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By

Colleen Martin

May 2017

PTSD SYMPTOM SEVERITY AND EMOTION REGULATION IN TRAUMA-EXPOSED, ACUTE-CARE PSYCHIATRIC INPATIENTS: ASSOCIATIONS WITH SUICIDALITY

A Dissertation Presented to the
Faculty of the College of Education
University of Houston

In Partial Fulfillment
of the Requirements for the Degree

Doctor of Philosophy

By

Colleen Martin

May 10, 2016

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May 10, 2016

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Abstract

Trauma and posttraumatic stress disorder (PTSD) have been positively associated with both suicidality (suicidal ideation and attempts) and difficulties with emotion regulation in various samples (e.g., sexual assault victims, combat veterans, college students, community samples). The association between PTSD and suicidality in a psychiatric inpatient setting has a limited research base of approximately 5 studies, and no study to date has examined the role of emotion regulation difficulties in the association of PTSD and suicidality. The present study aimed to address these gaps in the extant literature by examining the main and interactive effects of PTSD symptom severity and emotion regulation in regard to suicidality among trauma-exposed acute-care psychiatric inpatients. It is hypothesized that 1) PTSD will be significantly related to greater levels of suicidality, 2) greater difficulties in emotion regulation will be significantly related to greater levels of suicidality, and 3) the interaction of PTSD and emotion regulation difficulties will be significantly related to greater levels of suicidality. Participants were comprised of 120 adults in a psychiatric inpatient setting. Hierarchical linear and logistic regression analyses were used to examine the main and interactive effects of PTSD and emotion regulation difficulties with four outcomes of suicidality. PTSD symptom severity (ß = .30, p = .02) had a main effect on self-reported suicidal ideation. Difficulties in emotion regulation (p = .01) and number of traumatic life events (p = .002) had significant main effects in predicting suicide as the reason for current admission. An interactive effect of PTSD symptom severity and difficulties in emotion

regulation existed for self-reported suicidal ideation (ß = .24, $p < .001$) in that high levels of both of these variables resulted in the highest level of self-reported suicidal ideation. For individuals with heightened emotion regulation difficulties, the association between PTSD symptom severity and self-reported suicidal ideation was significant whereas with less emotion regulation difficulties it was non-significant. Limitations (e.g., measurement) and future directions (e.g., implementing causal and longitudinal designs) are discussed.

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Chapter I

Introduction

Approximately 1 million individuals world-wide commit suicide each year. In the United States (U.S.), suicide is the 10th leading cause of death, occurring at a rate of approximately 12.6 per 100,000 individuals (Centers for Disease Control [CDC], 2012). Specifically, the lifetime prevalence of suicidal ideation (13.5%) and suicide attempts (4.6%) in the general population in the U.S. has contributed to the clinical significance of understanding the complexity of suicidality. Notably, suicide rates have been highest among individuals with previous suicide attempts, highlighting the chronic nature of suicidality and the clinical utility of evidence-based prevention programs for such individuals (Yuodelis-Flores & Ries, 2015). Indeed, given the significant public health issue of suicidality, there has been a focus on examining more specific etiological and maintenance factors related to suicidal ideation and attempts in order to understand the mechanisms underlying suicidal behavior and inform effective prevention efforts (Han, Compton, Gfroerer, & McKeon, 2015; O'Connor, Smyth, & Williams, 2014; Yuodelis-Flores & Ries, 2015). Throughout the literature, suicidality has been conceptualized and defined as suicidal ideation, intent, or plan, as well as self-injurious behavior (Krysinska & Lester, 2010). The current review conceptualizes suicidality as suicidal ideation and suicide attempts.

Trauma and Suicidality

Trauma exposure has been identified as a leading risk factor for suicidality. According to the *DSM-IV-TR* (American Psychiatric Association, 2000), trauma is defined as "an event or events that involve actual or threatened death or serious

injury, or a threat to the physical integrity of self and others and the person's response involved intense fear, helplessness, or horror" (p. 467). In the current (5th edition) version of the *DSM*, trauma is defined as "exposure to actual or threatened death, serious injury, or sexual violence," and responses of intense fear, helplessness, or horror have been omitted from the current definition due to criticisms that these responses were not necessary for an individual to receive a PTSD diagnosis (APA, 2013, p. 271). Such events might include sexual or physical abuse or assault, transportation accidents, military combat, or natural disasters, for example.

Trauma can potentially lead individuals to question fundamental beliefs about themselves, others, and the world, which can contribute to negatively appraising one's existence (e.g., "I am worthless," "The trauma was my fault") (APA, 2013; Janoff-Bullman, 1992; Resick & Schnicke, 1992). Trauma exposure, including childhood abuse, combat exposure, and sexual violence, has been found to significantly contribute to both psychopathology and suicidal ideation (Cavanagh, Carson, Sharpe, & Lawrie, 2003; Jankovic et al., 2013) and attempts (Arsenault-Lapierre, Kim, & Turecki, 2004; Krysinska & Martin, 2009). For example, studies examining childhood trauma (physical and/or sexual abuse) have found that traumatic events in childhood are highly associated with future suicidal ideation (Barbosa et al., 2014) and attempts (Sarchiapone, Carli, Cuomo, & Roy, 2007) in various cultural and ethnic groups (e.g., African American, South American, Italian) (Bradley, Schwartz, & Kaslow, 2005; McGowan & Kagee, 2013). Additionally, survivors of sexual assault and rape, as well as those exposed to combat trauma, have higher rates of suicide attempts than other populations (Bryan, Ray-Sunnerud, Morrow, & Etienne, 2013; Steketee & Foa, 1987; Youseff et al., 2013).

Indeed, it is theorized that the association between trauma exposure and suicidality is likely either accounted for or exacerbated by the emotional states potentially associated with unresolved traumatic stress, such as guilt, anxiety, shame, and depression (Harned, Rizvi, & Linehan, 2010; Hendin & Haas, 1991; Marshall-Berenz, Morrison, Schumacher, and Coffey, 2011; Tarrier & Gregg, 2004). In the current literature, traumatic events are conceptualized as transdiagnostic risk factors for various psychiatric disorders. Such psychiatric disorders (i.e., posttraumatic stress disorder [PTSD]) in turn might mediate or moderate the association between trauma exposure and suicidality (Jankovic et al., 2013).

PTSD Symptom Severity and Suicidality

Posttraumatic stress disorder (PTSD) is a psychiatric disorder that results from exposure to trauma in a sub-set of the trauma-exposed population. In fact, PTSD has been identified as a major risk factor in suicide attempts (Brenner et al., 2011; Krysinska & Lester, 2010; Lopez-Castroman et al., 2015; Tarrier & Gregg, 2004)**.** Individuals with PTSD in the general population endorse a higher level of suicidal ideation than those who have not developed PTSD following trauma. More specifically, the majority (54.4%-56%) of individuals with PTSD have been shown to exhibit varying degrees of suicidality (ideation, plan, and/or attempt) (Lopez-Castroman et al., 2015; Panagioti, Gooding, Taylor, & Tarrier 2012; Tarrier & Gregg, 2004). Even after controlling for demographic variables and psychiatric diagnoses (e.g., major depression), the association between PTSD and suicidal ideation remains statistically significant ($R^2 = .033$, $p < .01$; Mazza, 2000). Similarly, when controlling for other psychiatric diagnoses, individuals who had experienced PTSD symptoms were 14 times more likely to have completed suicide, according to a large epidemiological study in Denmark (Gradus et al., 2012). When

controlling for other psychiatric diagnoses in a national sample of women with sexual assault histories, those with a PTSD diagnosis displayed 1.37-4.57 times more suicidal ideation and .72-2.43 times more suicide attempts than those without a PTSD diagnosis (Ullman & Brecklin, 2002). In addition, according to a meta-analysis examining associations between PTSD and suicidal ideation and suicide attempts across various populations (e.g., community members, domestic violence and sexual assault victims, substance abusers, psychiatric inpatients, and war veterans), individuals with PTSD, as compared to those without PTSD, displayed 3.67-5.1 times more suicidal ideation and 2.79-6.0 times more non-fatal suicidal behavior (Kessler, Borges, & Walters, 1999; Krysinska & Lester, 2010; Sareen, Houlahan, & Cox, 2005).

