Connections between polyvictimization, daily stress, emotion regulation, and mental health symptoms: An ecological momentary assessment study.

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CONNECTIONS BETWEEN POLYVICTIMIZATION, DAILY STRESS, EMOTION REGULATION, AND MENTAL HEALTH SYMPTOMS: AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY

By

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B.A. Swarthmore College, 2009
M.P.S. University of Maryland, College Park, 2017

A Dissertation
Submitted to the Faculty of the
College of Arts and Sciences at the University of Louisville
in Partial Fulfillment of the Requirements
for the Degree of

Doctor of Philosophy
in Clinical Psychology

Department of Psychological & Brain Sciences
University of Louisville
Louisville, Kentucky

December 2023
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July 25, 2023

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DEDICATION

For my mother, Mellena D. Bridges, M.D.
ACKNOWLEDGMENTS

This dissertation would not have been possible without the community who supported me at every stage of my graduate training. To my mentor, Dr. Tamara Newton, thank you for your guidance and for believing in me, despite my circuitous path to graduate school. Thanks also go to my committee members – Drs. Sara Bufferd, Richard Lewine, and Amanda Mitchell – for your time, feedback, and encouragement. To Drs. Cheri Levinson, Konrad Bresin, and Yara Mekawi, thank you for sharing your time and professional advice so generously, particularly during the postdoc application process. I have learned so much from all of you. I would also like to express my appreciation for the University of Louisville students who participated in this study.

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ABSTRACT

CONNECTIONS BETWEEN POLYVICTIMIZATION, DAILY STRESS, EMOTION REGULATION, AND MENTAL HEALTH SYMPTOMS: AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY

Zoe Bridges-Curry

July 25, 2023

Background and Objectives: Individuals who experience polyvictimization, or victimization across multiple life contexts, evidence particularly severe outcomes across a range of mental health diagnoses. Preliminary evidence suggests that emotion regulation difficulties and stress sensitization effects may help explain observed links between trauma exposure and mental health symptoms. However, the use of between-subjects designs to address within-subjects processes – a common approach across this literature – can result in erroneous interpretation of findings. Moreover, widespread reliance on retrospective trait measures of emotion regulation, daily stressors, and mental health symptoms have limited insight into the ways that these processes unfold in daily life.

Research Design and Methods: The current study used ecological momentary assessment (EMA) to assess relationships between trauma exposure, daily stressors, state perceived stress, emotion regulation, and mental health symptoms in an undergraduate sample ($N = 122$), with EMA surveys delivered via smartphone over a two-week period.
Results: As expected, polyvictimization independently predicted reduced state adaptive strategy use after accounting for baseline mental health symptoms. However, polyvictimization did not predict state maladaptive strategy use or dysregulation when controlling for the effects of baseline mental health symptoms. Contrary to my hypotheses and the stress sensitization framework, polyvictimimized individuals did not show reduced capacity to cope with proximal stressors as indicated by increased perceived stress, maladaptive strategy use, or emotion dysregulation. Additionally, results of mediation analyses indicated that there was no indirect effect of polyvictimization on state mental health symptoms via state emotion regulation. Self-monitoring effects were evident for certain groups, with female participants reporting a decrease in mental health symptoms and emotion dysregulation over the EMA period. In contrast, men reported an increase in mental health symptoms and emotion dysregulation from pre- to post-EMA. In terms of emotion regulation strategies, polyvictimimized individuals showed a slight decrease in rumination from baseline to follow-up.

Discussion and Implications: Prior cross-sectional research using trait measures of emotion regulation has implicated emotion regulation difficulties as a proximal risk factor for mental health symptoms for polyvictimimized individuals. The current findings are not entirely consistent with this view, suggesting that mental health symptoms may be a stronger predictor of emotion regulation problems than trauma exposure. Additionally, results add to a growing literature indicating that the use of emotion regulation strategies does not guarantee their efficacy – underscoring the need for methodologies that account for the complexities of the emotion regulation process and relevant contextual factors.
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INTRODUCTION AND LITERATURE REVIEW

Introduction

The experience of traumatic events is quite prevalent, with nearly 90% of adults in the United States reporting exposure to at least one Criterion A event as defined by the Diagnostic and Statistical Manual, Fifth Edition (American Psychiatric Association, 2013; Kilpatrick et al., 2013). Significant resources have been devoted to identifying the mental health sequelae of these experiences. This literature has clearly established links between trauma exposure and a wide range of psychosocial outcomes (e.g., Green et al., 2010). However, not everyone who experiences a traumatic event goes on to develop mental health problems (Bonanno & Burton, 2013; Galatzer-Levy et al., 2018; Gradus, 2007), nor do they experience these problems at the same level of severity (Agorastos et al., 2014; Cloitre et al., 2009; Cyr et al., 2017; Marchese et al., 2022; Steenkamp et al., 2012) – spurring efforts to identify those trauma-exposed individuals at the highest risk of deleterious outcomes.

One consistent finding has been that increased exposure to traumatic events (i.e., cumulative trauma) confers increased risk, often demonstrating a dose-response relationship with mental health outcomes (Agorastos et al., 2014). Individuals who experience polyvictimization, or victimization across multiple life contexts (Turner et al.,
evidence particularly severe outcomes across a range of mental health diagnoses (Haahr-Pedersen et al., 2020). This finding has significant implications for pinpointing the highest risk individuals. However, prevention and intervention efforts have been hampered by enduring gaps in knowledge about the factors that might account for the relationship between polyvictimization and mental health problems.

Using a well-established heuristic for developing and testing transdiagnostic models, the proposed study situates emotion regulation problems as a risk factor linking polyvictimization with mental health symptoms. Prior research in this area has consistently demonstrated associations between trauma exposure, emotion regulation, and symptomatology. However, the use of between-subjects designs to address within-subjects processes – a common approach across this literature – can result in erroneous interpretation of findings, underscoring the need for research that disaggregates between- and within-subjects effects (e.g., Charness et al., 2012; Curran & Bauer, 2011; Subramanian et al., 2009). Further limiting insight into the ways that these processes unfold in daily life, prior studies have often relied on retrospective trait measures of emotion regulation and retrospective measures of mental health symptoms. Thus, this promising area of research has yet to realize its potential for understanding and improving outcomes for trauma-exposed individuals.

**Literature Review**

**Polyvictimization**

**Quantifying Trauma Exposure**

Working within a cumulative risk perspective, polyvictimization has been defined as the experience of multiple types of trauma exposure, specifically across multiple life
contexts (Turner et al., 2016). When operationalized as the experience of five or more types of lifetime victimization, polyvictimization appears to be relatively common, affecting 30% of children and adolescents in a national sample in the United States (Turner et al., 2010). A variety of approaches have been used to operationalize and identify polyvictimization in prior research, using *a priori* cut-offs (e.g., 4 or more types experienced; Finkelhor et al., 2007c), top 10% of sample in terms of number of victimizations (Finkelhor, Ormrod, & Turner, 2009), or through mixture modeling methods designed to identify subgroups empirically (e.g., Reid & Sullivan, 2009).

Despite this methodological heterogeneity, a recent comparison of polyvictimization studies found that these approaches consistently yielded a subgroup of youth more likely to experience all types of victimization than their peers (Segura et al., 2018). Relatively little is known about the prevalence of polyvictimization among U.S. adults, and observed rates in other countries have varied widely (Cénat et al., 2021; Lippus et al., 2020; Pinto-Cortez et al., 2021).

The polyvictimization framework draws on evidence that distinct victimization experiences tend to ‘cluster’ or co-occur (Hamby et al., 2010, 2012; Radford et al., 2013). To explain this phenomenon, a number of risk factors for polyvictimization have been identified, including living in dangerous family and community contexts and psychological or behavioral factors that may increase the likelihood of subsequent victimization experiences (Finkelhor et al., 2007a; Le et al., 2015; Reid & Sullivan, 2009; Riley et al., 2020; Turner et al., 2013). Cross-sectional and longitudinal research in child and adolescent samples has found significant support for psychopathology as a risk factor for subsequent polyvictimization and re-victimization (Cuevas et al., 2008, 2010; Turner
et al., 2010a). Youth with co-occurring internalizing and externalizing symptoms appear to be at particularly high risk for polyvictimization, even after accounting for prior victimization experiences (Turner et al., 2010a).

To explain these findings, polyvictimization researchers have posited that behavioral patterns related to psychological distress may contribute to social isolation, antagonize adults and/or peers, and increase the odds that an individual will be viewed as vulnerable – heightening risk for victimization across multiple contexts by (Tanksley et al., 2020; Turner et al., 2010a). Consistent with this view, Finkelhor et al. (2007a) found that while living in a violent family context was associated with the onset of polyvictimization, anger and aggression predicted persistence of polyvictimization over time. Similarly, in a longitudinal twin study, Tanksley and colleagues (2020) found that self-control significantly predicted polyvictimization after accounting for genetic factors and family environment.

The salience of proposed risk factors for victimization across contexts may vary with age. For example, emotional problems have been found to increase risk of polyvictimization for younger children, while deleterious familial and community contexts appear to be more salient risk factors for older children (Finkelhor, Ormrod, Turner, et al., 2009). The risk of polyvictimization rises with age (Finkelhor et al., 2011; Palermo et al., 2019), as children are exposed to an increasing number of peer and community contexts outside the home. Indeed, onset of polyvictimization often corresponds with major developmental shifts (e.g., beginning elementary or high school; Finkelhor et al., 2009).

**Associated Mental Health Outcomes**
By far the most widely researched aspect of polyvictimization has been its association with poor mental health outcomes. In cross-sectional studies, polyvictimization has shown strong associations with mental health symptoms across a wide spectrum of disorders, with studies showing medium to large effect sizes for both internalizing and externalizing symptomatology (for a review, see Haahr-Pedersen et al., 2020). Crucially, numerous studies in child, adolescent, and adult samples have linked polyvictimization with heightened internalizing and externalizing symptoms relative to less pervasive patterns of trauma exposure (Álvarez-Lister et al., 2014; Charak et al., 2019a; Ford et al., 2010; Segura et al., 2016). Additionally, when compared to individual victimization types, polyvictimization is associated with higher levels of trauma-related symptomatology, including more frequent symptoms of anxiety, depression, anger, posttraumatic stress, and dissociation during childhood and adolescence (Cyr et al., 2013; Finkelhor et al., 2007b, 2007c; Hickman et al., 2012; Turner et al., 2010) and in adulthood (Elliot et al., 2019). A growing number of studies have found that cross-sectional associations observed between individual trauma types and mental health outcomes are reduced after accounting for polyvictimization (Cyr et al., 2017; Finkelhor et al., 2007b; Lätsch et al., 2017; Turner et al., 2010b). In a longitudinal study of children and adolescents, individual victimization types did not significantly predict trauma symptoms after accounting for polyvictimization (Finkelhor et al., 2007a).

Together, these findings offer compelling evidence that investigating polyvictimization when assessing trauma exposure assists in identification of trauma-exposed young people at highest risk for poor outcomes. As this body of research has evolved, a number of potential mechanisms linking polyvictimization with poor mental
health have been proposed – including detrimental changes in coping strategies, emotion regulation, and self-concept (Barnes et al., 2016; Finkelhor et al., 2007c; Hasselle et al., 2017). Of these proposed mechanisms, emotion regulation has received the most support in the broader literature and is thus well-positioned for further conceptual elaboration and empirical evaluation.

**Emotion Regulation**

**Models of Emotion Regulation**

Emotions have been defined as shifts in “subjective experience” that occur alongside related behavioral and physiological changes (Gross, 2015a; Mauss et al., 2005). Emotion regulation encompasses a variety of strategies used to modulate these experiences. Efforts to regulate emotion may be implemented consciously or may be automatic, occurring outside an individual’s conscious awareness (Bargh & Williams, 2007; Gross & Thompson, 2007). Whereas adaptive emotion regulation is flexible, appropriate to the context, and supportive of long-term goals, maladaptive emotion regulation may occur when strategies are used inflexibly or in a way that is inconsistent with long-term goals (Werner & Gross, 2010). For example, avoidance of social situations may meet the short-term goal of reducing anxiety but hinder a long-term goal of developing close relationships. Several models have been proposed to explain these processes and facilitate research on emotion regulation.

The process model of emotion regulation posits that emotions can be targeted for regulation at five distinct stages: 1) situation selection, 2) situation modification, 3) attentional deployment, 4) change in cognitions about the situation, and 5) response modulation (Gross, 1998, 2014; Gross & Thompson, 2007). As a leading framework for
emotion regulation, this model has generated considerable interest in specific emotion regulation strategies that correspond to the stages outlined by Gross (for example, see Webb et al., 2012). Specific strategies are generally categorized as either adaptive (e.g., reappraisal, problem solving, mindfulness, acceptance) or maladaptive (e.g., suppression, avoidance, rumination).

A large body of empirical research on emotion regulation and psychopathology supports the conceptualization of emotion regulation as a proximal transdiagnostic risk factor for psychopathology, spanning both internalizing and externalizing disorders (Aldao et al., 2010, 2016; Berking & Wupperman, 2012; Fernandez et al., 2016; Kring & Sloan, 2009; Martins et al., 2016; Sloan et al., 2017). A meta-analysis of this literature found consistent links between the use of maladaptive emotion regulation strategies and mental health problems, with medium to large effect sizes for rumination, avoidance, and suppression (Aldao et al., 2010). Maladaptive strategy use and emotion dysregulation have also been shown to decrease following treatment for internalizing and externalizing disorders, though longitudinal research is needed to determine whether decreases in emotion regulation difficulties precede symptom reduction (for a systematic review, see Sloan et al., 2017).

While the association of emotion regulation with psychopathology is well established, several nuances in the extant literature warrant additional discussion. Specifically, emotion regulation strategy use appears to be a stronger predictor of internalizing than externalizing pathology (Aldao et al., 2010). Additionally, the empirical evidence for associations between the use of adaptive strategies and psychopathology is mixed. A meta-analysis of this literature found considerably smaller
effect sizes for reappraisal and acceptance than for maladaptive strategies (Aldao et al., 2010). Subsequent research has found that adaptive strategy use predicted somatization, depression, and anxiety, but was not associated with other types of psychological symptoms (e.g., obsessive-compulsive, psychotic, phobic; Martins et al., 2016). Other studies have not found any significant association between adaptive strategy use and psychological symptoms (e.g., Dominguez-Sánchez et al., 2013; Ehring et al., 2010).

These inconsistent findings suggest that strategy use alone is not a sufficient indicator of whether an attempt at emotion regulation will be successful. In this vein, empirical and theoretical work pointing to limitations of the process model (for example, see Bonanno & Burton, 2013; Webb et al., 2012) has been used to inform Gross’s extended process model of emotion regulation. The extended process model includes regulatory stages of the emotion regulation process that go well beyond strategy selection (Gross, 2015a, 2015b; Sheppes et al., 2015). Specifically, these stages include 1) identification of the need to regulate emotions (i.e., emotional clarity, beliefs about whether emotions can be changed, self-efficacy), 2) selection (i.e., having access to sufficient emotion regulation strategies), 3) implementation (i.e., deciding which strategy to use), and 4) processing dynamics (i.e., stopping, maintaining, or switching strategies).

Measurement of Emotion Regulation

Existing measures of emotion regulation typically rely on retrospective self-report of general strategy use (e.g., Emotion Regulation Questionnaire (ERQ; Gross & John, 2003)) or the perceived effectiveness of attempts to regulate emotion (e.g., Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004)). While measures of strategy use align more closely with the original process model, DERS subscales scores evidence
considerable agreement with the extended process model, and include lack of emotional clarity, nonacceptance of emotional responses, lack of emotional awareness, difficulty engaging in goal-directed behavior, impulse control difficulties, and limited access to emotion regulation strategies. The DERS has shown stronger and more consistent associations with mental health outcomes than measures of specific strategies (e.g., Seligowski et al., 2015) and prospectively predicts symptom severity and response to treatment (Hallion et al., 2018). Higher DERS scores have also been linked with diminished heart rate variability (e.g., Visted et al., 2017), an objective measure of regulated emotional responding (Appelhans & Lueck, 2006). However, reliance on retrospective self-report of both strategy use and dysregulation introduces bias and presents significant challenges to understanding how the emotion regulation process unfolds in real time (Colombo et al., 2020; Schatten et al., 2019).

**Emotion Regulation and Mental Health Problems Following Trauma Exposure**

**Trauma and Emotion Regulation**

Models specifying emotion regulation as a proximal risk factor for mental health problems following trauma exposure (i.e., a distal risk factor) are bolstered by significant empirical support. Longitudinal studies in children have found evidence that trauma exposure prospectively predicts emotion regulation difficulties, which in turn predict both internalizing and externalizing symptomatology (for example, see Heleniak et al., 2016; Kim-Spoon et al., 2013; McLaughlin et al., 2020). Similarly, in a meta-analysis of studies examining associations of emotion regulation and post-traumatic stress symptoms (PTS) among adults, medium to large effects were found for maladaptive strategies (i.e., rumination, suppression, and avoidance) – with the largest effect size evident for general
emotion dysregulation (Seligowski et al., 2015). For children and adolescents, a meta-analysis likewise found associations between emotion dysregulation and PTSD diagnosis, with a pooled effect size in the medium range (Villalta et al., 2018).

