literature suggests that when an adult with a secure attachment style experiences a traumatic event, the individual’s response to the event would most likely be to seek out the support of their social group (activation of the attachment behavioral system), and this action in turn results in healthy regulation of their social emotions (decreased severity of shame and guilt), and thus reduces the potential of experiencing persistent post-traumatic stress. On the other hand, an adult with an insecure attachment style in the same situation would be likely to respond by either avoiding their social group (avoidant attachment style involving deactivation of the attachment behavioral system) or experiencing symptoms such as social anxiety and/or hypervigilance when attempting to seek support (anxious attachment style involving over activation of the attachment behavioral system). Based on the response of the attachment behavioral system, this individual would experience suppression of social emotion regulation (avoidant style) or experience a social emotion regulation response of negative reappraisal (anxious style). Both of these emotion regulation strategies would likely result in increased shame and guilt, thus increasing the potential for persistent post-traumatic stress. These scenarios are empirically assessed in the current project.

The Present Study

The objective of the present study was to investigate the relations among adult attachment style, PTSD severity, and the self-conscious emotions of shame and guilt. The study is a secondary analysis of data collected originally for a clinical psychology PhD dissertation at the University of Memphis (Tripp, 2018).

Hypotheses

The present study tested the following hypotheses:

- 1:** Insecure (anxious and avoidant) adult attachment style will be associated with PTSD severity
- 2:** Insecure (anxious and avoidant) adult attachment style will be associated with higher levels of shame and guilt.
- 3:** Higher levels of shame and guilt will be associated with PTSD severity

Conditional Hypothesis: If hypotheses 1, 2, and 3 are supported:

- 4:** Shame and Guilt will act as mediators in the relationship between insecure (anxious and avoidant) adult attachment style and PTSD severity.

Method

Participants

Participants were 208 US military personnel or veterans who reported having been deployed at least once to a combat zone as part of a post 9/11 conflict. The sample included 185 men (89%) and 22 women (11%). In terms of race and ethnicity, 81% of participants identified as white, 5% black, 5% hispanic/latino, and 3% multiracial, 2% Asian, 2% American Indian/Alaskan Native, <1% Indigenous Hawaiian or other Pacific Islander, and 1% individuals did not specify their race. The average age was 33.80 years ($SD = 7.08$).

Procedure

The present study is a secondary analysis of data collected from a previous project (Tripp, 2018). Military personnel and veterans were recruited from local advertisements and online websites, and then were directed to complete self-report measures through an online survey. Participants were recruited with posted flyers in the Memphis community, and online using

social media websites. Participants completed all study measures online using a survey hosted by Qualtrics. Prior to starting the survey, participants were required to provide consent and answer screening questions that verified involvement in the US armed forces. These questions asked for the participants' most recent paygrade and rank in the military as well as other information that individuals who did not serve would be unlikely to know. If participants did not answer any of the questions correctly, they were directed to a link that stated they were ineligible to complete the study and thanked them for their time and interest. After finishing the screening portion, eligible participants completed a battery of self-report measures. At the conclusion of the survey, participants were provided with debriefing information and mental health resources to contact if they were experiencing any form of distress. Participants were compensated with a \$10 Amazon gift card for participating in the study. A total of 831 surveys were collected in Qualtrics. 623 surveys were not used due to ineligibility, inaccurate responses, individuals taking the survey multiple times, or incomplete surveys, which resulted in a total of 208 participant surveys used for the study.

Measures

Demographics. Individuals were asked various demographic questions regarding their sex, ethnicity, relationship status, student status, income, military status, and combat deployments.

PTSD Severity. The PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013) is a twenty-item questionnaire that queries the respondent's experience of each DSM-5 symptom of PTSD over the past month. Items are scored on a scale from 0 (not at all) to 4 (extremely) and total score ranges from 0 to 80. A score of 38 or greater indicates likely PTSD (Blevins et al., 2015). The PCL-5 has shown strong internal consistency ($\alpha = 0.94$), convergent (r 's = 0.74 to

0.85) and discriminant (r 's = 0.31 to 0.60) validity, and test-retest reliability ($r = 0.82$) (Blevins et al., 2015). Convergent and discriminant validity have been established by comparing the questionnaire against other measures such as the IPF (Marx et al., 2009), WHODAS 2.0 (Ustün, Kostanjsek, Chatterji, & Rehm, 2010), and the PCL-C (Weathers et al., 1993). The PCL-5 has shown excellent temporal stability in a sample of combat exposed veterans during the time period of three months (Keane et al., 2014). Internal consistency for the CAPS in the current sample was strong as well ($\alpha = .95$).