Furthermore, the severity of avoidance, re-experiencing, and hyperarousal symptoms of PTSD have been associated with increased suicidal ideation in general psychiatric inpatient samples and in general community samples reporting a history of PTSD Criterion A traumatic events (i.e., the experience or witnessing of death, threatened death, or actual or threatened serious injury [APA, 1994]) (Anestis, Tull, Bagge, & Gratz, 2012; Ben-Ya-acov & Amir, 2004; Panagioti et al., 2012). Additionally, in trauma-exposed military veterans, symptoms of avoidance and negative alterations in cognitions and mood have been significantly associated with suicide attempts (Legarreta et al., 2015). These studies have illustrated how the specific symptoms of PTSD can possibly inform the association of PTSD and suicidal behaviors.

Role of Emotion Regulation in PTSD and Suicidality

Emotion regulation difficulties may play a key role in the link between PTSD and suicidality. Emotion regulation has been operationalized in different ways throughout the

literature. The most accepted, broad-based operationalization defines *emotion regulation* as the flexible and adaptive use of strategies to affect the likelihood, intensity, or duration of an emotion in order to engage in goal-directed behavior (Gratz & Roemer, 2004; Gross, 2002; Gross, 1998). According to the Difficulties with Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), a widely used self-report measure of emotion regulation, emotion regulation difficulties include deficiencies in emotional clarity, emotional awareness, impulse control, emotional acceptance, engaging in goal-directed behavior when upset, and access to emotion regulation strategies when upset. Traumatic events can elicit severe emotional reactions, such as anger, guilt, shame, and grief, and the inability to regulate these emotions adaptively can lead to the maintenance of PTSD symptoms (Bonn-Miller, Vujanovic, Boden, & Gross, 2011; Cloitre et al., 2010; O'Brien, 2015; Ullman, Foynes, & Tang, 2010). Indeed, individuals with PTSD are often characterized by high levels of emotional avoidance, which precludes effective cognitive and emotional processing of the trauma, thus perpetuating the disorder. Specifically, emotion regulation difficulties have been associated with PTSD in trauma-exposed samples (e.g., sexual assault victims, military veterans, community samples of trauma-exposed individuals), highlighting the potential utility of emotion regulation in conceptualizing the effects of traumatic events (Cloitre et al., 2005; Boden et al., 2013; Bonn-Miller et al., 2011; Kashdan et al., 2006). Essentially, when overwhelmed by distressing emotions, individuals with PTSD may experience difficulty effectively alleviating the emotional pain and may seek behaviors to escape or avoid negative emotions rather than to more adaptively accept or cope with emotions without

experiencing a loss of behavioral or emotional control (Bonanno et al., 2004; Moore et al., 2008; Shepherd & Wild, 2014).

Individuals with PTSD often have difficulty with experiencing a range of emotions, both positive and negative, due to the tendency to numb themselves from emotions following exposure to trauma (Seligowski et al., 2015). Avoidance of emotional processing following traumatic exposure has also been shown to inhibit one's recovery from trauma and contribute to the development of PTSD (Foa, Steketee, & Rothbaum, 1989). Various components of emotion regulation associated with emotional avoidance and numbing have been associated with PTSD symptomatology. For example, expressive suppression (e.g., trying not to cry after receiving negative feedback) has been linked to greater PTSD symptom severity (Gross, 1998). Conversely, cognitive reappraisal and acceptance have been inversely related to PTSD symptom severity, resulting in fewer PTSD symptoms (Shepherd & Wild, 2014; Thompson & Waltz, 2010; Vujanovic, Youngwirth, Johnson, & Zvolensky, 2009).

Similarly, difficulties with emotion regulation have been associated with suicidal ideation (Arria et al., 2009; Rajappa et al., 2012) and suicide attempts (Tamas et al., 2007; Zlotnick et al., 2003). Specifically, several aspects of emotion regulation difficulties (i.e., nonacceptance of emotions, impulse control, a lack of effective emotion regulation strategies) have been positively associated with suicidal ideation in various populations, including college students, adolescents, and individuals with borderline personality disorder (Anestis & Joiner, 2011; Chiles, Strosahl, Cowden, Graham, & Linehan, 1986; Wagner & Zimmerman, 2006). Additionally, the avoidance and numbing symptoms of PTSD have been associated with suicidality, suggesting that difficulties

with several aspects of emotion regulation may be involved in this association (O'Brien, 2015; Panagioti et al., 2012). It could be the case that individuals who feel especially overwhelmed and unable to regulate distressing emotions (i.e., survivors of trauma with PTSD symptoms) may view suicide as a way to escape these feelings, as an ultimate attempt at emotional avoidance (Baumeister, 1990; Miranda, Tsypes, Gallagher, & Rajappa, 2013).

PTSD symptom severity has been widely shown to play a significant role in suicidality in inpatient populations (Anestis et al., 2012), whereas other factors, such as emotion regulation difficulties, are more likely to influence the strength of the association. Specifically, heightened difficulties in emotion regulation have been associated with increased levels of PTSD symptom severity, suicidal ideation (Anestis et al., 2012), anxiety (Carthy, Horesh, Apter, & Gross, 2010; Goldin & Gross, 2010), and depression (Jacobson, Batejan, Kleinman, & Gould,,2012; Silk, Steinberg, & Morris, 2003). The ability to effectively regulate emotions (i.e., less difficulties in emotion regulation) has been posited as a potential protective factor in the PTSD-suicidality association (Anestis et al., 2012). Conversely, heightened emotion regulation difficulties may actually intensify the association between PTSD symptom severity and suicidality. Thus, suicidality may actually be greater in individuals who exhibit both severe PTSD symptomatology and heightened difficulties in emotion regulation. Therefore, difficulties in emotion regulation may *exacerbate* the complex association between PTSD and suicidality in trauma-exposed individuals.

Limitations in Current Research

There are several limitations inherent in the extant literature on PTSD symptomatology and suicidality. First, only approximately five studies to date have examined the associations between PTSD symptomatology and suicidality in acute-care psychiatric inpatient samples (Anestis et al., 2012; Dore, Mills, Murray, Teesson, & Farrugia, 2012; Huang, Schwandt, Ramchandani, George, & Heilig, 2012; Oquendo et al., 2003; Ramberg, Stanley, Ystgaard, & Mehlum, 2015). This shortage of data is unfortunate since an acute-care inpatient setting represents an especially high-risk sample with regard to trauma exposure, PTSD symptomatology (Dore et al., 2012; Havens et al., 2012; McCormack & Adams, 2015; Muskett, C., 2014), and suicidal ideation and behavior (Anestis et al., 2012; Pompili et al., 2014). Second, most relevant studies examining PTSD and suicide in inpatient settings to date have been based on adolescent (Brand, King, Olson, Ghaziuddin, & Naylor, 1996; Havens et al., 2012) and substance-abusing samples (Anestis et al., 2012; Dore et al., 2012). The empirical literature on general adult acute-care inpatient samples is thus limited. Third, no studies to date have examined the role of emotion regulation difficulties in the association between PTSD and suicidal ideation and behavior. This is an important area for further study as it has the potential to directly inform novel suicide prevention programming.

