The Role of Affect in The Relationship Between Social Stress and Posttraumatic Stress Disorder Symptomology

Alyssa S. Mielock
asmieloc@gmail.com

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ABSTRACT

THE ROLE OF AFFECT IN THE RELATIONSHIP BETWEEN SOCIAL STRESS AND POSTTRAUMATIC STRESS DISORDER SYMPTOMATOLOGY

Alyssa S. Mielock, M.A.
Department of Psychology
Northern Illinois University, 2021
Michelle Lilly, Director

Posttraumatic stress disorder (PTSD) is a psychological disorder that may develop following a traumatic event. Many factors have been shown to contribute to maintaining the distressing and impairing symptoms in response to the event. Internal factors, such as increased negative affect (NA), is positively associated with PTSD symptom severity (PTSS). External factors like social support have a negative relationship with PTSS; increased levels of social support are associated with decreased PTSS. Another external factor that may contribute to PTSS is increased stress. There are mixed findings as to how a psychosocial stressor impacts trauma-exposed samples physiologically. The current study addressed the gap in the literature examining the relationship between social stress and PTSS across time in a trauma-exposed college sample \((N = 44, \overline{M}_{\text{age}} = 19.09)\). Implementing Experience Sampling Methodology (ESM) to examine the relationship between momentary social stress, state NA, and PTSS, across seven days, participants completed a questionnaire measuring momentary affect and social stress via smartphone application up to eight times a day. Each evening, participants rated their PTSS across that day. Multilevel modeling showed that daily NA and daily affect variability both significantly predicted daily PTSS. However, social stress was not a significant predictor in
either daily PTSS or NA measured daily or momentarily. Additionally, time-lagged analyses did not support that momentary social stress predicts NA at the next time point. Findings support that NA maintains PTSS but that social stress may not be a significant factor for changing mood or PTSS in trauma-exposed populations.
THE ROLE OF AFFECT IN THE RELATIONSHIP BETWEEN SOCIAL STRESS AND POSTTRAUMATIC STRESS DISORDER SYMPTOMATOLOGY

BY

ALYSSA S. MIELOCK
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A THESIS SUBMITTED TO THE GRADUATE SCHOOL
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
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Thesis Director:
Michelle Lilly
DEDICATION

To everyone who provided endless support and encouragement: my thoughtful and caring parents, sister, labmates, friends, and research advisor. I love you all!
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CHAPTER ONE
INTRODUCTION AND LITERATURE REVIEW

Statement of the Problem

Posttraumatic stress disorder (PTSD) is a psychological disorder following a traumatic
event (American Psychiatric Association [APA, 2013). While many recover from the traumatic
event without chronic impairment in functioning and daily life, some continue to develop and
maintain a PTSD diagnosis, marked by externalizing and internalizing symptoms (Blanchard et
al., 1995; Breslau et al., 1991; Cusack et al., 2016; Kessler et al., 1995). There are many risk
factors that contribute to maintaining these impairing symptoms in response to the event (Brewin
et al., 2000; Ozer et al., 2003). As the literature currently stands, one of the risk factors that has a
large effect on a PTSD diagnosis is social support (Brewin et al., 2000; Ozer et al., 2003). There
is a negative association between social support and PTSD; less social support is associated with
increased PTSD symptom severity (PTSS; Brewin et al., 2000; Ozer et al., 2003). Social support
can also be viewed as a protective factor, as increased levels of social support are associated with
decreased PTSS (Brewin et al., 2000; Ozer et al., 2003).

Current literature indicates that stressors may contribute to the maintenance of PTSS
(Brewin et al., 2000; Ozer et al., 2003). However, there is a gap in the literature assessing
whether social stress (Myin-Germeys et al., 2003), measured behaviorally, is associated with
PTSS. Within participants diagnosed with major depressive disorder (MDD), social stress was
associated with increased negative affect (NA) and decreased positive affect (PA; Myin-
Germeys et al., 2003; van Winkel et al., 2015). As social support plays an important role in PTSS, there is a need to expand research on social stress in a trauma-exposed sample.

PTSD is not only identified by externalizing behaviors (e.g., hypervigilance) but is also marked by increased negative mood (APA, 2013). Current literature demonstrates that increased PTSS is associated with increased NA (Charak et al., 2014; Kraal et al., 2015; Short et al., 2017). Increasing the understanding of PTSS within different contexts, experience sampling methodology (ESM) allows researchers to capture data in the moment across time (Chun, 2016; Shiffman et al., 2008). The current study implemented ESM to assess the roles of social stress and NA in predicting PTSS. This study was, to this author’s knowledge, the first to examine this relationship in a trauma-exposed sample.

Posttraumatic stress disorder (PTSD) is unique among psychological disorders as it can only be diagnosed if a specific type of event preceded the impairing symptoms. This required event must be traumatic, described within the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; APA, 2013) as exposure to actual or threatened death or injury or sexual violence that is directly experienced, witnessed, or learned about, or repeated or extreme exposure to details of traumatic events within the context of one’s occupation. To assess the prevalence of traumatic event exposure as identified by the DSM-5, Kilpatrick and colleagues (2013) recruited 2,953 participants to mirror the age, sex, and race categories of the 2010 U.S. Census. A large majority of the sample (i.e., 89.7%) reported exposure to at least one DSM-defined traumatic event (APA, 2013). The modal number of traumatic event types experienced was three and lifetime prevalence of PTSD diagnosis was 9.4% (Kilpatrick et al., 2013).
Following a traumatic event, PTSD is not the only possible diagnosis. Individuals with PTSD are 80% more likely than those without PTSD to meet diagnostic criteria for at least one other mental disorder, such as anxiety, depression, and substance use disorders, impacting the functional impairment of the individual (APA, 2013; Breslau et al., 1991; Breslau et al., 1997; Galatzer-Levy et al., 2013; Goldstein et al., 2016; Green et al., 1992; Helzer et al., 1987; Keane & Wolfe, 1990).

The DSM-5 places PTSD under the category of “Trauma-and Stressor-Related Disorders” with other disorders that require exposure to a traumatic or stressful event (Criterion A; APA, 2013). After meeting Criterion A, exposure to a traumatic event, there are seven other criteria that must be met before a PTSD diagnosis can be made. Criterion B is met if an individual presents at least one intrusive symptom, such as recurrent and distressing memories of the traumatic event. Criterion C is marked by at least one symptom of avoidance, which can include avoidance of either external reminders of the event or internal memories or feelings. Criterion D requires at least two symptoms of negative alterations in cognitions and mood, such as consistent and exaggerated negative beliefs about the self, others, or the world. Criterion E contains symptoms of reactivity or arousal, such as irritable behavior or exaggerated startle response; individuals must endorse at least two symptoms within Criterion E. Criterion F specifies that the duration of these symptoms must have persisted for more than one month. The individual’s symptoms must cause significant distress and impairment in daily life (Criterion G). Lastly, Criterion H states that the impairing symptoms must not be attributed to another medical condition or effects due to a substance (APA, 2013).

Cusack et al. (2016) reported that among people who experience extreme stressors, up to one-third develop distressing symptoms within days, such as avoidance and increases in arousal.
However, PTSD symptoms typically resolve without treatment for the majority of trauma-exposed people (Blanchard et al., 1995; Breslau et al., 1991; Kessler et al., 1995). According to DSM-IV criteria, projected lifetime risk for PTSD at age 75 is 8.7% (APA, 2013). Twelve-month prevalence among U.S. adults is about 3.5% (Cusack et al., 2016). The course of PTSD differs for each person based on many factors, such as gender (higher risk for females across the lifespan; APA, 2013; Breslau et al., 1991; Breslau et al., 1997) and target population (increased rates within the military or those at extreme risks of traumatic exposure, such as police officers and paramedics; Cusack et al., 2016).

As discussed previously, the symptoms within the criteria of PTSD capture physical and emotional responses to a traumatic event (APA, 2013). These symptoms cause a portion of those exposed to traumatic events distress and impairment (Blanchard et al., 1995; Breslau et al., 1991; Cusack et al., 2016; Kessler et al., 1995). The emotional distress one experiences following a trauma may be captured by negative affect (NA; Byllesby et al., 2016; Watson & Pennebaker, 1989).

**Negative Affect and Posttraumatic Stress Disorder**

Broadly, there are two dimensions that explain emotional experience: positive affect (PA) and NA (Watson & Tellegen, 1985). Comparing high and low levels of affect (i.e., PA, NA), the differences in emotions are captured by the level of arousal (Watson & Tellegen, 1985). In other words, high PA and NA are both emotions marked by high arousal while low PA and NA are represented by emotions of low arousal. PA is centered on positive high-arousal emotions (e.g., excitement, strength) while NA is represented by negative high-arousal emotions (e.g., distress, hostility). Low PA is marked by emotions with an absence of joy and arousal (e.g., dull,
sluggish) while low NA is represented by lethargic emotions (e.g., calm, relaxed; Watson & Tellegen, 1985). This model of affect has been examined across a range of populations and cultures, demonstrating the reliability of PA and NA cross-culturally (Watson et al., 1984). The range of emotions captured by the orthogonal poles of affect represent the range of possible PTSD emotional reactions, from lack of positive emotion, to intense negative emotion (Charak et al., 2014).

Charak and colleagues (2014) assessed 200 participants who directly experienced a natural disaster (i.e., heavy rainfall resulting in flash floods, mudslides, and debris flow) in Ladakh, India. The purpose of the study was to examine the role of affect on different factors of PTSD. PTSD was measured by the Posttraumatic Stress Disorder Checklist-Specific (PCL-S) and affect was measured by the Positive and Negative Affect Schedule Short Form (PANAS short form). Results indicate that NA was associated with all factors of the dysphoria model (based on five re-experiencing, two avoidance, eight dysphoria, and two hyperarousal items; \( r = .63, p < .001 \)), suggesting the importance of NA in predicting PTSD symptomology (Charak et al., 2014).

Another study emphasized the importance of examining affect in a trauma sample. Kraal et al., (2015) examined the relationship between affect and psychiatric symptoms in 94 polytraumatic veterans (i.e., two or more physical injuries). Within the sample, 70 participants were diagnosed with mild traumatic brain injury or concussions (mTBI) and 24 participants had no prior concussions (xmTBI). Kraal et al. (2015) measured affect in the moment (i.e., state affect) using the PANAS and PTSD symptoms with the military version of the PCL (PCL-M) to reflect DSM-IV criteria (APA, 1994). Findings indicated a significant positive relationship between NA and PTSD symptoms in both the mTBI group and those that had no concussion (\( r = \))
.600, $r = .759$, respectively; Kraal et al., 2015). Conclusions emphasized the importance of examining NA and PTSD symptoms across different groups (i.e., whether or not there was an injury resulting from the traumatic event) and recognizing mood variations within different contexts and the resulting symptom severity changes.

Affect can be measured in two ways: state (i.e., fluctuate across a day in response to situations or stressors) or trait (i.e., general affect for an individual that is considered stable; Nett et al., 2017; Polk et al., 2005; Watson & Pennebaker, 1989). A physiological system that reflects mood changes (i.e., state affect) is the hypothalamic-pituitary-adrenal (HPA) system. Cortisol, an HPA hormone, can be measured using saliva as a marker of stress, regulating metabolic processes and immune function (Polk et al., 2005). The typical pattern of cortisol follows highest levels at the time of waking in the morning and slowly decreases throughout the day (Hanson et al., 2000; Polk et al., 2005). Increased levels of cortisol or dysregulation of cortisol patterns are associated with increased stress, physical health problems, and psychopathology (Polk et al., 2005). State NA has been found to have a positive association with cortisol levels (i.e., high negative mood in the moment is associated with high cortisol levels in the moment) while PA is associated with decreased cortisol levels (Hanson et al., 2000; Van Eck et al., 1996). Trait affect is associated with waking levels of cortisol; increased trait NA is associated with increased waking cortisol levels while decreased trait NA is associated with lower levels of cortisol in the morning (Polk et al., 2005). In other words, state affect impacts the pattern of cortisol, or immediate effects, while trait affect impacts overall morning cortisol levels overall, not in response to a change in mood. The impact of mood on cortisol levels emphasizes the need to recognize the difference between trait and state affect. The proposed study will focus on state
affect or emotional reactions to social situations during the day. The following studies described will examine the relationship between state affect and PTSD symptomology.

DiMauro et al., (2016) assessed 54 male Vietnam era veterans (i.e., 21 veterans being treated for PTSD, 33 veterans in the same location but with no Axis I disorder). PTSD symptoms were measured by the Mississippi Scale for Combat-Related PTSD and daily NA was assessed each night for 14 days from six questions about emotions (i.e., anxiety, anger, depression, frustration, irritability, and fear). Veterans diagnosed with PTSD reported greater daily NA compared to veterans with no Axis I disorder, indicating a significant relationship between a PTSD diagnosis and daily NA ($t = 4.33$, $p < .001$; DiMauro et al., 2016).

Implementing experience sampling methodology (ESM), Short et al. (2017) tested whether NA is a mechanism by which sleep disturbances predict daytime PTSD symptom severity (PTSS). This study included 30 participants diagnosed with PTSD. Sleep quality was measured by the Pittsburgh Sleep Quality Index (PSIQ), affect was measured by the PANAS, and PTSD symptoms were measured by the PCL-5. Each day, participants were sent four text messages assessing affect (eight items that load most strongly onto PA and NA) and PTSD symptoms (measured by 10 items that load most strongly onto the four symptom clusters). Each morning, participants were asked sleep quality questions. Results indicated that NA reported in the morning mediated the relationship between sleep quality and PTSS ($B = .80$, $SE = .45$, 95% CI [.23, 1.97]). However, the model was not significant for sleep efficiency (NA mediating the relationship between sleep efficiency and PTSS; $B = -.28$, $SE = .92$, 95% CI [-5.61, 4.80]). The inverse of this relationship was not significant, indicating that daytime PTSD symptoms do not predict sleep efficiency or quality ($B < .01$, $SE < .01$, 95% CI [-.01, .01] for sleep efficiency and $B = .03$, $SE = .02$, 95% CI [-.01, .06] for sleep quality). It is important to note that the association
between sleep quality and sleep efficiency is not significant \((r = -.29)\). These findings indicate that daily NA may be affected by daily experiences (i.e., sleep efficiency), which can then impact PTSS (Short et al., 2017).

Vujanovic and others (2013) assessed whether NA moderated the relationship between distress tolerance and PTSD symptoms. Distress tolerance was explained as one’s ability to tolerate negative emotional states. This study examined 190 participants that experienced a traumatic event (i.e., serious accident, sexual assault, natural disaster, life-threatening illness, military combat). PTSD symptoms were measured by the Posttraumatic Diagnostic Scale (PDS; Foa, 1995), distress tolerance was measured by Distress Tolerance Scale (DTS; Simons & Gaher, 2005), and affect was measured using the Affect Intensity Measure (AIM; Larsen & Diener, 1987). Results indicated that distress tolerance was significantly related to total PTSD symptom score for those that endorse high NA \((t = -2.87, \beta = -.42, p = .005)\). Distress tolerance was not significantly related to total PTSD symptom score if NA was low \((t = -1.39, \beta = -.19, p = .165)\). Specifically, the emotional numbing PTSD symptom cluster was associated with distress tolerance when NA was high \((t = -2.92, \beta = -.46, p = .004)\). The relationship between distress tolerance and the emotional numbing symptom cluster was not significant when NA was low \((t = -.20, \beta = -.03, p = .843)\). There was no association between distress tolerance and PTSD symptom clusters \((p = .081\) for re-experiencing, \(p = .806\) for effortful avoidance, \(p = .057\) for hyperarousal). These findings indicate that the impact of NA is particularly salient in the relationship between distress tolerance and either total PTSD score or the emotional numbing symptom cluster (Vujanovic et al., 2013). Within the association between one’s ability to tolerate stress and PTSD symptoms, the role of NA may differ based on the type and intensity of stress.
The next section will discuss the stressors that place one at risk for developing PTSD.

Social Support and Posttraumatic Stress Disorder

Risk factors increase the chance of experiencing persistent and impairing PTSD symptoms (Brewin et al., 2000; Ozer et al., 2003, Wright et al., 2013). Brewin and colleagues (2000) identified three categories of factors that are time sensitive in their impact on developing PTSD following a traumatic event: pretrauma, peritrauma, and posttrauma. Pretrauma factors are stable characteristics present before the traumatic event occurs, such as personality or psychiatric history. Peritraumatic factors are those that occur and transpire during the trauma, such as severity of the trauma and one’s immediate reactions to the event. Posttrauma factors focus on what happens after the event, such as re-exposure to trauma and social support (Brewin et al., 2000).

Two meta-analyses have examined the literature on risk factors for developing PTSD (Brewin et al., 2000; Ozer et al., 2003). Brewin et al. (2000) examined 77 studies (N = 30,987) and concluded that peritrauma (i.e., trauma severity; \( r = .23 \)) and posttrauma (i.e., lack of social support; \( r = .32-.40 \)) predictors had a stronger effect on PTSD symptoms and diagnosis compared to pretrauma predictors (i.e., childhood abuse, psychiatric history; \( r = .10 - .19 \)). Ozer and colleagues (2003) conducted a systematic review and meta-analysis across 68 articles (N = 25,122), identifying seven risk factors for developing PTSD. The goal of the meta-analysis was to focus on two types of predictors: individual characteristics for psychological processing and functioning and factors experienced during and following the traumatic event (Ozer et al., 2003).
It is important to note that both meta-analyses were limited in that unpublished studies were not included.

Ozer and colleagues (2003) split the factors identified into two groups based on weighted effect sizes and temporal relationship to the traumatic event. Effect sizes smaller than .20 included factors that were more distant from the traumatic event (i.e., prior adjustment, prior history of trauma, and history of psychopathology in the family). On the other hand, risk factors centered around the traumatic event (i.e., perceived life threat, perceived social support, intense emotional responses in the moment, and dissociating during the trauma) were stronger predictors with effect sizes larger than .20 (Ozer et al., 2003).