Adult Attachment Style. The Experiences in Close Relationships Scale (ECR; Brennan, Clark, & Shaver, 1998) is a 36-item measure of adult attachment style. The ECR measures individuals on two subscales of attachment: avoidance and anxiety. In general, individuals scoring high on the ECR avoidance scale find discomfort with intimacy and tend to seek independence, whereas individuals scoring high on the ECR anxiety scale tend to fear rejection and abandonment. The ECR includes 36-items and uses a 7-point scale ranging from (1) not at all like me to (7) very much like me. Higher scores on each subscale point to higher levels of anxiety and avoidance, which indicates a higher rating of insecure attachment. Lower scores on each subscale point to lower levels of anxiety and avoidance, which indicates a higher rating of secure attachment. The ECR-R has been shown to have good validity (Fairchild & Finney, 2006). Sample items from the ECR include: "I worry about being abandoned", "I get uncomfortable when a romantic partner wants to be very close", and "I find it difficult to allow myself to depend on romantic partners". Internal consistency in the current sample was strong (avoidance and anxiety; $\alpha = .94$).

Shame and Guilt. The Differential Emotions Scale-IV (Izard, Libero, Putnam, & Haynes, 1993) is a 36-item measure of 13 distinct positive and negative emotions. The measure includes

emotions such as shyness, disgust, guilt, shame, anger, surprise, interest, and enjoyment. Items are scored on a 5-point scale (0 = rarely or never to 4 = very often) for the frequency of which participants feel they experienced the different emotions over the past week. Sample items include “feel regret, like you did something wrong” (guilt) and “feel like people always look at you when anything goes wrong” (shame). The present study will be analyzing the shame and guilt subscales. The DES IV has shown good reliability and construct validity of each of the subscales (Izard, Libero, Putnam, & Haynes, 1993; Youngstrom & Green, 2003). Internal consistency in the current sample was: guilt subscale ($\alpha = .81$) and shame subscale ($\alpha = .74$).

Data Analytic Plan

Statistical analyses were conducted using IBM® SPSS® Statistics 25 software. The project data was properly screened and cleaned before use. Outliers were corrected using guidelines outlined by Tabachnick and Fidell (2007) as well. Descriptive statistics were calculated to obtain the demographic information of the sample and relevant statistics (M and SD) of the selected measures for the project. The individual items on the analyzed scales were properly reverse coded and totaled. The scales were then analyzed for reliability; Cronbach’s alpha coefficients will be calculated for each variable. Preliminary data analyses were used to test the assumptions of the measures to ensure there were no violations of normality, linearity, homoscedasticity, and multicollinearity. The project examined the cross-sectional data of relevant measures through the statistical methods of bivariate correlation (Meng, Rosenthal, & Rubin, 1992) and mediation modeling using PROCESS macro for SPSS (Hayes, 2012). The mediation models used bootstrapping (Hayes, 2013; Preacher & Hayes, 2004). It has been found that bootstrapping can overcome the issue of power due to nonnormality in the sampling distribution (Bollen & Stine, 1990).

1: To test the first hypothesis, bivariate correlations were conducted using a Pearson product-moment correlation coefficient on the following measures: The PTSD Checklist for DSM-5 (PTSD Severity) and the Differential Emotions Scale-IV (Shame and Guilt).

2: To test the second hypothesis, bivariate correlations were conducted using a Pearson product-moment correlation coefficient on the following measures: The Experiences in Close Relationships Scale (Attachment Style), the Differential Emotions Scale-IV (Shame and Guilt).

3: To test the third hypothesis, bivariate correlations were conducted using a Pearson product-moment correlation coefficient on the following measures: The PTSD Checklist for DSM-5 (PTSD Severity) and the Experiences in Close Relationships Scale (Attachment Style).

4: To test the fourth hypothesis, PROCESS macro mediation analyses were conducted using the following measures: The PTSD Checklist for DSM-5 (PTSD Severity), the Experiences in Close Relationships Scale (Adult Attachment Style), the Differential Emotions Scale-IV (Shame and Guilt).

Results

Descriptive Statistics

Demographic characteristics of the sample and descriptive statistics for the Experiences in Close Relationships Scale (avoidant and anxious adult attachment styles), the Differential Emotions Scale-IV (shame and guilt), and the PTSD Checklist for DSM-5 (PTSD severity) are shown in Table 1.