Disruptions in neurobiological development may help explain observed associations of trauma exposure with emotion regulation difficulties (Dvir et al., 2014; McLaughlin et al., 2020). Specifically, early traumatic experiences appear to influence maturation of brain regions involved in emotion regulation. Neuroimaging studies of abused children have found changes in volume and connectivity of the hippocampus, amygdala, corpus callosum, and prefrontal cortex (Hart & Rubia, 2012). Traumatic experiences that occur as these networks are developing may disrupt prefrontal inhibition, resulting in both under-regulation and over-regulation of emotional responses (e.g., hyperarousal and numbing; Dvir et al., 2014; Lanius et al., 2010). Neuroimaging studies have also found evidence linking early traumatic experiences with reduced activation in the default mode network (Bluhm et al., 2009; Viard et al., 2019) – a group of brain structures that shows activation when the mind is at rest and focused inward (i.e., engaged in self-referential thought) rather than on external goals or stimuli. Reduced activation of this network has potential implications for numerous aspects of emotion regulation, including attention and mindfulness (Dvir et al., 2014).

While these findings underscore the deleterious effects of traumatic events that occur during childhood, emerging evidence from the polyvictimization literature suggests that the pattern of trauma experienced may also be salient in the emergence of emotion regulation difficulties. Additionally, it is worth noting that emotion regulation and coping strategies that allow individuals to function in high-stress or potentially traumatic
contexts may prove “maladaptive” if these strategies generalize to other contexts (Bonanno & Mancini, 2008; Wadsworth, 2015). This generalization of maladaptive strategies may be more likely when an individual experiences repeated victimization across multiple contexts (Turner et al., 2017).

Polyvictimization and Emotion Regulation

A growing literature has linked polyvictimization with more pronounced emotion regulation difficulties and increased mental health symptoms relative to less pervasive patterns of exposure. In a sample of emerging adults, polyvictimization showed cross-sectional associations with both emotion dysregulation and eating disorder symptoms (Hasselle et al., 2017). Using data from the same sample, Barnes and colleagues (2016) identified an indirect effect of polyvictimization on social support via emotion dysregulation. Indirect effects of betrayal trauma (i.e., a sum score of traumatic interpersonal experiences perpetrated by someone close to the individual) on symptomatology via emotion dysregulation have been observed in samples of justice-involved youth (Bennett et al., 2016) and undergraduates (Goldsmith et al., 2013). Although broadly consistent with a mediational model, these findings must be considered in light of the cross-sectional nature of the data used. Moreover, the use of sum scores of trauma exposure in these studies prevents comparison of polyvictimization with less pervasive patterns of exposure (e.g., exposure to a single type of trauma).

In contrast, research using mixture modeling to identify distinct subgroups empirically has linked polyvictimization with increased difficulties in emotion regulation and mental health symptoms relative to other patterns of trauma exposure (Bridges-Curry & Newton, 2021; Charak et al., 2019a). Cross-sectional analyses have also revealed a
significant indirect effect of trauma exposure on mental health symptoms via emotion dysregulation for polyvictimized young adults (Bridges-Curry & Newton, 2021). Notably, no such indirect effect was observed for young adults reporting moderate trauma exposure. Although preliminary and limited by the cross-sectional design, these findings offer initial evidence that the role of emotion dysregulation in shaping mental health outcomes may vary as a function of the extent or pattern of trauma experienced.

In one of the few longitudinal studies in this literature, Kim and Cicchetti (2010) found that, relative to experiencing 1-2 maltreatment types, experiencing multiple (3-4) maltreatment types was significantly associated with elevated emotion regulation difficulties in children (ages 6-12), as reported by camp counselors. In turn, emotion regulation difficulties at baseline prospectively predicted internalizing and externalizing symptomatology at one-year follow-up (Kim & Cicchetti, 2010). The fact that findings from this literature are largely consistent, despite notable methodological differences, suggest that observed associations between polyvictimization, emotion regulation, and mental health may generalize across varying approaches to measurement and study design.

Yet very little theoretical or empirical work endeavors to explain why victimization across contexts would more severely disrupt emotion regulation than single-type or less pervasive trauma exposure. Charak and colleagues (2019) suggest that observed links between polyvictimization and emotion dysregulation may be related to the absence of caregivers who provide an appropriate environment for learning these skills and/or fail to model effective emotion regulation skills themselves. However, this hypothesis does not address why victimization experienced outside the home (e.g., peer
or community victimization) would confer additional risk for emotion regulation difficulties relative to child maltreatment alone. Given that cross-context exposure is central to the prevailing conceptualization of polyvictimization, explanations focused exclusively on the role of caregivers leave significant questions unanswered.

Theoretical accounts of polyvictimization posit that maladaptive coping strategies may be more likely to “generalize” when an individual experiences victimization across multiple settings (Turner et al., 2017). Although few studies have tested this hypothesis, results from the extant literature are generally consistent with this perspective. Specifically, polyvictimized individuals overestimate the likelihood of victimization events (Miller-Graff et al., 2019) and exhibit elevated patterns of threat avoidance relative to those reporting a single victimization experience (Herzog et al., 2018).

Chronic exposure to traumatic events early in life has also been linked to over-regulation of emotional responses (e.g., numbing, dissociation) compared to more limited exposure patterns (Lanius et al., 2010).

**Stress Sensitization**

The idea that exposure to traumatic events disrupts emotion regulation is broadly consistent with the stress sensitization model, which implicates increased sensitivity to proximal stressors in the development of mental health disorders among those exposed to childhood adversity (Stroud, 2020). Offering empirical support for this model, a large national study of adults found that the interaction of childhood adversity with past-year stressful events predicted perceived stress, measured as reported difficulty handling stressors and feeling overwhelmed (McLaughlin, Conron, et al., 2010). Specifically, as the number of stressful events increased, adults with three or more adverse childhood
experiences showed a more pronounced increase in perceived stress than those without exposure to childhood adversity. Exposure to childhood adversity also moderated the relationship between stressful life events and depression, anxiety, and PTSD over a 12-month period, with stress sensitization effects most evident among the high exposure group. To explain these results, McLaughlin and colleagues posit that adversity may only increase sensitivity to stress if it exceeds a certain ‘severity threshold’ (e.g., co-occurring forms of adversity, or polyvictimization). Consistent with this view, higher levels of trauma exposure have also been linked to increased sensitivity to stress among military and veteran populations (Bandoli et al., 2017; Davis et al., 2023; Smid et al., 2013).

A number of mechanisms have been proposed to account for stress sensitization among trauma-exposed individuals, including physiological and neurobiological changes, cognitive factors (e.g., negative schemas), and emotion regulation difficulties (Laurent et al., 2015; McLaughlin, Kubzansky, et al., 2010; Stroud, 2020; Weissman et al., 2020). Although the hypothesized pathway connecting trauma exposure with stress sensitization via emotion regulation has yet to be tested directly, heightened use of maladaptive emotion regulation strategies among trauma-exposed individuals may contribute to increases in distress due to daily stressors (McLaughlin et al., 2020). Related to this point, regulatory strategies developed to cope with repeated victimization (e.g., avoidance) may be ill-suited to managing daily stressors. However, despite evidence of increased stress sensitization effects in high-exposure individuals (Bandoli et al., 2017; Davis et al., 2023; McLaughlin, Conron et al., 2010; Smid et al., 2013), polyvictimization researchers have yet to test stress sensitization effects among this multiply-victimized group.

**Advancing Trauma and Emotion Regulation Research**
Limitations of Trait Measures

Widespread reliance on retrospective trait measurement poses significant challenges for research on trauma, emotion regulation difficulties, and associated mental health outcomes. Despite evidence that flexible and context-appropriate use of emotion regulation strategies may be more salient than whether the strategy is generally considered adaptive or maladaptive (Aldao et al., 2016; Blanke et al., 2019), strategy-focused trait measures do not offer insight into these factors (Colombo et al., 2020; Schatten et al., 2019). Trait measures of emotion regulation also introduce substantial bias (e.g., social desirability, self-perception, recall bias), a problem that appears to be especially pronounced among populations with more severe symptomatology (for further discussion, see Schatten et al., 2019). In light of the well-documented links between high levels of victimization and increased mental health symptoms, sole reliance on trait measures of emotion regulation may be particularly problematic for trauma research.

Indeed, widely used trait measures of emotion regulation show relatively little correspondence with state measures of the same constructs and have questionable discriminant validity. Comparing trait measures with daily report of strategy use, McMahon and colleagues (2020) found evidence that responses on trait measures reflect a general tendency to use maladaptive strategies (specifically avoidance strategies) rather than offering insight into the individual’s use of specific strategies. In one study focused on suppression and reappraisal, no significant association was found between trait and daily report of strategy use (Brockman et al., 2017). These findings underscore the need for approaches that reduce bias in reporting and more accurately reflect the use and efficacy of strategies employed in daily life.
Ecological Momentary Assessment

Research using ecological momentary assessment (EMA), an intensive longitudinal method that includes multiple assessments throughout the day, endeavors to address these limitations (Colombo et al., 2020; Schatten et al., 2019). EMA has been shown to reduce memory effects and bias relative to retrospective trait reports (Schatten et al., 2019). Using adapted versions of existing trait measures of emotion regulation, EMA studies have often focused on assessing the use of specific strategies and testing associations with symptomatology or affect (e.g., Bettis et al., 2021; Short et al., 2018). EMA has also been used to measure emotion dysregulation, typically operationalizing it as increased or highly variable negative affect (e.g., Schatten et al., 2019). While few studies have leveraged EMA to examine emotion regulation strategy use, per se, among trauma-exposed samples, evidence from research focused on variability in positive and negative affect are generally indicative of disruption in emotion regulation processes in this population (Karr et al., 2013; Kashdan et al., 2006; Santangelo et al., 2014).

To our knowledge, only one study has assessed state emotion regulation strategy use with EMA in a trauma-exposed sample (Short et al., 2018). Crucially, this study also offers the most direct test of the model connecting trauma exposure to symptomatology via emotion regulation difficulties. Findings indicated that maladaptive emotion regulation strategy use prospectively predicted increased symptoms later in the same day for individuals with PTSD. Baseline PTSD symptoms also emerged as a predictor of maladaptive strategy use, suggesting a cyclical/bidirectional relationship between symptomatology and emotion regulation problems. However, the study did not test
whether these relationships differed as a function of the pattern of trauma experienced (e.g., polyvictimization vs. single type trauma).

Relevant to stress sensitization research, EMA is well-positioned to identify shifts in emotion (e.g., an increase in negative affect) that follow recent stressors and/or precede increased symptoms (Bettis et al., 2021; Colombo et al., 2020; Schatten et al., 2019). EMA approaches may also be used to explore simultaneous use of multiple emotion regulation strategies (Heiy & Cheavens, 2014) and probe interactions of trait and state factors (Schatten et al., 2019). Using this type of model, van Nierop and colleagues (2018) compared stress sensitivity across low and high child trauma exposure groups. Findings did not support differences in stress sensitivity on the basis of trauma exposure alone. Rather, individuals reporting high levels of child trauma and a mixture of depression, anxiety, and psychotic symptoms evidenced heightened emotional reactivity relative to trauma-exposed individuals without this mixture of symptoms. As the authors pointed out, heightened stress reactivity in the mixed phenotype groups may be a state-level consequence of the symptoms themselves or may be explained by unmeasured risk or resilience factors (e.g., cognitive bias; van Nierop et al., 2018).

An alternative explanation is that the findings reflect unmeasured variation in pattern or extent of trauma exposure (i.e., polyvictimization). Specifically, the measure of childhood adversity used in the van Nierop study included general questions about happiness and omitted more “explicit” questions about physical and sexual abuse. Broadly consistent with this hypothesis, Teicher et al. (2015) found that young adults with a history of childhood maltreatment showed increased persistence in negative affect across EMA surveys relative to unexposed controls, despite analogous levels of mean
positive and negative affect. Those who reported multiple trauma types evidenced heightened variability in positive affect relative to those reporting single-type exposure (Teicher et al., 2015). Taken together, and in light of analogous findings from non-EMA studies (e.g., McLaughlin, Conron et al., 2010), these findings underscore the potential relevance of stress sensitization for polyvictimization research.

**Summary**

Substantial evidence attests to polyvictimization as a powerful correlate of psychopathology, over and above more limited patterns of trauma exposure (Cyr et al., 2013; Lätsch et al., 2017; Richmond et al., 2009). A growing body of evidence has also linked polyvictimization with emotion dysregulation (Barnes et al., 2016; Bennett et al., 2016; Bridges-Curry & Newton, 2021; Charak et al., 2019a; Goldsmith et al., 2013; Hasselle et al., 2017). In turn, problems with emotion regulation are widely understood to confer transdiagnostic risk (Aldao et al., 2010, 2016; Martins et al., 2016), and preliminary evidence suggests that emotion dysregulation may help explain observed relationships between polyvictimization and mental health outcomes (e.g., Bridges-Curry & Newton, 2021). Findings from the stress sensitization literature offer complementary evidence that individuals with high levels of trauma exposure are more sensitive to the deleterious effects of stressful events than those with less trauma exposure, potentially due to disruption in emotion regulation processes (McLaughlin, Conron et al., 2010).

However, it is not yet clear whether observed associations between polyvictimization and emotion dysregulation are statistically independent of existing mental health symptoms. Neither is it known whether efforts to regulate emotion in response to daily stressors may differ for polyvictims relative to those with less trauma
exposure, despite strong evidence from the stress sensitization literature that this may be the case. More broadly, widespread reliance on retrospective trait measures of emotion regulation and mental health symptoms have limited insight into the ways that emotion dysregulation and associated mental health symptoms unfold in daily life. EMA offers significant advantages for addressing these questions.

**Current Study**

The current study used online surveys to assess trauma exposure, trait emotion regulation, and mental health symptoms in an undergraduate sample at baseline and follow-up. Additionally, I used EMA to assess daily stressors, state perceived stress, emotion regulation, and mental health symptoms over a two-week period. First, to determine whether polyvictimization and mental health symptoms were independently related to state emotion regulation, I tested whether polyvictimization and mental health symptoms measured at baseline predict momentary emotion dysregulation and maladaptive strategy use measured across two weeks. Second, to replicate and extend existing research on stress sensitization effects, I tested polyvictimization as a moderator of the relationship between daily stressors and perceived stress. To explore potential differences in responding to daily stressors, I also tested polyvictimization as a moderator of the relationship between daily stressors and state emotion regulation (strategy use and dysregulation). Third, to assess the role of emotion regulation in the relationship between polyvictimization and increased mental health symptoms, I tested the indirect effect of baseline polyvictimization on state mental health symptoms via state emotion dysregulation and maladaptive strategy use.
Finally, the study design lends itself to exploring the relationship between attending to emotional responses and symptoms via self-monitoring and changes in symptoms over time. Self-monitoring of symptoms has been linked to improvements in internalizing (Bakker & Rickard, 2018; Korotitsch & Nelson-Gray, 1999; Kramer et al., 2014) and PTS symptoms (Ehlers & Clark, 2000; Hardy & Stallard, 2008; Tarrier et al., 1999). Little is known about potential effects of self-monitoring on emotion regulation strategy use or emotion dysregulation. Moreover, significant improvement in PTS symptoms is only evident in a subset of individuals following self-monitoring, while others continue to meet diagnostic criteria for PTSD (Hardy & Stallard, 2008; Tarrier et al., 1999). Amid growing interest in ecological momentary interventions (EMIs; Balaskas et al., 2021), research on self-monitoring of emotion regulation and on potential moderating variables – including pattern of trauma exposure – may be instructive. Thus, as an exploratory aim, the current study compared emotion regulation strategy use, emotion dysregulation, and mental health symptoms pre- and post-EMA.

**Hypotheses**

I hypothesized that:

1. Polyvictimization and mental health symptoms at baseline independently predict increased state emotion dysregulation, increased maladaptive strategy use, and decreased adaptive strategy use measured across two weeks.

2. Polyvictimized individuals show reduced capacity to cope with daily stressors.

2a. Trauma exposure moderates the relationship between daily stressors and state perceived stress, such that individuals exposed to more types of trauma evidence higher perceived stress in response to daily stressors.
2b. Trauma exposure moderates the relationship between daily stressors and state emotion regulation (strategy use and dysregulation), such that polyvictimized individuals are more likely to use maladaptive strategies, less likely to use adaptive strategies, and more likely to experience emotion dysregulation in response to daily stressors than other trauma-exposed individuals.

3. Baseline polyvictimization has an indirect effect on state mental health symptoms via state emotion dysregulation and emotion regulation strategy use.

4. Exploratory Aims: Consistent with evidence that self-monitoring is associated with decreases in symptoms, I compared pre- and post-EMA emotion regulation strategy use, emotion dysregulation, and mental health symptoms. I also tested moderation by trauma exposure. Due to their exploratory nature, no hypotheses were made about these analyses.
METHODS AND MATERIALS

Participants

Participants were University of Louisville undergraduate students ($N = 122$) recruited using the Department of Psychological and Brain Sciences’ online SONA system. Participant demographic information is presented in Table 1. The sample was majority female (79.5%) and White (65.6%). For inclusion in the study, participants were required to own a smartphone or tablet capable of running iOS or Android software. Participants in the study received 1 credit for completing the baseline questionnaires. For the EMA portion of the study, participants received 0.5 credits for completing less than 50% of the surveys, 1 credit for completing between 50-75% of surveys, and 2 credits for completing more than 75% of the surveys. Participants who completed the follow-up questionnaires in SONA received 1 additional credit.