One difference between the risk factors identified by Brewin et al. (2000) and Ozer et al. (2003) was the effect size of social support. Brewin and colleagues (2000) stated that social support was the strongest predictor for developing PTSD (i.e., for lack of social support: \( r = .43 \) for military population, \( r = .30 \) for civilian population) while Ozer et al. (2003) found social support to be more moderately associated with PTSD among the explored factors (for perceived social support: \( r = -.28 \)). One possible explanation for this difference may be the studies included in the meta-analysis. Ozer and others (2003) reported that the amount of time between the traumatic event and assessment of PTSD impacted the strength of the relationship between social support and PTSD. Specifically, the more time that had elapsed between the trauma and PTSD assessment, the stronger the relationship (Ozer et al., 2003). Brewin et al. (2000) may have concluded that social support was the strongest predictor of PTSD if the studies included in the meta-analysis had a longer time elapse between the traumatic experience and assessment compared to the studies included in the Ozer et al. (2003) meta-analysis (Ozer et al., 2003). In
order to further explore the role of social support in the development of PTSD, more contemporary studies must be considered.

Recent studies indicate that perceived social support is an important protective factor from PTSS across a variety of trauma types, ages, and time elapsed between trauma and assessment (Costa-Requena et al., 2013; Dworkin et al., 2017; Nickerson et al., 2017; Sripada et al., 2016). Beginning with a study examining the effect of social support on PTSD across ages, Sripada et al. (2016) assessed a sample of 741 Veterans Affairs (VA) patients. The veterans in this study served across different war eras: Vietnam, post-Vietnam/Desert Storm, or Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF). Each participant completed a social support measure (i.e., The Sources of Support Scale) and two PTSS measures (i.e., Clinician-administered PTSD Scale [CAPS], and PTSD Checklist-Civilian Version [PCL-C]). Results indicated that low social support was associated with both higher PCL score ($\beta = -.20, p < .001$) and CAPS score ($\beta = -.30, p < .001$). Era was significantly associated with social support; specifically, post-Vietnam/Desert Storm veterans endorsed reduced social support compared to OEF/OIF veterans ($\beta = -.18, p < .001$). PTSS and social support were negatively associated for both Vietnam and OEF/OIF era veterans ($\beta = -.28, p < .001$ for Vietnam veterans, $\beta = -.34, p < .001$ for OEF/OIF era veterans). A significant negative association between social support and PTSS was not observed for post-Vietnam/Desert Storm veterans ($\beta = -.17$). After standardizing the data set, the relationship between social support and PTSS no longer differed significantly across eras ($Z = -1.87, p = .06$ between post-Vietnam/Desert Storm and Vietnam era veterans, $Z = -1.25, p = .21$ between post-Vietnam/Desert Storm and OEF/OIF era veterans). These findings indicate that across different ages and stages of life, social support remains a significant factor in predicting PTSS (Sripada et al., 2016).
Next, assessing the relationship between social support and PTSD over time, Nickerson and colleagues (2017) examined 1,132 injury survivors in trauma centers and re-assessed at multiple time points (i.e., baseline, three months, 12 months, 24 months, and 72 months post baseline). Each participant completed the CAPS to measure PTSD symptoms and the Social Support Questionnaire (broken into two subscales: perceived positive and negative support by family and friends). Increased PTSS was associated with increased perceived negative support across all time points ($b = .13, p < .01$ at baseline, $b = .06, p < .01$ at three months, $b = .05, p = .01$ at 12 months, $b = .05, p = .02$ at 24 months). Increased PTSS was associated with decreased perceived positive support between three and 12 months ($b = -.01, p = .02$). This study indicates that across time, greater PTSS continues to have an effect on perceived negative social support (Nickerson et al., 2017). More detailed and immediate reports of PTSS following incidents of both perceived negative and positive social support would give light to how symptom severity changes in response to more temporal levels of social support.

Dworkin and others (2017) implemented ESM to assess the relationship between PTSD and social support daily, reducing the reliance on retrospective reports. The sample included 75 college students who had experienced sexual assault. Participants completed two assessments daily (i.e., morning and evening) on personal digital assistant devices (PDAs). The PDS was administered at baseline to measure PTSD diagnosis. The following questionnaires were administered on the PDAs twice daily: PCL (revised to assess PTSD symptoms in the past 24 hours) and one item from a brief measure of social support (i.e., “Since the last beep, you have gotten emotional support from your family and friends”). Results indicated that increased PTSD symptoms and increased social support were related to increased social support the following day ($\beta = .07, p = < .02$ for daily PTSD symptoms, $\beta = .32, p = < .0001$ for daily social support).
Further, reduced PTSD symptomology was associated with same-day social support ($\beta = -0.04$, $p = .005$). These findings may indicate that increased PTSD symptoms influence individuals to seek social support the following day since same-day social support is associated with reduced PTSD symptoms. This study revealed that momentary social support is associated with daily PTSS, highlighting the importance of examining how social support is perceived in the moment rather than relying on overall perceptions across time (Dworkin et al., 2017).

Costa-Requena and colleagues (2014) examined the role of perceived social support on PTSD symptoms in a different type of trauma, cancer diagnosis. The sample of 67 outpatients with a new cancer diagnosis each completed the PCL-C to measure PTSS and Medical Outcomes Study-Social Support Survey (MOS-SSS) to assess perceived social support. These measures were administered at baseline, the end of the treatment, six months, and one year following the end of treatment. Results indicated that at both pre- and post- treatment, social support was negatively associated with the re-experiencing and numbing symptom clusters of PTSD ($R^2 = .91$, $R^2 = .88$, respectively). At the third time point, six months after treatment, perceived social support was negatively associated with all PTSD symptoms ($R^2 = .79$ for re-experiencing, $R^2 = .77$ for avoidance, $R^2 = .71$ for numbing). At the one-year post-treatment assessment, perceived social support was inversely related to only the numbing symptom cluster of PTSD ($R^2 = .71$). These results indicate that perceived social support has a larger and consistent effect on numbing symptoms related to PTSD, such as reduced ability to feel emotions, and diminished interest or participation in activities one used to enjoy (APA, 2000; Costa-Requena et al, 2014). These findings highlight the relationship between PTSD, negative mood, and social support. The proposed study will explore the relationship between PTSD and social stress (i.e., measuring low
levels of connectedness or feelings of being unwanted as a stressor in the moment) through negative mood.

The studies previously described examine the association between social support and PTSD symptoms. A limitation of these studies is a lack of description as to what type of social support is being measured. There are different types of social support: emotional/instrumental support, social companionship, and social distress (Cyranowski et al., 2013). Emotional support is defined as having an understanding person available to listen to your struggles. Instrumental support includes having others to provide guidance when needed (Cyranowski et al., 2013). Social companionship is identified by three components: friendship (available companions to connect and interact with), intimacy (feeling close to companions), and loneliness (perception that one feels isolated from others; Cyranowski et al., 2013). Lastly, social distress is identified as negative perceptions about a relationship, such as hostile or rejected (Cyranowski et al., 2013).

The proposed study will address the limitation of previous studies and specify the type of social support of interest, social companionship (or lack thereof, identified as social stress). Social companionship contains two components (i.e., loneliness and intimacy) that may be crucial in explaining the relationship between NA and PTSS. When with others, if one feels disconnected, then this may lead to increased PTSS. Additionally, if one is alone and feel unwanted, this may also contribute to increased PTSS. This social support type specification allows results to be more precise and the connection between NA and PTSS better understood.

Social Stress

There are different types of stressors that may elicit emotional reactions (i.e., mental, physical, social). The proposed study will focus on emotional reactions in response to social
stress. There is a gap in the literature determining the role of social stress, specifically, in the relationship between NA and PTSS. A popular experimental method that induces and measures psychosocial stress is the Trier Social Stress Test (TSST; Kirschbaum et al., 1993); this method is considered to measure psychosocial stress by Foley and Kirschbaum’s (2010) conclusion that social support moderates the relationship between the TSST and HPA axis. The TSST is a task in which a participant has an anticipation period preparing for a presentation. Following this preparation time, the participant presents to a group of people about why he/she is an ideal applicant for a job position and then is asked to complete arithmetic problems aloud for a set amount of time. Physiological results from the TSST include increases in cortisol levels and heart rate (see Allen et al., 2014 for review). However, for samples with PTSD, there are mixed findings as to whether psychosocial stress causes a blunted (Wichmann et al., 2017; Zaba et al., 2015), heightened (McRae et al., 2006), or absent (Roelofs et al., 2009; Simeon et al., 2007) cortisol response. This may indicate that those with PTSD react differently to social stressors compared to normative samples. The proposed study will not measure psychosocial stress physiologically; therefore, the mechanisms by which psychosocial stress (i.e., TSST) impacts those with PTSD will not be discussed further. While the TSST provides valuable information about the role of stress physiologically in different samples, a gap exists in the literature that examines how social stress impacts PTSD functioning over time.

The proposed study will address this gap in the literature by examining the role of momentary social stress, behaviorally, across time. Definitions of social stress include dissonance between one’s cognitions about a social relationship, discomfort or anxiety experienced in social situations, and the tendency to avoid social situations (Mittelmark et al., 2004; Wadman et al., 2011; Zayan, 1991). In social situations, stress can occur when one is
isolated in a group setting, or when a meaningful relationship is impacted negatively (Zayan, 1991). Previous literature has measured social stress in daily life by asking whether participants would prefer to be alone when with others (Myin-Germeys et al., 2003) and feeling unwanted when alone (i.e., when with others; Brown et al., 2011; Kwapis et al., 2012; Myin-Germeys et al., 2003; Sheinbaum et al., 2015). Zayan (1991) identified three components of social stress: negative emotional experiences, perceptive processes, and cognitive processes. The proposed study will measure social stress, based on these three processes and previous study measurements, as decreased feelings of connectedness with others and increased feelings of being unwanted when alone.

Social Stress, Affect, and Psychopathology

As PTSD can be observed as emotional and physiological changes in response to a traumatic event, NA measured as a state can be marked by physiological measures in response to situations (i.e., cortisol levels; for a review on subjective emotional experience and physiological responses induced by the TSST, see Campbell & Ehlert, 2012). There are mixed conclusions as to whether NA is related to physiological changes (i.e., cortisol) in response to a psychosocial test (i.e., TSST; Campbell & Ehlert, 2012). Similar to these mixed results within the association between NA and social stress, there are varied findings as to how a psychosocial stressor impacts PTSS in trauma-exposed individuals (McRae et al., 2006; Roelofs et al., 2009; Simeon et al., 2007; Wichmann et al., 2017; Zaba et al., 2015). These inconclusive findings may indicate that affect and psychopathology are differentially impacted depending on the context of social stress.

There are currently no studies that examine the relationship between social stress and PTSD using ESM. As previously mentioned, there is a high comorbid rate between PTSD and
depression (Breslau et al., 1991; Breslau et al., 1997; Galatzer-Levy et al., 2013; Goldstein et al., 2016; Green et al., 1992; Helzer et al., 1987; Keane & Wolfe, 1990). Therefore, I will describe studies examining the association between major depressive disorder (MDD) and social stress using ESM.

Within a study comprised of 50 participants with non-affective psychosis, 30 participants with bipolar disorder, 47 participants with MDD, and 50 healthy controls, Myin-Germeys et al. (2003) was the first to operationalize social stress in a daily diary study. Using ESM, participants answered questionnaires ten times a day (every 90 minutes) for six consecutive days; the questionnaires assessed current mood and context. Mood was measured by eight items of NA (i.e., anxious, irritated, restless, tense, guilty, edgy, distractible, agitated) and four items for PA (i.e., gloomy, lonely, tired, calm). Daily social stress was measured by whether the participant preferred to be alone when with others. To examine the effect of stress on mood, Myin-Germeys and others (2003) used a multilevel linear regression model. These analyses used standardized NA and PA as the dependent variables. Stress (i.e., independent variable) was analyzed in units standard deviations of NA (i.e., dependent variable). Results indicated that mood was significantly associated with social stress across the sample ($\beta = 0.07, p < .0001$ for NA, $\beta = -0.07, p < .0001$). Specifically for depressed participants, NA was positively associated with social stress ($\beta = 0.07, p < .01$) and there was a negative relationship between PA and social stress ($\beta = -0.07, p < .01$; Myin-Germeys et al., 2003). These results indicate that for those with MDD, increased NA was associated with increased feelings of wanting to be alone when with others. Additionally, PA was negatively associated with social stress (Myin-Germeys et al., 2003).
Within a sample of 46 participants with MDD and 39 healthy participants, van Winkel and colleagues (2015) examined daily life stress. There were two time points, baseline and 18 months later (30 of the 46 MDD participants completed the second time point). An identical method to Myin-Germeys et al. (2003), van Winkel and others (2015) implemented ESM surveys ten times a day (every 90-minute block) for six consecutive days at the 18-month follow-up. Affect and social stress were measured at each time point (i.e., NA: anxious, irritated, restless, tense, guilty, edgy, distractible, agitated; PA: gloomy, lonely, tired, calm; social stress: preference to be alone when with others). For MDD remitted participants, mean PA was significantly lower than healthy controls ($p = .004$) and the mean NA was significantly higher ($p = .005$). Additional analyses were completed using multilevel regression modeling, taking response variability into account. At the 18-month follow-up, the effect of social stress on mood was computed using multilevel modeling (MLM) with mood state as the outcome and group, social stress, and the group by stress interaction as predictors. Results indicated that social stress was associated with decreased PA ($\beta = -0.112$, $p < .001$) and increased NA ($\beta = 0.162$, $p < .001$; van Winkel et al., 2015). These conclusions indicate that social stress increases NA and decreases PA in a sample of depressed participants (van Winkel et al., 2015). As the comorbidity between PTSD and MDD diagnoses are high, these findings may also be observed in a trauma-exposed sample.

A limitation within these two studies (Myin-Germeys, et al., 2003, van Winkel et al., 2015) is measuring social stress with one question: ‘I would rather be alone’ when in the presence of others. Within the context of MDD, the association between affect, psychopathology, and social stress may be due to lack of measurement precision. The desire to be alone is similar to symptoms of MDD (i.e., diminished interest or pleasure in activities; APA, 2013) and items
used to measure PA (i.e., lonely; Myin-Germeys et al., 2003; van Winkel et al., 2015; Watson & Tellegen, 1985). In order to address this limitation, the proposed study will include additional questions measuring social stress as Zayan (1991) described.

Research examining social stress, affect, and psychopathology indicate that within the affect may vary in response to social stress. The strength of this relationship changes based on the sample and whether participants have a diagnosis of a psychological disorder. There is a gap in the literature examining the relationship of social stress, affect, and PTSD. The proposed study aims to address this gap by examining whether there is an indirect effect of social stress on PTSS as mediated by affect in a trauma-exposed sample.

Experience Sampling Methodology

Clinical psychology research typically inquires about impairing symptoms. Researchers are trying to understand if, when, how, and how often these impairing symptoms occur in a participant’s life. However, these questions cause researchers to rely on participants’ memories to recall past events and feelings. The retrospective nature of research in clinical psychology may limit the accuracy (i.e., introduction of recall bias) and generalizability of the results (i.e., the contexts in which relationships may occur). An alternative research method is ESM, which assesses participants repeatedly in their everyday life, enhancing ecological validity (i.e., the ability to generalize the findings to everyday life), recognizing patterns in which these symptoms appear, and minimizing reliance on memory (i.e., asking current affect in that moment). Ecological Momentary Assessment (EMA) is another term for this type of study design and is used interchangeably with ESM; for the purposes of the proposed study, only the term ESM will be used.
Shiffman and others (2008) wrote a recent review of ESM. The authors identified the process of collecting data via ESM beginning with paper diaries (Shiffman et al., 2008). As technology has advanced, the methods by which researchers collect data have improved (i.e., handheld computers, online daily diaries, texting cell phones, smartphone applications), with the ability to reach participants anywhere and at any time (Shiffman et al., 2008).

Assessment of subjective states in the moment is crucial for good research practice and accurate interpretation of results. Recalling experiences retrospectively may lead to inaccurate statements (Shiffman et al., 2008). Reports from participants depend upon their current context and mental state (e.g., negative mood recalling mostly negative events; Chun, 2016; Shiffman et al., 2008). A benefit of implementing ESM in research designs is recognizing and investigating individual differences in the moment and across different contexts (Shiffman et al., 2008). Longitudinally, ESM allows for temporal conclusions, such as particular stressors that later increase NA or specific environments that trigger later PTSS (Chun, 2016; Shiffman et al., 2008). In the end, implementing ESM in a research design may be more complicated (e.g., technological difficulties, participant dropout rates), but increases ecological validity and the confidence and accuracy in the interpretation of research conclusions.

**Experience Sampling Methodology and Posttraumatic Stress Disorder**

A limitation in examining risk factors of PTSD is the reliance of retrospective data (Ozer et al., 2003). Most research on PTSS has used retrospective questionnaires and interviews, which rely on participants to accurately recall information over the past week, month, or even lifetime. Further, the retrospection may lead to biases (i.e., overestimating or underestimating symptoms, impairment, or distress) or error (i.e., false or poor memory; Chun, 2016). For these reasons,
assessing PTSS using ESM enhances the understanding of the endogeneity, flexibility, and potential causes of symptoms and distress.

Within the context of PTSD research, ESM has been implemented to assess a variety of samples (e.g., adolescents [Richards et al., 2004], college students [Berghoff et al., 2018; Bunce et al., 1995; Naragon-Gainey et al., 2012], couples [Campbell, Renshaw, et al., 2017], veterans [Black et al., 2016; Golier et al., 2001; Swanson et al., 2009]) and various races (e.g., African Americans [Richards et al., 2004], Israelis [Greene et al., 2018]). Assessment of how constructs fluctuate daily can lead to more precise conclusions regarding which and how variables lead to increased PTSS, such as sleep (e.g., Haynes et al., 2016; Johnson et al., 2002; Short et al., 2017; Straus et al., 2015; Swanson et al., 2009; Werner et al., 2016; Woodward et al., 2017), physical pain (e.g., Berghoff et al., 2018; Nicolson et al., 2010), physiological and cardiovascular systems (e.g., Beckham et al., 2000; Dennis et al., 2017, 2018; Edmondson et al., 2018; Green et al., 2016; Newton & Ho, 2008; Nicolson et al., 2010), substance use (e.g., Black et al., 2016; Campbell, Krenek, & Simpson, 2017; Cohn et al., 2014; Dworkin et al., 2017; Possemato et al., 2015), smoking (e.g., Dedert et al., 2016; Van Voorhees et al., 2018; Wilson et al., 2014), emotion regulation strategies (e.g., Short et al., 2018), environment (e.g., Richards et al., 2004), and mood (e.g., Beckham et al., 2000; Bunce et al., 1995; Cohn et al., 2014; Dennis et al., 2017, 2018; DiMauro et al., 2016; Golier et al., 2001; Kashdan, Julian et al., 2006; Kashdan, Uswatte et al., 2006; Kashdan et al., 2012; Kleim et al., 2013; Nicolson et al., 2010; Short et al., 2017; Van Voorhees et al., 2018).