Bivariate Correlations

Bivariate correlations between all of the variables of interest are shown in Table 2. Both subscales of the Experiences in Close Relationships Scale (avoidant and anxious adult attachment styles) were both correlated with the PTSD Checklist for DSM-5 (PTSD severity) (r

= .45, $p < .001$ and $r = .36$, $p < .001$, respectively), supporting the 1st hypothesis. Avoidant and anxious adult attachment styles were correlated with higher levels of the Differential Emotions subscales of shame ($r = .40$, $p < .001$ and $r = .51$, $p < .001$, respectively) and guilt ($r = .33$, $p < .001$ and $r = .50$, $p < .001$, respectively), supporting the 2nd hypothesis. Higher levels of shame and guilt were associated with greater PTSD severity ($r = .48$, $p < .001$ and $r = .48$, $p < .001$, respectively), supporting the 3rd hypothesis.

Mediation Analyses

Prior to testing the fourth hypothesis, we conducted analyses to check the interaction between avoidant and anxious adult attachment styles in relation to shame ($F = 1.36$, $p = .516$) and guilt ($F = .984$, $p = .630$). There were no significant results, so we proceeded to test the fourth hypothesis by conducting mediation analyses for each insecure attachment subtype individually. Both hypothesized models are displayed in Figures 1 and 2.

Model 1. PROCESS macro parallel mediation analyses for the first mediation model are shown in Figure 1. In the initial step of the model, avoidant adult attachment style significantly predicted both shame ($a_1 = .938$, $p < .001$) and guilt ($a_2 = .790$, $p < .001$). In the second step, both shame ($b_1 = 1.35$, $p = .02$) and guilt ($b_2 = 1.61$, $p = .003$) significantly predicted PTSD severity. In the third step, avoidant adult attachment style significantly predicted PTSD severity ($c = 7.02$, $p < .001$). In the last step, shame and guilt partially mediated the relation between avoidant attachment style and PTSD severity such that the path from avoidant style to PTSD severity was reduced ($c' = 4.47$, $p < .001$). We constructed 95% confidence intervals (bias corrected and accelerated) using 5,000 bootstrap samples and the results were significant ($\beta = .16$, $SE = .04$, $CI = .09 - .24$).

Model 2. PROCESS macro parallel mediation analyses for the second mediation model are shown in Figure 2. In the initial step of the second model, anxious adult attachment style significantly predicted both shame ($a_1= 1.20, p < .001$) and guilt ($a_2= 1.17, p < .001$). In the second step, both shame ($b_1=1.74, p=.003$) and guilt ($b_2=1.63, p=.005$) significantly predicted PTSD severity. In the third step, anxious adult attachment style significantly predicted PTSD severity ($c=5.69, p < .001$). In the last step, shame and guilt fully mediated the relation between anxious attachment style and PTSD severity such that the direct path was no longer significant ($c'=1.70, p=.130$). We constructed 95% confidence intervals (bias corrected and accelerated) using 5,000 bootstrap samples and the results were significant ($\beta = .25, SE= .05, CI = .16 - .35$).

Discussion

The present study investigated relations among adult attachment style, PTSD severity, shame, and guilt. As predicted in the first hypothesis, we found that avoidant and anxious adult attachment styles were both correlated with PTSD severity. In support of the second hypothesis, avoidant and anxious adult attachment styles were correlated with higher levels of shame and guilt. Supporting the 3rd hypothesis, higher levels of shame and guilt were associated with PTSD severity. All of these correlational findings have been reported in previous research as well (Lee, Scragg, & Turner, 2001; Vrticka & Vuilleumier, 2012; Woodhouse, Ayers, & Field, 2015). In a series of mediation analyses, we found that shame and guilt acted as partial mediators of the relationships between avoidant adult attachment style and PTSD severity, and that shame and guilt fully mediated the relationships between anxious adult attachment style and PTSD severity, supporting the 4th hypothesis.