Procedures

Baseline survey. After signing up for the study, participants received a link to the baseline survey via email, where they accessed the informed consent prior to beginning the baseline survey (see Appendix A for informed consent). Three attention checks were included in the survey to gauge participant engagement with the baseline and follow-up survey (e.g., “Please select three for this item”), consistent with current standards for
survey research (Kung et al., 2017). The survey concluded with the Post Traumatic Growth Inventory to remind participants of potential positive outcomes associated with exposure to stressful experiences. Additionally, a list of resources with contact information was provided at the end of the survey to ensure that participants were able to access support as needed. Participants then received instructions for the EMA portion of the study, followed by a quiz to confirm understanding of the instructions (see Appendix B).

**EMA smartphone surveys.** After completing the baseline surveys, participants received an email reviewing the instructions for downloading the smartphone survey application (the Participation in Everyday Life (PIEL) survey app; Jessup et al., 2012) and a file containing the EMA survey, which they downloaded onto their smartphone. EMA surveys were administered 4 times per day over a 14-day period. Assessments were sent via an app notification within each participant’s typical waking time. Participants received a reminder to complete surveys mid-way through the EMA portion of the study (i.e., one week after EMA begins; see Appendix C for participant emails).

**Follow-up survey.** Following completion of the EMA portion of the study, participants were prompted via email to complete a follow-up survey within a one-week period, consisting of the same questionnaires as the original baseline survey, excluding questions assessing sleep timing and exposure to traumatic events. After completing the follow-up survey, participants were again provided with a list of resources for mental health support.

**Confidentiality.** The baseline and follow-up surveys were created and administered via REDCap, a web application that was developed by Vanderbilt
University to securely collect and manage data. The Participation in Everyday Life (PIEL) survey app (Jessup et al., 2012) was used for the EMA portion of the study. To enhance security, the PIEL survey app encrypts and stores participant data directly on their personal smartphone, meaning that the data are not stored on a remote server or database. The developers of the application do not have access to participants’ data or identifying information. Unlike many applications used for EMA, the PIEL survey app only collects data specified in the survey questionnaires and does not gather other data from the device (e.g., geolocation, device information, or contacts). After completing the surveys, participants shared their data with the researcher using email. This data file did not include text of the questions or the selected answer, which are both identified by numbers. Emailed participant data is thus unintelligible without the “Control File” containing the survey questions. Participants were able to delete all of their survey data at any time.

**Compliance.** In adult samples, compliance (i.e., percentage of surveys completed) in EMA studies is typically around 80% (Williams et al., 2021). To improve compliance in the current study, research credits were awarded based on the percentage of smartphone surveys completed. In addition, participants received instructions for the EMA portion during the baseline survey and in a follow-up email reminder. Participants were also emailed a reminder one week after beginning the smartphone surveys. Two weeks after beginning the smartphone surveys, participants received an email with detailed instructions for returning their data to the researcher and a link to the follow-up survey. Participants who did not return their surveys within two weeks were contacted via
email to gauge interest in continued participation and assist with trouble-shooting the EMA or online survey portions of the study.

Measures

**Demographics.** Participants were asked to report their age, race/ethnicity, sex assigned at birth, gender, and socio-economic status at baseline.

**Baseline and Follow-Up Survey Questionnaires**

**Neighborhood Characteristics (baseline only).** The City Stress Inventory (CSI; Ewart & Suchday, 2002) is an 18-item measure of neighborhood characteristics. Respondents are asked to rate each item (e.g., I heard neighbors complaining about crime in our neighborhood) on a scale from 1 (never/none) to 4 (often/most). These scores are used to calculate two subscales: Neighborhood Disorder and Community Violence. The measure shows strong psychometric properties, including correlations with census measures of social disadvantage (Ewart & Suchday, 2002). In the current study, internal consistency was high for both the Neighborhood Disorder (alpha = .87) and Community Violence (alpha = .87) subscales.

**Trauma Exposure (baseline only).** The Lifetime Trauma and Victimization History (LTVH) questionnaire (Widom et al., 2005) is a 30-item self-report measure encompassing lifetime exposure to both interpersonal (25 items, including witnessed and experienced violence) and non-interpersonal (5 items) traumatic events, with respondents prompted to indicate whether or not they have ever experienced each event (YES/NO). Studies support the validity of the LTVH as a measure of exposure to traumatic events (Cuevas et al., 2010; Widom et al., 2005; Widom et al., 2008).
Consistent with the polyvictimization framework and prior polyvictimization research using the LTVH (Bridges-Curry & Newton, 2022), items were summed and transformed within trauma type to create a binary indicator (0 = no exposure, 1 exposure) for each of 11 trauma types: non-interpersonal trauma (i.e., natural disaster, man-made disaster, serious accident, exposure to toxic chemicals), combat/war zone exposure, physical assault (i.e., physically attacked, threatened or assaulted with weapon, threatened in confrontation), child physical abuse, sexual abuse/assault (i.e., forced/attempted to force into unwanted sexual contact), network trauma (i.e., murder or suicide of family, close friend, or romantic partner), witnessed violence (i.e., present during murder/serious injury, seeing dead/mutilated body, witnessing physical/sexual assault), crime (i.e., property damage, attempted/completed stealing with or without force, break-ins), kidnapping, stalking, and “other.” To facilitate comparison of polyvictimization with other patterns of exposure, polyvictimization was operationalized as 5 or more trauma types reported, consistent with prior research (e.g., Finkelhor et al., 2007c). Moderate exposure was operationalized as between 1-4 trauma types and non-exposure as 0 trauma types reported.

**Depression and Anxiety Symptoms.** Depression and anxiety symptoms were assessed using items drawn from the Patient Reported Outcomes Measurement Information System (PROMIS) 8-item depression and 7-item anxiety short form measures, which show strong psychometric properties (Cella et al., 2010). Respondents are asked to rate how often they have been bothered by each symptom (e.g., *I felt worthless*) in the past 7 days from 1 (*Never*) to 5 (*Always*). In the current study, internal
consistency was excellent for the depression (alpha = .96) and anxiety (alpha = .94) subscales.

**PTS Symptoms.** Past-month symptoms of PTSD were assessed using the 20-item PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013). Respondents rate how bothered they are by each symptom on scale of 0 (*Not at all*) to 4 (*Extremely*). Among a sample of trauma-exposed undergraduates, the measure exhibited high internal consistency (alpha = .94) and good test-retest reliability (*r* = .82) (Blevins et al., 2015). In the current study, the PCL-5 showed similarly high internal consistency (alpha = .96).

**Emotion Dysregulation.** The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item measure of emotion dysregulation (e.g., “I experience my emotions as overwhelming and out of control”). Respondents rate how often they experience each item on a 5-point scale from 1 (*Almost Never*) to 5 (*Almost Always*). The DERS yield a total score and six subscale scores including: nonacceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. The measure as a whole evidences high internal consistency (alpha = .93), convergent validity, and predictive validity (Gratz & Roemer, 2004). The DERS had high internal consistency in the current study (alpha = .95).

**Suppression and Reappraisal.** Trait suppression and reappraisal were measured using the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), a 10-item measure of two emotion regulation strategies, expressive suppression and cognitive reappraisal. Respondents are asked to rate their response to statements on scale from 1 (*Strongly disagree*) to strongly 7 (*Agree*). The reappraisal (alpha = .89) and expressive
suppression (alpha = .79) subscales showed good internal consistency in the current study.

**Rumination.** Trait rumination was assessed using the 10-item Ruminative Responses Scale – Short Version (RRS-SF; Erdur-Baker & Bugay, 2010; Treynor et al., 2003), which has demonstrated reliability and validity in undergraduate samples and across cultural contexts (e.g., Lei et al., 2017). For each item, respondents rate how often they engage in the behavior on a 4-point scale from 1 (Almost Never) to 4 (Almost Always). In the current study, the RRS-SF evidenced good internal consistency (alpha = .79).

**Sleep Timing (baseline only).** To determine an optimal window for EMA prompts, each participant was asked about their typical sleep habits using four items drawn from the Sleep Timing Questionnaire (Monk et al., 2003), which assess usual bedtime and waking time on work/school days and on days off.

**Posttraumatic growth.** The 10-item Posttraumatic Growth Inventory (PTGI; Cann et al., 2009) was used to measure perceived favorable changes that may occur following exposure to traumatic events. Each item is rated on a scale from 0 (“I did not experience this change as a result of this stress”) to 5 (“I experienced this change to a very great degree as a result of this stress”). The PTGI showed high internal consistency in the current study (alpha = .90)

See Appendix D for complete baseline and follow-up survey.

**EMA Survey**

At each assessment, participants completed a 26-item survey of stress, emotion regulation, and mental health symptoms.
**Daily Stressors.** Using 7 items drawn from the Daily Inventory of Stressful Events (Almeida et al., 2002), participants were asked to indicate which stressful situations (if any) they have experienced since the last assessment. Participants were prompted to select all that apply. Responses were re-coded as a binary variable (0 = no stressor reported, 1 = at least one stressor reported).

**Perceived Stress.** Perceived stress since the last assessment was measured using an adapted version of the Stress Numerical Rating Scale-11, a one-item measure of perceived stress that asks respondents to rate their current stress on a scale from 0-10 (Stress NRS-11; Karvounides et al., 2016). For the purposes of the current study, responses were rated on a Visual Analogue Scale (VAS) scale from 0 (no stress) to 100 (worst stress possible).

**Emotion regulation.** Eight items were used to assess state strategy use (reappraisal, cognitive and expressive suppression, acceptance, rumination, problem solving, impulsive behaviors, and avoidance), using a measure modeled after prior EMA research (Short et al., 2018; Tan et al., 2012). Participants were asked whether they used each of the strategies to help manage stress since the last survey, with responses rated on a VAS scale as 0 (I have not used this at all) to 100 (I have used this an extreme amount). Items assessing state reappraisal, acceptance, and problem solving were summed to create a total score for adaptive strategy at each time point. Items assessing state cognitive and expressive suppression, rumination, impulsive behavior, and avoidance were summed to create a total score for maladaptive strategy use.

Emotion dysregulation was assessed using items drawn from the State Difficulties in Emotion Regulation Scale (S-DERS; Lavender et al., 2017). The S-DERS uses 21
items from the DERS adapted to assess current emotion dysregulation (e.g., *I am confused about how I feel*), rated on a VAS scale from 0 (*Not at all*) to 100 (*Extremely*). To reduce burden on participants, the four items with the highest loadings on the subscales were used in the current study and summed to create a total score, consistent with prior adaptations of existing measures for EMA (Short et al., 2018).

**Mental health symptoms.** Momentary assessment of mental health symptoms was conducted using items drawn from the short forms of the PROMIS depression and anxiety measures, consistent with prior research (Moore et al., 2016). The prompts and items were adjusted to query current symptoms (e.g., *At the moment, I feel…*”). A four-item version of the PCL-5 (Price et al., 2016) was adapted to assess current PTS symptoms, with participants asked to indicate how much they have been bothered by each problem since the last survey. All items assessing mental health symptoms were rated on a VAS scale and summed to create total depression, anxiety, and PTS scores.

Appendix E includes a complete list of measures included in the EMA portion of the study.

**Analytic plan**

**Power Analysis.** Power analysis was conducted using the Shiny application developed by Barnett et al. (2020) for use in intensive longitudinal studies. Compliance was estimated at 75%, consistent with typical response rates for EMA studies in adult samples (Williams et al., 2021), and medium effect sizes were specified, in line with prior research indicated medium to large associations between trauma exposure, emotion regulation, and mental health outcomes (e.g., Aldao et al., 2010; Haahr-Pedersen et al., 2020). Results indicated that a sample size of 90 was sufficient to detect significant
differences at the $p < .05$ level, with a follow up period of 14 days. Separate power analyses were also conducted for each model to confirm adequate power across the planned analyses.

Specifically, Arend and Schäfer’s (2019) guidelines for statistical power in two-level models were used to determine adequate sample size for Hypotheses 1 and 2a-2b. A medium intraclass correlation coefficient (ICC) and random slope variance component were specified for these estimations, consistent with current recommendations for determining sample size when these data are not available from prior multi-level studies (Arend & Schäfer, 2019). For Hypothesis 1, which tested direct effects of Level 2 variables (polyvictimization and mental health symptoms), a sample size of 30 was adequate to detect medium effect sizes with 30 or more EMA observations per individual ($n = 56$ in the current study). For hypotheses 2a-2b, which tested cross-level interactions between daily stressors and trauma exposure, a sample size of 40 was adequate to detect medium effect sizes with 30 or more observations per individual. While similar guidelines for multilevel mediation models have yet to be developed, comparison of mediation analyses in multilevel models vs. multilevel structural equation models suggests that multilevel models can detect a small indirect effect even with relatively few observations per individual ($n = 7-14$) at relatively small sample sizes ($N \geq 10$) (McNeish, 2017). Additionally, McNeish (2017) found that more than 98% of simulated models converged with $N = 50$, indicating that this may be a useful benchmark for multilevel mediation studies.

Power analysis for the repeated measures ANOVA (Exploratory Aim) was conducted using G*Power 3.1. Consistent with prior research (e.g., Bakker & Rickard,
a large effect size was specified (partial $\eta^2 = 0.05$). With a moderate correlation across timepoints (0.5) and a Type I error rate of 0.05, a sample size of 51 was needed to test potential self-monitoring effects and moderation by trauma exposure. Thus, results of power analyses for each model indicated that the study would be more than adequately powered with the sample size identified by power analysis for intensive longitudinal studies ($N = 90$), which accounts for factors specific to these designs (e.g., compliance). To compensate for dropouts or higher-than-expected missingness, 120 participants were recruited.

**Missing data.** No compliance threshold was used in the current study. This choice reflects a growing consensus (e.g., Murray et al., 2021) that the use of compliance thresholds may result in the exclusion of individuals with more severe symptoms (Silvia et al., 2013), thereby introducing substantial bias in parameter estimation (i.e., by introducing non-random missingness; Rubin, 1976). Consistent with current recommendations for managing missing data in intensive longitudinal designs (Ji et al., 2018), I planned to use a partial multiple imputation approach. Using this approach, missing covariates are imputed with multiple imputation, using the *Multivariate Imputation by Chained Equations (MICE)* package in R (van Buuren & Groothuis-Oudshoorn, 2011).

However, due to high collinearity between within-survey variables (i.e., stressor, perceived stress, and mental health symptoms), missing independent variables did not populate when using the MICE package. This is a common problem when using multiple imputation to address missing EMA data (Slipetz et al., 2023). Other approaches to imputing missing data in time series data were considered, including Kalman smoothing.
However, Kalman smoothing is intended for use with continuous time series variables and the variable being imputed (i.e., stressor) for the current study was binary.

Fortunately, in addition to its ability to account for hierarchical data (i.e., observations nested within individuals), multilevel modeling is robust to missing data (Raudenbush & Bryk, 2002). Full information maximum likelihood estimation (FIML) was used to address missingness in dependent variables. For the exploratory analyses, which relied solely on data from the baseline and follow-up surveys, multiple imputation was conducted using the MICE package (van Buuren & Groothuis-Oudshoorn, 2011) as originally planned.

**Multilevel analyses.** Data were screened using SPSS Version 29 to confirm accurate data entry and identify outliers. Graphical analyses (i.e., histograms and QQ plots) were used to evaluate normality and homoskedasticity of residuals and random effects. Multilevel modeling was used to analyze the data, with EMA responses (Level 1) nested within individuals (Level 2). All continuous Level 1 variables (i.e., mental health symptoms, emotion regulation) were person-centered to decompose within- and between-person effects. Analyses were conducted using full information maximum likelihood (FIML) estimation. Consistent with current recommendations for intensive longitudinal designs (Bolger & Laurenceau, 2013) and due to the temporal relationships between the predictors and outcomes, time was included as an independent variable in the models. Time was coded from 0-55 with 0 representing the first survey (i.e., time coefficients represent change in the dependent variable from one survey to the next survey). To account for serially correlated residuals and variation in intervals between EMA assessments, a continuous time autoregressive structure was added to models that
included Level 1 predictors (i.e., Hypotheses 2a and 2b). Sex assigned at birth was included as a covariate in all analyses (1 = male, 2 = female). Multilevel analyses for Hypotheses 1-2 were conducted using the MIXED procedure in SPSS Version 29.

**Multilevel Mediation.** To test indirect effects of trauma exposure on mental health via emotion regulation, multilevel mediation analyses were conducted in the demo version of Mplus Version 8.9 using recommended code for $2 \rightarrow 1 \rightarrow 1$ mediation models (Preacher et al., 2010). These analyses were conducted using Bayesian estimation, which reduces bias through latent centering of predictors and mediators (Asparouhov & Muthen, 2019.) Autoregressive effects were included in these models to account for serially correlated residuals. Due to limitations of the software, I was unable to include additional covariates (i.e., sex assigned at birth) in these models.