Since the current study implemented ESM to measure social stress, affect, and PTSS, the ESM studies that will be described further will be those that examined mood. Reviews will focus
on methodology and statistical analyses rather than results as those that are comparable to the proposed study were discussed prior.

To begin, Beckham and others (2000) examined the relationship between daily affect and cardiovascular activity in 117 veterans (i.e., 61 with PTSD, 56 without PTSD); participants responded to assessments on Palm Pilots (completed every 1-3 hours with a two-minute window after the alarm to begin the assessment) and wore an ambulatory recorder (programmed to take measurements every 30 minutes during waking hours) for one day. Within person, momentary affect ratings were averaged across all reports to represent one score. Three factors were identified within the affect questions (i.e., Anger-Hostility, Anxiety-Depression, and PA); summary scores were calculated as the sum of the items within each factor. After computing these affect factor summary scores, group comparisons (i.e., PTSD, non-PTSD) in affect responses were computed using Analysis of Covariance (ANCOVA; Pooled $SD = 1.76 – 2.00$; Beckham et al., 2000).

Bunce and colleagues (1995) measured mood and daily events in undergraduate students (i.e., 26 trauma-exposed and 30 non-trauma-exposed) using diaries completed at a midpoint in the day (reporting on experiences during the first half of the day) and at bedtime (reporting on experiences during the second half of the day) for four weeks. Daily data were computed by averaging across all daily reports for each student (i.e., average mood across the month). The authors then analyzed the data using $t$ tests. There was a medium effect size for the relationship between affect intensity and traumatized versus non-traumatized students was ($d = 0.54$; Bunce et al., 1995).

Cohn et al. (2014) examined the role of momentary NA in the relationship between alcohol use and PTSD within a sample of 60 women. Participants recorded daily alcohol use,
NA, and PTSD symptoms once a day, through a phone call, during a 6-hr window in the evening from 6pm-12am for 14 days. The authors calculated an average NA for each day. Analyses were conducted using a Poisson model in MLM (i.e., level 1: daily reports, level 2: within participant). Mediation analyses were conducted by examining significant coefficients on both Path A (i.e., dependent variable to mediator; $b = .13, .13$) and Path B (i.e., mediator to independent variable; $b = .42, .39$; Cohn et al., 2014).

Within a sample of 197 young adults diagnosed with PTSD, Dennis et al. (2017) examined the relationship between heart rate variability, PTSD symptoms, and affect across a 24-hour period. Participants completed biometric measurements (i.e., flow-mediated dilation and hyperemic flow to measure endothelial functioning), wore a 24-hour digital electrocardiogram (i.e., to measure heart rate variability; HRV), and carried Palm Pilots (i.e., to measure affect every 2-3 hours). NA was calculated as the mean NA items, and acute NA episodes were deemed as those with an NA level greater than 3 (“quite a bit”). In order to examine the relationships between affect, PTSD, and hyperemic flow, latent variable modeling was implemented. Mediation analyses were computed by first examining the effect of PTSS on each mediator (i.e., Path A; association between PTSS and mean NA: $\beta = 0.59$; association between PTSS and acute NA: $\beta = 0.15$), and then examining the effect of each mediator on hyperemic flow (i.e., Path B; association between mean NA and hyperemic flow: $\beta = 0.07$; association between acute NA and hyperemic flow: $\beta = 0.03$). The mediation effect was calculated as the product of Paths A and B and significance of these mediation effects were tested by generating samples (i.e., bootstrapping confidence intervals; bootstrapped 95% confidence interval of standardized effect of the indirect relationship between PTSS and HRV through NA = -0.32 to -0.16; Dennis et al., 2017).
Dennis and others (2018) assessed the relationship between momentary NA (i.e., using Palm Pilots to randomly alert participants to complete questionnaires beginning at about 2pm and continuing through the following evening) and autonomic arousal (i.e., through electrocardiogram watch) for two days within a sample of 178 young adults. Momentary NA was derived as the mean of the affect items at each assessment. Data was analyzed through MLM to accommodate for repeated-measures at person-level (i.e., affect) and reading-level (i.e., autonomic arousal; mean $\beta = -0.70$ to 1.21; Dennis et al., 2018).

DiMauro et al. (2016) as previously discussed, studied the relationship between fluctuating mood and PTSS, within a sample of 54 veterans, through daily paper entries over 14 consecutive days. Data were examined using a multilevel random coefficient model with daily NA (within person) as level 1 (person-centered) and negative mood regulation (NMR) and PTSD diagnosis (between person) as level 2. Both PTSD status and NMR individually predicted daily NA ($\beta = 6.033$, -3.01, respectively; DiMauro et al., 2016).

Golier and others (2001) examined 49 veterans assessing for differences in those with PTSD and MDD for 2 nights at a hospital, measuring mood on a paper questionnaire across 18 time points. Mood level was calculated as the mean, maximum, and minimum values of the 18 time points; differences of mood levels within groups (i.e., PTSD and MDD) were analyzed using a $t$ test. There was a small effect size of mood between PTSD and MDD groups ($d = 0.30$; Golier et al., 2001).

Within a sample of veterans (i.e., 20 outpatients, 22 residential inpatients, and 35 controls), Kashdan, Julian, et al. (2006) examined the roll of well-being in the relationship between NA and PTSD; participants completed paper questionnaires daily for two weeks. Results were analyzed using hierarchical regression analyses because of the multiple levels
within the data collected (i.e., repeated measures nested within participants). There was a large effect size of NA on veterans with PTSD compared to those without a PTSD diagnosis ($d = 2.25$; Kashdan, Julian, et al., 2006). Further, Kashdan, Uswatte, and others (2006) examined the relationship between self-esteem, affect, and PTSD in veterans (i.e., 13 outpatients, 14 residential inpatients, and 26 controls); participants completed daily paper reports for 14 days. Scores were computed as mean intensity scores across all reports and analyses were run as regressions. The effect size of NA instability for veterans with PTSD, compared to no PTSD diagnosis, was large ($d = .76$; Kashdan, Uswatte, et al., 2006). Further, Kashdan and colleagues (2012) examined the role of rumination and mood in daily PTSS within a sample of veterans (i.e., 27 with PTSD and 27 with no Axis 1 disorder). Participants were instructed to complete daily record entries before going to sleep (after 6pm) each night for 14 days and mailed the daily records to the researchers every few days. Data were analyzed through multilevel random coefficient models with daily records as level 1 and within person at level 2. Within the analysis, level 1 variables were person-centered and level 2 variables were grand-mean centered. The relationship between the prior day and next day NA was significant and moderated by a PTSD diagnosis ($\beta = 0.11, \beta = 0.11$, respectively; Kashdan et al., 2012).

Kleim et al. (2013) assessed 46 adults (i.e., 20 adults with PTSD and 26 adults without PTSD) using Palm Pilots to measure intrusive thoughts, distress, and PTSS for seven days. Researchers used MLM to handle time intervals between data points and missing data. Within Mplus, associations between the repeated measures within participants were examined. There were stronger emotional responses for those with PTSD with effect sizes ranging from medium to large ($d = .74$ for fear, $d = .91$ for helplessness, $d = .76$ for anger, $d = .62$ for shame; Kleim et al., 2013).
Nicolson et al. (2010) examined the relationship between child maltreatment, daily cortisol levels, and affect within a sample of 257 women with chronic pain (i.e., fibromyalgia and osteoarthritis). Participants completed reports each evening on a computer (i.e., before bedtime) and provided saliva samples (i.e., three times a day) for up to 30 consecutive days. Data were analyzed within MLM with cortisol levels at level 1 (i.e., saliva samples collected multiple times a day), affect and symptomology at level 2 (i.e., collected every evening), and within person at level 3. Daily affect was calculated as the average across the month of participation. The relationships between affect and psychopathology were analyzed using linear regression; when adding cortisol levels into the analyses, results were calculated using multilevel regression analyses. The relationship between childhood maltreatment and daily affect was significant ($r_s = .31$ for NA, $r_s = -.29$ for PA; Nicolson et al., 2010).

As previously discussed, Short et al. (2017) examined the role of sleep quality, affect, and PTSS in a sample of 30 participants with a PTSD diagnosis. Participants received four text messages daily (i.e., upon waking, mid-morning, afternoon, evening) across eight days. In order to take into account nested data and missing data, analyses were computed through MLM. There were three levels of data: mood and symptomology measured multiple reports a day, sleep measured once a day, and within person. NA reported in the morning was significantly associated with PTSD symptoms ($\beta = 0.39$; Short et al., 2017).

Van Voorhees et al. (2018) recruited 114 participants that had experienced a traumatic event from a smoking-cessation trial. Participants carried Palm Pilots across one week, responding to questionnaires every 1-3 hours; assessment responses were time stamped to ensure temporal accuracy. The authors examined a facet of state NA, irritability and hostility, and PTSD symptoms present in the moment. Data were analyzed with MLM to account for the different
levels of reports (i.e., diary and participant). Time lagged analyses were computed by using
PTSD symptom reports from the previous recording in the equation. The relationship between
irritability and hostility and PTSD symptoms was not dependent on a PTSD diagnosis ($\beta = 0.36$
for PTSD diagnosis, $\beta = 0.32$ for no PTSD diagnosis; Van Voorhees et al., 2018).

There are several limitations within ESM and PTSD research studies that will be
addressed by the proposed study. To begin, several studies measured PTSD using a subset of the
symptoms, limiting the generalizability of the results, as well as minimizing individual
differences in symptom profiles (e.g., Beckham et al., 2000; Chun, 2016; Dedert et al., 2016;
Dennis et al., 2017, 2018; Green et al., 2016; Short et al., 2017, 2018; Tarrier et al., 1999; Van
Voorhees et al., 2018; Wilson et al., 2014). The current study addressed this limitation by
measuring all PTSD symptoms at the end of each day.

Next, several studies permitted participants to delay data entries, allowing participants to
complete the assessments at their convenience (e.g., Beckham et al., 2000; Dedert et al., 2016;
Dennis et al., 2017, 2018; Green et al., 2016; Greene et al., 2018; Pfaltz et al., 2010, 2013;
Possemato et al., 2015; Short et al., 2017, 2018; Van Voorhees et al., 2018; Wilson et al., 2014).
The proposed study will only allow the participant to complete the survey within 10 minutes
upon receiving the notification to increase ecological validity. Relatedly, as some studies
included questionnaires assessing experiences, reactions, and symptoms that had occurred since
the last assessment (e.g., two hours or 24 hours prior), there is some reliance on retrospective
reports (e.g., Black et al., 2016; Campbell, Krenek, & Simpson, 2017; Edmondson et al., 2018;
Greene et al., 2018; Pfaltz et al., 2010, 2013; Tarrier et al., 1999). While the current study also
included some retrospective reports (i.e., PTSS experienced across the day), mood was assessed
in the moment, allowing for more accurate mood responses rather than asking participants to report how they have been generally feeling across time.

Lastly, study designs relying on collection of pencil and paper measures (e.g., Bunce et al., 1995; DiMauro et al., 2016; Haynes et al., 2016; Johnson et al., 2002; Kashdan et al., 2010; Kashdan, Julian, et al., 2006; Kashdan et al., 2012; Newton & Ho, 2008; Richards et al., 2004; Schönfeld & Ehlers, 2017; Straus et al., 2015; Swanson et al., 2009; Tarrier et al., 1999; Werner et al., 2016; Woodward et al., 2017), handheld computers (i.e., Palm Pilots; e.g., Beckham et al., 2000; Dedert et al., 2016; Dennis et al., 2017, 2018; Dworkin et al., 2017; Green et al., 2016; Kleim et al., 2013; Naragon-Gainey et al., 2012; Pfaltz et al., 2010, 2013; Priebe et al., 2013; Van Voorhees et al., 2018; Wilson et al., 2014), or phone calls (e.g., Black et al., 2016; Campbell, Krenek, & Simpson, 2017; Cohn et al., 2014; Possemato et al., 2015) may put additional burden on the participants. Texting may be more feasible to respond to a questionnaire in the moment as opposed to answering phone calls, or having to carry additional equipment in different situations and contexts (i.e., meetings, work). The current study addressed these limitations by using a smartphone application to make it easier for participants to complete the questionnaires across settings.

**The Current Study**

The current research study implemented ESM to assess the relationship between state NA, social stress, and daily PTSS. Additionally, the current study examined whether state social stress had an indirect effect on PTSS as mediated by NA.
Study Hypotheses

1. Overall social stress ratings for each participant, measured as the average of social stress ratings across all assessments, will be associated positively with PTSS, measured as the average PTSS score across all reports.
   1a. When alone, overall feelings of being unwanted will be associated positively with overall PTSS score.
   1b. When with others, overall feelings of disconnectedness will be associated positively with overall PTSS score.

2. Daily stress ratings for each participant, measured as the average of social stress ratings across the day, will be associated positively with PTSS levels measured during the evening of the same day.
   2a. When alone, daily feelings of being unwanted will be associated positively with daily PTSS score.
   2b. When with others, daily feelings of disconnectedness will be associated positively with daily PTSS score.

3. Social stress in the moment will be positively associated with NA at the same assessment.
   3a. When alone, feelings of being unwanted will be associated positively with NA at that same measurement time point.
   3b. When with others, feelings of disconnectedness in the moment will be associated positively with NA at that same measurement time point.
4. Social stress in the moment will be positively associated with NA at the next assessment (i.e., within the next 1.5 hours).
4a. When alone, feelings of being unwanted will be associated positively with NA at the next measurement time point (i.e., within the next 1.5 hours).
4b. When with others, feelings of disconnectedness in the moment will be associated positively with NA at the next measurement time point (i.e., within the next 1.5 hours).

5. Given the previous literature connecting NA and PTSS, it is hypothesized that participants’ level of NA throughout the day, measured as the average of the NA items across the day, will be associated positively with PTSS that same night.

6. There will be an indirect effect of social stress on PTSS as mediated by NA. NA, as measured as the average NA score across the day, may be one mechanism by which social stress, measured as the average social stress rating across the day, will predict increased PTSS, measured as the total symptom score that same evening.

Research Question: Given that PTSD is associated with difficulty in regulating emotion (Seligowski et al., 2015), it is reasonable to anticipate that affect variability may be associated with PTSD symptomatology. As such, the association of affect variability with PTSD symptoms will be examined. It is anticipated that affect variability, measured as the variability within affect ratings across the day, will be associated positively with PTSS, measured as the total PTSD symptom score for that day.
CHAPTER TWO

METHOD

Participants

Data were collected from 86 trauma-exposed female undergraduate students enrolled in an introductory psychology course at a Midwestern university. Females who did not endorse at least one threshold symptom per PTSD cluster were not included in the analyses (n = 38). An additional four participants were excluded from analyses due to poor adherence to completing hourly questionnaires (i.e., 38% a day) making the final sample size 44 participants (M_{age} = 19.09, SD = 1.29, range 18 – 24). Typically, increasing the sample size within the lowest level (i.e., within cluster) has the most impact in power for the design and model. Sample sizes of less than 30 at the cluster level have been associated with smaller standard errors for fixed effects (Maas & Hox, 2005; Scherbaum & Ferreter, 2009). Similarly, for cross-level interactions, a study needs at least 30 clusters (Level 2) and 30 observations within each cluster (Level 1) to achieve sufficient power (Scherbaum & Ferreter, 2009). The current sample completed an average of 34 hourly questionnaires per participant (M_{size} = 34.11, SD = 12.95, range 9 – 56), suggesting adequate power for the study.

Most participants identified as White (59.1%), followed by Black (27.3%), and Asian or Pacific Islander (20.5%); one participant selected to not respond. The majority of participants were non-Hispanic (75%); 20.5% of the sample was Hispanic, and 4.5% preferred to not respond. The sample was mostly single (97.3%), employed (52.3%) freshman (75%); sophomore
= 18.2%; junior = 4.5%; 4+ years = 2.3%) with no children (97.7%). All participants owned a smart phone and were granted eight research credits towards their psychology course for participating.

Materials

Baseline Questionnaires

Clinician-Administered PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2018)

The CAPS-5 is a structured interview that assesses for PTSD diagnosis measuring both the frequency and intensity of each symptom. The interview answers are scored on a rating scale from 0 to 4 (i.e., 0 = Absent, 1 = Mild/subthreshold, 2 = Moderate/threshold, 3 = Severe/markedly elevated, 4 = Extreme/incapacitating) for each of the 30 questions. Scores can be combined for a total score representative of PTSS, cluster severity, or PTSD diagnosis based on the number of severe scores within each cluster. The CAPS-5 has strong intrarater reliability ($\alpha = .78$ to 1.00 depending on scoring rule), test-retest reliability across up to six days ($r = .83$), internal consistency ($r = .88$), convergent validity with the CAPS for DSM-IV ($r = .83$), and discriminant validity between measures of anxiety, depression, somatization, functional impairment, psychopathy, and alcohol use (median $r = .47$; Weathers et al., 2018). The current study did not compute scores following administration of the CAPS-5 but instead utilized the structured interview to identify participants that currently endorse at least one threshold symptom per cluster. Therefore, this measure was not included in the analyses. A total of 86 participants completed the CAPS-5, 44 (51%) were eligible for the study.
Life Events Checklist (LEC; Weathers, Blake, et al., 2013)

The LEC assesses exposure to 16 traumatic events (e.g., natural disasters, car accidents, uncomfortable sexual experiences) one may directly experience, witness, or learn about. The LEC is best used in accordance with the CAPS to assess for Criterion A, which is required before making a PTSD diagnosis (APA, 2013). This questionnaire has acceptable test-retest reliability across one week ($r = .82$; Gray et al., 2004). This measure was used to assess the traumatic events that participants experienced and was not included in data analyses. Administration of the LEC allowed the researcher to inquire about the endorsed trauma, determine which event was most distressing for the participant, and conclude whether the event meets criterion A for a PTSD diagnosis (APA, 2013; Gray et al., 2004).