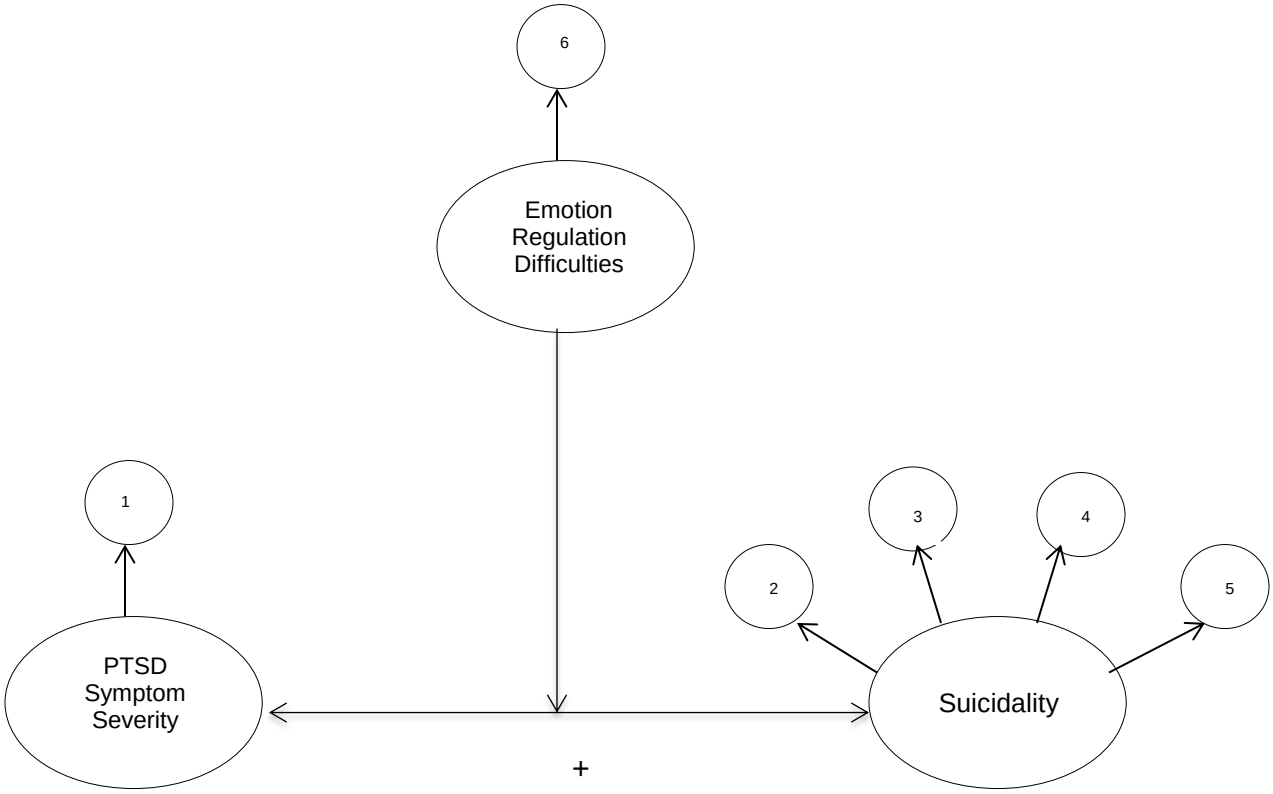
Hypotheses

The present study aims to address these gaps in the extant literature by examining the main and interactive effects of PTSD symptom severity and emotion regulation in regard to suicidality among trauma-exposed acute-care psychiatric inpatients. For purposes of this study, suicidality is operationalized as four distinct variables: (1) current self-reported suicidal ideation severity, (2) extent of suicidal ideation during current

hospitalization (i.e., proportion of days of expressed suicidal ideation to nursing staff or in treatment team meetings, to total days of hospitalization) (3) number of self-reported past suicide attempts, and (4) suicidality as basis for current hospital admission (yes/no). First, it is hypothesized that higher levels of PTSD symptom severity will be significantly incrementally (above and beyond covariates) related to greater levels of each of the four suicidality outcomes. Second, it is hypothesized that greater difficulties in emotion regulation will be significantly incrementally related to greater levels of each of the suicidality outcomes. Third, it is hypothesized that the interactive effect of PTSD symptom severity and emotion regulation difficulties will be significantly incrementally related to greater levels of each of the suicidality outcomes; please see Figure 1 for a graphical representation of the hypothesized model.

Specifically, it is expected that the combination of greater PTSD symptom severity and greater difficulties in emotion regulation will be significantly incrementally related to greater suicidality. These effects are predicted after controlling for theoretically relevant covariates, including trauma exposure severity (i.e., number of traumatic life events endorsed) and number of psychiatric diagnoses on record. Trauma exposure severity and the number of psychiatric diagnoses on record are likely implicated in the association between PTSD symptom severity and suicidality (Cavanagh et al., 2003; Arsenault-Lapierre et al., 2004; Gaher, Hofman, Simons, & Hunsaker, 2013) and thus will be held constant in the present study.

Figure 1. Theoretical Model. Hypothesized Interactive Effect of PTSD Symptom Severity and Emotion Regulation Difficulties in Terms of Suicidality Outcomes



1. PTSD symptom severity (PCL-5 Total Score)
2. Current self-reported suicidal ideation severity (BSS-Total Score)
3. Suicidality as basis for current hospital admission (yes/no)
4. Number of self-reported past suicide attempts
5. Extent of suicidal ideation during current hospitalization (i.e., proportion of days of expressed suicidal ideation to total days of hospitalization)
6. Emotion regulation difficulties (DERS Total Score)

Chapter II

Materials and Methods

Participants

Participants were 120 adults (57.4% male; Mage = 33.83, SD = 11.19) admitted to an acute-care psychiatric inpatient hospital between August 2014 and February 2015. Please see Table 1 for a summary of participant characteristics. The majority of participants identified as a member of a racial/ethnic minority group (56.1%) and single (67.7%). Participants also exhibited a variety of psychiatric diagnoses (see Table 2): mood disorders, substance disorders, and psychotic-spectrum disorders were the most well represented.

To be included in the study, participants had to be (1) between the ages of 18 and 65 and (2) report a history of trauma exposure consistent with DSM-5 PTSD Criterion A (i.e., participants did not need to meet criteria for a full PTSD diagnosis). Exclusionary criteria were comprised of an inability to provide verbal and written informed consent and/or a score of 19/30 or below on the Mini Mental State Examination (MMSE). The current study is a secondary data analysis from data collected as part of a study approved by the Institutional Review Board (IRB) of the University of Texas-Health Sciences Center at Houston. The University of Houston's Committee for the Protection of Human Subjects has also given IRB approval has for this study.

Table 1
Participant Characteristics

	N/% or M/SD
Sex	
Male	89/57.4
Female	66/42.6
Race/Ethnicity	
White/Caucasian	68/43.9
Black or African American	59/38.1
Asian	3/1.9
Native Hawaiian or Other Pacific Islander	1/0.6
Hispanic	24/15.5
Age	33.83/11.19*
Marital Status	
Single	105/ 67.7
Married	18/11.6
Divorced	18/11.6
Separated	11/7.1
Widowed	3/1.9
Mean Monthly Income	
Average	$350.07/$1,459.80*
Median	$0
Mini Mental Status Examination	27.34/3.14*
Education	
6th grade	3/1.9
7th grade	3/1.9
8th grade	8/5.2
9th grade	16/10.3
10th grade	7/4.5
11th grade	8/5.2
High school/GED	58/37.4
Some college	31/20.0
College diploma	10/6.5
Graduate studies	1/0.6
Graduate degree	4/2.6
Length of Hospitalization (Days)	9.25/5.21*
Trauma Endorsement	
Transportation accident	96/62.3
Exposure to toxic substance	93/60.4
Natural Disaster	90/58.4
Serious accident (e.g., at work, home)	75/48.7
Assault with a weapon	75/48.7
Serious injury, harm, or death [participant] caused to someone else	63/40.9
Physical assault	58/37.7
Sudden violent death	55/35.7

Sexual assault	54/35.1
Severe human suffering	51/33.1
Other unwanted or uncomfortable sexual experience	48/31.2
Fire or Explosion	47/30.5
Combat exposure to a war-zone	43/27.9
Sudden accidental death	33/21.4
Life-threatening illness or injury	30/19.5
Captivity	22/14.3

Note: Ranges of continuous study variables, age (18-65), monthly income ($0-$15,000), MMSE (11-30), and length of stay (2-41).