**Hypothesis 1.** Polyvictimization and mental health symptoms at baseline will independently predict increased state emotion dysregulation, increased maladaptive strategy use, and decreased adaptive strategy use measured across two weeks. Baseline trauma exposure (Level 2) and mental health symptoms (Level 2) were entered as independent variables, with separate multilevel models specifying emotion regulation strategy use (maladaptive and adaptive) and emotion dysregulation (Level 1) as the dependent variable (see Figure 1). Because these models included only Level 2 predictors (i.e., baseline trauma exposure and mental health symptoms), they are considered means as outcomes regression models (also known as random intercept models; Garson, 2019) and test prediction of the group (i.e., subject) mean of the Level 1 dependent variables. Due to high correlations between baseline anxiety, depression, and PTS symptoms, multicollinearity was evaluated and these variables were centered. While standard errors
for the predictors appeared to be in an acceptable range, I created a sum score for mental health symptoms and re-ran the models. This approach did not significantly alter the results so the three separate variables for anxiety, depression, and PTS were retained in the final models. Trauma exposure was dummy coded, with no exposure specified as the reference category.

Hypothesis 2a: Trauma exposure will moderate the relationship between daily stressors and state perceived stress, such that individuals exposed to more types of trauma evidence higher perceived stress in response to daily stressors.

Separate multilevel models were used to test the interaction of state stressors (Level 1) with trauma exposure (Level 2), measured categorically (i.e., polyvictimization, moderate exposure, non-exposed), as a predictor of state perceived stress (see Figure 2a).

Hypothesis 2b: Trauma exposure will moderate the relationship between daily stressors and state emotion regulation (strategy use and dysregulation), such that polyvictimized individuals are more likely to use maladaptive strategies, less likely to use adaptive strategies, and more likely to experience emotion dysregulation in response to daily stressors than other trauma-exposed individuals.

Separate multilevel models were used to test the interaction of state stressors (Level 1) with trauma exposure (Level 2), measured categorically (i.e., polyvictimization, moderate exposure, non-exposed), as a predictor of strategy use and emotion dysregulation (Level 1) (see Figure 2b).

Hypothesis 3: Baseline polyvictimization will have an indirect effect on state mental health symptoms via state emotion dysregulation and strategy use. Direct and indirect effects in the relationship between baseline trauma exposure (Level 2), emotion
regulation (Level 1), and state mental health symptoms (Level 1) were tested using 2→1→1 multilevel mediation (Bauer et al., 2006; Bolger & Laurenceau, 2013). Separate models were used to test state maladaptive strategy use (Level 1), adaptive strategy use (Level 1), and emotion dysregulation (Level 1) in the relationship between polyvictimization (Level 2) and state depression, anxiety, and PTS symptoms (Level 1) (see Figure 3).

The three trauma exposure groups were originally used in these analyses and dummy coded, with no exposure specified as the reference category. However, these models evidenced poor fit when tested using Posterior Predictive Checking (PPC), with posterior predictive $p$-values falling below the recommended cut-off of .05 (for a detailed discussion of PPC for testing model fit in Bayesian analysis, see Asparouhov & Muthen, 2010). Combining the non-exposure and moderate exposure groups to create a binary indicator of polyvictimization ($0 =$ no – moderate exposure, $1 =$ polyvictimization) resulted in interpretable models (posterior predictive $p$-values $> .05$) and this operationalization/coding scheme was used in the final analyses.

**Exploratory Aims:** Test potential self-monitoring effects on emotion regulation strategy use, emotion dysregulation, and symptom pre- and post-EMA.

Repeated measures ANOVA was used to compare pre- and post-EMA scores for emotion regulation strategy use, emotion dysregulation, and mental health symptoms. Trauma exposure (i.e., polyvictimization, moderate exposure, non-exposed) was tested as a moderator in these analyses, with sex assigned at birth included as a covariate.
RESULTS

Descriptives

Descriptive statistics for baseline mental health symptoms, trait emotion regulation, trauma exposure, and neighborhood characteristics are presented in Table 2. Mental health concerns were prevalent, with a significant number of individuals reporting symptoms above clinical cut-off scores. Trauma exposure was common in the sample ($M_{\text{trauma types}} = 4.32$, $SD = 2.79$), with very few participants (4.9%, $n = 6$) reporting that they had never experienced a traumatic event. A majority of the sample (52.5%, $n = 64$) reported exposure to between 1-4 trauma types (i.e., moderate exposure) and 42.6% ($n = 52$) reported exposure to 5 or more trauma types (i.e., polyvictimization). Rates of each trauma type and associated LTV items are presented in Table 3. Non-interpersonal trauma, physical assault, sexual abuse/assault, witnessed violence, and crime were among the most commonly reported trauma types. Very few participants reported kidnapping or war zone/combat exposure.

Correlations of Level 2 variables, including baseline mental health symptoms, trait emotion regulation and trauma exposure, are presented in Table 4. Depression, anxiety, and PTS scores were highly correlated. Maladaptive emotion regulation strategies and emotion dysregulation were positively correlated with mental health symptoms, while adaptive strategies (i.e., reappraisal) were negatively correlated with
mental health symptoms. Mental health symptoms showed medium to large correlations with emotion dysregulation and small or non-significant associations with strategy use. Additionally, emotion regulation strategies (i.e., reappraisal, rumination, and suppression) did not show statistically significant correlations with one another. As expected, number of trauma types and baseline mental health symptoms showed statistically significant correlations with neighborhood characteristics, including neighborhood disorder and exposure to violence (Ewart & Suchday, 2002).

Descriptive statistics for Level 1 variables, including perceived stress, state mental health symptoms, and state emotion regulation, are presented in Table 5. Between- and within-person variability for each dependent variable in the planned analyses were calculated by running a null model in SPSS with only the grouping variable (in this case, subject) and no other fixed or random effects included in the model. Between-person differences accounted for more than half of the variance in state anxiety and emotion regulation and nearly 75% of the variance in state PTS and depression. Within-person differences accounted for a relatively high portion of the variance (64%) in perceived stress. Participants reported experiencing at least one stressful event since the last survey in 53.6% of completed surveys. In terms of stressor type, school or work problems was the most commonly reported, accounting for 65.2% of reported stressors, followed by other (37.9%), problems at home (11.2%), argument or disagreement (10.0%), something happening to a close relative or friend (5.5%), and discrimination (0.7%). Among surveys indicating a recent stressful experience, 30.5% included multiple stressor types.
Consistent with prior research (Brockman et al., 2017; McMahon & Naragon-Gainey, 2020), scores on trait measures of emotion regulation, which were collected at baseline, showed relatively low correspondence with state measures of the same constructs measured during the EMA portion of the study. In fact, trait and state reappraisal showed a weak negative correlation ($r = -0.036, p = 0.026$). For self-reported maladaptive strategy use, correlations between trait and state measures were weak for rumination ($r = 0.23, p < 0.001$) and in the low moderate range for expressive suppression ($r = 0.34, p < 0.001$). Trait emotion dysregulation was moderately correlated with state emotion dysregulation ($r = 0.51, p < 0.001$). To determine within-individual associations between Level 1 (i.e., state) measures of emotion regulation, repeated measures correlations were conducted using a bootstrapping procedure in the rmcorr package in R (Bakdash & Marusich, 2017). State adaptive strategy use was positively correlated with state maladaptive strategy use ($r = 0.35, p < 0.001$) and negatively correlated with state emotion dysregulation ($r = -0.079, p < 0.001$). State maladaptive strategy use and state emotion dysregulation were positively correlated ($r = 0.23, p < 0.001$; see Figure 4 for scatterplots with individual regression lines).

**Compliance**

Inspection of responses to the three attention check questions suggested adequate attention to baseline survey items, with correct response rates ranging from 95.9% to 99.2%. Of the 122 participants who completed the baseline survey, 91 (74.6%) completed the EMA portion of the study and 86 (70.5%) completed the follow-up survey. Roughly 95% of participants who completed the EMA portion of the study went on to complete the follow-up survey. On average, participants completed 77.8% of EMA surveys, similar
to compliance rates documented in other EMA studies in adult samples (Williams et al., 2021) and slightly higher than projected in the power analyses conducted to determine sample size. As anticipated, the polyvictimized group had a relatively higher level of missingness (27.2%) relative to the moderate (19.7%) and non-exposed groups (18.6%).

**Preliminary Analyses**

The dataset consisted of 91 (individuals) x 56 (surveys administered) = 5,096 possible observations. Of the total number of surveys administered, 3,965 were completed. Panel plots were created and used to examine within-person variability for Level 1 variables, including perceived stress, emotion dysregulation, maladaptive strategy use, and adaptive strategy use. Participants were grouped by trauma exposure to facilitate comparison of patterns between non-trauma exposed, moderate exposure, and polyvictimized individuals (see Appendix F). To test multilevel modeling assumptions and identify outliers, predicted values, Level 1 residuals, and Level 2 random effects were estimated for each model. Histograms, QQ plots, and bivariate plots were then created and examined to assess normality and homoscedasticity of residuals and random effects, and to identify potential outliers. Histograms and QQ plots indicated that residuals were approximately normally distributed at Level 1 and Level 2. Bivariate scatter and box plots for each trauma exposure group suggested that the data were largely consistent with key assumptions. Examination of bivariate plots of random effects for Level 2 predictors revealed several extreme cases (i.e., individuals). I conducted sensitivity analyses and found that exclusion of these cases from the analyses did not significantly alter results, so all observations were retained for the analyses reported below. See Appendix G for sample diagnostic output.
**Hypothesis 1**

Multilevel models were used to test whether trauma exposure predicted state emotion regulation facets (i.e., dysregulation, adaptive strategy use, maladaptive strategy use) after accounting for baseline mental health symptoms.

**Adaptive Strategy Use.** Relative to the null model, the model testing trauma exposure as a predictor of state adaptive strategy use (a sum score of state reappraisal, acceptance, and problem solving) resulted in a 2% reduction in between-person variance in adaptive strategy use. Results of the omnibus test indicated a statistically significant effect of trauma exposure ($F(2, 79.72) = 4.00, p = .02$). Estimates of fixed effects are presented in Table 6. Relative to non-exposure, polyvictimization ($b = -69.56, t(79.09) = -2.31, p = .02, CI_{95} = -129.63, -9.48$) predicted less use of adaptive emotion regulation strategies in daily life. No statistically significant effect was observed for moderate exposure ($b = -32.85, t(78.74) = -1.19, p = .24, CI_{95} = -87.67, 21.96$). There was a trend toward female participants being less likely than male participants to report use of adaptive emotion regulation strategies ($b = -28.81, t(80.97) = -1.87, p = .07, CI_{95} = -59.54, 1.91$), though this effect did not reach the threshold for statistical significance.

**Maladaptive Strategy Use.** Relative to the null model, the model testing trauma exposure as a predictor of state maladaptive strategy use (a sum score of state cognitive and expressive suppression, rumination, impulsive behavior, and avoidance) resulted in a 38% reduction in between-person variance in maladaptive strategy use. Results of the omnibus test did not show a statistically significant effect ($F(2, 81.05) = 1.86, p = .16$). Estimates of fixed effects are presented in Table 7. Relative to non-exposure, neither moderate exposure nor polyvictimization were statistically significant predictors of
maladaptive strategy use \((ps > .05)\). Baseline depression \((b = 3.91, t(81.59) = 3.01, p = .004, CI_{95} = 1.32, 6.50)\) and posttraumatic stress \((b = 1.71, t(82.95) = 2.41, p = .02, CI_{95} = 0.30, 3.12)\) predicted higher levels of maladaptive strategy use. Female participants were less likely than males to report maladaptive strategy use \((b = -63.93, t(85.57) = -3.94, p < .001, CI_{95} = -96.17, -31.69)\). Across the sample, self-reported maladaptive strategy use decreased over time \((b = -0.31, t(2253.81) = -4.89, p = .001, CI_{95} = -0.44, -0.19)\).

**Emotion Dysregulation.** Relative to the null model, the model testing trauma exposure as a predictor of state emotion dysregulation resulted in a 25% reduction in between-person variance in emotion dysregulation. Results of the omnibus test did not show a statistically significant effect \((F(2, 81.16) = .016, p = .98)\). Estimates of fixed effects for emotion dysregulation are presented in Table 8. Relative to the non-exposure group, neither moderate exposure nor polyvictimization predicted state emotion dysregulation \((ps > .05)\). However, baseline depression \((b = 2.79, t(81.57) = 2.32, p = .023, CI_{95} = 0.40, 5.18)\) was a statistically significant predictor of state emotion dysregulation. Across the sample, emotion dysregulation decreased over time \((b = -0.11, t(1932.00) = -2.58, p = .023, CI_{95} = -0.20, -0.03)\).

**Hypothesis 2**

I used a multilevel model specifying within-subject sensitivity to daily stressors that I expected would be stronger for polyvictimied individuals relative to those with moderate or no trauma exposure. Results of these analyses are presented in Figures 5-8 and Tables 9-12. The figures show fitted regression lines for each individual by trauma group (no exposure, moderate, and polyvictimied), alongside thick fitted lines showing the average for each group, for perceived stress (Figure 5), emotion dysregulation (Figure
6), maladaptive strategy use (Figure 7), and adaptive strategy use (Figure 8). Visual inspection of these lines suggest that my hypotheses were not supported (i.e., slopes do not appear to differ between the groups).

Results of statistical tests are consistent with this view. Specifically, there was no statistically significant effect for the trauma exposure x within-stressor interaction for perceived stress (see Table 9), emotion dysregulation (see Table 10), maladaptive strategy use (see Table 11), or adaptive strategy use (see Table 12). For perceived stress, there was a statistically significant effect of the within stressor variable ($b = 22.90$, $t(85.95) = 3.18$, $p = .002$, $CI_{95} = 8.56, 37.23$), suggesting that experiencing a stressful does impact perceived stress. Given the coding of the trauma exposure variables and the presence of the within-stressor x moderate and within stressor x polyvictimization interaction terms in the model, this is the coefficient for within stressor for the no exposure group (i.e., perceived stress was approximately 23 units higher when individuals in this group reported a stressful event). Consistent with the findings for Hypothesis 1, there was also a statistically significant effect of time on maladaptive strategy use ($b = -0.36$, $t(883.90) = -4.59$, $p < .001$, $CI_{95} = -0.51, -0.21$).

As presented in the second panel of Tables 9-12, there was significant between-person variability in the slopes and intercepts for all trauma exposure groups. Results also revealed significant autocorrelation in Level 1 (within-person) residuals, as expected given the temporal proximity of the EMA surveys.

**Hypothesis 3**

I used a 2→1→1 mediation model to test indirect effects of polyvictimization on state depression, anxiety, and posttraumatic stress symptoms via state emotion regulation,
including maladaptive strategy use, adaptive strategy use, and emotion dysregulation. Results of all mediation analyses are presented in Figures 9-11. Because state mental health symptoms showed significant autocorrelation in all models described below ($p < .001$), the autoregressive structure was retained in the final models.

**Adaptive strategy use.** The total effect of polyvictimization on state PTS symptoms did not reach the threshold for statistical significance ($b = 28.33, 95\% CI [-5.54, 53.32], p = .10$). The indirect effect of polyvictimization on PTS symptoms via adaptive strategy also fell above the threshold for statistical significance ($b = -1.54, 95\% CI [-4.01, 0.41], p = .13$). Similarly, the total effect of polyvictimization on state depression symptoms was not statistically significant ($b = 30.98, 95\% CI [-11.63, 61.32], p = .11$). Results did not indicate a statistically significant indirect effect of polyvictimization on state depression via adaptive strategy use ($b = 0.24, 95\% CI [-0.47, 1.34], p = .32$). The total effect of polyvictimization on state anxiety symptoms was not statistically significant ($b = 17.17, 95\% CI [-19.46, 56.43], p = .34$). The indirect effect of polyvictimization on anxiety symptoms via adaptive strategy did not reach the threshold for statistical significance ($b = -4.07, 95\% CI [-9.00, 0.84], p = .14$).

At the within-person level, state adaptive strategy use was not a statistically significant predictor of concurrent state depression ($b = -0.01, 95\% CI [-0.04, 0.02], p = .26$), but did predict concurrent state anxiety ($b = 0.20, 95\% CI [0.15, 0.24], p < .001$) and state PTS symptoms ($b = 0.07, 95\% CI [0.05, 0.10], p < .001$).

**Maladaptive strategy use.** In the model testing indirect effects of trauma exposure on PTS symptoms via maladaptive strategy use, there was a statistically significant total effect of polyvictimization on state PTS symptoms ($b = 25.41, 95\% CI$
However, no indirect effect was observed via maladaptive strategy use \((b = 1.09, 95\% \text{ CI } [-5.30, 7.18], p = .72)\). Similarly, there was a significant total effect of polyvictimization on depression \((b = 29.87, 95\% \text{ CI } [0.64, 65.08], p = .04)\) but the indirect effect via maladaptive strategy use was not different from zero \((b = 0.63, 95\% \text{ CI } [-3.48, 4.61], p = .74)\). For state anxiety, the total effect of polyvictimization was not statistically significant \((b = 14.45, 95\% \text{ CI } [-26.14, 42.90], p = .40)\). Results did not indicate an indirect effect on anxiety via maladaptive strategy use \((b = 0.67, 95\% \text{ CI } [-12.50, 12.86], p = .88)\).