Daily Questionnaires


The PCL-5 is one of the most widely used self-report questionnaires in research for assessing PTSD symptoms. There are 20 items, each directly measuring one of the 20 symptoms defined in the DSM-5 (APA, 2013). Items are rated on a 5-point scale to reflect the symptom’s presence during the prior month (i.e., 1 = not at all, 5 = extremely). Scores can be interpreted in several ways: total score, symptom cluster, or possible PTSD diagnosis (Weathers, Litz, et al., 2013). The PCL-5 has been found to have good psychometric properties: internal consistency ($\alpha = .94$), inter item consistency (correlations ranged from .17 to .77), test-retest reliability across a 1-week period ($r = .82$), item level test-retest reliability ($rs$ ranged from .39 to .83), convergent validity between the PCL-5 and PCL ($r = .85$), PDS ($r = .85$), and DAPS ($r = .84$), and
discriminant validity against depression \( (r = .60) \), Antisocial Personality \( (r = .39) \), Mania \( (r = .31; \text{Blevins et al., 2015}) \). Daily PTSS was computed using a total symptom severity score with an excellent reliability score \( (\alpha = .93) \), consistent with previous research. The average daily PCL score was 25.84 \( (SD = 16.93) \). Consistent with previous ESM studies examining PTSD symptoms, the questionnaire was reworded to assess PTSD symptoms that were experienced within the past 24 hours and assessed each evening (Black et al., 2016; Cohn et al., 2014; Greene et al., 2018; Short et al., 2017, 2018).

**Experience Sampling Methodology Questionnaires**

**Positive and Negative Affect Schedule Scales – State Version (PANAS) (Watson et al., 1988).**

The PANAS measures two dimensions of emotional experience: positive affect (PA) and negative affect (NA). There are 20 self-report items (i.e., 10 assessing PA and 10 assessing NA) rated on a scale from 1 to 5 (i.e., 1 = *very slightly or not at all*, 5 = *extremely*). The PANAS has good reliability \( (\alpha = .86 \text{ for PA and } \alpha = .87 \text{ for NA}) \) and discriminant validity between the two dimensions \( (r = -.09; \text{Watson et al., 1988}) \). The present-moment instructions for the state version measured state affect, rating how much the participant currently felt each emotion (Charles et al., 2016; Young, Shuster, & Mikels, 2018). State NA was computed as the average of the NA item ratings, and had good reliability \( (\alpha = .87) \). The average daily state NA score was 1.81 \( (SD = 0.64) \). PA scores are not reported as they were not included in study hypotheses.

**Social Stress.** Social stress was measured by two items, varying based on whether the participant was alone or with others. If with others, the item “do you feel connected with those around you” was asked on a 5-point scale. The responses were reversed scored so that higher
scores indicated increased social stress; the average daily social stress score when with others was 3.03 ($SD = 1.23$). If alone, participants were asked the dichotomous question “I am alone because no one wants to be with me” (i.e., 0 = no, 1 = yes; Barrantes-Vidal et al., 2013; Brown et al., 2011; Kwapis et al., 2012; Myin-Germey et al., 2003; Sheinbaum et al., 2015; van Winkel et al., 2015). Participants reported experiencing social stress 14.6% of the time when alone. Due to the quantity of the questions assessing social stress for each category (i.e., alone versus with others), the reliability of the scale may be biased and therefore was not computed. Questionnaires can be found in Appendix A

Procedure

Participants were screened through mass testing; females who had directly experienced at least one traumatic event and met a specified cut off score on the PCL were recruited for the study (Appendix B). A PCL cut off score of 31 has been associated with a 15.97 higher chance of a positive PTSD diagnosis within a sample of police officers (van der Meer et al., 2017). As the proposed sample consisted of college women with subthreshold rather than probable PTSD, females with a total score of 25 and above on the PCL were eligible and invited to participate in the study ($n = 86$). The first session was in-person and included completing the informed consent (Appendix C), describing the study design, downloading the survey application, and completing a practice questionnaire on the participants’ cell phone. Afterwards, the participant filled out the LEC and then completed the CAPS-5 administered by a trained graduate student. Students who did not endorse at least one PTSD symptom threshold per cluster on the CAPS-5 (49% of the invited sample) were not included in the analyses. Participants received a letter for their teacher/employer explaining the study, the involvement of filling out surveys, the importance of
collecting momentary data, and the possibility of a notification occurring during class/work (Appendix D).

Following the completion of the first session in person, participants were partially debriefed by explaining the purpose of the study and received a list of mental health resources in the event that the information gathered caused distress (Appendices E and F). The rest of data collection was online via the application on the participant’s cell phone over the next seven days (to ensure data collection over a weekend). Data were only stored within the application temporarily and uploaded online every night. Throughout the day, the student received a notification within the application eight times (i.e., randomly every 1.5 hours between 8am and 8pm) to complete surveys measuring momentary affect and social stress. With the goal of obtaining an average of six momentary assessments a day for each participant, eight surveys were administered to account for individual variation in responding (e.g., morning responders versus night responders). Participants completed an average of 34.11 ($SD = 12.95$) hourly questionnaires in the week of participation. The questionnaire distributed throughout the day took approximately two minutes to complete, which minimized the burden put on the participant (Stone & Shiffman, 2002). The survey expired within 10 minutes of the participant receiving the notification to ensure that it was completed at that random time and to avoid back filling at the end of the day (Trull & Ebner-Priemer, 2009). A ninth survey was distributed to the participant between 8 and 9:30pm to assess for PTSS experienced across that day. Participants completed an average of approximately four nightly surveys throughout the week ($M = 4.43$, $SD = 2.05$, range 0 – 7).

Approximately half way through the week, the participant received an email from the research staff asking if there were any problems with the app or questionnaires and if there were
any questions about participation (G). To ensure that participants received this email, they were requested to reply within one day of receiving it. A total of 39 participants (88.6% of the sample) responded to the email. The purpose of this email was to address any problems the participant may be experiencing, to encourage responses, and to keep retention high. Another effort to maintain retention, participants were entered into a drawing for one of two $50 Amazon gift cards each day they completed at least 75% of the daily surveys (i.e., 6 of the 8 questionnaires); each participant had the opportunity to earn up to seven entries in the drawing. A drawing was conducted at the conclusion of each semester of data collection. At the end of the study, the participants were given course credit and emailed a debriefing form and counseling resources (Appendices H and F).
CHAPTER THREE
RESULTS

Data Analytic Plan

The first hypothesis was analyzed utilizing regression within SPSS. MLM was implemented through the statistical software HLM 8 to analyze hypotheses two through six to account for the clustered nature of the data (i.e., repeated measures within individuals) and missing data (Nezlek, 2008; Scherbaum & Ferreter, 2009). Data were organized into two levels with the time points as the level-1 units and individuals as the level-2 units. Equations for all hypotheses can be found in Appendix I.

Data Screening and Correlations

Prior to analyzing the data, multilevel modeling assumptions were examined. Participants that completed at least 38% of the questionnaires of the day (3 of the 8) were included in the analyses to increase the accuracy of interpretation of the results. Missing data for daily values were as follows: PTSS = 24.6%, NA daily average = 0%, SS (unwanted) when alone = 8.2%, SS (connectedness) when with others = 9.8%. For hourly values: NA = 32.9%, SS (unwanted) when alone = 65.6%, SS (connectedness) when with others = 63%. The higher percentages of SS were due to lack of variability in being alone versus with others throughout the day; when combined (i.e., total SS score for either alone or with others) there was 41.3% missing data. Basilevsky et al. (1985) labeled levels of missing data (i.e., 10% is considered low, 30% moderate, and 50%
Applying these levels to the missing data in the current study, daily missing values fall within the low to moderate range and hourly values within the moderate to high range (Basilevsky et al., 1985). Prior to running analyses, Little’s (1988) Missing Completely at Random (MCAR) test examined the randomness of the missing values. Results indicated that the study variables were not MCAR \((p < .05)\) thus data were assumed to be Missing at Random (MAR; Little, 1988). It is important to note that it is possible that data were Missing Not at Random (NMAR; Little, 1988). The restricted estimation maximum likelihood (REML) was used to account for small sample sizes (e.g., average 34 time points per participant) and estimating variances based on sample data rather than the population, which is appropriate considering this was the first study examining the role of social stress in a trauma-exposed population (Hox & McNeish, 2020; Peugh, 2010).

Descriptive statistics and correlations among the daily (level 2) study variables are documented in Table 1 and the hourly (level 1) study variables in Table 2. Significant correlations between variables may indicate support for examining the association within a hierarchical linear model. On the other hand, if variables are not correlated, this may explain why including the predictor in a model does not provide a better fit (than the null model). Among daily variables, PTSS showed significant zero-order correlations with NA \((r = .429)\) and SS \((r = -.206)\), indicating a relationship between these variables. There were no significant correlations among hourly variables (i.e., NA, SS zero-order correlations, SS higher-order correlations).
Null Models

Null models include the outcome variable with no predictor variables. This allows for assessment of whether the outcome variable varies significantly among the clusters and for identification of the average of the outcome variable across days (level-1 variables) and

Table 1

Descriptive Statistics and Bivariate Correlations Among Daily Study Variables

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSS</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NA_daily</td>
<td>.429**</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS_alone_daily</td>
<td>.202**</td>
<td>.062</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>SS_others_daily</td>
<td>.140</td>
<td>.019</td>
<td>.115</td>
<td>--</td>
</tr>
<tr>
<td>Min</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Max</td>
<td>80</td>
<td>3.99</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Mean</td>
<td>25.84</td>
<td>1.81</td>
<td>0.15</td>
<td>3.03</td>
</tr>
<tr>
<td>SD</td>
<td>16.93</td>
<td>0.64</td>
<td>0.31</td>
<td>1.23</td>
</tr>
<tr>
<td>N</td>
<td>193</td>
<td>256</td>
<td>235</td>
<td>232</td>
</tr>
</tbody>
</table>

Note. PTSS = PTSD Checklist for DSM-5 (PCL-5) sum; NA_daily = Positive and Negative Affect Schedule (PANAS) average of completed negative affect items across the day; SS_alone_daily = average rating of “I am alone because people do not want to be with me” across the day; SS_others_daily = average rating of “I feel close to this person (these people)” across the day.

* = p < .05, ** = p < .01
Table 2
Descriptive Statistics and Bivariate Correlations Among Hourly Study Variables

<table>
<thead>
<tr>
<th>Scale</th>
<th>1</th>
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<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA_avg</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS_alone</td>
<td>.056</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>SS_others</td>
<td>.054</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Min</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Max</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Mean</td>
<td>1.79</td>
<td>0.15</td>
<td>2.95</td>
</tr>
<tr>
<td>SD</td>
<td>0.75</td>
<td>0.35</td>
<td>1.55</td>
</tr>
<tr>
<td>N</td>
<td>1374</td>
<td>684</td>
<td>758</td>
</tr>
</tbody>
</table>

Note. NA_avg = Positive and Negative Affect Schedule (PANAS) average of completed negative affect items; SS_alone = rating of “I am alone because people do not want to be with me”; SS_others = rating of “I feel close to this person (these people).”

*p < .05, ** p < .01.

participants (level-2). The null model also provides the values to compute the intraclass correlation (ICC) and design effect (DEFF), as well as determine the importance of clustering and analyzing the data utilizing MLM. The ICC indicates the importance of clustering while recognizing similarity in cases within a cluster (e.g., a participant or days) and distinctiveness among clusters (e.g., among participants or varying days). Barcikowski (1981) highlights that even a small ICC (e.g., ICC = .01) will inflate Type 1 error rates. All ICC’s in the current study were above .20 meaning that clustering cannot be ignored. The DEFF represents how much standard error increases due to clustering. All DEFF’s were above 2 in the current study, which
means that if clustering is ignored, the standard errors are substantially inflated. It is important to note that when data are nested, using MLM is necessary regardless of ICC and DEFF scores (Nezlek, 2008).

Model Building

Models are built through forward stepping meaning that predictors are entered one at a time, beginning with the null model, to assess for significance of each variable and therefore the best fit of the model (Nezlek, 2008). Both NA and SS when with others were grand-mean centered to facilitate the interpretation of the results. SS when alone was uncentered to increase the interpretation of the results (i.e., from feeling wanted to unwanted).

Including residual error at level 2, which allows the predictor's coefficients to vary, is necessary when the model involves within-unit comparisons (e.g., across days within the same participant) or if the data are irregular (e.g., differences in the number of completed hourly questionnaires; Nezlek, 2008). However, if the random slope is not significant \( (p > .20) \), it is recommended that the term is not included in the model (Nezlek, 2001, 2008). The random effect of the slopes was not significant and thus the slopes were fixed for the following hypotheses: daily SS when with others predicting daily PTSS (hypotheses 2b and 6, path C; \( p > .500 \)), momentary SS when with others predicting future NA (hypothesis 4b, \( p > .500 \)), daily NA predicting daily PTSS (hypotheses 5 and 6 path B, \( p = .340 \)), daily SS when with others predicting daily NA (hypothesis 6, path A, \( p = .295 \)). Table 3 provides information regarding each alternative model.
Table 3
Regression Results Pertaining to Each Outcome

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Predictor</th>
<th>B</th>
<th>SE</th>
<th>d.f.</th>
<th>t</th>
<th>p-value</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall PTSS</td>
<td>Overall SS_Alone</td>
<td>14.42</td>
<td>9.39</td>
<td>40</td>
<td>1.540</td>
<td>.133</td>
<td>.056</td>
</tr>
<tr>
<td></td>
<td>Overall SS_Others</td>
<td>4.01</td>
<td>2.67</td>
<td>40</td>
<td>1.500</td>
<td>.142</td>
<td>.055</td>
</tr>
<tr>
<td>Daily PTSS</td>
<td>Daily SS_Alone</td>
<td>0.86</td>
<td>2.84</td>
<td>40</td>
<td>0.301</td>
<td>.765</td>
<td>.0349</td>
</tr>
<tr>
<td></td>
<td>Daily SS_Others</td>
<td>0.17</td>
<td>0.36</td>
<td>136</td>
<td>0.470</td>
<td>.639</td>
<td>.1134</td>
</tr>
<tr>
<td></td>
<td>Daily NA</td>
<td>4.08</td>
<td>1.69</td>
<td>150</td>
<td>2.416</td>
<td>.017</td>
<td>-.0071</td>
</tr>
<tr>
<td></td>
<td>Affect Variability</td>
<td>0.97</td>
<td>0.02</td>
<td>150</td>
<td>51.964</td>
<td>&lt;.001</td>
<td>.9468</td>
</tr>
<tr>
<td>Daily NA</td>
<td>Daily SS_Alone</td>
<td>0.13</td>
<td>0.17</td>
<td>43</td>
<td>0.776</td>
<td>.442</td>
<td>.0831</td>
</tr>
<tr>
<td></td>
<td>Daily SS_Others</td>
<td>0.00</td>
<td>0.03</td>
<td>188</td>
<td>0.022</td>
<td>.982</td>
<td>-.0511</td>
</tr>
<tr>
<td>Momentary NA</td>
<td>Momentary SS_Alone</td>
<td>0.03</td>
<td>0.13</td>
<td>43</td>
<td>0.233</td>
<td>.817</td>
<td>.0786</td>
</tr>
<tr>
<td></td>
<td>Momentary SS_Others</td>
<td>0.02</td>
<td>0.02</td>
<td>42</td>
<td>1.443</td>
<td>.156</td>
<td>.0353</td>
</tr>
<tr>
<td></td>
<td>T-1 SS_Alone</td>
<td>0.12</td>
<td>0.15</td>
<td>42</td>
<td>0.813</td>
<td>.421</td>
<td>-.1680</td>
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<tr>
<td></td>
<td>T-1 SS_Others</td>
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<td>0.02</td>
<td>413</td>
<td>0.698</td>
<td>.486</td>
<td>.0237</td>
</tr>
</tbody>
</table>

Notes. Random Effect: Intercept; ICC = intraclass correlation coefficient; DEFF = design effect; PTSS = PTSD symptom severity; SS_Alone = social stress measure when alone; SS_Others = social stress measure when with others; NA = negative affect; T-1 SS_Alone = social stress (when alone) at the previous time point; T-1 SS_Others = social stress (when with others) at the previous time point.
Effect Sizes

Typically, effect sizes determine the strength of an effect after introducing another component (e.g., predictor) to a model. This allows for additional information to determine how much of the variation in the outcome variable is due to the added variable. In most statistical analyses effect sizes are based on fixed parameters; however, in MLM, effect sizes are based on (error) variance parameters. Therefore, Nezlek (2001, 2008) emphasizes that effect sizes may not be accurate and therefore should be interpreted with caution. Roberts et al. (2010) have noted that $R^2$ can be a negative number; however, this does not imply that the predictor variable decreases the model fit. Instead, a negative effect size may indicate that the predictor variable has minimal variation or does not account for cluster size (Roberts et al., 2010). In this study, variance-accounted-for was computed as $R^2 \equiv \frac{\hat{\sigma}^2}{\sigma^2_{null} - \hat{\sigma}^2_{null}} - \hat{\sigma}^2_{alternative} / \hat{\sigma}^2_{null}$ (null model) where $\hat{\sigma}^2$ represents the error variance at level-1 (Woltman et al., 2012).

Hypothesis Analysis

Hypothesis 1: Overall SS as a Predictor of PTSS

The first hypothesis analyzed whether there was a relationship between SS and PTSS. Analyses were conducted using the average SS score and PTSS score across all time points for each participant. Implementing ordinary least-squares (OLS) linear regression at a single level, the average SS score was the predictor and PTSS was the outcome variable. Results indicated that SS when alone (i.e., feeling unwanted) or with others (i.e., decreased feelings of connectedness) were not significant predictors of PTSS ($B = 14.42, p = .133$ and $B = 4.01, p = .142$ respectively).
Hypothesis 2: Daily SS as a Predictor of PTSS

The second hypothesis was examined using HLM to assess the relationship between SS, aggregated as the mean of the hourly time points across each day for when the participant is alone (2a) or with others (2b), and PTSS, computed as the total PCL-5 score, measured at the day level. SS when alone (2a) is uncentered and SS when with others (2b) is grand-mean centered.

Hypothesis 2a: Daily SS when Alone as a Predictor of PTSS

SS when alone (i.e., feeling unwanted) was not a significant predictor of PTSS ($p = .765$). Results concluded that adjusting for SS when alone, the overall mean PTSS score across individuals was 24.82 ($\beta_{00} = 24.82$) and the overall adjusted mean PTSS score differed significantly from zero ($p < .001$).

Hypothesis 2b: Daily SS when with Others as a Predictor of PTSS

SS when with others (i.e., decreased connectedness) was not a significant predictor for PTSS ($p = .779$). Results concluded that adjusting for SS when with others, the overall mean PTSS score across individuals was 24.72 ($\beta_{00} = 24.72$) and the overall adjusted mean PTSS score differed significantly from zero ($p < .001$).