Table 2
Psychiatric Diagnostic Composition of Current Sample

Disorder	Prevalence within sample (%)
Mood Disorders	**39.4**
Bipolar Disorder NOS	19.4
Major Depressive Disorder	8.4
Bipolar Disorder I/II	7.1
Substance-Induced Mood/Psychosis	2.6
Mood Disorder NOS	1.9
Substance Use Disorders	**29.5**
Alcohol Abuse/Dependence	20.0
Opioid Abuse/Dependence	2.2
Cocaine Abuse/Dependence	1.9
Polysubstance Abuse/Dependence	1.3
Cannabis Abuse/Dependence	1.2
Hallucinogen Abuse	1.1
Amphetamine Abuse/Dependence	.6
PCP Abuse/Dependence	.6
Anxiolytic Abuse/Dependence	.6
Inhalant Abuse	0
Psychotic-Spectrum Disorders	**27.5**
Schizoaffective Disorder	11.6
Schizophrenia	8.4
Psychosis NOS	4.3
Schizophreniform Disorder	3.2
Anxiety and Related Disorders	**6.3**
Posttraumatic Stress Disorder	5.1
Anxiety Disorder NOS	.6
Adjustment Disorder	.6
Panic Disorder	0

Measures

Mini Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975). The MMSE is an 11-item instrument used as an objective screening assessment for general mental status. The MMSE provides a brief screening of abilities in the areas of attention, memory orientation (recall of words, recognition of sentences), and initiation and maintenance of verbal and motor responses. Scores range from 0-30, where a score of 26 or above indicates normal cognitive functioning. Scores below 19 have been

indicative of moderate cognitive impairment; thus, a score of 19 or below was used as a cutoff score for the present study. The MMSE has demonstrated good test-retest reliability over a 4-6 week period (e.g., α = .70), good internal consistency (α =.60 – .70), as well as concurrent validity with other cognitive assessments (i.e., Mental Alternation Test, Cognitive Performance Scale) in inpatient populations (Billick, Siedenburg, Burgert, & Bruni-Solhkhah, 2001; deLeon, Ellis, Rosen, & Simpson, 1993; Espino, Lichtenstein, Palmer, & Hazuda, 2004; Wellens et al., 2013). In the current sample, the MMSE had a low internal consistency (α = .55).

Life Events Checklist for DSM-5 (LEC-5; Weathers, Blake, Schnurr, Kaloupek, Marx, & Keane, 2013a). The LEC-5 is a self-report measure used to screen for potentially traumatic events over the course of a respondent's lifetime. The LEC-5 presents respondents with 16 potentially traumatic events (e.g., natural disaster, combat, sexual assault) and includes an additional item assessing for other stressful events not listed in the 16 items. With regard to each event listed, respondents are asked to indicate (by check mark) whether the event "has happened to you at some point in your life." Notably, this represents a modification of the original LEC-5, which asks participants whether each event (a) "happened to you," (b) "you witnessed it happen to someone else," (c) "you learned about it happening to a close family member of close friend," (d) "you were exposed to it as part of your job," or (e) "you're not sure if it fits." This modification was instituted to simplify the measure for the acute-care inpatient population. The LEC-5 shares convergent validity with other measures assessing exposure to potentially traumatic events (Gray, Litz, Hsu, & Lombardo, 2004). In the

current study, the LEC-5 will be used to determine the number of traumatic life events each participant has experienced.

PTSD Checklist-Civilian Version-5 (PCL-C 5; Weathers, Litz, Keane, Palmieri, Marx, & Schnurr, 2013). The PCL-5 is a 20-item self-report measure of PTSD symptom severity. Each of the 20 items reflects a DSM-5 symptom of PTSD. Respondents are asked to rate each item on a 5-point scale (1 = *Not at all* to 5 = *Extremely*) in terms of how often they have been bothered by the symptom in the past month (e.g., "In the past month, how much have you been bothered by repeated, disturbing, and unwanted memories of the stressful experience?"). Total symptom severity scores range from 20-100, where higher scores indicate higher symptom severity. In the current literature on the DSM-V, a total score of 38 has been proposed as a reasonable cutoff score for a PTSD diagnosis until further studies on the psychometric properties of the PCL-5 have been conducted (Weathers et al., 2013a). The PCL-5 is an updated version of the PCL-C (based on the DSM-IV PTSD criteria), which has demonstrated good reliability (α = .93-.96) and predictive diagnostic validity in individuals with trauma histories (Keen, Kutter, Niles, & Krinsley, 2008; Ruggieru, Del Ben, Scotti, & Rabalais, 2003). The internal consistency of the PCL-5 in the current study was high (α = .95). The current study examines PTSD symptom severity on a continuum, not a PTSD diagnosis, thus resulting in more variability than a diagnoses would provide.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a 36-item self-report measure on which respondents indicate, using a 5-point scale (1 = *almost never* to 5 = *almost always*), how often each item applies to them. The DERS is multidimensional in that it is composed of six subscales that yield a total score:

(1) Nonacceptance of Emotional Responses (e.g., “When I’m upset, I feel guilty for feeling that way”), (2) Difficulties Engaging in Goal-Directed Behavior (e.g., “When I’m upset, I have difficulty focusing on other things”), (3) Impulse Control Difficulties (e.g., “When I’m upset, I feel out of control”), (4) Lack of Emotional Awareness (e.g., “I pay attention to how I feel” reverse-scored), (5) Limited Access to Emotion Regulation Strategies (e.g,. “When I’m upset, my emotions feel overwhelming”), and (6) Lack of Emotional Clarity (e.g., “I have no idea how I am feeling”). The DERS has high levels of internal consistency (α = .93, Gratz & Roemer, 2004) and adequate test–retest reliability over a 4- to 8-week period (*r* = .88, Gratz & Roemer, 2004). The current study supports high levels of internal consistency found in other populations (α = .89). For purposes of the current project and consistent with extant literature, the DERS – Total Score was used in order to index global difficulties in emotion regulation (Banducci, Hoffman, Lejuez, & Koenen, 2014; Long, Felton, Lilienfeld, & Lejuez, 2014; van Rheenen, Murray, & Rossell, 2015).

Beck Scale for Suicide Ideation (BSS; Beck et al., 1991). The BSS is a 20-item self-report measure that measures the severity of an individual’s suicidal ideation and plans and will be used in the current study as a measure of suicidality. Respondents’ scores range from 0 to 40, with higher scores indicating higher levels of suicidal ideation. Respondents rate, on a 3-point scale, the most accurate statement (e.g., “I have a moderate to strong will to live”) for the intensity of suicidal ideation present over the past week, “including today.” Part One assesses one’s desire to die, while Part Two assesses the severity of suicidal ideation, intent, and planning for those respondents who endorsed a desire to die. Scores on the BSS have demonstrated high internal consistency (α = .96)

and strong test-retest reliability over a 1-week period (r = .88) in psychiatric inpatient populations (Beck, Steer, & Ranieri, 1988; Pinninti, Steer, Rissmiller, Nelson, & Beck, 2002). In the current study, the internal consistency of the BSS was also high (α = .94).

Medical Records Review. Demographic information, including age, sex, race/ethnicity, and marital status were derived from the electronic medical records. Discharge psychiatric diagnoses (Axis I and II) were summed and used to inform the diagnostic composition of the present sample. Since patients often present for admission in acute distress, intake diagnostic information is often incomplete; discharge diagnostic data are more comprehensive and provided a standardized time-point for extraction of diagnostic data.

For the purposes of the current project, three outcomes of suicidality were obtained from medical records: (1) extent of suicidality during current hospitalization, (2) number of self-reported past suicide attempts, and (3) suicidality as a basis for current hospital admission (yes/no). Data regarding suicidality preceding the current hospitalization and history of suicide attempts were extracted from the Initial Psychiatric Evaluation. The extent of suicidality during the current hospitalization was defined as proportion of days of self-reported suicidal ideation to total days of hospitalization; standardized daily nursing notes were used for these data. Specifically, daily assessments of suicide were conducted by patients' treatment team, led by a psychiatrist, and were entered into each patient's treatment team progress note for the day. Four separate outcomes of suicidality were included in this study to provide to a multi-method assessment of suicidality. Outcomes that appeared redundant based on multicollinearity statistics were eliminated.

Procedures

All individuals assigned to one unit, chosen at random for purposes of this study protocol, in an acute-care psychiatric inpatient hospital were screened for a history of trauma using the Life Events Checklist-5 upon admission for hospitalization. Study staff approached individuals who endorsed at least one traumatic event on the LEC-5 for potential participation, and individuals who were willing to participate provided informed verbal and written consent. Participants were then administered the MMSE, PCL-5, and the BSS with study staff present, followed by a behavioral and computer task, which were not included as part of the current study. Finally, participants completed a self-report packet, which included the questionnaires used for the current study.

Data Analytic Plan

First, a missing value analysis was conducted, and data were examined for outliers using Cook's D in order to minimize the risk of inflated error rates and substantial distortions of parameter and statistic estimates. Second, descriptive statistics and bivariate correlations were examined among all variables of interest. Correlations among the covariates (LEC: Number of Traumas; number of psychiatric diagnoses) and predictor variables (PCL-5: Total Score; DERS: Total Score) were examined for multicollinearity. If variables were correlated at 0.7 or higher, the variance inflation factor (VIF) and tolerance indicator were examined to determine if multicollinearity affected the analyses (i.e., VIF value of 10 or higher, tolerance value below .10).