At the within-person level, state maladaptive strategy use predicted state mental health symptoms, including depression \((b = 0.14, 95\% \text{ CI } [0.12, 0.16], p < .001)\), anxiety \((b = 0.33, 95\% \text{ CI } [0.30, 0.37], p < .001)\), and PTS symptoms \((b = 0.23, 95\% \text{ CI } [0.21, 0.25], p < .001)\).

**Emotion dysregulation.** In the model testing the indirect effect of polyvictimization on PTS via emotion dysregulation, the total effect of polyvictimization on state PTS symptoms did not reach the threshold for statistical significance \((b = 20.31, 95\% \text{ CI } [-4.69, 52.42], p = .12)\). No indirect effect was observed for PTS symptoms via emotion dysregulation \((b = 5.74, 95\% \text{ CI } [-3.30, 13.93], p = .22)\). The model testing the indirect effect of polyvictimization on depression via emotion dysregulation yielded similar results, with the total effect falling above the threshold for statistical significance \((b = 21.21, 95\% \text{ CI } [-6.87, 58.19], p = .14)\) and no indirect effect observed via emotion dysregulation \((b = 8.24, 95\% \text{ CI } [-4.81, 20.27], p = .22)\). The total effect of polyvictimization on state anxiety symptoms was not statistically significant \((b = 5.78,
95% CI [-25.65, 38.82], \( p = .74 \) and there was no indirect effect via emotion dysregulation (\( b = 20.31, 95\% \text{ CI} [-4.69, 52.42], \ p = .12 \)).

At the within-person level, state emotion dysregulation significantly predicted state depression (\( b = 0.42, 95\% \text{ CI} [0.32, 0.39], \ p < .001 \)), state anxiety (\( b = 0.47, 95\% \text{ CI} [0.42, 0.52], \ p < .001 \)), and state PTS symptoms (\( b = 0.29, 95\% \text{ CI} [0.26, 0.31], \ p < .001 \)).

**Exploratory Analysis**

**Mental health symptoms.** Given moderate to high correlations between depression, anxiety, and posttraumatic stress scores pre- and post-EMA, a repeated measures MANOVA was used to assess change in mental health scores over time, with sex included as a covariate in the model. The omnibus test indicated that there was not a statistically significant difference in mental health symptoms across time (pre- and post-EMA) (\( F(3, 116) = 1.97, \ p = .12 \)). The interaction of time with trauma exposure approached but did not reach statistical significance (\( F(6, 232) = 2.03, \ p = .063 \)). Inspection of estimated marginal means for each group showed a decrease in depression, anxiety, and posttraumatic stress symptoms over time for the polyvictimzed group, while symptoms increased over time for the moderate and non-exposed groups. However, as noted above, these changes did not meet the threshold for statistical significance in the omnibus test. Plots of estimated marginal means for each group are presented in Figure 12.

Additionally, results of the omnibus test revealed a statistically significant effect of the time x sex interaction on mental health symptoms (\( F(3, 116) = 2.82, \ p < .042, \) partial eta squared = .068). Results of univariate tests for each dependent variable indicated a statistically significant effect of the time x sex interaction on depression,
anxiety, and posttraumatic stress symptoms ($ps < .05$). Inspection of profile plots showed that females reported a decrease in mental health symptoms from pre- to post-EMA, while men reported an increase in mental health symptoms over time.

**Emotion dysregulation.** A separate repeated measures ANOVA was used to examine changes over time in emotion dysregulation, with sex assigned at birth included in the model as a covariate. Results of the omnibus test revealed a small but statistically significant effect of time on emotion dysregulation ($F(1, 118) = 5.97, p = .016$, partial eta squared $= .048$), with a slight increase from baseline ($M = 87.22, SD = 3.73$) to follow-up ($M = 90.06, SD = 2.86$). The interaction of time with trauma exposure was not statistically significant ($F(2, 118) = 0.96, p = .39$). Change in trait emotion dysregulation over time differed for males relative to females ($F(1, 118) = 6.12, p = .015$, partial eta squared $= .049$), with females reporting a slight decrease over time while men reported an increase in trait emotion dysregulation from pre- to post-EMA. Results are presented in Figure 13.

**Emotion regulation strategy use.** Changes in trait reappraisal, suppression, and rumination from baseline to follow-up were also examined using repeated measures ANOVA. Figure 14 shows estimated marginal means pre- and post-EMA for reappraisal, suppression, and rumination, by trauma exposure group. There was no statistically significant effect of time on either reappraisal ($F(1, 118) = 0.28, p = .60$) or suppression ($F(1, 118) = <.001, p = .98$). For suppression, the interaction of time and trauma exposure approached but did not reach the threshold for statistical significance ($F(2, 118) = 2.70, p = .071$). For rumination, results indicated a small but statistically significant effect of the $time \times trauma\ exposure$ interaction ($F(2, 118) = 3.50, p = .033$, partial eta squared =
Pairwise comparisons with a Bonferroni adjustment revealed a significant decrease in trait rumination from pre- to post-EMA for the polyvictimized group (-2.18 (95% CI, 0.85 to 3.50), \( p = .002 \)), but not for the moderate exposure (-0.15 (95% CI, -1.05 to 1.35), \( p = .81 \)) or non-exposed groups (1.77 (95% CI, -5.68 to 2.15), \( p = .37 \)). Results of these analyses did not indicate sex differences in change in trait rumination, suppression, or reappraisal scores over time.
DISCUSSION

Summary and Conclusions

The present study aimed to address longstanding limitations of the polyvictimization and stress sensitization literature, using EMA to better capture the ways that emotion regulation and mental health symptoms unfold in daily life. Planned analyses tested whether polyvictimization and mental health symptoms independently predicted state emotion regulation and test indirect effects of polyvictimization on mental health symptoms via emotion regulation. Additionally, the study was designed to replicate and extend existing research on stress sensitization effects by testing polyvictimization as a moderator of the relationship between daily stressors, perceived stress, and emotion regulation. Broadly, I hypothesized that findings would be consistent with models specifying emotion regulation as a proximal risk factor following trauma exposure, with polyvictimimized individuals showing particularly pronounced difficulties regulating emotion.

Descriptives

Trauma exposure. In line with prior research (Kilpatrick et al., 2013), exposure to at least one traumatic event was the norm in the current sample, with only 5 percent of participants reporting that they had never experienced a traumatic event. The rate of polyvictimization in the current study (38%) was slightly higher than the prevalence rate.
(30%) identified in a national sample of U.S. children and adolescents that operationalized polyvictimization using the same cut-off (i.e., 5 or more victimization types; Turner et al., 2010). Given that the current sample included undergraduate students, the increased rate of polyvictimization may reflect the accumulation of additional trauma exposures during early adulthood.

However, the rate of polyvictimization was also higher than in a prior study of University of Louisville students (Bridges-Curry & Newton, 2022), which used latent class analysis to identify a polyvictimized subgroup accounting for roughly 11% of the sample. The discrepancy in rates of polyvictimization across these two studies is likely explained by methodological differences (i.e., the use of a priori cut offs vs. mixture modeling approaches). Consistent with this view, the rate of specific trauma types mirrored findings from the previous study (Bridges-Curry & Newton, 2022), with non-interpersonal trauma (i.e., man-made and natural disasters) representing the most common form of trauma exposure, while kidnapping and combat/war zone exposure were relatively rare.

The polyvictimization framework draws on evidence that distinct victimization experiences tend to ‘cluster’ or co-occur (Hamby et al., 2010, 2012; Radford et al., 2013), though reasons for this phenomenon are not fully understood. The current study found that number of trauma types reported was significantly correlated with neighborhood characteristics, including both exposure to violence and neighborhood disorder as measured by the CSI (Ewart & Suchday, 2002). These results are consistent with the idea that community factors may represent one “pathway” to polyvictimization (Finkelhor, Ormrod, Turner, et al., 2009), in which living in an under-resourced and violent
neighborhood increases risk of exposure to multiple types of traumatic experiences. Neighborhood characteristics also showed statistically significant correlations with baseline depression, anxiety, and PTS symptoms, underscoring the importance of considering social determinants of both physical and mental health (Alegría et al., 2018; Ewart & Suchday, 2002).

**Emotion regulation.** Baseline mental health symptoms were more highly correlated with trait emotion dysregulation than with trait emotion regulation strategy use, a result that aligns closely with prior cross-sectional research (Bridges-Curry & Newton, 2022; Seligowski et al., 2015). This finding may be due to overlap between DERS items and specific symptoms of depression, anxiety, and PTS and/or may be explained by the well-documented challenges of assessing emotion regulation strategy use. For example, trait measures of rumination, suppression, and reappraisal used in the current study do not account for the potential co-occurrence of strategy use across maladaptive and adaptive strategies, the possibility of sequential use of strategies, or contextual factors that may determine whether a given strategy is adaptive or maladaptive (Colombo et al., 2019; Schatten et al., 2019).

Consistent with prior research (Brockman et al., 2017), the current study found significant discrepancies between trait and state measures of emotion regulation strategies, with correlations in the weak to low moderate range for both adaptive and maladaptive strategies. Trait emotion dysregulation showed only moderate correspondence with state emotion dysregulation. Interestingly, state maladaptive and adaptive strategy use were positively correlated, suggesting that some individuals may be more likely to use strategies and/or may be more aware of strategy use than others. State
maladaptive strategy use was also positively correlated with state emotion dysregulation. This finding may reflect links between maladaptive strategy use and increased dysregulation (i.e., the result of ineffective emotion regulation), consistent with process models of emotion regulation (Gross, 2015b).

**Level 1 variables.** School or work problems were by far the most common form of stressor reported in the EMA surveys, consistent with research highlighting high rates of academic stress among college students (Barbayannis et al., 2022). In comparison, discrimination was the least commonly reported type of stressor, accounting for less than 1% of stressors reported. This finding is surprising given higher rates of discriminatory experiences identified in prior studies of undergraduates. For examples, Stevens et al. (2018) found that between 5-15% of students experienced past-year discrimination. This discrepancy may reflect the relatively brief time frame of the current study (two weeks vs. past-year or lifetime), characteristics of the University of Louisville undergraduate sample, or the item language assessing discrimination in the EMA surveys (“discrimination on the basis of race, sex, or age”), which might not capture discrimination based on other factors. Participants reported more than one type of stressor in roughly one-third of surveys, suggesting that undergraduate students are often grappling with stressors beyond those related to their coursework.

Mental health symptoms showed greater variability between than within persons, suggesting relative stability of these symptoms over time and potentially reflecting differences between individuals with or without diagnosable mental health disorders. Between person variability was particularly pronounced for PTS and depression, whereas anxiety symptoms showed relatively high variability over time. Interestingly, between-
person variability accounted for more than half of variance in strategy use and
dysregulation, suggesting that strategy use and dysregulation vary more across
individuals than across time. In contrast, within-person fluctuations accounted for more
than 60% of the variance in perceived stress, consistent with the idea that perceived stress
may be more prone to fluctuations due to environmental factors (e.g., a stressful event)
than mental health symptoms, which may be better explained by person-specific factors
(e.g., a current diagnosis of major depressive disorder or PTSD).

Hypothesis 1

Hypothesis 1 tested whether trauma exposure predicted state emotion regulation
after accounting for effects of baseline mental health symptoms. Findings were mixed,
indicating a significant effect of trauma exposure on adaptive strategy use but not
maladaptive strategy use or emotion dysregulation. The null findings for maladaptive
strategy use and emotion dysregulation run contrary to prior research, which has
consistently identified cross-sectional associations between trauma exposure and emotion
dysregulation (Barnes et al., 2016; Bridges-Curry & Newton, 2022; Charak et al., 2019b;
Hasselle et al., 2017). However, this literature has typically relied on retrospective report
of trait emotion regulation and has not accounted for potential contributions of existing
mental health symptoms to the use of maladaptive emotion regulation strategies and
emotion dysregulation. Indeed, the current study found that baseline depression predicted
both maladaptive strategy use and emotion dysregulation. Consistent with prior EMA
research (Short et al., 2018; Tull et al., 2007), baseline PTS symptoms also predicted
state maladaptive strategy use.
A contrasting pattern of findings was evident for adaptive strategy use, with polyvictimization but not moderate exposure predicting lower use of adaptive emotion regulation strategies (i.e., a sum score of reappraisal, acceptance, and problem solving). Reduced use of adaptive emotion regulation strategies among polyvictimized individuals is well-aligned with the conceptualization that polyvictimization individuals may not be exposed to modeling of effective emotion regulation skills (Charak et al., 2019b). However, to my knowledge, this is the first study to directly test the relationships between polyvictimization and adaptive strategy use in daily life.

The finding that baseline mental health symptoms predicted maladaptive strategy use and dysregulation but did not predict adaptive strategy use adds to a growing literature indicating inconsistent relationships between adaptive emotion regulation and mental health symptoms (Aldao et al., 2010; Domínguez-Sánchez et al., 2013; Ehring et al., 2010; Martins et al., 2016). Specifically, and in contrast to the current findings, a previous EMA study in an undergraduate sample found that anxiety and depression predicted increased use of both adaptive as well as maladaptive strategies, though observed associations were stronger for maladaptive than adaptive strategy use (Alawadhi et al., 2023).

Taken together, results of these analyses call into question the assumption that emotion regulation difficulties – specifically maladaptive strategy use and dysregulation – observed among trauma exposed groups exist independent of acute mental health symptoms. Instead, growing evidence attests to baseline mental health symptoms as predictors of state emotion regulation strategy use (Alawadhi et al., 2023; Liu et al., 2023; Short et al., 2018; Tull et al., 2007) and the likelihood of a bidirectional
relationship between these constructs cannot be discounted. Discrepancies between the current findings and prior research also highlight the importance of research using longitudinal designs, experience sampling approaches, and multi-method assessment of emotion regulation to address common-method variance. Additionally, the absence of a consistent association between baseline mental health symptoms and state adaptive strategy use in the present study – and in the broader emotion regulation literature – underscores the need for methodological approaches that capture relevant contextual factors, including potential co-occurrence or sequencing of emotion regulation strategies (Aldao et al., 2014, 2016; Blanke et al., 2019; Martins et al., 2016).

**Hypothesis 2**

Hypothesis 2 was designed to test the stress sensitization hypothesis. Specifically, I expected that the relationship of daily stressors with state perceived stress and emotion regulation difficulties would differ based on level of trauma exposure. Results did not support this hypothesis. Across the sample, experiencing a stressful event was associated with increased perceived stress, but did not show a significant effect on maladaptive strategy use, adaptive strategy use, or emotion dysregulation. This finding suggests that relative to strategy use and dysregulation, perceived stress may be more likely to fluctuate in response to daily stressors. An individual’s tendency to use emotion regulation strategies or experience dysregulation may be more stable over time and circumstance or might shift significantly only above a certain threshold for stress (e.g., in response to highly stressful events or stressors of a certain type).

Moreover, individuals in the polyvictimized and moderate exposure groups did not show higher levels of perceived stress, maladaptive emotion regulation strategies, or
emotion dysregulation in response to experiencing a stressful event. Trauma-exposed individuals also did not report lower levels of adaptive strategy use when coping with stressful events in daily life. While prior research using trait measures and cross-sectional designs has offered significant support for the stress sensitization hypothesis (e.g., McLaughlin et al., 2010, 2020), the current findings add to a small but growing body of research investigating stress sensitization using EMA, which have not consistently demonstrated increased sensitivity to stress on the basis of trauma exposure alone (Rauschenberg et al., 2017, 2021, 2022).

Specifically, Rauschenberg et al. found evidence of stress sensitization effects (i.e., negative affect in response to daily stressors) for adolescents and young adults seeking mental health services but not for community controls. This finding suggests that factors that lead to treatment seeking (e.g., lack of social support, higher symptom severity, comorbid mental health conditions; Rauschenberg et al., 2017) might shape sensitivity to daily stressors among trauma-exposed individuals. In addition to methodological differences, operationalization of stress sensitization varies significantly across this literature (Stroud, 2020) and may contribute to discrepant findings, including those documented in the current study.

**Hypothesis 3**

Based on the existing literature, I predicted that there would be an indirect effect of trauma exposure on state mental health symptoms via state emotion regulation. Contrary to my hypotheses, polyvictimization did not consistently predict state depression, anxiety, or PTS symptoms when compared to moderate exposure. At the within-person level, state emotion regulation was significantly associated with state
mental health symptoms. Specifically, maladaptive strategy use and emotion dysregulation were associated with increased depression, anxiety, and PTS symptoms. Adaptive strategy use (i.e., reappraisal, acceptance, and problem solving) also predicted increased anxiety and PTS symptoms. While counterintuitive, the role of adaptive strategy use in the etiology and maintenance of mental health symptoms has yet to fully explicated, with numerous studies showing inconsistent and mixed findings (Aldao et al., 2010; Domínguez-Sánchez et al., 2013; Ehring et al., 2010; Martins et al., 2016).

Given the cross-sectional nature of the analyses used to test Hypothesis 3, the within-person associations between emotion regulation and mental health symptoms may also be interpreted as evidence that individuals experiencing acute mental health symptoms are more likely to attempt emotion regulation strategies. For example, it is possible that experiencing higher levels of anxiety and PTS symptoms increases contemporaneous attempts at both maladaptive and adaptive strategies but undermines the efficacy of these efforts. Indeed, recent research has found that individuals with high levels of trauma exposure (Wooten et al., 2022) and mental disorders (Alawadhi et al., 2023; Visser et al., 2018) may show similar or higher rates of adaptive strategy use but differ from their peers in terms of the efficacy of these efforts.