Hypothesis 3: SS as a predictor of NA

The third hypothesis proposed that momentary SS was positively associated with levels of NA. Within HLM, the analysis examined hourly time points nested within individuals with NA as the outcome variable. The null model was compared to an alternative model with SS as a predictor for NA. When the participant reported being alone, the SS score measured feelings of
being unwanted (3a), which was uncentered in the analysis. When with others, the SS score reflected feelings of connectedness (3b), which was grand-mean centered.

**Hypothesis 3a: SS when Alone as a Predictor of NA**

SS when alone (i.e., feeling unwanted) was not a significant predictor for NA ($p = .817$). Results concluded that adjusting for SS when alone, the overall mean NA score across days was 1.82 ($\beta_{00} = 1.82$) and the overall adjusted mean NA score differed significantly from zero ($p < .001$).

**Hypothesis 3b: SS when with Others as a Predictor of NA**

SS when with others (i.e., decreased connectedness) was not a significant predictor of NA ($p = .156$). Results concluded that adjusting for SS when with others, the overall mean NA score across days was 1.78 ($\beta_{00} = 1.78$) and the overall adjusted mean NA score differed significantly from zero ($p < .001$).

**Hypothesis 4: Momentary SS as a Predictor of Future NA**

The fourth hypothesis, examining time points within individuals, analyzed whether SS in the moment predicted NA at the next time point. This analysis was assessed by examining whether there was a significant relationship between the SS score at time point $t-1$ and NA score at time $t$ (Clegg, Jackson, & Wall, 1977). The null model included NA as the outcome variable. This model was compared to another model with SS as the predictor of NA. To assess this hypothesis, SS in the second model was specified as the score at the previous time point from the NA outcome variable (e.g., if it is the NA at time point 3, the predictor SS was from
time point 2). Specifically, if the participant was alone at the appropriate time point (i.e., SS time point – 1), the SS score reflected feelings of being unwanted (4a). If the participant reported being with others at the previous time point, the SS score measured feelings of being disconnected (4b).

Hypothesis 4a: Momentary SS When Alone as a Predictor of Future NA

HLM analyses showed that SS when alone (i.e., feeling unwanted) was not a significant predictor of NA at the next time point \( (p = .421) \). Results additionally showed that adjusting for SS when alone, the overall mean NA score (across days) at the next time point was 1.82 \( (\beta_{00} = 1.82) \) and the overall adjusted mean NA score differed significantly from zero \( (p < .001) \).

Hypothesis 4b: Momentary SS When with Others as a Predictor of Future NA

HLM analyses showed that SS when with others (i.e., decreased connectedness) was not a significant predictor of NA at the next time point \( (p = .486) \). Results additionally showed that adjusting for SS when with others, the overall mean NA score (across days) at the next time point was 1.79 \( (\beta_{00} = 1.79) \) and the overall adjusted mean NA score differed significantly from zero \( (p < .001) \).

Hypothesis 5: Daily NA as a Predictor of PTSS

The fifth hypothesis aggregated the mean of the time points of NA across each day and examined the relationship between NA and day-level PTSS (computed as the total PCL-5 score). Using HLM analysis, only PTSS was considered as the outcome variable. A null model was compared to another model with the daily NA rating average as a predictor of PTSS; NA was
grand-mean centered. NA was a significant predictor of PTSS \((p = .017)\). Results additionally showed that adjusting for NA, the overall mean PTSS score across individuals was 24.82 \((\beta_{00} = 24.82)\) and the overall adjusted mean PTSS score differed significantly from zero \((p < .001)\). The effect of NA on PTSS was 4.08, meaning that each unit increase in NA was associated with 4.08 points gain in PTSS. The observed value of \(R^2 \ (R^2 = .0071)\) may indicate that NA had minimal variation on PTSS (Roberts et al., 2010).

**Hypothesis 6: Indirect Effect of Social Stress on PTSS as Mediated by NA**

Hypothesis six is a mediation model. Time point responses were aggregated by the mean at the day level in order to examine the relationship between SS, NA, and PTSS. Using HLM, mediation analyses were conducted by first examining the relationship between the aggregated daily rating of SS and the daily rating of NA (Path A). Next, the relationship between the daily rating of NA and total PTSS daily score (Path B) was analyzed. Last, the relationship between daily SS scores and daily PTSS scores were examined (Path C). Significant coefficients on each of these paths would indicate a significant mediation (Cohn et al., 2014). Results are shown in Figures 1 and 2.

**Path 6a: Daily SS as a Predictor of NA**

**SS when alone.** Daily SS when alone (i.e., feeling unwanted) was not a significant predictor of NA \((p = .442)\). Results concluded that adjusting for SS when alone, the overall mean NA score across individuals was 1.81 \((\beta_{00} = 1.81)\) and the overall adjusted mean NA score differed significantly from zero \((p < .001)\).
Figure 1. Multilevel mediation analyses with a mediating effect of daily negative affect on the relationship between social stress when alone on PTSD symptom severity. Daily social stress when alone predicting daily negative affect, daily negative affect predicting daily PTSD symptom severity, daily social stress when alone predicting PTSD symptom severity
*p < .01 **p < .001

Figure 2. Multilevel mediation analyses with a mediating effect of daily negative affect on the relationship between social stress when with others on PTSD symptom severity. Daily social stress when with others predicting daily negative affect, daily negative affect predicting daily PTSD symptom severity, daily social stress when with others predicting PTSD symptom severity
*p < .01 **p < .001
SS when with others. Daily SS when with others (i.e., decreased connectedness) was not a significant predictor of NA ($p = .982$). Results concluded that adjusting for SS when with others, the overall mean NA score across individuals was $1.80$ ($\beta_{00} = 1.80$) and the overall adjusted mean NA score differed significantly from zero ($p < .001$).

Path 6b: Daily NA as a Predictor of PTSS

As previously described in hypothesis 5, daily NA was a significant predictor of PTSS ($p = .017$) with an overall mean PTSS score across individuals $24.82$ ($\beta_{00} = 24.82$) that differs significantly from zero ($p < .001$). The slope for predicting daily PTSS from daily NA was $4.08$, which means that every unit increase in NA is associated with a $4.08$ gain in PTSS. The observed value of $R^2$ ($R^2 = -.0071$) may indicate that NA has minimal variation or does not account for cluster size for PTSS (Roberts et al., 2010).

Path 6c: Daily SS as a Predictor of PTSS

Social stress when alone. As previously described in hypothesis 2, SS when alone (i.e., feeling unwanted) was not a significant predictor of PTSS ($p = .765$). The overall mean PTSS score across individuals when adjusting for SS when alone was $24.82$ ($\beta_{00} = 24.82$) and differed significantly from zero ($p < .001$).

SS when with others. SS when with others (i.e., decreased connectedness) was not a significant predictor of PTSS ($p = .779$). The overall mean PTSS score across individuals adjusting for SS when with others was $24.72$ ($\beta_{00} = 24.72$) and varied significantly from zero ($p < .001$). The overall mediation model was not significant as the only significant path was 6b (i.e., NA predicting PTSS). All other paths were not significant.
Research Question: Affect Variability as a Predictor of PTSS

The research question examined the relationship between affect variability and PTSS. Affect variability was computed as the variance of hourly affect ratings at the day level. Similar to hypothesis five, the null model included PTSS as the outcome variable with no predictors. The alternative model included day level affect variability as the predictor of PTSS. Affect variability was a significant predictor of PTSS ($p < .001$). Adjusting for affect variability, the overall mean PTSS score across individuals was 24.81 ($\beta_{00} = 24.81$), which differed significantly from zero ($p < .001$). The slope for predicting PTSS from affect variability was 0.97; for every unit increase in affect variability there was a 0.97 gain in PTSS. The observed value of $R^2$ ($R^2 = .9471$) may indicate that 94.71% of participant variation in PTSS is explained by affect variability.
CHAPTER FOUR
DISCUSSION

Overview

The current study examined the relationship between state negative affect, momentary social stress, and daily PTSD symptom stress (PTSS) in a sample of trauma-exposed female college students. State negative affect was identified as the average of negative affect items (e.g., distress, upset, nervous) from the Positive and Negative Affect Schedule (PANAS). Previous studies measured social stress with one item, which differed depending on whether the participant was alone (“I am alone because people do not want to be with me”) or with others (“I feel close to this person/these people”); the current study applied the same measure for social stress. PTSS was measured as the sum of the items from the PTSD Checklist for DSM-5 (PCL-5). Utilizing experience sampling methodology (ESM), participants completed surveys within a smart phone application across 7 days. Mood and social stress were measured eight times daily between 8am and 8pm and daily PTSS was assessed between 8 and 9:30pm. The current study hypothesized that daily PTSS would be predicted by daily social stress and negative affect, and that current social stress would predict both current and future negative affect. Additionally, it was hypothesized that daily social stress would have an indirect effect on PTSS as mediated by negative affect.
Previous literature established a relationship between negative affect and PTSD. DiMauro et al. (2016) assessed the relationship between PTSD and daily negative affect for 14 days, concluding that veterans with PTSD reported greater daily negative affect compared to veterans with no Axis 1 disorder. Short et al. Schmidt (2017) reported that for participants diagnosed with PTSD, daily negative affect mediates the relationship between sleep quality and PTSS. Specifically, morning negative affect may be affected by daily experiences that impact PTSS. These study findings influenced the current study’s aim to replicate the findings of an observed relationship between daily negative affect and PTSS. Within the current study, the two variables were assessed using valid and reliable measures (i.e., PANAS measuring affect and PCL-5 measuring PTSS). The measures were significantly correlated, increasing the confidence in a significant association between the constructs.

Findings indicated a significant relationship between daily negative affect and same-day PTSS, consistent with prior research and theory that affect is one factor that may maintain PTSS. Both DiMauro et al. (2016) and Short et al. (2017) examined samples with a diagnosis of PTSD. The current study’s findings indicate that the relationship between increased daily negative affect and PTSS may be relevant for trauma-exposed populations that are experiencing any PTSD symptom distress, not only those that meet diagnostic criteria for PTSD. Factors that prolong distress (e.g., distress tolerance, negative affect intensity) maintain psychological impairment (Marshall-Berenz et al., 2010; Tull et al., 2007; Vujanovic et al., 2013). Increased difficulty tolerating and reacting to negative emotional states is associated with increased PTSS. Brown et
al. (2016) argued that overall increased negative affect may impair cognitive functioning and increase psychological distress. Conversely, trauma-exposed individuals with increased tolerance to distress may demonstrate resilience and increased engagement in effective strategies to reduce PTSD symptoms. The current study’s results may further support the importance of increased assessment of emotional responses and PTSS; it may be valuable to examine daily PTSS and increase one’s awareness of how it may be impacted by daily stressors and mood. The relationship between negative affect and PTSS may also inform which psychotherapy intervention components may be important to incorporate in therapy (e.g., increased distress tolerance and adaptive emotion regulation strategies).

**Daily Affect Variability and PTSS**

Affect variability is typically associated with borderline personality disorder (BPD), but Santangelo et al. (2014) reported the same trait in a sample of participants with PTSD. Another study concluded that in a sample of trauma-exposed adolescents, affect variability was associated with both same day and next day PTSS (Deane et al., 2020). Deane and others (2020) reported that increased affect variability in trauma-exposed adolescents may indicate maladaptive emotion regulation, meaning that they respond inappropriately to stressors (e.g., with hostility). Consistent with the literature, affect variability throughout the day significantly predicted same-day PTSS within the current study. Individuals with difficulty regulating their affect may engage in maladaptive coping and emotion regulation strategies, resulting in increased PTSS. The resulting affect variability throughout the day may limit cognitive abilities (e.g., attentional control) that are needed to effectively respond to, and recover from, daily experiences. This may then result in overall increases in negative affect (Bardeen & Read, 2010; DiMauro et al., 2016).
As previously described, increased negative affect is associated with maintaining PTSS (Marshall-Berenz et al., 2010; Tull et al., 2007; Vujanovic et al., 2013). These findings further inform treatment for trauma-exposed populations. Addressing emotion regulation strategies may better one’s response to daily stressors, decrease negative emotional states, and reduce PTSS.

Social Stress and PTSD

Previous meta-analyses determined that social support is an important factor in the development of PTSD (Brewin et al., 2000; Ozer et al., 2003). Additional research studies continue to establish this relationship across time, age, and populations (Dworkin et al., 2017; Nickerson et al., 2017; Sripada et al., 2016). These studies conclude that decreased social support is associated with increased PTSS within the same day (Dworkin et al., 2017) and across months (Nickerson et al., 2017). The current study examined how stress about social support may impact mood and PTSS. Social stress has been measured physiologically (i.e., cortisol levels) in trauma-exposed populations (McRae et al., 2006; Roelofs et al., 2009; Simeon et al., 2007; Wichmann et al., 2017; Zaba et al., 2015). Results were mixed, emphasizing the importance of expanding literature that examines the role of social stress in trauma-exposed samples. Behaviorally, social stress has been defined as a dissonance between negative cognitions about, physiological discomfort during, and the tendency to avoid social situations and relationships (Mittelmark et al., 2004; Wadman et al., 2011; Zayan, 1991). Integrating these definitions into a measure, social stress was operationalized in this study as feeling unwanted when alone and decreased connectedness when with others (Brown et al., 2011; Kwapil et al., 2012; Myin-Germeys et al., 2003; Sheinbaum et al., 2015). The current study replicated this psychological measure of social stress.
Within the current sample, neither measure of social stress (i.e., when alone nor with others) significantly predicted PTSS. One possible reason for the lack of association may be that previous studies examining social stress did not report an association with the psychological symptoms (e.g., MDD) but instead emotional responses (i.e., affect; Myin-Germeys et al., 2003; van Winkel et al., 2015). Psychological disorders are associated with distress and interference in functioning (e.g., cognitive abilities). In response to a stressor (e.g., social stress), the disruption in cognitive abilities may increase emotional distress (e.g., negative affect), which then further impacts psychological symptoms.

Social Stress and Negative Affect

Research studies that examined social stress with ESM concluded that there was a significant relationship between social stress and affect in the moment and across time (e.g., daily values, across months; Myin-Germeys et al., 2003; van Winkel et al., 2015). However, in the current sample, neither measure of social stress (i.e., alone nor with others) correlated with negative affect. Results indicated no significant association between momentary social stress and current and future negative affect, meaning that there may not be an increased emotional response (i.e., increased negative affect) to social stress. The relationship between social stress and affect may differ for those reporting PTSD symptom distress.

One possible explanation for the lack of association between social stress and affect may be that there is not a significant effect of social stress within trauma-exposed populations. Following a traumatic event, one’s reaction to stress (e.g., HPA axis, emotion regulation) may become dysregulated. The changes in responses vary, just the same as how one type of stressor (e.g., trauma reminder) may impact one individual differently than another. For instance,
following a traumatic experience, one may become a non-responder to stressful situations; an individual may not emotionally react (appropriately) in dangerous situations (Zaba et al., 2015). Within the current study, it is possible that the sample included non-responders and therefore, they did not report an emotional response to social stress. Another possible reason this relationship was not observed in the current sample may be resiliency. The lifetime prevalence of PTSD is approximately 9%, meaning that the majority of those who experience a traumatic event do not develop or maintain a PTSD diagnosis (Kilpatrick et al., 2013). The current study recruited females who endorsed at least one threshold symptom per PTSD cluster rather than meeting a PTSD diagnosis. Therefore, the sample may include those who demonstrate resiliency to a PTSD diagnosis and do not experience significant emotional distress following social stress. It is also important to note that additional factors, such as comorbid diagnoses (e.g., MDD, anxiety) and peritrauma factors (e.g., personality, childhood development, genetics) are associated with blunted responses to social stress (Wichmann et al., 2017; Zaba et al., 2015). These additional variables were not controlled for within the current study, and this may explain the lack of significant association.

Construct Validity of Social Stress Measure

Within the current study, the only significant relationships were those related to negative affect and PTSS. All hypotheses including social stress were not supported. Construct validity of a measure may be in question if the construct being measured is poorly operationally defined correctly (Cronbach & Meehl, 1966). Therefore, in order to accept the behavioral measure of social stress, the definition of social stress must also be accurate. There are three types of social support (i.e., instrumental support, social companionship, social distress; Cyranowski et al.,
and three components of social stress (i.e., negative emotional experiences, perspective processes, and cognitive processes; Zayan, 1991). The current single-item measure (depending on whether the individual is alone or with others) may not be incorporating all three components of social stress, limiting the validity of the measure. The measure would benefit from additional studies expanding the definition and application across other populations. Specifically, within trauma-focused samples, the measure can be further validated across groups with varying index trauma types (e.g., motor vehicle accidents, interpersonal violence) and PTSS scores. Further, the measure currently asks the participant whether they feel wanted or connected, which may be additional constructs that are differentially (operationally) defined by each participant. Interpreting one item (e.g., feeling unwanted) as accurately capturing the three components of social stress may lead to inaccurate conclusions. Expanding the measure to incorporate multiple items may further increase the validity and interpretation of the measure’s results. Improving the measure may also increase the confidence in the definition of the construct (i.e., social stress) and increase reliability in the measure across constructs (compared to having separate measures of social stress dependent on whether one is alone or with others). Additionally, changing the response options to include more rating options may increase accuracy in responses and interpretation of the data. The current measure implemented a 2-point rating for social stress when alone (e.g., feeling unwanted or wanted) and a 5-point scale when with others which may be unnatural in how an individual interprets their connections to others. The 2-point scale reduces the variability in responses and the accuracy in capturing how individuals may report social stress across contexts. The expansion of social stress measures should incorporate different methods (e.g., self-report, physiological, interview, observational) and items that test the construct as it is currently operationally defined. As such, the current measure of social stress
should be interpreted with caution until the validity and reliability of the measure improves and theory about the construct is better established.

Limitations

There may be additional complicating factors that the current study did not account for such as one’s preference to be alone or with others, their immediate context and current activity, and the nature of the relationship on which the participant is reporting in any one timepoint. Increasing the understanding of an individual’s social context may improve the interpretation of social stress. Specifically for trauma-exposed populations, it is important to account for one’s index trauma type. This additional information may help in distinguishing between trauma reminders and social stress. For instance, an individual who experienced an interpersonal trauma may be more likely to report increased detachment and disconnectedness from others compared to other trauma types (e.g., motor vehicle accidents; Elwood & Williams, 2007; Forbes et al., 2013). Survivors of interpersonal trauma may be more focused on interpersonal stressors than someone without such a history and therefore experience increased loneliness and social stress (Elwood & Williams, 2007; Forbes et al., 2013). This was the first study utilizing this social stress measure within a trauma-exposed population. The current sample was trauma-exposed female college students; expanding the assessment of social stress in different groups of trauma-exposed individuals (e.g., gender, age, PTSS, trauma type) may increase the validity of the measure as well as increase an understanding of whether social stress impacts the outcome of interest. Furthermore, the current study examined the relationship between social stress, PTSS, and affect. Broadening the focus in which social stress may impact different outcomes (i.e.,
MDD, sleep, substance use, experiential avoidance) may also enhance the criterion validity of
the measure and construct.