Third, a series of three hierarchical linear regression analyses was conducted. The criterion variables included (1) current self-reported suicidal ideation severity (BSS-Total Score), (2) extent of suicidal ideation during current hospitalization (i.e., proportion of

days of expressed suicidal ideation to total days of hospitalization), and (3) number of self-reported past suicide attempts. A logistic regression analysis was then conducted using suicidality as basis for current hospital admission (yes/no) as the criterion variable. In block one of each regression model, theoretically relevant covariates (LEC: number of traumas; number of psychiatric diagnoses) were entered. In block two of each model, mean-centered variables for PTSD symptom severity (PCL-5: Total Score) and emotion regulation difficulties (DERS: Total Score) were entered. In block three of each model, the interaction term (the product) for mean-centered PTSD symptom severity (PCL-5: Total Score) by emotion regulation difficulties (DERS: Total Score) was entered. Probing analyses of simple slopes for moderation effects were conducted using Hayes' (2012) PROCESS macro for SPSS.

Chapter III

Results

Examination of Data for Outliers and Missing Data

Outliers were examined, and none were excluded from the analyses (i.e., no cases had a Cook's D of greater than one). The data was found to be missing completely at random, thus pairwise deletion was used to address the missing data in order to keep as many cases as possible.

Descriptive Statistics and Bivariate Correlations

A preliminary analysis was conducted to examine the bivariate correlations of the variables included in the study. None of the significant correlations exceeded 0.7, indicating multicollinearity was not a concern. Descriptive statistics for all study variables (e.g., PCL-C [M=39.38], DERS [M=94.00]) are found in Table 3.

Number of traumatic life events was significantly (positively) correlated with PTSD symptom severity ($r = .46$, $p < .001$) and difficulties in emotion regulation ($r = .23$, $p < .01$). PTSD symptom severity was significantly (positively) correlated with difficulties in emotion regulation ($r = .67$, $p < .001$), BSS score ($r = .42$, $p < .001$), and suicidality as reason for current hospitalization ($r = .23$, $p < .01$). Difficulties in emotion regulation total was significantly (positively) correlated with BSS score ($r = .39$, $p < .001$) and suicidality as reason for current hospitalization ($r = .37$, $p < .001$). BSS score was significantly (positively) correlated with suicidality as reason for current hospitalization ($r = .37$, $p < .001$), while suicidality as reason for current hospitalization was significantly (positively) correlated with number of self-reported past suicide attempts ($r = .17$, $p < .05$).

Table 3
Descriptive Data and Bivariate Correlations among Theoretically-Relevant Variables

Variable	1	2	3	4	5	6	7	8	M (SD) or %
1. LEC[1]	1	.05	.46***	.23**	.12	-.09	-.01	.01	6.05 (3.62)
2. Diagnoses total	-	1	.11	.12	.15	.09	-.00	-.05	2.01 (1.14)
3. PCL[2]	-	-	1	.67***	.42***	.23*	-.02	.00	39.38 (20.89)
4. DERS[3]	-	-	-	1	.39***	.37***	.00	-.10	94.00 (27.13)
5. BSS[4]	-	-	-	-	1	.37***	.03	-.05	3.53 (7.48)
6. Reason for admission	-	-	-	-	-	1	.17*	-.13	52.3%[5]
7. History of attempts	-	-	-	-	-	-	1	.05	1.66 (.83)
8. Ratio of suicidality on unit	-	-	-	-	-	-	-	1	0.3[6]

Note. *$p<.05$, **$p<.01$, ***$p<.001$.
[1] Life Events Checklist
[2] PTSD Checklist-Civilian Version
[3] Difficulties in Emotion Regulation Scale
[4] Beck Scale of Suicidal Ideation
[5] Percentage of patients who endorsed "yes" for suicidality as reason for admission
[6] Average number of days reporting suicidality on unit

Regression Analyses

Please see Table 4 for a summary of regression analyses.

BSS self-report. With regard to BSS as the criterion variable, the overall model was statistically significant, accounting for 26.4% of variance, $F(2, 127) = 8.77$, $p < 001$. Step one of the model accounted for 4.8% of variance ($p < .05$). Step two of the model accounted for an additional 15.7% of unique variance ($p < .001$), with greater PTSD symptom severity significantly associated with greater BSS scores in this step ($\beta = .30$, $p = .02$). Difficulties in emotion regulation was not significantly associated with BSS scores in the second step ($\beta = .19$, $p = .09$). Step three of the model accounted for an additional 5.9% of unique variance ($p < .001$), with evidence for a significant interactive

effect for PCL x DERS item total score (β = .25, *p* = .002). The effects of the individual independent variables on the BSS score are summarized in Table 4.

Figure 2 displays the significant interaction of PTSD symptom severity by emotion regulation difficulties in relation to BSS total score. Probing analyses of the simple slopes and interactions were conducted using the PROCESS Macro for SPSS (Hayes, 2012). These analyses revealed the moderating role of difficulties in emotion regulation in the association of PTSD symptom severity and suicidality as measured by the BSS. Specifically, PTSD symptom severity was significantly associated with BSS total score among those high in difficulties in emotion regulation (t = 4.12, β = .24, *p* < .001), with higher levels of PTSD symptom severity being associated with increased suicidality. Conversely, the association between PTSD symptom severity and suicidality was not statistically significant for those low in difficulties in emotion regulation (t = -.41, β = -.02, *p* = .68).

Proportion of days suicidal during admission. With regard to the proportion of days suicidal during the current admission as the criterion variable, the overall model was not statistically significant, R^2 = .02, $F(4, 127)$ = .53, *p* = .72. The effects of covariates, PTSD symptom severity, and difficulties in emotion regulation were not statistically significant (*p*'s > .05).

Number of previous suicide attempts. With regard to the number of self-reported suicide attempts as the criterion variable, the overall model was not statistically significant, R^2 = .002, $F(4, 127)$ = .05, *p* = .99. The effects of covariates, PTSD symptom severity, and difficulties in emotion regulation were not statistically significant (*p*'s > .05).

Suicide at current admission (yes/no). With regard to suicidality as a basis for current hospital admission (yes/no), a test of the full model against a constant only model was statistically significant, indicating that the predictors reliability distinguish suicide as a basis for admission as compared to distinguishing at random ($\chi^2 = 27.83$, $p < .001$, df = 5). The H-L statistic had a significance of .44, which indicated that the current model was a good fit.

Nagelkere's R^2 of .26 indicated a relatively small relationship between prediction and observed estimates of suicide as basis for admission. Prediction success overall was 67.2%. The Wald criterion demonstrated that number of traumatic life events ($p = .01$) and difficulties in emotion regulation ($p = .002$) made significant predictions. Number of psychiatric diagnoses and PTSD symptom severity were not significant predictors. Exp(B) values indicate that when number of traumatic life events and difficulties in emotion regulation were raised by one unit respectively, the odds ratios were .82 and 1.03 times as large. Therefore, these individuals were .82 and 1.03 times more likely to have suicide as a basis for admission.