While the multilevel mediation analyses detected significant within-person effects, there was no indirect effect of polyvictimization on state depression, anxiety, or PTS symptoms via state maladaptive strategy use, adaptive strategy use, or dysregulation. These findings stand in contrast to prior research using trait measures of emotion regulation and mental health symptoms, which have documented cross-sectional (Bridges-Curry & Newton, 2022; Demir et al., 2020) and prospective prediction of
mental health symptoms via emotion regulation for trauma exposed individuals (Bardeen et al., 2013; Heleniak et al., 2016; Kim-Spoon et al., 2013). The apparent discrepancy between studies using trait and state measures of emotion regulation is concerning. Specifically, it raises the possibility that prior research has overstated a potential mediating role of emotion regulation due to common-method variance and/or biased reporting of emotion regulation as a result of acute mental health symptoms (Schatten et al., 2019).

**Exploratory Aims**

As an exploratory aim, I tested potential self-monitoring effects on mental health symptoms and emotion regulation, and whether changes from baseline to follow-up differed on the basis of trauma exposure. Prior research suggests that self-monitoring may improve internalizing (Bakker & Rickard, 2018; Korotitsch & Nelson-Gray, 1999; Kramer et al., 2014) and PTS symptoms (Ehlers & Clark, 2000; Hardy & Stallard, 2008; Tarrier et al., 1999). However, because the current analyses were exploratory, no specific hypotheses were made. Results revealed a significant time x sex interaction, with females showing a decrease in mental health symptoms over time, while men reported an increase from pre- to post-EMA. Descriptively, mental health symptoms decreased for the polyvictimized group over the EMA period and increased for the moderate and non-exposed groups. Though this trend did not reach the threshold for statistical significance, these findings are in line with prior research showing that self-monitoring only benefits a subset of individuals (Hardy & Stallard, 2008; Tarrier et al., 1999).

Relative to mental health symptoms, less is known about the potential effects of monitoring emotion regulation strategy use or dysregulation. In the current study, females
showed a decrease in trait emotion dysregulation over time and men showed an increase over time. For emotion regulation strategies, only rumination changed significantly over time, with polyvictimied individuals showing a slight decrease in rumination at follow-up. It is unclear why certain groups (e.g., males vs. females, polyvictimied individuals vs. those with less pervasive patterns of exposure) would benefit more from self-monitoring of emotion regulation strategies than others and why these trends would be observed for rumination but not reappraisal or suppression. However, these preliminary findings support the potential utility of self-monitoring of certain emotion regulation facets for certain groups. While observed effects were small, additional research is warranted to elucidate factors that might accentuate or attenuate the efficacy of self-monitoring as an intervention for emotion regulation difficulties.

The finding of a significant time x sex interaction on mental health symptoms and emotion dysregulation, with men reporting increased symptoms and dysregulation over time, may be of particular interest for future research. Although preliminary, these results raises the possibility that heightened awareness of symptoms is less helpful for males than for females and is consistent with prior research documenting increased symptomatology among male undergraduate students with higher levels of emotional awareness (Bridges-Curry et al., 2021). In the context of traditional masculine gender norms, which stigmatize emotional experiences (e.g., Neilson et al., 2020) and discourage help-seeking behaviors (e.g., Seidler et al., 2016), it is possible that increased awareness of mental health symptoms and dysregulation among men may contribute to increased distress and symptomatology.
Limitations

Several limitations of the current study should be noted. While lower rates of survey completion among polyvictimized individuals is consistent with arguments against the use of compliance thresholds (e.g., Murray et al., 2021), difficulty with imputation of EMA data may have resulted in reduced power in the current study. The relatively small size of the non-exposed group, which accounted for roughly 5% of the sample, may have also contributed to reduced power. For the mediation analyses, low rates of non-exposure precluded comparison of polyvictimization with non-exposure, which might be more likely to reveal significant effects of trauma exposure on emotion regulation and mental health symptoms. Additionally, given that the current sample consisted predominately of female undergraduate students, findings may not generalize to other populations. Also related to sample characteristics, school- and work-related stressors were by far the most common type of stressor reported in the current study. The rate of school-related stressors is highly specific to student samples, and findings might not generalize to other life stages or contexts. Despite a high percentage of surveys indicating multiple recent stressful experiences, the stressor variable used in the analyses was also summed and dichotomized (0 = no stressor, 1 = at least one stressor reported), which fails to account for potential differences in reactivity based on stressor type or cumulative load of recent stressors.

While EMA offers advantages over trait report of emotion regulation, approaches to measuring emotion regulation used in the current study nevertheless carry several limitations. Emotion regulation was assessed using self-reported strategy use and
dysregulation. It is possible that mental health symptoms and/or trauma exposure could impact an individual’s awareness of strategy use or contribute to biased reporting due to higher levels of acute distress (Schatten et al., 2019). Incorporating other-reported and objective measures of emotion regulation could help address these concerns. Indeed, in one of the few studies testing longitudinal associations between polyvictimization and emotion regulation, emotion regulation difficulties (e.g., inappropriate emotional expression, mood lability, lack of emotional awareness) and mental health symptoms were assessed using other-report (Kim & Cicchetti, 2010). Interestingly, findings of this study were consistent with an indirect effect of trauma exposure on symptomatology via emotion regulation difficulties. Moving beyond self-reported emotion regulation in future EMA studies could help shed light on the efficacy of emotion regulation strategies and offer a more objective measure of state (dys)regulation.

In addition to relying on self-report, the current study summed specific strategies (e.g., reappraisal, problem-solving, etc.) to create total scores for maladaptive and adaptive emotion regulation. While this approach is consistent with prior research (e.g., Short et al., 2018), examining the role of individual strategies could yield different results – particularly if individual strategies are differentially associated with particular mental health outcomes (i.e., depression, anxiety, or PTS). For example, Short et al. (2018) found that individuals with PTSD used avoidance more often than other emotion regulation strategies, whereas rumination is a hallmark feature of depression (Davidson et al., 2002). Related to this point, this approach to operationalizing emotion regulation does not capture the full complexity of these processes (e.g., whether strategies are used sequentially or maintained over time).
These limitations are particularly notable given a growing body of evidence that flexible and context-appropriate use of strategies is more important than whether the strategy is typically considered adaptive or maladaptive (Colombo et al., 2019; Pavlacic et al., 2022; Schatten et al., 2019). For example, in an EMA study, Visser et al. (2018) found that relative to healthy controls, individuals diagnosed with schizophrenia initiated emotion regulation at lower levels of distress, attempted to use a greater number of strategies, and attempted strategies that were less appropriate to the context. Preliminary evidence also suggests that trauma exposure may impact efficacy of adaptive emotion regulation strategies. Specifically, Wooten et al. (2022) found that reappraisal was less effective for adults reporting higher levels of trauma exposure compared to those reporting lower levels of exposure. In recognition of these complexities, emotion regulation researchers have called for studies that more fully assess emotion regulation flexibility and relevant contextual factors (Colombo et al., 2019; English & Eldesouky, 2020; Schatten et al., 2019).

Additional limitations of the current study relate to the cross-sectional nature of the analytic approaches used to test Hypotheses 2 and 3. Specifically, while the EMA portion of the study spanned a two-week period, these analyses tested cross-sectional effects of stressor on perceived stress or emotion regulation (Hypothesis 2) and of state emotion regulation on psychological symptoms (Hypothesis 3), with all Level 1 variables assessed during the same survey. It is possible the findings would differ had the analyses tested prospective prediction of the dependent variables (for example, see Short et al., 2018). For the mediation analyses specifically, the observed within-person effects of emotion regulation on mental health symptoms do not elucidate temporal or causal
relations between the constructs – and may overstate the size of these effects due to
common-methods variance. Indeed, a recent meta-analyses of experience sampling
studies found a pattern of larger effect sizes when relations between emotion regulation
and affect were tested contemporaneously than when tested prospectively (Boemo et al.,
2022). Cross-sectional approaches fall short of elucidating the complexities of the
relations between daily stressors, emotion regulation, and psychological symptoms.

**Future Directions**

The limitations detailed above underscore the need for methodological rigor in
testing temporal and causal links between trauma exposure, proximal risk factors, and
psychological symptoms. Experience sampling methodologies are well-suited to
investigating these topics but there remains relatively little theoretical guidance on
designing these types of studies (English & Eldesouky, 2020). Koval and Kalokerinos (in
press) offer a model for EMA studies that incorporates the identification, selection, and
implementation phases of the emotion regulation process. They also highlight the need
for research to establish psychometrically strong measures of state emotion regulation,
increase insight into potential measurement reactivity (i.e., how measuring emotion
regulation in daily life might change regulatory efforts), and shed light on the timescale
of emotion regulation and related processes. Addressing these issues is foundational to
future emotion regulation research using experience sampling methodologies.

Findings of the current study also point to multiple areas for future investigation,
including studies leveraging objective measures of emotion regulation and exploring
salient contextual factors (e.g., stressor type). Studies that incorporate biophysical
and/or task measures of emotion regulation alongside state self-report would shed light
on the validity of commonly-used state measures of these constructs, including items assessing strategy use and emotion dysregulation (e.g., the S-DERS). Analytic designs that account for auto-regressive effects and test prospective relations between stress, emotion regulation, and mental health symptoms are needed to address limitations of the literature, including the current study. Lagged designs (e.g., Short et al., 2018) and multilevel structural equation modeling (MSEM) approaches are well-suited to analyzing the intensive longitudinal data gathered in experience sampling studies.

Research in larger samples may assist in explicating discrepancies between the current findings and prior polyvictimization research. Specifically, a larger sample would confer adequate power to identify trauma exposure subgroups empirically using person-centered methods (e.g., latent class analysis). The a priori operationalization of polyvictimization in the current study (i.e., 5+ trauma types), which resulted in a larger polyvictimized subgroup than prior research in the UofL subject pool (Bridges-Curry & Newton, 2022), may be one reason that results did not align with prior cross-sectional research. Given that non-exposure appears to be relatively rare, a larger sample would help ensure adequate numbers in the non-exposed reference group and increase statistical power.

While the current sample was relatively diverse in terms of race/ethnicity and SES, there remains a significant need for research among diverse and underserved populations, who face disproportionate rates of exposure to traumatic experiences (Kilpatrick et al., 2013). Findings of studies leveraging EMA methods to elucidate the role of emotion regulation in the etiology and maintenance of trauma-related mental health symptoms would help inform effective intervention strategies for those at highest
risk of poor outcomes. For example, researchers at Emory University are currently testing an emotion regulation-focused intervention in trauma-exposed Black pregnant women (Dialectical Behavior Therapy for Moms to Be; Lott, 2022). Similarly, research with active duty and veteran samples could help clarify the relative impact of combat exposure and potential co-occurrence of combat exposure with other forms of traumatic experiences.

Trauma exposure is a well-documented transdiagnostic risk factor and reactions to trauma exposure are heterogenous (Cyr et al., 2017; Galatzer-Levy et al., 2018). Perhaps related to this reality, current trauma-focused treatments (i.e., PE and CPT) are not universally effective or acceptable (Najavits, 2015; Steenkamp et al., 2015) and may not fully address co-morbid conditions. Experience sampling approaches such as the one used in the current study could be extended to clinical settings to inform more personalized and targeted interventions for trauma survivors. Specifically, leveraging these methodologies at the idiographic level could shed light on facets of emotion regulation that are most important in the etiology and maintenance of symptomatology for a given individual. While the literature exploring these possibilities is nascent, interventions guided by this type of information may be more effective due to targeting transdiagnostic risk factors and personalization of the treatment (Rodebaugh et al., 2020).
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### TABLES

#### Descriptives

Table 1. Participant demographic information

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**Table 2.** Descriptive Statistics for Trait Mental Health Symptoms and Emotion Regulation

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<td>16.67</td>
<td>7.39</td>
<td>7.00-25.00</td>
<td>3 (50.0)</td>
</tr>
<tr>
<td>Moderate exposure</td>
<td>18.16</td>
<td>6.10</td>
<td>7.00-32.00</td>
<td>29 (46.0)</td>
</tr>
<tr>
<td>Polyvictimized</td>
<td>21.63</td>
<td>7.79</td>
<td>7.00-35.00</td>
<td>33 (64.7)</td>
</tr>
<tr>
<td>Trait reappraisal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full sample</td>
<td>27.08</td>
<td>6.83</td>
<td>12.00-42.00</td>
<td>-</td>
</tr>
<tr>
<td>Non-exposed</td>
<td>27.00</td>
<td>7.67</td>
<td>18.00-38.00</td>
<td>-</td>
</tr>
<tr>
<td>Moderate exposure</td>
<td>26.47</td>
<td>6.27</td>
<td>12.00-41.00</td>
<td>-</td>
</tr>
<tr>
<td>Polyvictimized</td>
<td>27.82</td>
<td>7.43</td>
<td>14.00-42.00</td>
<td>-</td>
</tr>
<tr>
<td>Trait rumination</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full sample</td>
<td>23.84</td>
<td>5.86</td>
<td>10.00-40.00</td>
<td>-</td>
</tr>
<tr>
<td>Non-exposed</td>
<td>20.83</td>
<td>2.64</td>
<td>17.00-24.00</td>
<td>-</td>
</tr>
<tr>
<td>Moderate exposure</td>
<td>22.98</td>
<td>5.58</td>
<td>10.00-37.00</td>
<td>-</td>
</tr>
<tr>
<td>Polyvictimized</td>
<td>25.25</td>
<td>6.19</td>
<td>11.00-40.00</td>
<td>-</td>
</tr>
<tr>
<td>Trait suppression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full sample</td>
<td>15.51</td>
<td>5.62</td>
<td>4.00-28.00</td>
<td>-</td>
</tr>
<tr>
<td>Non-exposed</td>
<td>12.00</td>
<td>3.95</td>
<td>8.00-18.00</td>
<td>-</td>
</tr>
<tr>
<td>Moderate exposure</td>
<td>14.75</td>
<td>5.02</td>
<td>4.00-24.00</td>
<td>-</td>
</tr>
<tr>
<td>Polyvictimized</td>
<td>16.86</td>
<td>6.19</td>
<td>4.00-28.00</td>
<td>-</td>
</tr>
<tr>
<td>Trait dysregulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full sample</td>
<td>91.04</td>
<td>26.57</td>
<td>44.00-153.00</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 3. Rate of Types of Trauma Exposure

<table>
<thead>
<tr>
<th>Trauma type</th>
<th>LTVH item</th>
<th>n (%) endorsed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural disaster</td>
<td>40 (32.8)</td>
<td></td>
</tr>
<tr>
<td>Man-made disaster</td>
<td>67 (54.9)</td>
<td></td>
</tr>
<tr>
<td>Serious accident</td>
<td>23 (18.9)</td>
<td></td>
</tr>
<tr>
<td>Exposure to toxic chemicals</td>
<td>11 (9.0)</td>
<td></td>
</tr>
<tr>
<td>Combat/war zone exposure</td>
<td>4 (3.3)</td>
<td></td>
</tr>
<tr>
<td>Combat</td>
<td>3 (2.5)</td>
<td></td>
</tr>
<tr>
<td>War zone</td>
<td>3 (2.5)</td>
<td></td>
</tr>
<tr>
<td>Physical assault</td>
<td>59 (48.4)</td>
<td></td>
</tr>
<tr>
<td>Physically assaulted</td>
<td>42 (34.4)</td>
<td></td>
</tr>
<tr>
<td>Threatened with weapon/object</td>
<td>25 (20.5)</td>
<td></td>
</tr>
<tr>
<td>Threatened face-to-face</td>
<td>51 (41.8)</td>
<td></td>
</tr>
<tr>
<td>Assaulted with weapon/object</td>
<td>7 (5.7)</td>
<td></td>
</tr>
<tr>
<td>Physical abuse (before age 12)</td>
<td>30 (24.6)</td>
<td></td>
</tr>
</tbody>
</table>
Sexual abuse/assault  
- Forced into sexual activity: 40 (32.8)
- Forced into sexual activity (attempted): 54 (44.3)
- Molestation other than reported above: 42 (34.4)

Network trauma  
- Murder of family member/partner/friend: 18 (14.8)
- Witnessed murder-serious injury: 23 (18.9)
- Suicide of family member/partner/friend: 29 (23.8)

Witnessed violence  
- Seen dead body: 26 (21.3)
- Witnessed physical assault: 37 (30.3)
- Witnessed sexual assault: 5 (4.1)

Crime  
- Property damage/destruction: 37 (30.3)
- Theft with force: 3 (2.5)
- Theft with force (attempted): 4 (3.3)
- Broken into dwelling when present: 29 (23.8)
- Broken into dwelling when away: 10 (8.2)
- Theft without force: 31 (25.4)

Kidnapping  
- 2 (1.6)

Stalking  
- 27 (22.1)

Other  
- 30 (24.6)