Taken together, these findings suggest that shame and guilt both contribute to the relationship between adult attachment style and PTSD severity. To understand these results, we

propose a model outlined in the introduction of this paper, suggesting that both types of insecure attachment (avoidant and anxious styles) foster difficulty with regulation of emotions, potentially leading to higher trait levels of shame and guilt, which may increase the likelihood that a person develops PTSD following trauma. These results provide some support for the existing clinical frameworks of Shame-Based PTSD and Guilt-Based PTSD, where both emotions play a central role in the development of the disorder (Lee, Scragg, & Turner, 2001; Wilson, Droždek, & Turkovic, 2006). Evaluating the results through this model also reinforces findings that maladaptive emotion regulation is involved in the relationship between insecure attachment and PTSD (Charuvastra & Cloitre, 2008). Since our results also support evidence showing that both shame and guilt are associated with insecure adult attachment styles (e.g. Wagner & Tangney, 1991; Lopez, et al., 1997; Wei, Shaffer, Young, & Zakalik, 2005), this suggests that adults with insecure attachment styles have an inability to properly regulate the emotions of shame and guilt. However, the explanation to why there is a relationship between insecure adult attachment style, shame, and guilt is not understood. A possible answer to this question could be found by examining how these constructs are defined and utilized in terms of social relationships.

As discussed earlier, shame and guilt are conceptualized as social, negatively valenced, moral emotions that have been theorized to serve an evolutionary role as social signals to create and mend relationships with others in a social group (Blum, 2008; Tangney, Stuewig, & Mashek, 2007). Insecure adult attachment styles are primarily defined by having difficulty interacting with and building relationships with others (Ainsworth & Bell, 1970; Brennan, Clark, & Shaver, 1998; Bretherton, 1992) and these tend to be rooted in early attachment relationships with caregivers. It is possible that early attachment relationships characterized by high levels of guilt

and shame, and in which the caregiver does not support the child in managing overwhelming emotions may set the stage for adverse reactions to traumatic events.

As discussed previously, the combined relationships between adult attachment style, PTSD severity, shame, and guilt can be demonstrated when looking at how insecurely attached adults perceive and regulate social emotional information in the context of traumatic stress. Since it has been theorized that one of the evolutionary functions of human attachment is to obtain closeness and support from one's social group in stressful or threatening situations (Charuvastra & Cloitre, 2008; Vrticka & Vuilleumier, 2012), and that shame and guilt act as emotional signals to make and repair social relationships (Blum, 2008; Tangney, Stuewig, & Mashek, 2007), these mechanisms could be coupled with a maladaptive (insecure) attachment behavioral response to traumatic stress and explain why higher levels of shame and guilt are associated with PTSD.

Interestingly, we found different patterns of results for the two insecure attachment style types. The correlational results show that anxious attachment style had a stronger relationship to both shame and guilt, compared to avoidant attachment style; although avoidant attachment style seemed to show a stronger correlation with PTSD severity. The magnitudes of the effects in the a-paths of both mediation models point to anxious attachment styles having a stronger significant relationship to both shame and guilt compared to avoidant attachment style as well, while the overall magnitude of the effect of avoidant style on PTSD was greater than the effect for anxious attachment on PTSD. This might explain why the mediation model that included anxious adult attachment style showed full mediation and the model including avoidant attachment only showed partial mediation. These findings are consistent with research showing that anxious attachment style has a stronger relationship with social emotional regulation compared to avoidant attachment style as well (Vrticka & Vuilleumier, 2012; Vrticka et al., 2012).

Our correlation results also showed that anxious attachment styles have a somewhat weaker relationship to PTSD severity, compared to avoidant attachment style and similar results were obtained in the c-paths of the mediation models. This is contrary to a meta-analysis finding that overall anxious attachment style was more strongly related to PTSD severity than avoidant attachment style across multiple studies (Woodhouse, Ayers, & Field, 2015). Although, the authors of the meta-analysis stated that the studies analyzed provided mixed results, including multiple contradicting findings. Future research should be conducted to see if there are any other factors that might be influencing the outcomes of the strength in the relationships between PTSD and attachment style type.

Limitations

The present study has limitations that should be noted. A major shortcoming is that the data were collected cross-sectionally, therefore we are unable to pinpoint the temporal relations among the variables in the mediation models. This makes our causal inferences speculative. Future research should analyze the relationship between attachment style, PTSD severity, shame, and guilt using research methods that would be more suited to examine the proposed model, such as longitudinal design or an experiment.

Another limitation is the precision and type of the measures used in the study. All of the variables used in the project were based on self-report measures. Future research should include measures that better quantify the study constructs so that they can be understood at a mechanistic level to a larger degree. There was also no analysis of the type of trauma experienced by the population. Examining the specific types of trauma that were involved in the development of PTSD symptoms would give better clarity to how the development of the disorder relates to attachment style, shame, and guilt. Other potential studies on this topic should include in-person

clinical interviews for diagnosing PTSD as well. There should also be the inclusion of measures of constructs that might be confounding to the model, such as trait negative affect.