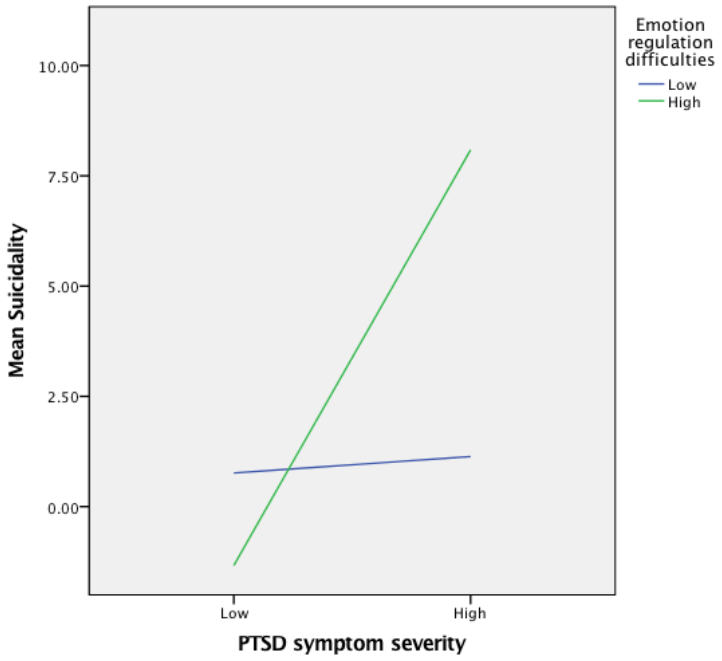
Table 4
Main and Interactive Effects of PTSD Symptom Severity and Difficulties in Emotion Regulation in Association with Suicidality

Linear Regression	ΔR^2	t	β	sr^2	p
BSS Score					
Step 1	.048				.05
DX		1.95	.17	.62	.06
LEC		1.52	.13	.21	.13
Step 2	.157				< .001
PCL		2.45	.30	.05	.02
DERS		1.70	.19	.03	.10
Step 3	.059				< .001
PCLxDERS		3.13	.25	.00	.002
Extent of suicidality on unit					
Step 1	.002				.88

DX		-.48	-.04	.01	.64
LEC		-.16	-.01	.004	.88
Step 2	.016				.72
PCL		.93	.13	.001	.36
DERS		-1.36	-.17	.001	.18
Step 3	.000				.84
PCLxDERS		.02	.002	.000	.99
History of attempts					
Step 1	.002				.91
DX		.42	.04	21.09	.67
LEC		-.15	-.01	7.12	.88
Step 2	.000				.99
PCL		-.07	-.01	1.68	.95
DERS		.03	.004	1.15	.97
Step 3	.007				.95
PCLxDERS		-.95	-.09	.04	.34

Logistic Regression	*SE*	*df*	*B*	*Wald*	*p*	e^B	*95% CI*	
							L	*U*
Suicide as reason for admission								
Step 1								
DX	.20	1	.18	.81	.37	1.19	.81	1.75
LEC	.08	1	- .20	6.76	.01	.82	.70	.95
Step 2								
PCL	.02	1	.01	.67	.41	1.01	.94	1.09
DERS	.01	1	.03	9.67	.00	1.03	.99	1.07
Step 3								
PCLxDERS	.00	1	.00	.01	.08	1.00	1.00	1.00
Constant	.60	1	1.05	3.08	.08	2.88		
χ^2	7.91							
df	8							

Figure 2. Interactive Effects of PTSD Symptom Severity and Difficulties in Emotion Regulation Predicting BSS Total Score



Chapter IV

Discussion

Study Overview

The present study sought to address gaps in the literature on PTSD symptom severity and suicidality. The study extends current work by examining the moderating role of emotion regulation in the association between PTSD symptom severity and suicidality in acute-care psychiatric inpatients. Specifically, the main and interactive effects of PTSD symptom severity and difficulties in emotion regulation were examined in regard to suicidality in a trauma-exposed, acute-care psychiatric inpatient sample. Suicidality was defined as (1) current self-reported suicidal ideation severity, (2) extent of suicidal ideation during current hospitalization (i.e., proportion of days of expressed suicidal ideation to nursing staff in treatment team meetings, to total days of hospitalization), (3) number of self-reported past suicide attempts, and (4) suicidality as basis for current hospital admission (yes/no).

PTSD Symptoms and Suicidality

Consistent with hypotheses, PTSD symptom severity demonstrated significant positive associations with self-reported suicidal ideation severity ($\beta = .30$ $p < .05$). Higher levels of PTSD symptom severity were associated with greater endorsement of suicidal ideation (BSS), above and beyond the variance contributed by the number of traumatic life events, number of diagnoses at discharge, and difficulties in emotion regulation. The covariates significantly accounted for 4.8% of the variance in self-reported suicidal ideation, whereas PTSD symptom severity and difficulties in emotion regulation contributed an additional 15.7% of significant variance. This is consistent with the extant

literature on PTSD symptom severity and suicidality (Brenner et al., 2011; Krysinska & Lester, 2010; Lopez-Castroman et al., 2015; Tarrier & Gregg, 2004; Mazza, 2000). The severity of PTSD symptoms has been associated with suicidal ideation (e.g., Mazza, 2000; Anestis et al., 2012), suicide attempts (e.g., Brenner et al., 2011; Krysinska & Lester, 2010), suicidal behaviors (e.g., Ramberg, Stanley, Ystgaard, & Mehlum, 2015), and non-injurious self-injury (Kruger et al., 2014) in various populations. The current findings extend this association to trauma-exposed, acute-care psychiatric inpatients. While other studies have documented associations between PTSD and suicidality in inpatient samples, participants were largely composed of veterans, adolescents, or adults in residential treatment programs for substance use disorders (Anestis et al., 2012; Krysinska & Lester, 2010; Davidson, Babson, Bonn-Miller, Souter, & Vannoy, 2013), as opposed to general acute-care psychiatric inpatients.

Notably, there have been only five studies to date establishing significant associations between PTSD symptom severity and suicidality in psychiatric inpatients, specifically in general extended-stay inpatient samples (Anestis et al., 2012; Dore, Mills, Murray, Teesson, & Farrugia, 2012; Huang, Schwandt, Ramchandani, George, & Heilig, 2012; Oquendo et al., 2003; Ramberg, Stanley, Ystgaard, & Mehlum, 2015). The current study examined this association in an acute-care psychiatric inpatient facility, which may capture a population with more acute distress. Extant studies have established that a PTSD diagnosis has been associated with history of attempted suicide (Oquendo et al., 2003; McFarlane, Schrader, Bookless, & Browne, 2006) as well as increased suicidal ideation (McFarlane, Schrader, Bookless, & Browne, 2006) and suicidal behaviors (Ramberg et al., 2015). However, this is the first study to date to examine PTSD

symptomatology, on a continuum, in relation to suicidality in acute-care psychiatric inpatients. Participants in the current study reported high levels of PTSD symptomatology (M = 39.38, SD = 20.89), with 50.7% meeting the DSM-5 diagnostic cut-off for probable-PTSD on the PCL-5 (e.g., suggested cutoff score of 38 for the DSM-5; Weathers et al., 2013a). According to theoretical models of the association between PTSD and suicidality (e,g., Joiner's Interpersonal-Psychological Theory of Suicide; Joiner, 2005), individuals who feel a sense of perceived burdensomeness and thwarted belongingness are more likely to experience various forms of suicidality (e.g., ideation, attempts) (Bryan, Morrow, Anestis, & Joiner, 2009; Anestis, & Joiner, 2011). Theoretically, the level of distress (i.e., re-experiencing, hypervigilance) and isolation (i.e., avoiding people and places associated with trauma) inherent in PTSD may lead those with PTSD to feel that they are a burden and lack connection with others, thus potentially amplifying suicidality potential.

Contrary to hypothesis, PTSD symptom severity was not significantly associated with suicidality as a basis for hospital admission, number of self-reported past suicide attempts, or the extent of suicidal ideation during hospitalization. At the bivariate level (i.e., point-biserial correlation), PTSD symptom severity was, however, significantly (positively) associated with suicidality as reason for hospital admission ($r = .23$, $p < .05$). For this suicidality outcome, the covariates (number of traumatic life events and number of diagnoses at discharge) likely had more influence in the variance PTSD symptom severity contributed in the final model. Specifically, the covariates in this model accounted for 26% of significant variance in suicidality as a basis for hospital admission. This could be attributed to the idea that individuals who have severe trauma histories and

multiple psychiatric diagnoses exhibit more severe presenting problems upon admission (i.e., suicidality). Therefore, the two covariates in this model were strong enough determinants of suicidality as a basis for admission, that the predictor variables did not contribute significant additional variance.

There may be several reasons for the lack of effect with these remaining suicidality outcomes. Upon admission, patients' self-reports of suicidal ideation and/or attempts, as well as history of attempts, may not be entirely accurate due to recall bias, acute distress, or interviewing styles of attending physicians, for example. Additionally, the extent of suicidality during hospitalization may have had inherent measurement limitations due to non-standardized operationalization of "suicidal ideation" by nursing staff as well as non-standardized assessments. For example, the accuracy of documentation may have been influenced by the stylistic differences of nursing staff (e.g., some nursing staff may have been more detailed than others) or difficulties obtaining accurate information from the patient (e.g., due to medication effects, mental health symptoms, and/or differences in how the nursing staff assessed for suicidality). In order to more accurately capture the associations between PTSD symptom severity and suicidality in acute-care, trauma-exposed inpatients, a more standardized procedure and measurement of suicidality is necessary. For example, implementing more standardized questions to assess for suicidal ideation on the unit may improve the measurement of suicidality. Additionally, it may benefit future research to include close friend/family member reports as well as past medical record verification of number of past suicide attempts in order to validate the individual's history of suicidality more accurately.