Table 4. Correlations of Level 2 Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Anxiety</td>
<td>.77**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. PTS</td>
<td>.80**</td>
<td>.807**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Reappraisal</td>
<td>-.239**</td>
<td>-.229*</td>
<td>-.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Suppression</td>
<td>.26**</td>
<td>0.15</td>
<td>.24**</td>
<td>.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Rumination</td>
<td>.53**</td>
<td>.56**</td>
<td>.58**</td>
<td>.12</td>
<td>.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Dysregulation</td>
<td>.73**</td>
<td>.74**</td>
<td>.71**</td>
<td>-.33**</td>
<td>.34**</td>
<td>.51**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Neighborhood disorder</td>
<td>.25**</td>
<td>.34**</td>
<td>.42**</td>
<td>.027</td>
<td>.28**</td>
<td>.24**</td>
<td>.26**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Exposure to violence</td>
<td>.32**</td>
<td>.36**</td>
<td>.45**</td>
<td>.15</td>
<td>.35**</td>
<td>.21*</td>
<td>.10</td>
<td>.65**</td>
<td></td>
</tr>
<tr>
<td>10. Number of trauma types</td>
<td>.36**</td>
<td>.35**</td>
<td>.57**</td>
<td>.046</td>
<td>.19*</td>
<td>.35**</td>
<td>.33**</td>
<td>.42**</td>
<td>.43**</td>
</tr>
</tbody>
</table>
*p < .01, **p < .001 (two-tailed)

Table 5. Descriptive Statistics for Level 1 Variables

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>% between persons variability</th>
<th>% within persons variability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stressor</td>
<td>-</td>
<td>-</td>
<td>29.5</td>
<td>70.5</td>
</tr>
<tr>
<td>State perceived stress</td>
<td>28.11</td>
<td>27.93</td>
<td>36.1</td>
<td>63.9</td>
</tr>
<tr>
<td>State depression</td>
<td>70.09</td>
<td>98.66</td>
<td>72.9</td>
<td>27.1</td>
</tr>
<tr>
<td>State anxiety</td>
<td>122.21</td>
<td>118.95</td>
<td>59.1</td>
<td>40.9</td>
</tr>
<tr>
<td>State PTS</td>
<td>75.64</td>
<td>78.68</td>
<td>74.4</td>
<td>25.6</td>
</tr>
<tr>
<td>State adaptive ER</td>
<td>132.69</td>
<td>77.73</td>
<td>51.6</td>
<td>48.4</td>
</tr>
<tr>
<td>State maladaptive ER</td>
<td>163.86</td>
<td>96.82</td>
<td>58.9</td>
<td>41.1</td>
</tr>
<tr>
<td>State ED</td>
<td>91.91</td>
<td>75.21</td>
<td>68.2</td>
<td>31.8</td>
</tr>
</tbody>
</table>

Note: Table presents grand mean and SD for Level 1 variables. Stressor is a binary variable and thus no mean or SD are reported. PTS = posttraumatic stress, ER = emotion regulation, ED = emotion dysregulation.

Hypothesis 1

Table 6. Parameter Estimates for Multilevel Model of Adaptive Strategy Use as a Function of Trauma Exposure, Accounting for Baseline Mental Health Symptoms

<table>
<thead>
<tr>
<th>Fixed effects (intercept, slopes)</th>
<th>Estimate</th>
<th>(SE)</th>
<th>t</th>
<th>p^</th>
<th>CI95 Lower</th>
<th>CI95 Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>233.06</td>
<td>37.72</td>
<td>6.18</td>
<td>&lt;.001</td>
<td>158.01</td>
<td>308.11</td>
</tr>
<tr>
<td>Time</td>
<td>-0.09</td>
<td>0.06</td>
<td>-1.55</td>
<td>0.12</td>
<td>-0.20</td>
<td>0.02</td>
</tr>
<tr>
<td>Sex</td>
<td>-28.81</td>
<td>15.44</td>
<td>-1.87</td>
<td>0.07</td>
<td>-59.54</td>
<td>1.91</td>
</tr>
<tr>
<td>Moderate^b</td>
<td>-32.85</td>
<td>27.54</td>
<td>-1.19</td>
<td>0.24</td>
<td>-87.67</td>
<td>21.96</td>
</tr>
<tr>
<td>Polyvictimization^b</td>
<td>-69.56</td>
<td>30.18</td>
<td>-2.31</td>
<td><strong>0.02</strong></td>
<td>-129.63</td>
<td>-9.48</td>
</tr>
<tr>
<td>Baseline anxiety</td>
<td>2.29</td>
<td>1.63</td>
<td>1.40</td>
<td>0.17</td>
<td>-0.96</td>
<td>5.54</td>
</tr>
<tr>
<td>Baseline depression</td>
<td>0.13</td>
<td>1.24</td>
<td>0.11</td>
<td>0.92</td>
<td>-2.34</td>
<td>2.60</td>
</tr>
<tr>
<td>Baseline posttraumatic stress</td>
<td>0.25</td>
<td>0.67</td>
<td>0.38</td>
<td>0.71</td>
<td>-1.09</td>
<td>1.60</td>
</tr>
</tbody>
</table>

Note: N = 91 individuals, 56 surveys administered, 5,096 possible observations (3,965 total surveys completed).

^aOne-tailed p-values used for variances, which must be non-negative. All other analyses used two-tailed p-values.

^bTrauma exposure (i.e., no exposure, moderate, polyvictimization) was dummy coded, with no exposure specified as the reference category.

Table 7. Parameter Estimates for Multilevel Model of Maladaptive Strategy Use as a Function of Trauma Exposure, Accounting for Baseline Mental Health Symptoms
<table>
<thead>
<tr>
<th>Fixed effects (intercept, slopes)</th>
<th>Estimate</th>
<th>(SE)</th>
<th>t</th>
<th>( p^a )</th>
<th>CI(_{95} )</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>307.41</td>
<td>39.56</td>
<td>7.77</td>
<td>&lt;.001</td>
<td>228.70 - 386.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-0.31</td>
<td>0.06</td>
<td>-4.89</td>
<td>&lt;.001</td>
<td>-0.44 - 0.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>-63.93</td>
<td>16.21</td>
<td>-3.94</td>
<td>&lt;.001</td>
<td>-96.17 - 31.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate(^b)</td>
<td>-7.80</td>
<td>28.84</td>
<td>-0.27</td>
<td>0.79</td>
<td>-65.20 - 49.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyvictimization(^b)</td>
<td>-37.33</td>
<td>31.62</td>
<td>-1.18</td>
<td>0.24</td>
<td>-100.26 - 25.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline anxiety</td>
<td>-0.65</td>
<td>1.72</td>
<td>-0.38</td>
<td>0.71</td>
<td>-4.06 - 2.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline depression</td>
<td>3.91</td>
<td>1.30</td>
<td>3.01</td>
<td>0.00</td>
<td>-1.32 - 6.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline posttraumatic stress</td>
<td>1.71</td>
<td>0.71</td>
<td>2.41</td>
<td>0.02</td>
<td>0.30 - 3.12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: \( N = 91 \) individuals, 56 surveys administered, 5,096 possible observations (3,965 total surveys completed).

\( ^a \)One-tailed \( p \)-values used for variances, which must be non-negative. All other analyses used two-tailed \( p \)-values.

\( ^b \)Trauma exposure (i.e., no exposure, moderate, polyvictimization) was dummy coded, with no exposure specified as the reference category.

Table 8. Parameter Estimates for Multilevel Model of Emotion Dysregulation as a Function of Trauma Exposure, Accounting for Baseline Mental Health Symptoms

<table>
<thead>
<tr>
<th>Fixed effects (intercept, slopes)</th>
<th>Estimate</th>
<th>(SE)</th>
<th>t</th>
<th>( p^a )</th>
<th>CI(_{95} )</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>106.20</td>
<td>36.51</td>
<td>2.91</td>
<td>0.01</td>
<td>33.58 - 178.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-0.11</td>
<td>0.04</td>
<td>-2.58</td>
<td>0.01</td>
<td>-0.20 - 0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>-7.06</td>
<td>14.94</td>
<td>-0.47</td>
<td>0.64</td>
<td>-36.78 - 22.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate(^b)</td>
<td>4.29</td>
<td>26.70</td>
<td>0.16</td>
<td>0.87</td>
<td>-48.83 - 57.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyvictimization(^b)</td>
<td>3.00</td>
<td>29.25</td>
<td>0.10</td>
<td>0.92</td>
<td>-55.21 - 61.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline anxiety</td>
<td>0.59</td>
<td>1.58</td>
<td>0.37</td>
<td>0.71</td>
<td>-2.55 - 3.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline depression</td>
<td>2.79</td>
<td>1.20</td>
<td>2.32</td>
<td>0.02</td>
<td>0.40 - 5.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline posttraumatic stress</td>
<td>0.82</td>
<td>0.65</td>
<td>1.26</td>
<td>0.21</td>
<td>-0.48 - 2.12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: \( N = 91 \) individuals, 56 surveys administered, 5,096 possible observations (3,965 total surveys completed).

\( ^a \)One-tailed \( p \)-values used for variances, which must be non-negative. All other analyses used two-tailed \( p \)-values.

\( ^b \)Trauma exposure (i.e., no exposure, moderate, polyvictimization) was dummy coded, with no exposure specified as the reference category.
Table 9. Parameter Estimates for Multilevel Model of Perceived Stress as a Function of Daily Stressors and Trauma Exposure

<table>
<thead>
<tr>
<th>Fixed effects (intercept, slopes)</th>
<th>Estimate</th>
<th>(SE)</th>
<th>( t^a )</th>
<th>( p^b )</th>
<th>CI(_{95}) Lower</th>
<th>CI(_{95}) Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>28.78</td>
<td>6.79</td>
<td>4.24</td>
<td>&lt;.001</td>
<td>15.30</td>
<td>42.27</td>
</tr>
<tr>
<td>Time</td>
<td>-0.03</td>
<td>0.02</td>
<td>-1.35</td>
<td>0.18</td>
<td>-0.07</td>
<td>0.01</td>
</tr>
<tr>
<td>Sex</td>
<td>-3.38</td>
<td>2.62</td>
<td>-1.29</td>
<td>0.20</td>
<td>-8.59</td>
<td>1.84</td>
</tr>
<tr>
<td>Within stressor</td>
<td>22.90</td>
<td>7.21</td>
<td>3.18</td>
<td><strong>0.002</strong></td>
<td>8.56</td>
<td>37.23</td>
</tr>
<tr>
<td>Moderate(^c)</td>
<td>6.74</td>
<td>5.56</td>
<td>1.21</td>
<td>0.23</td>
<td>-4.32</td>
<td>17.81</td>
</tr>
<tr>
<td>Polyvictimization(^c)</td>
<td>6.78</td>
<td>5.65</td>
<td>1.20</td>
<td>0.23</td>
<td>-4.45</td>
<td>18.01</td>
</tr>
<tr>
<td>Within stressor by moderate</td>
<td>7.59</td>
<td>7.54</td>
<td>1.01</td>
<td>0.32</td>
<td>-7.40</td>
<td>22.57</td>
</tr>
<tr>
<td>Within stressor by polyvictimization</td>
<td>10.23</td>
<td>7.72</td>
<td>1.33</td>
<td>0.19</td>
<td>-5.12</td>
<td>25.58</td>
</tr>
<tr>
<td>Between stressor</td>
<td>29.09</td>
<td>14.90</td>
<td>1.95</td>
<td>0.05</td>
<td>-0.53</td>
<td>58.71</td>
</tr>
<tr>
<td>Between stressor by moderate</td>
<td>19.24</td>
<td>15.80</td>
<td>1.22</td>
<td>0.23</td>
<td>-12.17</td>
<td>50.64</td>
</tr>
<tr>
<td>Between stressor by polyvictimization</td>
<td>18.94</td>
<td>16.16</td>
<td>1.17</td>
<td>0.24</td>
<td>-13.17</td>
<td>51.05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Random effects ([co]-variances)</th>
<th>Estimate</th>
<th>(SE)</th>
<th>( z )</th>
<th>( p^b )</th>
<th>CI(_{95}) Lower</th>
<th>CI(_{95}) Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2 (between person)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>122.22</td>
<td>20.98</td>
<td>5.83</td>
<td><strong>&lt;.001</strong></td>
<td>87.30</td>
<td>171.09</td>
</tr>
<tr>
<td>Within stressor</td>
<td>96.62</td>
<td>23.44</td>
<td>4.12</td>
<td><strong>&lt;.001</strong></td>
<td>50.69</td>
<td>142.55</td>
</tr>
<tr>
<td>Intercept and within stressor</td>
<td>183.13</td>
<td>37.56</td>
<td>4.88</td>
<td><strong>&lt;.001</strong></td>
<td>122.52</td>
<td>273.73</td>
</tr>
<tr>
<td>Level 1 (within person)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>302.98</td>
<td>7.58</td>
<td>39.95</td>
<td><strong>&lt;.001</strong></td>
<td>288.48</td>
<td>318.22</td>
</tr>
<tr>
<td>Autocorrelation</td>
<td>0.27</td>
<td>0.02</td>
<td>14.76</td>
<td><strong>&lt;.001</strong></td>
<td>0.23</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Note: \( N = 91 \) individuals, 56 surveys administered, 5,096 possible observations (3,965 total surveys completed).

\(^a\)Degrees of freedom were specified based on the number of subjects (\( N = 91 \)) rather than the total number of observations (\( N = 5,096 \)), a conservative approach.

\(^b\)One-tailed \( p \)-values used for variances, which must be non-negative. All other analyses used two-tailed \( p \)-values.

\(^c\)Trauma exposure (i.e., no exposure, moderate, polyvictimization) was dummy coded, with no exposure specified as the reference category.
Table 10. Parameter Estimates for Multilevel Model of Emotion Dysregulation as a Function of Daily Stressors and Trauma Exposure

<table>
<thead>
<tr>
<th>Fixed effects (intercept, slopes)</th>
<th>Estimate (SE)</th>
<th>t^a</th>
<th>p^b</th>
<th>CI_95 Lower</th>
<th>CI_95 Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>44.54 (35.30)</td>
<td>1.26</td>
<td>0.21</td>
<td>-25.59</td>
<td>114.66</td>
</tr>
<tr>
<td>Time</td>
<td>-0.10 (0.05)</td>
<td>-1.91</td>
<td>0.056</td>
<td>-0.21</td>
<td>0.00</td>
</tr>
<tr>
<td>Sex</td>
<td>10.59 (14.25)</td>
<td>0.74</td>
<td>0.46</td>
<td>-17.75</td>
<td>38.94</td>
</tr>
<tr>
<td>Within stressor</td>
<td>7.46 (12.49)</td>
<td>0.60</td>
<td>0.55</td>
<td>-17.35</td>
<td>32.26</td>
</tr>
<tr>
<td>Moderate^c</td>
<td>28.39 (28.20)</td>
<td>1.01</td>
<td>0.32</td>
<td>-27.68</td>
<td>84.45</td>
</tr>
<tr>
<td>Polyvictimization^c</td>
<td>40.84 (28.57)</td>
<td>1.43</td>
<td>0.16</td>
<td>-15.99</td>
<td>97.66</td>
</tr>
<tr>
<td>Within stressor by moderate</td>
<td>7.26 (13.01)</td>
<td>0.56</td>
<td>0.58</td>
<td>-18.60</td>
<td>33.11</td>
</tr>
<tr>
<td>Within stressor by polyvictimization</td>
<td>15.15 (13.32)</td>
<td>1.14</td>
<td>0.26</td>
<td>-11.32</td>
<td>41.63</td>
</tr>
<tr>
<td>Between stressor</td>
<td>35.99 (81.45)</td>
<td>0.44</td>
<td>0.66</td>
<td>-125.86</td>
<td>197.84</td>
</tr>
<tr>
<td>Between stressor by moderate</td>
<td>37.65 (86.22)</td>
<td>0.44</td>
<td>0.66</td>
<td>-133.67</td>
<td>208.98</td>
</tr>
<tr>
<td>Between stressor by polyvictimization</td>
<td>56.63 (87.88)</td>
<td>0.64</td>
<td>0.52</td>
<td>-117.98</td>
<td>231.23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Random effects ([co]-variances)</th>
<th>Estimate (SE)</th>
<th>z</th>
<th>p^b</th>
<th>CI_95 Lower</th>
<th>CI_95 Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2 (between person)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>3332.31 (527.02)</td>
<td>6.32</td>
<td>&lt;.001</td>
<td>2444.14</td>
<td>4543.24</td>
</tr>
<tr>
<td>Within stressor</td>
<td>601.14 (188.34)</td>
<td>3.19</td>
<td>0.001</td>
<td>232.00</td>
<td>970.28</td>
</tr>
<tr>
<td>Intercept and within stressor</td>
<td>398.57 (100.36)</td>
<td>3.97</td>
<td>&lt;.001</td>
<td>243.31</td>
<td>652.90</td>
</tr>
<tr>
<td>Level 1 (within person)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>1752.32 (44.09)</td>
<td>39.74</td>
<td>&lt;.001</td>
<td>1667.99</td>
<td>1840.91</td>
</tr>
<tr>
<td>Autocorrelation</td>
<td>0.28 (0.02)</td>
<td>15.74</td>
<td>&lt;.001</td>
<td>0.24</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Note: N = 91 individuals, 56 surveys administered, 5,096 possible observations (3,965 total surveys completed).

^a Degrees of freedom were specified based on the number of subjects (N = 91) rather than the total number of observations (N = 5,096), a conservative approach.