Next, there are limitations to the current study’s design. First, the study design may have
been demanding to the participants, which may have contributed to increased missing data.
Additionally, although the technology used to administer and collect the data on the participant’s
personal smartphone increased ease of data collection. Due to technological issues (e.g., network
difficulty), some participants reported difficulty completing questionnaires. Further, the
application that distributed the questionnaires randomly eliminated one item on the PANAS scale
each time it was administered, limiting the ability to compute a sum score for positive and
negative affect. Next, generalizability of these results is limited due to the specific sample of
female college students. This may have impacted the study results. Additionally, the study was
fairly limited in participant characteristics. Expanding the sample to incorporate a more diverse
population (e.g., gender, trauma type, PTSS) may impact the strength of the association between
social stress, affect, and PTSS. Further, level-1 residuals were not homogeneous across clusters
for PTSS or momentary negative affect meaning that the variances (and distributions) were not
similar across participants and there may be an over- or under-estimation of the findings.
Improving the study design and measure of social stress may increase homogeneity in variance
and the interpretation and generalizability of the results.

Implications

This was the first study to examine the role of social stress in a trauma-exposed
population. The findings may indicate that social stress, affect, and PTSS within trauma-exposed
populations may not be significantly associated. Social support has been identified as a
significant factor in the development of PTSD. The current study may highlight the nuances of the social support types and how they may differentially influence distress. Therefore, the type of social support that the current study focused on (i.e., social companionship) may not be a factor that is associated with changes in mood or PTSS. The current study’s implementation of ESM highlights the value in assessing experiences and emotional expression across contexts rather than examining the associations in a controlled research laboratory.

Examining the relationship between these constructs in one’s daily life may be particularly helpful considering the current social situation (i.e., COVID-19). The pandemic may have impacted one’s ability to expand their social support network; regarding the current sample, due to stay-at-home orders and increased use of online classes, college students may be surrounded by others with whom they do not feel connected. Notably, all data for this project were collected prior to stay-at-home orders due to COVID-19. Focusing on how the current study’s findings may inform future treatment for trauma-exposed individuals, increased affect variability may be associated with engagement in maladaptive emotion regulation strategies (Deane, Richards, & Santiago, 2020; Santangelo et al., 2014). The significant association between daily affect variability and increased PTSS may highlight the importance of incorporating emotion regulation strategies in psychotherapy interventions. Within therapy, the current study demonstrated the value of frequent assessment of mood and psychological symptom distress to increase one’s awareness of the frequency and impact of (different) experiences across various contexts.
Future Directions

Addressing the limitations of the current study, future research should expand samples (e.g., PTSD diagnosis, index trauma type, gender, age) assessing the association between social stress, affect, and PTSS in daily life, which would increase the accuracy in interpretation and generalizability of the results. Furthermore, literature would benefit from additional studies examining the validity of the social stress measures as well as introducing additional questions to challenge the operationally defined construct. Future studies should also investigate how comorbidity of other mental disorders impact the proposed relationships. For instance, a diagnosis of MDD may influence an individual to isolate themselves due to low motivation to engage with others compared to isolation due to symptoms related to trauma reminders. It may be useful to examine the mediating role of avoidance in temporarily reducing momentary distress after experiencing a stressor, which may explain some of the current study’s null findings.

Conclusion

The majority of people report experiencing life events that we currently define as ‘traumatic’ in nature (e.g., witnessing or experiencing a motor vehicle accident, learning about someone close to you being interpersonally violated, having a natural disaster impact one’s life). The high probability of trauma exposure increases the importance of addressing not only the factors that contribute to developing the impairing symptoms of PTSD, but also the factors that maintain the distress. This study examined the role of negative affect, social stress, and PTSD symptom severity (PTSS). Results indicated that overall daily negative affect and affect variability throughout the day significantly predict same-day PTSS. The findings highlight the
importance of focusing on affect and emotion regulation in treatments with trauma-exposed individuals endorsing PTSS.
REFERENCES


APPENDIX A

QUESTIONNAIRES
Life Events Checklist

Listed below are a number of difficult or stressful things that sometimes happen to people. For each event check one or more of the boxes to the right to indicate that: (a) it happened to you personally; (b) you witnessed it happen to someone else; (c) you learned about it happening to a close family member or close friend; (d) you were exposed to it as part of your job (for example, paramedic, police, military, or other first responder); (e) you’re not sure if it fits; or (f) it doesn’t apply to you.

Be sure to consider your entire life (growing up as well as adulthood) as you go through the list of events.

1. Natural disaster (for example, flood, hurricane, tornado, earthquake)
2. Fire or explosion
3. Transportation accident (for example, car accident, boat accident, train wreck, plane crash)
4. Serious accident at work, home, or during recreational activity
5. Exposure to toxic substance (for example, dangerous chemicals, radiation)
6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)
7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)
8. Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm)
9. Other unwanted or uncomfortable sexual experience
10. Combat or exposure to a war-zone (in the military or as a civilian)
11. Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)
12. Life-threatening illness or injury
13. Severe human suffering
14. Sudden violent death (for example, homicide, suicide)
15. Sudden accidental death
16. Serious injury, harm, or death you caused to someone else
17. Any other very stressful event or experience
Clinician Administered PTSD Scale for DSM-5:

Criterion A: Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:

1. Directly experiencing the traumatic event(s).

2. Witnessing, in person, the event(s) as it occurred to others.

3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.

4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse). Note: Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.

[Administer Life Events Checklist or other structured trauma screen]

I’m going to ask you about the stressful experiences questionnaire you filled out. First I’ll ask you to tell me a little bit about the event you said was the worst for you. Then I’ll ask how that event may have affected you over the past month. In general I don’t need a lot of information – just enough so I can understand any problems you may have had. Please let me know if you find yourself becoming upset as we go through the questions so we can slow down and talk about it. Also, let me know if you have any questions or don’t understand something. Do you have any questions before we start?

The event you said was the worst was (EVENT). What I’d like for you to do is briefly describe what happened.

*Index event (specify):*

**What happened?** (*How old were you? How were you involved? Who else was involved? Was anyone seriously injured or killed? Was anyone’s life in danger? How many times did this happen?*)

*Exposure type:*

*Experienced ___*

*Witnessed ___*

*Learned about ___*

*Exposed to aversive details ___*
Life threat? NO YES [self ___ other ___]

Serious injury? NO YES [self ___ other ___]

Sexual violence? NO YES [self ___ other ___]

Criterion A met? NO PROBABLE YES

For the rest of the interview, I want you to keep (EVENT) in mind as I ask you about different problems it may have caused you. You may have had some of these problems before, but for this interview we’re going to focus just on the past month. For each problem I’ll ask if you’ve had it in the past month, and if so, how often and how much it bothered you.

Criterion B: Presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred:

1. (B1) Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s).
   Note: In children older than 6 years, repetitive play may occur in which themes or aspects of the traumatic event(s) are expressed.
   In the past month, have you had any unwanted memories of (EVENT) while you were awake, so not counting dreams? [Rate 0=Absent if only during dreams]

   How does it happen that you start remembering (EVENT)?
   [If not clear:] (Are these unwanted memories, or are you thinking about [EVENT] on purpose?) [Rate 0=Absent unless perceived as involuntary and intrusive]

   How much do these memories bother you?

   Are you able to put them out of your mind and think about something else?

   Circle: Distress = Minimal Clearly Present Pronounced Extreme

   How often have you had these memories in the past month?
   # of times __________

   Key rating dimensions = frequency / intensity of distress
   Moderate = at least 2 X month / distress clearly present, some difficulty dismissing memories
   Severe = at least 2 X week / pronounced distress, considerable difficulty dismissing memories

   0 Absent
   1 Mild / subthreshold
   2 Moderate / threshold
   3 Severe / markedly elevated
   4 Extreme / incapacitating
2. (B2) Recurrent distressing dreams in which the content and/or affect of the dream are related to the event(s). Note: In children, there may be frightening dreams without recognizable content.  
In the past month, have you had any unpleasant dreams about (EVENT)?

Describe a typical dream. (What happens?)

[If not clear:] (Do they wake you up?)

[If yes:] (What do you experience when you wake up? How long does it take you to get back to sleep?)

[If reports not returning to sleep:] (How much sleep do you lose?)

How much do these dreams bother you?

Circle: Distress = Minimal Clearly Present Pronounced Extreme

How often have you had these dreams in the past month?  
# of times __________

Key rating dimensions = frequency / intensity of distress  
Moderate = at least 2 X month / distress clearly present, less than 1 hour sleep loss  
Severe = at least 2 X week / pronounced distress, more than 1 hour sleep loss

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

3. (B3) Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.) Note: In children, trauma-specific reenactment may occur in play.  
In the past month, have there been times when you suddenly acted or felt as if (EVENT) were actually happening again?

[If not clear:] (This is different than thinking about it or dreaming about it – now I’m asking about flashbacks, when you feel like you’re actually back at the time of [EVENT], actually reliving it.)
How much does it seem as if (EVENT) were happening again? (Are you confused about where you actually are?)

What do you do while this is happening? (Do other people notice your behavior? What do they say?)

How long does it last?

Circle: Dissociation = Minimal Clearly Present Pronounced Extreme

How often has this happened in the past month?
# of times __________

Key rating dimensions = frequency / intensity of dissociation
Moderate = at least 2 X month / dissociative quality clearly present, may retain some awareness of surroundings but relives event in a manner clearly distinct from thoughts and memories
Severe = at least 2 X week / pronounced dissociative quality, reports vivid reliving, e.g., with images, sounds, smells

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

4. (B4) Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).
In the past month, have you gotten emotionally upset when something reminded you of (EVENT)?

What kinds of reminders make you upset?

How much do these reminders bother you?

Are you able to calm yourself down when this happens? (How long does it take?)

Circle: Distress = Minimal Clearly Present Pronounced Extreme

How often has this happened in the past month?
# of times __________

Key rating dimensions = frequency / intensity of distress
Moderate = at least 2 X month / distress clearly present, some difficulty recovering
Severe = at least 2 X week / pronounced distress, considerable difficulty recovering

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

5. (B5) Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

In the past month, have you had any physical reactions when something reminded you of (EVENT)?

Can you give me some examples? (Does your heart race or your breathing change? What about sweating or feeling really tense or shaky?)

What kinds of reminders trigger these reactions?

How long does it take you to recover?

Circle: Physiological reactivity = Minimal Clearly Present Pronounced Extreme

How often has this happened in the past month?

# of times __________

Key rating dimensions = frequency / intensity of physiological arousal

Moderate = at least 2 X month / reactivity clearly present, some difficulty recovering
Severe = at least 2 X week / pronounced reactivity, sustained arousal, considerable difficulty recovering

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

Criterion C: Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:

6. (C1) Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

In the past month, have you tried to avoid thoughts or feelings about (EVENT)?
What kinds of thoughts or feelings do you avoid?

How hard do you try to avoid these thoughts or feelings? *(What kinds of things do you do?)*

Circle: Avoidance = *Minimal Clearly Present Pronounced Extreme*

How often in the past month?
# of times __________

*Key rating dimensions = frequency / intensity of avoidance*
Moderate = at least 2 X month / avoidance clearly present
Severe = at least 2 X week / pronounced avoidance

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

7. (C2) Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

In the past month, have you tried to avoid things that remind you of *(EVENT)*, like certain people, places, or situations?

What kinds of things do you avoid?

How much effort do you make to avoid these reminders? *(Do you have to make a plan or change your activities to avoid them?)*

[If not clear:] *(Overall, how much of a problem is this for you? How would things be different if you didn’t have to avoid these reminders?)*

Circle: Avoidance = *Minimal Clearly Present Pronounced Extreme*

How often in the past month?
# of times __________

*Key rating dimensions = frequency / intensity of avoidance*
Moderate = at least 2 X month / avoidance clearly present
Severe = at least 2 X week / pronounced avoidance

0 Absent
Criterion D: Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

8. (D1) Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).

In the past month, have you had difficulty remembering some important parts of (EVENT)? (Do you feel there are gaps in your memory of [EVENT]?)

What parts have you had difficulty remembering?

Do you feel you should be able to remember these things?

[If not clear:] (Why do you think you can’t? Did you have a head injury during [EVENT]? Were you knocked unconscious? Were you intoxicated from alcohol or drugs?)

[Rate 0=Absent if due to head injury or loss of consciousness or intoxication during event]

[If still not clear:] (Is this just normal forgetting? Or do you think you may have blocked it out because it would be too painful to remember?)

[Rate 0=Absent if due only to normal forgetting]

Circle: Difficulty remembering = Minimal Clearly Present Pronounced Extreme

In the past month, how many of the important parts of (EVENT) have you had difficulty remembering? (What parts do you still remember?)

# of important aspects __________

Would you be able to recall these things if you tried?

Key rating dimensions = amount of event not recalled / intensity of inability to recall

Moderate = at least one important aspect / difficulty remembering clearly present, some recall possible with effort

Severe = several important aspects / pronounced difficulty remembering, little recall even with effort

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
9. (D2) Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., “I am bad,” “No one can be trusted,” “The world is completely dangerous,” “My whole nervous system is permanently ruined”).

In the past month, have you had strong negative beliefs about yourself, other people, or the world?

**Can you give me some examples?** *(What about believing things like “I am bad,” “there is something seriously wrong with me,” “no one can be trusted,” “the world is completely dangerous”?)*

**How strong are these beliefs?** *(How convinced are you that these beliefs are actually true? Can you see other ways of thinking about it?)*

Circle: Conviction = Minimal Clearly Present Pronounced Extreme

**How much of the time in the past month have you felt that way?**

% of time __________

**Did these beliefs start or get worse after [EVENT]?** *(Do you think they’re related to [EVENT]? How so?)*

Circle: Trauma-relatedness = Definite Probable Unlikely

**Key rating dimensions = frequency / intensity of beliefs**

Moderate = some of the time (20-30%) / exaggerated negative expectations clearly present, some difficulty considering more realistic beliefs

Severe = much of the time (50-60%) / pronounced exaggerated negative expectations, considerable difficulty considering more realistic beliefs

0 Absent

1 Mild / subthreshold

2 Moderate / threshold

3 Severe / markedly elevated

4 Extreme / incapacitating

10. (D3) Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.

In the past month, have you blamed yourself for [EVENT] or what happened as a result of it? Tell me more about that. *(In what sense do you see yourself as having caused [EVENT]? Is it because of something you did? Or something you think you should have done but didn’t? Is it because of something about you in general?)*
What about blaming someone else for (EVENT) or what happened as a result of it? Tell me more about that. (In what sense do you see [OTHERS] as having caused [EVENT]? Is it because of something they did? Or something you think they should have done but didn’t?)

How much do you blame (YOURSELF OR OTHERS)?

How convinced are you that [YOU OR OTHERS] are truly responsible for what happened? (Do other people agree with you? Can you see other ways of thinking about it?)

[Rate 0=Absent if only blames perpetrator, i.e., someone who deliberately caused the event and intended harm]

Circle: Conviction = Minimal Clearly Present Pronounced Extreme

How much of the time in the past month have you felt that way?
% of time __________

Key rating dimensions = frequency / intensity of blame
Moderate = some of the time (20-30%) / distorted blame clearly present, some difficulty considering more realistic beliefs
Severe = much of the time (50-60%) / pronounced distorted blame, considerable difficulty considering more realistic beliefs

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

11. (D4) Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).
In the past month, have you had any strong negative feelings such as fear, horror, anger, guilt, or shame?

Can you give me some examples? (What negative feelings do you experience?)

How strong are these negative feelings?

How well are you able to manage them?

Circle: Negative emotions = Minimal Clearly Present Pronounced Extreme

How much of the time in the past month have you felt that way?
% of time __________
Did these negative feelings start or get worse after (EVENT)? (Do you think they’re related to [EVENT]? How so?)
Circle: Trauma-relatedness = Definite Probable Unlikely

*Key rating dimensions = frequency / intensity of negative emotions*
Moderate = some of the time (20-30%) / negative emotions clearly present, some difficulty managing
Severe = much of the time (50-60%) / pronounced negative emotions, considerable difficulty managing

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

12. (D5) Markedly diminished interest or participation in significant activities.
In the past month, have you been less interested in activities that you used to enjoy?

What kinds of things have you lost interest in or don’t do as much as you used to? *(Anything else?)*

Why is that?
[Rate 0=Absent if diminished participation is due to lack of opportunity, physical inability, or developmentally appropriate change in preferred activities]

*How strong is your loss of interest?* *(Would you still enjoy [ACTIVITIES] once you got started?)*

Circle: Loss of interest= Minimal Clearly Present Pronounced Extreme

Overall, in the past month, how many of your usual activities have you been less interested in?
% of activities __________

What kinds of things do you still enjoy doing?

Did this loss of interest start or get worse after (EVENT)? *(Do you think it’s related to [EVENT]? How so?)*
Circle: Trauma-relatedness = Definite Probable Unlikely

*Key rating dimensions = percent of activities affected / intensity of loss of interest*
Moderate = some activities (20-30%) / loss of interest clearly present but still has some enjoyment of activities
Severe = many activities (50-60%) / pronounced loss of interest, little interest or participation in activities

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

13. (D6) Feelings of detachment or estrangement from others.
In the past month, have you felt distant or cut off from other people?
Tell me more about that.