Difficulties in Emotion Regulation and Suicidality

Consistent with hypotheses, difficulties in emotion regulation were significantly associated with suicidality as a basis for hospital admission. Individuals with greater difficulties in emotion regulation were significantly more likely to be admitted for current inpatient hospitalization due to suicidal ideation and/or attempts ($\beta = 1.03$, $p = .002$), above and beyond number of traumatic life events, number of psychiatric diagnoses, and PTSD symptom severity. The covariates significantly contributed 3.9% of the variance in suicidality as a basis for current admission, whereas combined PTSD symptom severity and difficulties in emotion regulation contributed an additional 26.1% of unique variance. Difficulties in regulating intense emotions (e.g., anger, guilt, extreme sadness) have been associated with the inability to engage in strategies to alleviate emotional pain (Bonnano et al., 2004; Moore et al., 2008; Shepherd & Wild, 2014). Theoretically, when unable to regulate these painful emotions, individuals may seek escape through suicidal ideation (Arria et al., 2009; Rajappa et al., 2012) and/or attempts (Tamas et al., 2007; Zlotnick et al., 2003). This finding lends support to the current literature on emotion regulation and suicidality, demonstrating how the inability to regulate distressing emotions (e.g., depression, anxiety) can lead some people to feel overwhelmed, and thus, potentially to seek hospital admission for suicidal ideation and/or attempts.

Inconsistent with hypotheses, difficulties in emotion regulation were not significantly associated with self-reported suicidal ideation severity, number of self-reported past suicide attempts, and the extent of suicidal ideation during hospitalization. At the bivariate level, difficulties in emotion regulation were significantly (positively) associated with self-reported suicidal ideation *(*$r = .39$, $p < .001$); however, covariates (number of traumatic life events and number of diagnoses at discharge) significantly ($p <$

.05) accounted for 4.8% of the variance in self-reported suicidal ideation. Furthermore, PTSD symptom severity was significantly associated with self-reported suicidal ideation, which also accounted for a significant amount of variance in self-reported suicidal ideation. Although PTSD symptom severity and difficulties in emotion regulation were significantly correlated ($r = .67$, $p < .001$), they represented distinct constructs, highlighting the separate influence of PTSD symptom severity over difficulties in emotion regulation in self-reported suicidal ideation.

As noted above, the accuracy of self-reported suicidal ideation and past attempts may have been weakened by the self-report measurement nature of these outcomes. Regarding the extent of suicidal ideation during hospitalization, patients may have become more stable and thus more emotionally regulated during hospitalization due to participation in treatment (i.e., medication management, group treatment, and individual therapy services). The difficulties in emotion regulation scale (DERS), as it is currently worded, asks respondents to indicate how often they identify with the items listed. Perhaps a more specified time frame (e.g., “past week” or “today”) may aid in more accurately capturing distinct time-frames in emotion regulation difficulties. Therefore, difficulties in emotion regulation may not have had a significant association with the extent of suicidal ideation during hospitalization. In order to determine whether emotion regulation difficulties are in fact associated with other suicidality outcomes, a more standardized method of assessing suicidal ideation and history of suicide attempts will be necessary for future research. If available, it may also be beneficial to verify prior self-reported suicide attempts through medical record information if patients have had previous admissions to an inpatient hospital or emergency room. Additionally, an

assessment of suicidal ideation at regular intervals during hospitalization, using a standardized assessment form, may offer a more consistent understanding of changes in suicidal ideation during hospitalization.

Interactive Effects of PTSD and Difficulties in Emotion Regulation: Relations with Suicidality

The interactive effect of PTSD symptom severity by difficulties in emotion regulation was significantly associated with self-reported suicidal ideation severity, after accounting for the variance contributed by covariates and main effects. After conducting post-hoc probing analyses of simple slopes, the moderating role hypothesis of emotion regulations was supported. As expected, the combination of high levels of PTSD and heightened difficulties in emotion regulation was associated with the highest levels of self-reported suicidal ideation severity. Further, low levels of emotion regulation difficulties, in the presence of high or low PTSD symptoms, were nearly equally related to lower levels of self-reported suicidal ideation. Finally, the combination of low PTSD symptom severity and heightened difficulties in emotion regulation was related to the lowest levels of self-reported suicidal ideation. Thus, it appears that high levels of difficulties in emotion regulation, in the absence of substantive PTSD symptomatology, are not related to heightened self-reported suicidal ideation.

Clinically, trauma-exposed, acute-care inpatients with severe PTSD symptomatology are significantly more likely to endorse higher self-reported suicidal ideation when they also report heightened difficulties in regulating emotions. In other words, the association between PTSD symptom severity and self-reported suicidal ideation is exacerbated by high levels of difficulties in emotion regulation. Individuals

with severe PTSD symptomatology who endorse self-reported suicidal ideation likely have a difficult time with various aspects of emotion regulation (e.g., awareness of emotions, impulse control, emotional acceptance, engaging in goal-directed behavior when upset, and access to emotion regulation strategies when upset). For example, it follows that having difficulty with impulse control and access to emotion regulation strategies when distressed may lead an individual with PTSD to experience higher levels of suicidal ideation to escape the distressing emotions. When individuals do not experience such difficulty in regulating distressing emotions and can engage in more effective emotion regulation strategies, the effect of PTSD symptomatology on self-reported suicidal ideation weakens (i.e., participants were less likely to endorse suicidal ideation).

Inconsistent with hypotheses, no interactive effects of PTSD symptom severity by difficulties in emotion regulation were observed for number of self-reported suicide attempts, suicide as reason for admission, or the extent of suicidality while on the unit. The lack of interactive effects may be attributed to the unspecified time frame of the DERS, which asks respondents to indicate how often they experience various aspects of emotion regulation difficulties but does not specify a certain time frame to consider (e.g., currently, past week, past month). Additionally, number of past suicide attempts, suicide as reason for admission, and extent of suicidality while on the unit heavily rely on the patient accurately reporting suicidality. It may be the case that the self-report nature of these additional outcomes may have contributed to the lack of interactive effects of PTSD symptom severity by difficulties in emotion regulation in this sample.

Notable Covariates

The covariates used in the current study were trauma severity (i.e., number of trauma types endorsed on the LEC-5) and number of psychiatric diagnoses at discharge, per medical record. These covariates were included in the models due to their likelihood to influence the association between PTSD symptom severity and suicidality (e.g., Cavanagh et al., 2003; Arsenault-Lapierre et al., 2004; Krysinska & Martin, 2009; Brent et al., 1994; Beautrais A., 2005; Conner et al., 2001; Engstrom et al., 1999; Brown et al., 2002). Individuals in the current study endorsed multiple traumatic life events (M = 6.05, SD = 3.62) and psychiatric diagnoses (M = 2.01, SD = 1.14), as consistent with other literature based upon inpatient samples (Mauritz, Goossens, Draijer, & van Achterberg, 2013; Barton, Cumella, & Sanathara, 2006; Melartin et al., 2002). At the bivariate level, trauma exposure severity (i.e., total number of event types) was significantly (positively) associated with PTSD symptom severity ($r = .46$, $p < .001$) and difficulties in emotion regulation ($r = .23$, $p < .01$), consistent with the literature examining these associations (Gearon, Kaltman, Brown, & Bellack, 2003; Yehuda, McFarlane, & Shalev, 1998; Gaher, Hofman, Simons, & Hunsaker, 2013; Fukunishi, Sasaki, Yasunori, Masanori, & Masaki, 1996).