The study is also limited in the extent of which it explored variables in the context of the veteran sample used and the demographics of the population. There are multiple studies that have examined insecure attachment and PTSD as well as shame, guilt and PTSD in veteran populations (Nye et al., 2008; Harari et al., 2009; Mikulincer, Ein-dor, Solomon & Shaver, 2011; Bannister et al., 2019). Although our study appears to be the first to look at how all of the variables relate together, we have not analyzed them in how they relate uniquely to the given sample. The reason for this is because the focus of the study is on understanding the relationships between the constructs at a mechanistic level, which in theory would apply to all populations. Future studies should look at adult attachment style, PTSD severity, shame, and guilt in how they relate specifically to veteran populations. The sample is also limited based on race and gender demographics as well. The sample is predominantly Caucasian (81%) and male (89%). Future research should include a more diverse sample.

Future Directions

In terms of other future directions for this line of research, studies which improve upon the design will help to move the field forward. We proposed a mechanistic model of the relationships between adult attachment styles, shame and guilt regulation, and PTSD, and a logical next research step would be to test the model in an experimental study. There has already been experimental research investigating some of the relationships addressed in our model. Attachment style and PTSD has been researched in multiple experimental studies (Bryant & Chan, 2017; Toumbelekis, Liddell, & Bryant, 2018; Bryant & Chan, 2015). The previously cited research conducted by Vrticka & Vuilleumier (2012) and Vrticka et al. (2012) used experimental

tests to investigate the relationships between adult attachment style and social emotions as well. And although shame and guilt haven't been researched experimentally in the direct context of PTSD, they have been examined in certain mechanistic factors related to the disorder, including their effects on memory and stress reactions (Cavalera & Pepe, 2014; Cavalera et al., 2018; Dickerson, Gruenewald, & Kemeny, 2004). These robust experimental findings on the constructs addressed in our study all provide excellent design frameworks that could allow for our proposed model to be properly tested at a mechanistic level. Another future direction is to target the mechanisms in the model for the development of clinical treatments. There have been clinical models of treatment targeting shame and guilt in PTSD (e.g. Lee, Scragg, & Turner, 2001; Bannister et al., 2019) as well as the relationship between adult attachment style and PTSD (Charuvastra & Cloitre, 2008). Creating a combined clinical treatment model of PTSD that addresses the relationships between shame, guilt, and adult attachment style could build upon existing clinical treatments and potentially result in more successful outcomes.

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Appendix

Table 1

Sample Characteristics and Descriptive Statistics for Adult Attachment Style, Shame, Guilt, & PTSD Severity

Variable	<i>n</i>	Valid Percent	
Gender	--	--	
Male	185	89%	
Female	23	11%	
Race	--	--	
Caucasian	170	81%	
African American	11	5%	
Hispanic/Latino	10	5%	
Multiracial	7	3%	
Asian	4	2%	
Other/Not Specified	6	3%	
Scales	<i>Mean</i>	<i>SD</i>	α
Avoidant Attachment	3.73	1.29	.95
Anxious Attachment	3.65	1.28	.94
Shame	4.23	2.99	.75
Guilt	3.97	3.02	.81
PTSD Severity	27.97	20.09	.95

Table 2

Correlations for Insecure Adult Attachment Styles, Shame, Guilt, & PTSD Severity

Scales	AVOID	ANX	Shame	Guilt	PTSD
AVOID	-				
ANX	.21**	-			
Shame	.40***	.51***	-		
Guilt	.33***	.50***	.69***	-	
PTSD Severity	.45***	.36***	.48***	.48***	-

Note. * $p < .05$; ** $p < .01$; *** $p < .001$. AVOID = Avoidant Adult Attachment Style
 ANX = Anxious Adult Attachment Style