How strong are your feelings of being distant or cut off from others? (Who do you feel closest to? How many people do you feel comfortable talking with about personal things?)
Circle: Detachment or estrangement = Minimal Clearly Present Pronounced Extreme

How much of the time in the past month have you felt that way?
% of time __________

Did this feeling of being distant or cut off start or get worse after (EVENT)? (Do you think it’s related to [EVENT]? How so?)
Circle: Trauma-relatedness = Definite Probable Unlikely

Key rating dimensions = frequency / intensity of detachment or estrangement
Moderate = some of the time (20-30%) / feelings of detachment clearly present but still feels some interpersonal connection
Severe = much of the time (50-60%) / pronounced feelings of detachment or estrangement from most people, may feel close to only one or two people

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

14. (D7) Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).
In the past month, have there been times when you had difficulty experiencing positive feelings like love or happiness?
Tell me more about that. *(What feelings are difficult to experience?)*

How much difficulty do you have experiencing positive feelings? *(Are you still able to experience any positive feelings?)*

Circle: Reduction of positive emotions = *Minimal Clearly Present Pronounced Extreme*

How much of the time in the past month have you felt that way?
% of time __________

Did this trouble experiencing positive feelings start or get worse after (EVENT)? *(Do you think it’s related to [EVENT]? How so?)*
Circle: Trauma-relatedness = *Definite Probable Unlikely*

*Key rating dimensions = frequency / intensity of reduction in positive emotions*
Moderate = some of the time (20-30%) / reduction of positive emotional experience clearly present but still able to experience some positive emotions
Severe = much of the time (50-60%) / pronounced reduction of experience across range of positive emotions

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

Criterion E: Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

15. (E1) Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects.
In the past month, have there been times when you felt especially irritable or angry and showed it in your behavior?

Can you give me some examples? *(How do you show it? Do you raise your voice or yell? Throw or hit things? Push or hit other people?)*
Circle: Aggression = *Minimal Clearly Present Pronounced Extreme*

How often in the past month?
# of times __________

Did this behavior start or get worse after (EVENT)? *(Do you think it’s related to [EVENT]?)*
How so?)
Circle: Trauma-relatedness = *Definite Probable Unlikely*

*Key rating dimensions = frequency / intensity of aggressive behavior*
Moderate = at least 2 X month / aggression clearly present, primarily verbal
Severe = at least 2 X week / pronounced aggression, at least some physical aggression

| 0 | Absent |
| 1 | Mild / subthreshold |
| 2 | Moderate / threshold |
| 3 | Severe / markedly elevated |
| 4 | Extreme / incapacitating |

16. (E2) Reckless or self-destructive behavior.
In the past month, have there been times when you were taking more risks or doing things that might have caused you harm?

Can you give me some examples?

How much of a risk do you take? *(How dangerous are these behaviors? Were you injured or harmed in some way?)*

Circle: Risk = *Minimal Clearly Present Pronounced Extreme*

How often have you taken these kinds of risks in the past month?
# of times __________

Did this behavior start or get worse after (EVENT)? *(Do you think it’s related to [EVENT]? How so?)*
Circle: Trauma-relatedness = *Definite Probable Unlikely*

*Key rating dimensions = frequency / degree of risk*
Moderate = at least 2 X month / risk clearly present, may have been harmed
Severe = at least 2 X week / pronounced risk, actual harm or high probability of harm

| 0 | Absent |
| 1 | Mild / subthreshold |
| 2 | Moderate / threshold |
| 3 | Severe / markedly elevated |
| 4 | Extreme / incapacitating |

17. (E3) Hypervigilance.
In the past month, have you been especially alert or watchful, even when there was no specific threat or danger? *(Have you felt as if you had to be on guard?)*
Can you give me some examples? (What kinds of things do you do when you’re alert or watchful?)
[If not clear:] (What causes you to react this way? Do you feel like you’re in danger or threatened in some way? Do you feel that way more than most people would in the same situation?)

Circle: Hypervigilance = Minimal Clearly Present Pronounced Extreme

How much of the time in the past month have you felt that way?
% of time __________

Did being especially alert or watchful start or get worse after (EVENT)? (Do you think it’s related to [EVENT]? How so?)
Circle: Trauma-relatedness = Definite Probable Unlikely

Key rating dimensions = frequency / intensity of hypervigilance
Moderate = some of the time (20-30%) / hypervigilance clearly present, e.g., watchful in public, heightened awareness of threat
Severe = much of the time (50-60%) / pronounced hypervigilance, e.g., scans environment for danger, may have safety rituals, exaggerated concern for safety of self/family/home

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

18. (E4) Exaggerated startle response.
In the past month, have you had any strong startle reactions?

What kinds of things made you startle?

How strong are these startle reactions? (How strong are they compared to how most people would respond? Do you do anything other people would notice?)

How long does it take you to recover?

Circle: Startle = Minimal Clearly Present Pronounced Extreme

How often has this happened in the past month?
# of times __________

Did these startle reactions start or get worse after (EVENT)? (Do you think they’re related to [EVENT]? How so?)
Circle: Trauma-relatedness = *Definite Probable Unlikely*

**Key rating dimensions = frequency / intensity of startle**
Moderate = at least 2 X month / startle clearly present, some difficulty recovering
Severe = at least 2 X week / pronounced startle, sustained arousal, considerable difficulty recovering

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

19. (E5) Problems with concentration.
*In the past month, have you had any problems with concentration?*

Can you give me some examples?

Are you able to concentrate if you really try?

Circle: Problem concentrating = *Minimal Clearly Present Pronounced Extreme*

**How much of the time in the past month have you had problems with concentration?***

% of time _________

**Did these problems with concentration start or get worse after (EVENT)? (Do you think they’re related to [EVENT]? How so?)**
Circle: Trauma-relatedness = *Definite Probable Unlikely*

**Key rating dimensions = frequency / intensity of concentration problems**
Moderate = some of the time (20-30%) / problem concentrating clearly present, some difficulty but can concentrate with effort
Severe = much of the time (50-60%) / pronounced problem concentrating, considerable difficulty even with effort

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

20. (E6) Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).
In the past month, have you had any problems falling or staying asleep?

What kinds of problems? (How long does it take you to fall asleep? How often do you wake up in the night? Do you wake up earlier than you want to?)

How many total hours do you sleep each night?

How many hours do you think you should be sleeping?

Circle: Problem sleeping = Minimal Clearly Present Pronounced Extreme

How often in the past month have you had these sleep problems?

# of times __________

Did these sleep problems start or get worse after (EVENT)? (Do you think they’re related to [EVENT]? How so?)

Circle: Trauma-relatedness = Definite Probable Unlikely

Key rating dimensions = frequency / intensity of sleep problems
Moderate = at least 2 X month / sleep disturbance clearly present, clearly longer latency or clear difficulty staying asleep, 30-90 minutes loss of sleep
Severe = at least 2 X week / pronounced sleep disturbance, considerably longer latency or marked difficulty staying asleep, 90 min to 3 hrs loss of sleep

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating

Criterion F: Duration of the disturbance (Criteria B, C, D, and E) is more than 1 month.

21. Onset of symptoms
[If not clear:] When did you first start having (PTSD SYMPTOMS) you’ve told me about? (How long after the trauma did they start? More than six months?)

22. Duration of symptoms
[If not clear:] How long have these (PTSD SYMPTOMS) lasted altogether?
Total # months delay in onset __________
With delayed onset (> 6 months)? NO YES
Total # months duration __________
Duration more than 1 month? NO YES
Criterion G: The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

23. Subjective distress

Overall, in the past month, how much have you been bothered by these (PTSD SYMPTOMS) you’ve told me about?

[Consider distress reported on earlier items]

0 None
1 Mild, minimal distress
2 Moderate, distress clearly present but still manageable
3 Severe, considerable distress
4 Extreme, incapacitating distress

24. Impairment in social functioning

In the past month, have these (PTSD SYMPTOMS) affected your relationships with other people? How so?

[Consider impairment in social functioning reported on earlier items]

0 No adverse impact
1 Mild impact, minimal impairment in social functioning
2 Moderate impact, definite impairment but many aspects of social functioning still intact
3 Severe impact, marked impairment, few aspects of social functioning still intact
4 Extreme impact, little or no social functioning

25. Impairment in occupational or other important area of functioning

[If not clear:] Are you working now?
[If yes:] In the past month, have these (PTSD SYMPTOMS) affected your work or your ability to work? How so?

[Consider reported work history, including number and duration of jobs, as well as the quality of work relationships. If premorbid functioning is unclear, inquire about work experiences before the trauma. For child/adolescent trauma, assess pre-trauma school performance and possible presence of behavior problems]

[If no:] Have these (PTSD SYMPTOMS) affected any other important part of your life?

[As appropriate, suggest examples such as parenting, housework, schoolwork, volunteer work, etc.]

How so?

0 No adverse impact
1 Mild impact, minimal impairment in occupational/other important functioning
2 Moderate impact, definite impairment but many aspects of occupational/other important functioning still intact
3 Severe impact, marked impairment, few aspects of occupational/other important functioning still intact
4 Extreme impact, little or no occupational/other important functioning

Global Ratings

26. Global validity
Estimate the overall validity of responses. Consider factors such as compliance with the interview, mental status (e.g., problems with concentration, comprehension of items, dissociation), and evidence of efforts to exaggerate or minimize symptoms.

0 Excellent, no reason to suspect invalid responses
1 Good, factors present that may adversely affect validity
2 Fair, factors present that definitely reduce validity
3 Poor, substantially reduced validity
4 Invalid responses, severely impaired mental status or possible deliberate “faking bad” or “faking good”

27. Global severity
Estimate the overall severity of PTSD symptoms. Consider degree of subjective distress, degree of functional impairment, observations of behaviors in interview, and judgment regarding reporting style.

0 No clinically significant symptoms, no distress and no functional impairment
1 Mild, minimal distress or functional impairment
2 Moderate, definite distress or functional impairment but functions satisfactorily with effort
3 Severe, considerable distress or functional impairment, limited functioning even with effort
4 Extreme, marked distress or marked impairment in two or more major areas of functioning

28. Global improvement
Rate total overall improvement since the previous rating. Rate the degree of change, whether or not, in your judgment, it is due to treatment.

0 Asymptomatic
1 Considerable improvement
2 Moderate improvement
3 Slight improvement
4 No improvement
5 Insufficient information
Specify whether with dissociative symptoms: The individual’s symptoms meet the criteria for posttraumatic stress disorder, and in addition, in response to the stressor, the individual experiences persistent or recurrent symptoms of either of the following:

29. (1) Depersonalization: Persistent or recurrent experiences of feeling detached from, and as if one were an outside observer of, one’s mental processes or body (e.g., feeling as though one were in a dream; feeling a sense of unreality of self or body or of time moving slowly).

In the past month, have there been times when you felt as if you were separated from yourself, like you were watching yourself from the outside or observing your thoughts and feelings as if you were another person?

[If no:] (What about feeling as if you were in a dream, even though you were awake? Feeling as if something about you wasn’t real? Feeling as if time was moving more slowly?)

Tell me more about that.

How strong is this feeling? (Do you lose track of where you actually are or what’s actually going on?)

What do you do while this is happening? (Do other people notice your behavior? What do they say?)

How long does it last?

Circle: Dissociation = Minimal Clearly Present Pronounced Extreme

[If not clear:] (Was this due to the effects of alcohol or drugs? What about a medical condition like seizures?)

[Rate 0=Absent if due to the effects of a substance or another medical condition]

How often has this happened in the past month?

# of times _________

Key rating dimensions = frequency / intensity of dissociation
Moderate = at least 2 X month / dissociative quality clearly present but transient, retains some realistic sense of self and awareness of environment
Severe = at least 2 X week / pronounced dissociative quality, marked sense of detachment and unreality

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating
30. (2) Derealization: Persistent or recurrent experiences of unreality of surroundings (e.g., the world around the individual is experienced as unreal, dreamlike, distant, or distorted).
In the past month, have there been times when things going on around you seemed unreal or very strange and unfamiliar?

[If no:]
(Do things going on around you seem like a dream or like a scene from a movie? Do they seem distant or distorted?)
Tell me more about that.

How strong is this feeling? (Do you lose track of where you actually are or what’s actually going on?)

What do you do while this is happening? (Do other people notice your behavior? What do they say?)

How long does it last?

Circle: Dissociation = Minimal Clearly Present Pronounced Extreme

[If not clear:] (Was this due to the effects of alcohol or drugs? What about a medical condition like seizures?)
[Rate 0=Absent if due to the effects of a substance or another medical condition]

How often has this happened in the past month?
# of times __________

Key rating dimensions = frequency / intensity of dissociation
Moderate = at least 2 X month / dissociative quality clearly present but transient, retains some realistic sense of environment
Severe = at least 2 X week / pronounced dissociative quality, marked sense of unreality

0 Absent
1 Mild / subthreshold
2 Moderate / threshold
3 Severe / markedly elevated
4 Extreme / incapacitating
Momentary Assessment

Indicate the extent you feel this **right now** on a scale from 1 (very slightly or not at all) to 5 (extremely).

1. **Right now**, I feel interested
2. **Right now**, I feel distressed
3. **Right now**, I feel excited
4. **Right now**, I feel upset
5. **Right now**, I feel strong
6. **Right now**, I feel guilty
7. **Right now**, I feel scared
8. **Right now**, I feel hostile
9. **Right now**, I feel enthusiastic
10. **Right now**, I feel proud
11. **Right now**, I feel irritable
12. **Right now**, I feel alert
13. **Right now**, I feel ashamed
14. **Right now**, I feel inspired
15. **Right now**, I feel nervous
16. **Right now**, I feel determined
17. **Right now**, I feel attentive
18. **Right now**, I feel jittery
19. **Right now**, I feel active
20. **Right now**, I feel afraid
21. Right now I am alone? Yes or No

[If yes, only answer 22, 23, & 24]

[If no, only answer 25, 26, & 27]

22. I am alone because people do not want to be with me? Yes or No

23. Right now, I feel lonely (rated on the same 1 to 5 scale)

24. Right now, I prefer to be with people (rated on the same 1 to 5 scale)

25. I feel close to this person (these people) (rated on the same 1 to 5 scale)

26. Right now, I feel lonely (rated on the same 1 to 5 scale)

27. Right now, I prefer to be alone (rated on the same 1 to 5 scale)
Nightly Assessment (including PTSD symptoms)

Indicate the extent you feel this right now on a scale from 1 (very slightly or not at all) to 5 (extremely).

1. Right now, I feel interested
2. Right now, I feel distressed
3. Right now, I feel excited
4. Right now, I feel upset
5. Right now, I feel strong
6. Right now, I feel guilty
7. Right now, I feel scared
8. Right now, I feel hostile
9. Right now, I feel enthusiastic
10. Right now, I feel proud
11. Right now, I feel irritable
12. Right now, I feel alert
13. Right now, I feel ashamed
14. Right now, I feel inspired
15. Right now, I feel nervous
16. Right now, I feel determined
17. Right now, I feel attentive
18. Right now, I feel jittery
19. Right now, I feel active
20. Right now, I feel afraid
21. Right now I am alone? Yes or No

[If yes, only answer 22, 23, & 24]

[If no, only answer 25, 26, & 27]

22. I am alone because people do not want to be with me? Yes or No

23. Right now, I feel lonely (rated on the same 1 to 5 scale)

24. Right now, I prefer to be with people (rated on the same 1 to 5 scale)

25. I feel close to this person (these people) (rated on the same 1 to 5 scale)

26. Right now, I feel lonely (rated on the same 1 to 5 scale)

27. Right now, I prefer to be alone (rated on the same 1 to 5 scale)

Now, please rate how much you were bothered by each symptom in the past 24 hours, on a scale from 0 (not at all) to 4 (quite a bit)

1. Repeated, disturbing, and unwanted memories of the stressful experience?

2. Repeated, disturbing dreams of the stressful experience?

3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?

4. Feeling very upset when something reminded you of the stressful experience?
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?

6. Avoiding memories, thoughts, or feelings related to the stressful experience?

7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?

8. Trouble remembering important parts of the stressful experience?

9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?

10. Blaming yourself or someone else for the stressful experience or what happened after it?

11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?

12. Loss of interest in activities that you used to enjoy?

13. Feeling distant or cut off from other people?
14. Trouble experiencing positive feelings *(for example, being unable to feel happiness or have loving feelings for people close to you)*?

15. Irritable behavior, angry outbursts, or acting aggressively?

16. Taking too many risks or doing things that could cause you harm?

17. Being “superalert” or watchful or on guard?

18. Feeling jumpy or easily startled?

19. Having difficulty concentrating?

20. Trouble falling or staying asleep?

If you missed answering any of the questionnaires today, please briefly explain why: _________

*This is a reminder to upload all your survey responses to the app*
Demographics Questionnaire

We would like to ask you some questions about yourself. Please answer the following questions as accurately as possible.

1. What gender do you identify with?
   
   A. Male
   
   B. Female
   
   C. Other

2. What race do you identify as?
   
   A. White
   
   B. Black or African American
   
   C. American Indian or Alaska Native
   
   D. Asian
   
   E. Native Hawaiian or Other Pacific Islander

3. What ethnicity do you identify as?
   
   A. Hispanic
   
   B. Non-Hispanic

4. What is your partnership status?
   
   1 = Single
   
   2 = Married
5. What is your age? __________

6. What is the highest year of college you have completed?
   A. None, I am a Freshman
   B. 1 year (I am a Sophomore)
   C. 2 years (I am a Junior)
   D. 3 years (I am a Senior)
   E. 4+ Years

7. Do you have children?
   A. Yes
   B. No

8. If you answered yes to question 7, how many children do you have?
   _______________________

9. If you answered yes to question 7, are they all living with you right now?
   _______________________

3 = Divorced
4 = Separated
5 = Remarried
6 = Widowed
10. If you answered no to question 9, how many of your children are not residing with you?

_________________________

11. Are you currently employed?

Yes

No
APPENDIX B

RECRUITMENT EMAIL
Hello,

Your participation in mass testing makes you eligible to participate in the “Daily Life Experiences” study. This experiment looks at the daily life experiences of college students. For this study, you will be asked to answer simple, two-minute questionnaires on your smart phone for one week. You will receive 8 SONA credits for participating in addition to be entered into a drawing for one of two $50 Amazon gift cards. If you are interested in participating, please reply to this email and I will provide you with the key to sign up for a session on SONA.

Thank you for your interest and I hope to see you in the study!

Alyssa Mielock

Email: lillylabniu@gmail.com
Phone: 815-753-0372
APPENDIX C

INFORMED CONSENT
Informed Consent

You are being asked to take part in the study entitled, “Daily Life Experiences.” The purpose of the study is to examine how experiences throughout the day may impact mental health in young adults. Another goal of the study is to examine the impact of social experiences on mood and feelings in the moment. Findings from the study may allow for better understanding as to what causes negative feelings and mental health distress.

We anticipate that this lab session will take approximately 1-1.5 hours to complete today. First, you will be asked to complete a set of questionnaires that should take approximately 15 minutes to complete. Then, you will complete a structured interview with a graduate student that should take about 30-45 minutes. Lastly, you will download an app onto your smartphone, complete a practice questionnaire, and be instructed about completing the daily questionnaires on your phone for the next seven days. This is the only time you will have to come in person for the study. After this session today, everything else will be completed on your phone within the app you will download later. After completion of the daily surveys, you will receive 8 credits toward the PSYC 102 course credit.