Notably, number of psychiatric diagnoses was not significantly associated with any study variables. This is inconsistent with a priori hypotheses or extant literature (Gaher, Hofman, Simons, & Hunsaker, 2013; Fukunishi, Sasaki, Yasunori, Masanori, & Masaki, 1996) demonstrating that higher numbers of psychiatric diagnoses were associated with more severe mental health symptoms, such as suicidality. In the current study, psychiatric diagnoses were derived via unstandardized clinical interviews conducted by attending psychiatrists and psychiatry residents. It is unclear whether

standardized diagnostic assessments were used consistently, if at all. Additionally, patients had variable lengths of stay on the unit, and thus may not have been given comprehensive diagnostic evaluations due to abbreviated length of time on the unit. Therefore, assigned discharge psychiatric diagnoses were likely not a comprehensive representation of all diagnoses of each patient's complete clinical picture.

Trauma exposure severity (β = .13, p = .13) and number of discharge diagnoses (β = .17, p = .05) contributed significant variance (4.8%) only in the model with self-reported suicidal ideation as the outcome. In addition, number of traumatic life events was significantly associated with suicide as the reason for hospital admission (Wald = 6.76, p = .01). Specifically, individuals with fewer traumatic life events were 18% less likely to have suicidality as a reason for hospital admission, indicating that the effects of experiencing multiple traumatic events contributed to suicidality upon admission (Cavanagh et al., 2003; Arsenault-Lapierre et al., 2004; Krysinska & Martin, 2009). Given that the average number of psychiatric diagnoses was 2.01, and that the number of psychiatric diagnoses represented was likely an underestimate due to non-comprehensive, unstandardized clinical interviews, it may be that there was not enough variability in this covariate to influence the suicidality outcomes.

Limitations and Future Directions

Although the current sample is diverse in regard to psychiatric diagnoses, it is composed of an acute-care inpatient psychiatric population that represents a severe cross-section of the population with regard to mental health. Therefore, these findings may not extend to outpatient or community samples. Additionally, the sample is socioeconomically disadvantaged (M = $350.07 per month), a level of poverty that does

not generalize to other populations. The diverse nature of the current sample's characteristics, however, is a strength since it increases the external validity of the findings and more accurately reflects the demographic characteristics found in real-world acute-care psychiatric inpatient settings. Nonetheless, further research is needed to examine the associations of PTSD symptom severity, difficulties in emotion regulation, and suicidality in potentially less severe populations in outpatient clinics or the community, more generally.

Second, several measurement limitations were present in this study. Many of the instruments (e.g., PCL, DERS, LEC, BSS) used self-report, potentially contributing to method variance or social desirability bias. It would benefit future research to include more clinician interview-based measures, specifically of PTSD symptom severity (e.g., Clinician Administered PTSD Scale-5 [CAPS-5]; Weathers, Blake, Schnurr, Kaloupek, Marx, & Keane, 2013b) and psychiatric diagnoses more generally (e.g., Structured Clinical Interview for DSM-5; First, Spitzer, Gibbon, & Williams, 1996). In addition to interview-based measures, behavioral forms of assessment of difficulties in emotion regulation may provide a more accurate assessment of participants (e.g., neuroimaging). An experimental design might include presenting participants with an emotionally intensifying task (e.g., reading emotionally-laden or trauma-relevant stories, viewing emotional or trauma-relevant images) and assessing both suicidality and how long it takes patients to regulate their emotional reactions by using emotion anchors (e.g., Indicate on a scale of 1-10 how angry you feel right now) every 5 minutes starting from the time they are exposed to the task until they feel back to baseline. Furthermore, the DERS, as it is currently worded, does not provide a time frame for respondents to reference when

choosing responses. It may be more beneficial to find a measure of emotion regulation difficulties that specifies a time frame (e.g., today, past week, past month) to gather a more accurate picture of *when* participants have experienced difficulties in emotion regulation. There were non-standardized assessments of psychiatric diagnoses; thus, future research would benefit from using standardized diagnostic assessments, such as the Structured Clinical Interview for the DSM-IV Axis I Disorders (SCID-I). The lack of consistency in hospital unit notes was also a limitation in the current study, as different hospital disciplines were involved in medical record notes (e.g., nurses, mental health technicians, medical students, psychology services), which may have contributed to disparities in the type and amount of detail used in each note. Given the non-standardized procedure for assessing suicide on the unit, the suicidality outcomes aside from the BSS may not have been completely accurate or comprehensive. Therefore, including standardized note templates for assessing suicidal ideation for all personnel involved in writing notes (e.g., nurses, psychology services) would improve the consistency and accuracy required to examine daily suicide assessments in a more valid manner. Parameters of the note templates could include statements such as, "Patient felt like hurting or killing self today," as well as scaling options (1-10) for the severity of suicidal ideation, intent, and/or plans each day.

Third, several factors may have influenced the accurate assessment of difficulties in emotion regulation during participants' hospital stays. Some patients may have received or elected to participate in individual and/or group therapy services, which may have assisted in more effective regulation of intense emotions that were present at admission. Psychiatrists who were more directive or involved in patient care (e.g.,

therapeutic interventions, implementing effective medication regimens) may have also contributed to patients' gaining more effective emotion regulation strategies.

Finally, it is impossible to draw conclusions about directionality among the study variables given the cross-sectional design of the current study. The associations in the current model may actually flow in a different direction, in that PTSD symptom severity may moderate the association between difficulties in emotion regulation and suicidality. Longitudinal studies may elucidate the causal directionality of these three constructs. Furthermore, future studies should incorporate longitudinal designs to examine the effects of length of hospitalization or emotion regulation interventions in the association of PTSD symptom severity and suicidality. For example, dialectical behavior therapy (Linehan, 2014) offers a specific module on emotion regulation that may serve as useful individual and/or group-based therapeutic interventions.

Clinical Implications

The findings of the current study have implications for clinical work in acute-care psychiatric inpatient settings. Given that participants who exhibited heightened difficulties in emotion regulation and severe PTSD symptoms had the highest level of self-reported suicidal ideation, greater attention should be given to these individuals. It may benefit clinicians to screen for PTSD symptomatology and/or emotion regulation skills upon hospital admission to gain a sense of which individuals may be more at risk for endorsing suicidal ideation. Interventions for emotion regulation skills may be especially beneficial in such settings.

Second, the association between PTSD symptom severity and self-reported suicidal ideation was weaker for those who did not have heightened difficulties in

emotion regulation. Therefore, emotion regulation should be a target of therapeutic interventions, both in individual and group therapy formats, on acute-care, psychiatric inpatient units. When possible, clinicians should aim to teach emotion regulation skills (e.g., engaging in goal-directed behavior when upset, decreasing impulsivity) to individuals with PTSD symptomatology and place more emphasis on those who have more severe PTSD symptoms. These skills are also of particular relevance given that individuals with heightened difficulties in emotion regulation were significantly more likely to endorse suicide as a reason for their current admission. Those who were unable to effectively regulate emotional distress prior to admission likely saw suicide as a way to escape such distress. If clinicians can begin incorporating emotion regulation skills into treatment, they may ultimately decrease the number of patients admitted for suicidality in the future.

Third, there was a discrepancy in individuals with a PTSD diagnosis at discharge (5.1%) versus the percentage of individuals who actually met the DSM-5 cutoff criteria for a PTSD diagnosis on the PCL (50.7%). It seems that PTSD may be under-diagnosed in this type of setting if over 40% of individuals are not receiving the appropriate diagnosis. Patients admitted to this setting who exhibit symptoms that are consistent with PTSD may be underdiagnosed due to unstandardized assessment practices and a focus on the immediate (presenting) psychological disturbances, typically mood (e.g., bipolar I/II, major depressive disorder) and/or psychotic-spectrum disorders (e.g., schizophreniform disorder). Future clinicians might screen for traumatic life events and PTSD symptom severity upon admission, given the strong association between PTSD symptom severity and suicidality documented in this population.

Conclusions

Overall, PTSD symptom severity and difficulties in emotion regulation were significantly associated with two measures of suicidality (self-reported suicidal ideation and suicide as reason for current admission), above and beyond the influence of number of traumatic life events and diagnoses at discharge. Additionally, patients who had heightened PTSD symptom severity and difficulties in emotion regulation had the highest level of self-reported suicidal ideation. These findings highlight the importance of screening for PTSD symptoms in acute-care, inpatient settings, as well as implementing interventions that encourage more effective emotion regulation, to decrease the suicide rate in this population. Further research is warranted to gain a more accurate understanding of the associations among these constructs by using more standardized measurement techniques and experimental or longitudinal designs.

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