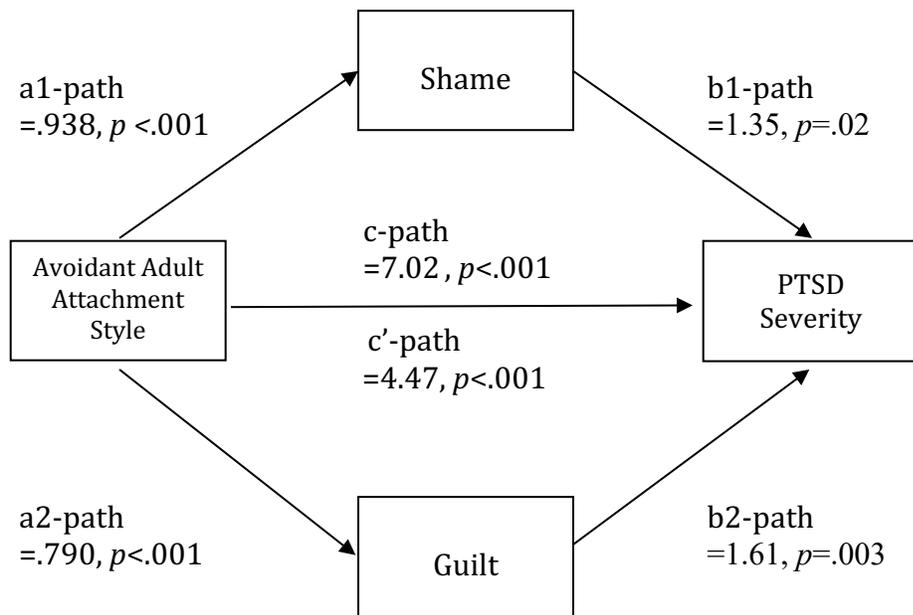


Figure 1. Mediation of relation between Avoidant Adult Attachment Style and PTSD Severity by Shame and Guilt.

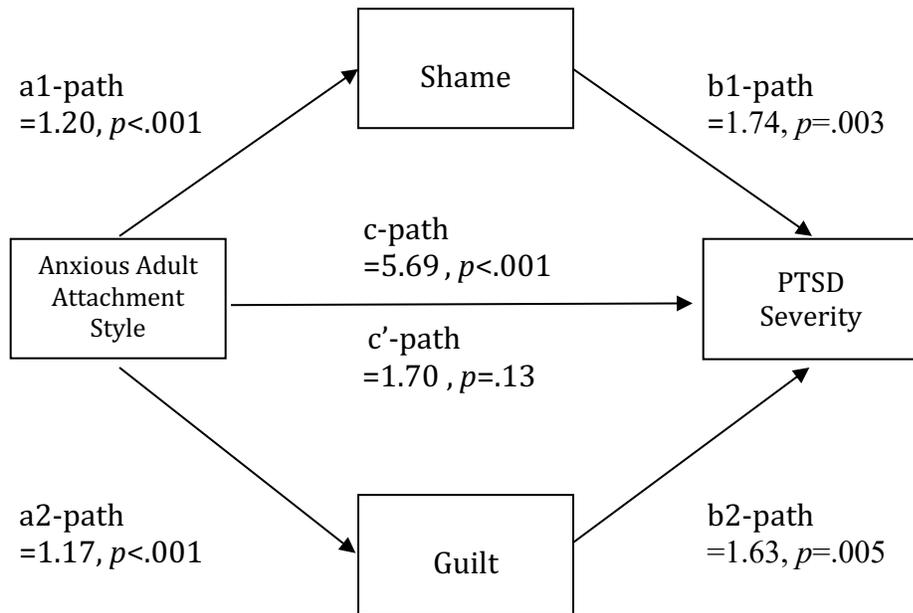


Figure 2. Mediation of relation between Anxious Adult Attachment Style and PTSD Severity by Shame and Guilt

Hello,

The University of Memphis Institutional Review Board, FWA00006815, has reviewed and approved your modification submission in accordance with all applicable statutes and regulations as well as ethical principles.

PI NAME: Jessica Tripp

CO-PI:

PROJECT TITLE: Understanding Differences between PTSD and Moral Injury

FACULTY ADVISOR NAME (if applicable): Meghan McDevitt-Murphy

IRB ID: #4233

APPROVAL DATE: 10/21/2016

EXPIRATION DATE: 06-17-2017

LEVEL OF REVIEW: Full Board Modification

Please Note: Modifications do not extend the expiration of the original approval

Approval of this project is given with the following obligations:

1. If this IRB approval has an expiration date, an approved renewal must be in effect to continue the project prior to that date. If approval is not obtained, the human consent form(s) and recruiting material(s) are no longer valid and any research activities involving human subjects must stop.
2. When the project is finished or terminated, a completion form must be completed and sent to the board.
3. No change may be made in the approved protocol without prior board approval, whether the approved protocol was reviewed at the Exempt, Expedited or Full Board level.
4. Exempt approval are considered to have no expiration date and no further review is necessary unless the protocol needs modification.

Thank you,

James P. Whelan, Ph.D.

Institutional Review Board Chair

The University of Memphis.

Note: Review outcomes will be communicated to the email address on file. This email should be considered an official communication from the UM IRB.