You should also be aware that you will be asked questions in the structured interviews and questionnaires that may be sensitive. These questions may ask about your current mental health functioning, exposure to previous distressing events, and how you are coping with distress. You are free to skip questions as needed and may withdraw from the study at any time. The structured interview will be audio recorded so that the experimenter can listen to a selection and ensure accuracy in reporting. There will be no identifying information that is recorded, you will only be known as a participant number. All audio recordings will be permanently deleted two months after data collection is completed.

Following the completion of this session, the rest of the study will be collected on your phone. You will download an app (ilumivu) and receive notifications within the app to complete questionnaires throughout the day for a total of seven days. You will receive 8 notifications randomly every day between the times of 8am and 10pm. While it is understood that you may
not be able to complete every questionnaire, we ask that you complete as many as possible. For each day you complete at least 6 of the 8 questionnaires, your name will be entered into a drawing for one of two $50 Amazon gift cards that will be chosen at the end of the semester. These questionnaires take about 2 minutes to complete and ask about current mood and social interactions. You must begin the survey within 10 minutes of receiving the notification. If you do not complete the survey in time, you will have missed the opportunity to do that time point. In order to most accurately capture mood and experiences in the moment, it is important that you respond to these questionnaires with how you are feeling and what you are doing at that time. Each evening, you will complete a slightly longer survey (approximately 10 minutes to complete) that will ask about different distressing symptoms that you may have experienced that day. These symptoms are related to the distressing event that you will discuss with the graduate student. In the morning, you will be asked about sleep and use of substances (alcohol and other) from the previous day. These responses are kept completely confidential, no one can link your name to your responses and results will be investigating the sample as a whole compared and not individual responses.

Potential Risks:
You will be asked about some experiences and feelings that may be difficult or uncomfortable to discuss. Some of the questionnaires will ask you to recall potentially distressing events that you have experienced, as well as assess aspects of your mental health functioning. Answering questions about some of these events and experiences may be uncomfortable. If you feel distressed, you can stop at any point. You are also free to skip any questions that you do not wish to answer. Withdrawal from the present study will not affect your relationship with the researchers, PSYC 102 instructors, or NIU in any way. A list of nationwide hotlines, as well as a list of resources local to DeKalb, have been included at the bottom of this page. If you experience distress associated with your participation in this study, it is recommended by the researchers to follow up with one of these resources.

All of the information that you provide as a part of this study will be confidential to the full extent of the law, and accessible only to research project staff for research purposes. All data will
be password protected and stored in a private office. Once analyzed, your data will be encrypted. Though results from this study may be published, you will not be personally identified in any reports or publications that may result from this study.

If you feel upset during or after the study, please ask to speak with the experimenter. At the end of the study, you will be provided with other phone numbers of agencies in the DeKalb area that provide counseling. You will be provided with Dr. Michelle Lilly’s, the experimenter, phone number and she can be reached during standard business hours.

Any further information about the experiment may be obtained by contacting Dr. Michelle Lilly or Alyssa Mielock, Department of Psychology, Northern Illinois University, at (815) 753-0372. If you have questions about your rights as a research participant, please contact the NIU Office of Research Compliance, (815) 753-8588.

You realize that Northern Illinois University policy does not provide for compensation for, nor does the University carry insurance to cover injury or illness incurred as a result of participation in University sponsored research projects.

You understand that your consent to participate in this project does not constitute a waiver of any legal rights or redress you might have as a result of your participation, and you acknowledge that you have received a copy of this consent form.

I have read the above statements. I understand the purpose of the study and have been given the chance to ask questions and express concerns about the research project. I understand that I can withdraw from the study at any time for any reason. I understand that Northern Illinois University does not provide compensation for treatment of injuries that may occur as a result of participation in this research. I give my informed consent to be a participant in this study. I have been given a copy of the consent form.
Video and audio taping: As described above, the structured interview conducted with the graduate student will be audio recorded to ensure accuracy. Audio recorded interviews will not be identifiable by name and will be stored on a password protected server. All recorded interviews will be permanently deleted within two months of recording.

I have read the above statements. I have been given the chance to ask questions and express concerns about the taping. All my questions about taping have been answered. I understand that I take part in this study of my own free will. I understand that I can stop at any time for any reason and that I have a choice not to take part in the taping.
To Whom It May Concern:

I am providing this letter to make you aware that your student/employee has agreed to participate in a week-long research project through the Department of Psychology at Northern Illinois University. [Insert name of participant]’s participation in this study started on _________ and will end on _________.

As part of this study, I have asked all participants to carry their smart cell phone with them everywhere they go throughout this week. The phone will receive a notification randomly eight times each day between 8am and midnight to answer a brief (2-3 minute) questionnaire. These questionnaires will provide us a great deal of important scientific information in at least two ways: 1) we will learn more about how college students are feeling and thinking in a number of different situations; and 2) by utilizing these questionnaires sent to the smartphones, participants will be recording information on the spot, instead of later when they may have forgotten some of the details.

We have provided this letter to all participants in the event that the text messages sent to their smartphones create a disturbance. In the event that a disturbance occurs, I ask for your patience and understanding. If carrying this smartphone is not acceptable, please inform the student. The student will not be penalized for missing one of the recordings, though we hope to gather as much in-the-moment data as possible over the course of the student’s participation. Thank you for your attention to this matter.

Sincerely,

Alyssa Mielock
amilock1@students.niu.edu
Doctoral Clinical Psychology Student
Northern Illinois University
APPENDIX E

DEBRIEFING AFTER THE FIRST SESSION
Debriefing After the First Session

Thank you for your participation in the first session. We appreciate your time and willingness to take part in this research. This project is examining how daily life experiences can impact mental health in young adults. This is one of the first studies to examine this relationship across time. The rest of the data collection will be on your phone within the ilumivu app. If you have any questions or problems about the study throughout the next week, please contact the research staff at lillylabniu@gmail.com.

It is possible that the material you provide may elicit some distressing thoughts, feelings, or memories for you. If you need immediate assistance, please call the 24-hour Crisis Line (815) 758-6655. If you feel like you are distressed and need help, please either visit a psychological or counseling center (see attached Mental Health resources in the surrounding area). Additionally, the National Suicide Prevention Lifeline phone number is: 1-800-273-8255. The National Domestic Violence Hotline is: 1-800-799-SAFE (7233). We encourage you to print the current and next pages in the event that you would like to access these resources at a later time.

Thank you for your participation!
APPENDIX F

MENTAL HEALTH RESOURCES
Mental Health Resources
(provided with the informed consent and the debriefings)

Campus Services

Counseling & Consultation Services, NIU (STUDENTS ONLY) (The Counseling and Student Development Center - CSDC)

- Phone: 815/753-1206
- Address: Campus Life Building-200
- Fees: None for counseling. Modest testing fees.
- Hours: 8:00 a.m. – 4:30 p.m. Monday-Friday
- Open whenever NIU is open, including breaks.
- After Hours: Assistance after hours available by calling—815/753-1212

Description of Services: This service provides students with short-term, individual and group counseling for a broad range of personal concerns. Career counseling services include interest assessment, workshops, and use of computerized career counseling programs. Educational counseling services include assistance with test anxiety and study skills. Assessments of drug and alcohol abuse are also provided. First appointment scheduled with 3-7 days. (Handicapped Accessible).

Community Counseling Training Center, NIU (formerly The Counseling Laboratory)

- Phone: 815/753-9312
- Address: 416 Graham Hall
- Fees: None for students, faculty, or staff.
- Hours: Call for available counseling hours.
• Description of Services: A wide range of services are offered by the counselors including both personal and vocational counseling. In general, the approach used is one that promotes growth and focuses on increasing emotional well-being and self-awareness. All counselors are doctoral or masters level students who are being supervised by members of the counseling faculty. First appointments scheduled within 3-5 days.

The Couple and Family Therapy Clinic of NIU, NIU (formerly The Family Therapy Clinic)

• Phone: 815-753-1684

• Address: Wirtz Hall 146

• Fees: The cost of services are determined by a sliding fee scale. No client is turned away due to the inability to pay. This gives clients of all income levels access to our high-quality care.

• Hours: Monday, Tuesday – 12 noon – 9:00 pm; Wednesday, Thursday - 9:00 am - 9:00pm; Friday - 9:00 am - 5:00 pm

• Website: http://www.chhs.niu.edu/familytherapyclinic/contact/index.shtml

• Description of Services: The Couple and Family Therapy Clinic at NIU is a training and research facility that is an integral component of the specialization in Marriage and Family Therapy Program (SMFT). They provide clinical services to individuals, couples, and families with a unique perspective of addressing the issues in a larger systemic context. They follow rigorous training standards as set forth by our accrediting organization, being accredited by the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE).

Psychological Services Center, NIU

• Phone: 815/753-0591

• Address: Normal Rd and Lincoln Hwy.
• Fees: No fee for therapy for students; fee for assessments for students. Faculty, staff, and community members charged on a sliding scale.

• Hours: Monday – 11:00 a.m. – 7:00 p.m. Tuesday – 12:00 noon – 8:00 p.m. Wednesday-Friday-9:00 a.m. to 5:00 p.m.

• Open whenever NIU is open, including breaks.

• Description of Services: Individual, couples, family, and group psychotherapy, intellectual, personality, and academic assessments. Clients are generally seen by advanced level graduate student staff under faculty supervision. Services are tailored to meet a client's specific needs. First appointment scheduled within 7 days. (Handicapped accessible.)

**Community Resources**

**KishHealth System Behavioral Health Services (formerly Ben Gordon Center)**

• Phone: 815/756-4875

• Address: 12 Health Services Dr., DeKalb, IL 60115

• Fees: Sliding fee scales based on income. Insurance accepted.

• Hours: Monday-Thursday- 8:00 a.m. – 8:30 p.m. Friday-8:00 a.m.-5:00 p.m.

• After Hours: 815/758-6655 Crisis Line

• Description of Services: Comprehensive counseling services to all residents of DeKalb County. Services to all persons affected by mental health problems, substance abuse, and family/child welfare concerns. 24-hour sexual assault/abuse services can be accessed through the Crisis Line. First appointment scheduled within 30 days. (Handicapped accessible and on Campus Bus Route).
Braden Counseling Center

- Phone: 815/787-9000
- Address: 2580 DeKalb Ave., Suite C., Sycamore, IL 60178
- 951 S. 7th St., Suite G., Rochelle, IL 60168
- Fees: Sliding fee scales based on income. Insurance accepted.
- Description of Services: Free initial consultation. Specializes in counseling individuals, couples and families in various stages of life. Has flexible scheduling with Sycamore and Rochelle locations. Also offers a variety of evaluations, including same-day DUI evaluations, and legal and forensic work for attorneys.

Village Counseling

- Phone: 815/756-9907
- Address: 1211 Sycamore Rd., DeKalb, IL 60115
- Fees: Sliding fee scales based on income. Insurance accepted.
- Hours: Monday-9:00 a.m.-10:00 p.m., Wednesday/Thursday-9:00 a.m.-9:00 p.m., Friday-10:00 a.m.-10:00 p.m.
- Description of Services: Provides relationship-centered counseling, including life counseling for individuals, couples, families, adolescents, and children, as well as marriage and family counseling.

Family Service Agency, Center for Counseling

- Phone: 815/758-8616
- Address: 14 Health Services Dr.-DeKalb
- Fees: $75.00 per visit. Insurance accepted, including NIU Student Insurance. Payment plans and scholarship funds available.
- Hours: Monday-Wednesday-9:00 a.m. – 8:00 p.m., Thursday – Friday – 8:00 a.m. – 4:00 p.m. Additional hours available by appointment.

- Description of Services: Individual, couple, group counseling for children, adults, senior citizens, and families. First appointment scheduled within 1-7 days. (Handicapped accessible and on Campus Bus Route).

**Living Rite, The Center for Behavioral Medicine.**

- Phone: 815-758-8400
- Address: 1958 Aberdeen Court, Suite 2, Sycamore, IL 60178
- Fees: Based on insurance. Self-pay options are available.
- Description of Services: Individual and Group Therapy. Therapy to deal with chronic pain.

**Safe Passage, Inc.**

- Phone: 815-756-7930
- Hotline/Crisis: 815-756-5228
- Address: P.O. Box 621, DeKalb, IL 60115
- Description of Services: A wide variety of services are offered to victims and perpetrators of domestic and sexual violence including crisis intervention and medical advocacy for victims of domestic and sexual violence, short- and long-term housing for victims and their children, counseling, legal advocacy, children's services, community education, a batterer's intervention program, and a Latina outreach program.
Nationwide Resources

People Against Rape (PAR; 1-800-877-7252)

Rape, Abuse, Incest National Network (RAINN; 1-800-656-4673; http://www.rainn.org/)

Suicide Prevention Hotline (1-800-273-8255, http://www.suicidepreventionlifeline.org/)

   National Alliance on Mental Illness (NAMI; 1-800-950-6264; http://www.nami.org/)
APPENDIX G

MID-WEEK EMAIL
Hello,

Thank you for participating in the “Daily Life Experiences” study! It is extremely important that you complete as many questionnaires as you can each day. Also, remember that for every day you complete at least 6 of the 8 questionnaires, you earn another entry for one of two $50 Amazon gift cards!

Please let me know if you have any problems receiving notifications within the app, completing the questionnaires, or uploading the responses each night.

Feel free to contact me if you have any questions. Please leave a message if no one answers the phone and someone will be in contact with you as soon as possible.

**Please respond to this email within 24 hours indicating that you received and read it.**

Thank you again for participating in this research study,

Alyssa Mielock

Email: lillylabniu@gmail.com

Phone: 815-753-0372
APPENDIX

DEBRIEFING AFTER STUDY COMPLETION
Debriefing After Study Completion

Thank you for your participation. We appreciate your time and willingness to take part in this research. This project is examining how daily life experiences can impact mental health in young adults. Specifically, we are interested in understanding whether social interactions predict mood changes and whether this will impact mental health functioning. This is one of the first studies to examine this relationship across time.

It is possible that the material you provided throughout this study may have elicited some distressing thoughts, feelings, or memories for you. If you need immediate assistance, please call the 24-hour Crisis Line (815) 758-6655. If you feel like you are distressed and need help, please either visit a psychological or counseling center (see attached Mental Health resources in the surrounding area). Additionally, the National Suicide Prevention Lifeline phone number is: 1-800-273-8255. The National Domestic Violence Hotline is: 1-800-799-SAFE (7233). We encourage you to print the current and next pages in the event that you would like to access these resources at a later time.

If you would like to meet with a member of the research staff to discuss the study and receive this debriefing in person, please respond to this email and we will set a meeting with you this week.

If you have any questions about the study or what you were asked, please feel free to contact Michelle Lilly at (815) 753-0372 or lillylabniu@gmail.com.

Thank you for your participation!
APPENDIX I

EQUATIONS
The variables in the following equations represent the following constructs: $PTSS = PTSD$ symptom severity total score, $NA = momentary$ negative affect, $SS = momentary$ social stress, $SS (day \ t - 1) = momentary$ social stress score at the prior assessment.

1. Overall social stress ratings for each participant, measured as the average of social stress ratings across all assessments, will be associated with increased $PTSS$, measured as the average $PTSS$ score across all reports.

$$PTSS_i = \beta_0 + \beta_1(SS)$$

2. Daily measures (level 1) clustered within persons (level 2), participant’s social stress, measured the average of social stress ratings across the day, will be positively associated with $PTSS$ that same night.

Null Model:

Level 1: $PTSS = \pi_{0i} + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + r_{0i}$

Alternative Model:

Level 1: $PTSS = \pi_{0i} + \pi_{1i}(SS) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + r_{0i}$

$$\pi_{1i} = \beta_{10}$$

3. Hourly measures (level 1) clustered within persons (level 2), participant’s social stress in the moment will be positively associated with $NA$ at the same assessment.
Null Model:

Level 1: \( NA = \pi_{0i} + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)

Alternative Model:

Level 1: \( NA = \pi_{0i} + \pi_{1i}(SS) + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)

\[ \pi_{1i} = \beta_{10} \]

4. Hourly measures (level 1) clustered within persons (level 2), participant’s social stress in the moment will be positively associated with NA at the next assessment (i.e., within the next 1.5 hours).

Null Model:

Level 1: \( NA = \pi_{0i} + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)

Alternative Model:

Level 1: \( NA = \pi_{0i} + \pi_{1i}(SS[\text{day } t - 1]) + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)

\[ \pi_{1i} = \beta_{10} \]
5. Daily measures (level 1) clustered within persons (level 2), participant’s NA, measured as the average NA ratings across the day, will be positively associated with PTSS that same night.

Null Model:

Level 1: \( PTSS = \pi_{0i} + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)

Alternative Model:

Level 1: \( PTSS = \pi_{0i} + \pi_{1i}(NA) + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)

\( \pi_{1i} = \beta_{10} \)

6. There will be an indirect effect of social stress on PTSS, as mediated by NA. NA, as measured as the average NA score across the day, may be one mechanism by which social stress, measured as the average social stress rating across the day, will be positively associated with PTSS, measured as the total symptom score that same evening.

Path A: Daily measures (level 1) clustered within persons (level 2), social stress, measured as the daily average score, will be positively associated with NA, measured as the average daily ratings.

Null Model:

Level 1: \( NA = \pi_{0i} + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)

Alternative Model:
Level 1: \( NA = \pi_{0i} + \pi_{1i}(SS) + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)

\( \pi_{1i} = \beta_{10} \)

Path B: Daily measures (level 1) clustered within persons (level 2), NA, measured as the average daily rating, will be positively associated with PTSS, measured as the total sum score.

Null Model:

Level 1: \( PTSS = \pi_{0i} + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)

Alternative Model:

Level 1: \( PTSS = \pi_{0i} + \pi_{1i}(NA) + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)

\( \pi_{1i} = \beta_{10} \)

Research Question: Daily measures (level 1) clustered within persons (level 2), it is hypothesized that affect variability, measured as the variability within affect ratings across the day, will be positively associated with PTSS, measured as the total PTSD symptom score that day.

Null Model:

Level 1: \( PTSS = \pi_{0i} + e_{ti} \)

Level 2: \( \pi_{0i} = \beta_{00} + r_{0i} \)
Alternative Model:

Level 1: $PTSS = \pi_{0i} + \pi_{1i} \text{var}(NA) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + r_{0i}$

$\pi_{1i} = \beta_{10}$