^b One-tailed p-values used for variances, which must be non-negative. All other analyses used two-tailed p-values.

^c Trauma exposure (i.e., no exposure, moderate, polyvictimization) was dummy coded, with no exposure specified as the reference category.
Table 11. Parameter Estimates for Multilevel Model of Maladaptive Strategy Use as a Function of Daily Stressors and Trauma Exposure

<table>
<thead>
<tr>
<th>Fixed effects (intercept, slopes)</th>
<th>Estimate</th>
<th>(SE)</th>
<th>$t^a$</th>
<th>$p^b$</th>
<th>CI95 Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>201.08</td>
<td>39.24</td>
<td>5.13</td>
<td>&lt;.001</td>
<td>123.11</td>
<td>279.05</td>
</tr>
<tr>
<td>Time</td>
<td>-0.36</td>
<td>0.08</td>
<td>-4.59</td>
<td>&lt;.001</td>
<td>-0.51</td>
<td>-0.21</td>
</tr>
<tr>
<td>Sex</td>
<td>-30.26</td>
<td>15.96</td>
<td>-1.90</td>
<td>0.061</td>
<td>-62.00</td>
<td>1.47</td>
</tr>
<tr>
<td>Within stressor</td>
<td>26.75</td>
<td>18.39</td>
<td>1.45</td>
<td>0.15</td>
<td>-9.83</td>
<td>63.32</td>
</tr>
<tr>
<td>Moderate</td>
<td>31.84</td>
<td>31.04</td>
<td>1.03</td>
<td>0.31</td>
<td>-29.91</td>
<td>93.59</td>
</tr>
<tr>
<td>Polyvictimization</td>
<td>22.16</td>
<td>31.89</td>
<td>0.70</td>
<td>0.49</td>
<td>-41.27</td>
<td>85.60</td>
</tr>
<tr>
<td>Within stressor by moderate</td>
<td>2.14</td>
<td>19.14</td>
<td>0.11</td>
<td>0.91</td>
<td>-35.92</td>
<td>40.20</td>
</tr>
<tr>
<td>Within stressor by polyvictimization</td>
<td>19.58</td>
<td>19.73</td>
<td>0.99</td>
<td>0.32</td>
<td>-19.67</td>
<td>58.82</td>
</tr>
<tr>
<td>Between stressor by moderate</td>
<td>41.13</td>
<td>91.40</td>
<td>0.45</td>
<td>0.65</td>
<td>-140.55</td>
<td>222.80</td>
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<tr>
<td>Between stressor by polyvictimization</td>
<td>88.71</td>
<td>95.92</td>
<td>0.93</td>
<td>0.36</td>
<td>-101.95</td>
<td>279.38</td>
</tr>
<tr>
<td>Between stressor by polyvictimization</td>
<td>103.87</td>
<td>100.99</td>
<td>1.03</td>
<td>0.31</td>
<td>-96.85</td>
<td>304.60</td>
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</table>

<table>
<thead>
<tr>
<th>Random effects ([co]-variances)</th>
<th>Estimate</th>
<th>(SE)</th>
<th>$z$</th>
<th>$p^b$</th>
<th>CI95 Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2 (between person)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>4007.79</td>
<td>649.97</td>
<td>6.17</td>
<td>&lt;.001</td>
<td>2916.50</td>
<td>5507.43</td>
</tr>
<tr>
<td>Within stressor</td>
<td>-833.65</td>
<td>306.29</td>
<td>-2.72</td>
<td>0.006</td>
<td>-1433.97</td>
<td>-233.32</td>
</tr>
<tr>
<td>Intercept and within stressor</td>
<td>917.47</td>
<td>228.52</td>
<td>4.02</td>
<td>&lt;.001</td>
<td>563.09</td>
<td>1494.90</td>
</tr>
<tr>
<td>Level 1 (within person)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>3502.39</td>
<td>91.26</td>
<td>38.38</td>
<td>&lt;.001</td>
<td>3328.01</td>
<td>3685.91</td>
</tr>
<tr>
<td>Autocorrelation</td>
<td>0.33</td>
<td>0.02</td>
<td>19.21</td>
<td>&lt;.001</td>
<td>0.30</td>
<td>0.36</td>
</tr>
</tbody>
</table>

Note: N = 91 individuals, 56 surveys administered, 5,096 possible observations (3,965 total surveys completed).

$^a$Degrees of freedom were specified based on the number of subjects ($N = 91$) rather than the total number of observations ($N = 5,096$), a conservative approach.

$^b$One-tailed $p$-values used for variances, which must be non-negative. All other analyses used two-tailed $p$-values.

$^c$Trauma exposure (i.e., no exposure, moderate, polyvictimization) was dummy coded, with no exposure specified as the reference category.
Table 12. Parameter Estimates for Multilevel Model of Adaptive Strategy Use as a Function of Daily Stressors and Trauma Exposure

<table>
<thead>
<tr>
<th>Fixed effects (intercept, slopes)</th>
<th>Estimate</th>
<th>(SE)</th>
<th>( t^a )</th>
<th>( p^b )</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>197.14</td>
<td>33.68</td>
<td>5.85</td>
<td>&lt;.001</td>
<td>130.23</td>
<td>264.05</td>
</tr>
<tr>
<td>Time</td>
<td>-0.08</td>
<td>0.07</td>
<td>-1.13</td>
<td>0.26</td>
<td>-0.21</td>
<td>0.06</td>
</tr>
<tr>
<td>Sex</td>
<td>-17.99</td>
<td>13.55</td>
<td>-1.33</td>
<td>0.19</td>
<td>-44.93</td>
<td>8.95</td>
</tr>
<tr>
<td>Within stressor</td>
<td>11.25</td>
<td>22.41</td>
<td>0.50</td>
<td>0.62</td>
<td>-33.30</td>
<td>55.79</td>
</tr>
<tr>
<td>Moderate(^c)</td>
<td>-20.58</td>
<td>26.98</td>
<td>-0.76</td>
<td>0.45</td>
<td>-74.24</td>
<td>33.08</td>
</tr>
<tr>
<td>Polyvictimization(^c)</td>
<td>-46.67</td>
<td>27.35</td>
<td>-1.71</td>
<td>0.09</td>
<td>-101.07</td>
<td>7.72</td>
</tr>
<tr>
<td>Within stressor by moderate</td>
<td>8.93</td>
<td>23.43</td>
<td>0.38</td>
<td>0.70</td>
<td>-37.65</td>
<td>55.50</td>
</tr>
<tr>
<td>Within stressor by polyvictimization</td>
<td>23.38</td>
<td>24.02</td>
<td>0.97</td>
<td>0.33</td>
<td>-24.36</td>
<td>71.13</td>
</tr>
<tr>
<td>Between stressor</td>
<td>29.59</td>
<td>76.32</td>
<td>0.39</td>
<td>0.70</td>
<td>-122.13</td>
<td>181.31</td>
</tr>
<tr>
<td>Between stressor by moderate</td>
<td>-6.90</td>
<td>80.88</td>
<td>-0.09</td>
<td>0.93</td>
<td>-167.67</td>
<td>153.88</td>
</tr>
<tr>
<td>Between stressor by polyvictimization</td>
<td>-4.68</td>
<td>82.50</td>
<td>-0.06</td>
<td>0.96</td>
<td>-168.67</td>
<td>159.31</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Random effects ([co]-variances)</th>
<th>Estimate</th>
<th>(SE)</th>
<th>( z )</th>
<th>( p^b )</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2 (between person)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>3015.62</td>
<td>487.53</td>
<td>6.19</td>
<td>&lt;.001</td>
<td>2196.68</td>
<td>4139.88</td>
</tr>
<tr>
<td>Within stressor</td>
<td>-1127.20</td>
<td>332.18</td>
<td>-3.39</td>
<td>&lt;.001</td>
<td>-1778.27</td>
<td>-476.14</td>
</tr>
<tr>
<td>Intercept and within stressor</td>
<td>1832.27</td>
<td>359.78</td>
<td>5.09</td>
<td>&lt;.001</td>
<td>1246.96</td>
<td>2692.32</td>
</tr>
<tr>
<td>Level 1 (within person)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>2609.25</td>
<td>67.03</td>
<td>38.93</td>
<td>&lt;.001</td>
<td>2481.13</td>
<td>2744.00</td>
</tr>
<tr>
<td>Autocorrelation</td>
<td>0.31</td>
<td>0.02</td>
<td>18.04</td>
<td>&lt;.001</td>
<td>0.28</td>
<td>0.35</td>
</tr>
</tbody>
</table>

Note: \( N = 91 \) individuals, 56 surveys administered, 5,096 possible observations (3,965 total surveys completed).

\( ^a\)Degrees of freedom were specified based on the number of subjects \( (N = 91) \) rather than the total number of observations \( (N = 5,096) \), a conservative approach.

\( ^b\)One-tailed \( p \)-values used for variances, which must be non-negative. All other analyses used two-tailed \( p \)-values.

\( ^c\)Trauma exposure (i.e., no exposure, moderate, polyvictimization) was dummy coded, with no exposure specified as the reference category.
Figure 1: Baseline trauma exposure (none, moderate exposure, polyvictimization) and mental health symptoms as predictors of state emotion (dys)regulation. Emotion (dys)regulation = maladaptive strategy use, adaptive strategy use, and emotion dysregulation, tested in separate models.
Figure 2a: Daily stressors as predictors of perceived stress, moderated by trauma exposure (none, moderate, polyvictimization).

Figure 2b: Daily stressors as predictors of emotion (dys)regulation, moderated by trauma exposure (none, moderate exposure, polyvictimization). Emotion (dys)regulation = maladaptive strategy use, adaptive strategy use, and emotion dysregulation, tested in separate models.

Figure 3: Indirect effects of trauma exposure on mental health symptoms via emotion (dys)regulation. Emotion (dys)regulation = adaptive strategy use, maladaptive strategy use and emotion dysregulation, tested in separate models. Mental health symptoms = depression, anxiety, and PTS symptoms, tested in separate models.
Figure 4. Scatterplots with individual regression lines for correlations of a) state adaptive strategy use and maladaptive strategy use, b) state adaptive strategy use and emotion dysregulation, and c) state maladaptive strategy use and emotion dysregulation. Note: eradapt = adaptive strategy use, ermal = maladaptive strategy use, ed = emotion dysregulation.

Figure 5. Spaghetti plots of average (thick) and participant-specific (thin) regression lines for perceived stress as a function of stressor for no exposure (left), moderate exposure (middle), and polyvictimized groups (right).
Figure 6. Spaghetti plots of average (thick) and participant-specific (thin) regression lines for emotion dysregulation as a function of stressor for no exposure (left), moderate exposure (middle), and polyvictimized groups (right).

Figure 7. Spaghetti plots of average (thick) and participant-specific (thin) regression lines for maladaptive strategy use as a function of stressor for no exposure (left), moderate exposure (middle), and polyvictimized groups (right).
Figure 8. Spaghetti plots of average (thick) and participant-specific (thin) regression lines for adaptive strategy use as a function of stressor for no exposure (left), moderate exposure (middle), and polyvictimized groups (right).
Figure 9. Polyvictimization, state adaptive strategy use, and state mental health symptoms: direct and indirect effects of polyvictimization relative to non-exposure for symptoms of a) depression, b) anxiety, and c) PTS. Note: *p < .05, **p < .001. ER = emotion regulation. PTS = posttraumatic stress. N = 91 individuals, 56 surveys, 5,096 observations (3,965 total surveys completed). Figures present unstandardized regression coefficients.
Figure 10. Polyvictimization, state maladaptive strategy use, and state mental health symptoms: direct and indirect effects of polyvictimization relative to non-exposure for symptoms of a) depression, b) anxiety, and c) PTS. Note: *p < .05, **p < .001. ER = emotion regulation. PTS = posttraumatic stress. N = 91 individuals, 56 surveys, 5,096 observations (3,965 total surveys completed). Figures present unstandardized regression coefficients.
Figure 11. Polyvictimization, state emotion dysregulation, and state mental health symptoms: direct and indirect effects of polyvictimization relative to non-exposure for symptoms of a) depression, b) anxiety, and c) PTS. Note: *p < .05, **p < .001. PTS = posttraumatic stress. N = 91 individuals, 56 surveys, 5,096 observations (Note: N = 91 individuals, 56 surveys administered, 5,096 possible observations (3,965 total surveys completed). Figures present unstandardized regression coefficients.
Figure 12. Plot of estimated marginal means at baseline and follow-up for a) depression, b) anxiety, and c) PTS symptoms, by trauma exposure groups. Note: N = 122.

Figure 13. Plot of estimated marginal means for trait emotion dysregulation at baseline and follow-up, by trauma exposure groups. Note: N = 122.
Figure 14. Plot of estimated marginal means for trait a) reappraisal, b) suppression, and c) rumination at baseline and follow-up, by trauma exposure group. Note: $N = 122$. 
Appendices

Appendix A: Informed Consent

INFORMED CONSENT

Dear participant,

You are invited to participate in a research study being conducted, under the supervision of Dr. Tamara Newton, by Zoe Bridges-Curry, a graduate student in the Clinical Psychology program at the University of Louisville, Department of Psychological and Brain Sciences.

Purpose
The purpose of this study is to understand the ways that stressful experiences may impact emotional and mental health.

Procedures
The study takes place entirely online and consists of three parts.

1) The initial survey consists of online questionnaires and will take about one hour to complete. 2) Within a few days of filling out the online questionnaires, you will receive an email with instructions on how to download a survey application onto your smartphone. After downloading the application, for 14 days you will receive 4 surveys a day during your typical waking time with at least 1 hour between each survey. 3) After completing the daily surveys on your smartphone, you will receive a link to the final online survey, which will take about one hour to complete.

Potential Risks
The surveys will include questionnaires asking about past stressful experiences, your emotions, and your health. Some of the questions in the surveys are personal. It may be distressing to read or think about these topics. While there are no other known risks to participating, there may be unforeseen risks.

Benefits
The information gathered in this study may not benefit you directly. However, by improving our understanding about the ways that stress influences emotions and health, it may be helpful to others who have experienced stressful events.

Confidentiality
Total privacy cannot be guaranteed. We will protect your privacy to the extent permitted by law. If the results from this study are published, your name will not be made public. Once your information leaves our institution, we cannot promise that others will keep it private.
Your information may be shared with the following:

- The University of Louisville Institutional Review Board, Human Subjects Protection Program Office, Privacy Office, others involved in research administration and research and legal compliance at the University, and others contracted by the University for ensuring human participants safety or research and legal compliance

**Security**

You will complete the initial and final online questionnaires on REDCap, a web application that was developed by Vanderbilt University to securely collect and manage data. You will complete the daily surveys on the PIEL Survey application. Details about security and confidentiality of the PIEL Survey application are available at: [https://pielsurvey.org/profile/confidentiality/](https://pielsurvey.org/profile/confidentiality/). The PIEL Survey application does not use a remote server or database and the developers of the application will not have access to your data. Your survey data will be encrypted and stored directly on your phone.

Identifying information is not included in the survey data. After completing the surveys, you will be able to share your data with the researcher using email. You may choose to delete all of your daily survey data at any time within the PIEL Survey application. To request that your data from the online questionnaires be deleted, you may contact the researcher via email.

All data collected from the online questionnaires and daily surveys will be downloaded and stored on the I drive, the University of Louisville’s secure storage site. The data will be confidential to the extent permitted by law. Should the data be published, your identity will not be disclosed. While unlikely, individuals from the Department of Psychological and Brain Sciences, the Institutional Review Board (IRB), the Human Subjects Protection Program Office (HSPPO), and other regulatory agencies may inspect these records. In all other circumstances, access to your survey will be limited to the research team.

**Compensation**

You will be compensated for your time by receiving up to 4 research credits. You will receive 1 credit for completing the initial online survey. You will receive 0.5 credits for completing less than 50% of the phone surveys, 1 credit for completing between 50-75% of the phone surveys, and 2 credits for completing more than 75% of the phone surveys. You will receive an additional 1 credit for completing the final online survey.

**Voluntary Participation**

Taking part in this study is voluntary and you may choose to discontinue the study at any time. By answering initial online survey questions, you are acknowledging that you have no further questions regarding this informed consent document and agree to participate in this research study. You do not have to answer any questions that make you uncomfortable. While the smartphone application does not allow users to skip
questions, you may discontinue the survey at any point and still receive credit for surveys with incomplete data.

Questions
If you have any questions, concerns, or complaints about the research study, please contact: Zoe Bridges-Curry at zoe.bridges-curry@louisville.edu or 502-852-2665. To reach her supervisor, please contact: Tamara L. Newton, Ph.D. at tamara.newton@louisville.edu or (502) 852-0070.

If you have any questions about your rights as a research subject or wish to discuss the study with someone other than the research staff, you may call the Human Subjects Protection Program Office at (502) 852-5188. By calling this number, you may discuss any questions or concerns privately with a member of the Institutional Review Board (IRB). The IRB is an independent committee made up of people from the University community, staff of the institutions, as well as people from the community not connected with these institutions. The IRB has reviewed this research study.

If you have concerns or complaints and do not wish to give your name, you may call 1-877-852-1167. This is a 24-hour hotline answered by people who do not work at the University of Louisville.

Sincerely,

Zoe Bridges-Curry, M.P.S.
Tamara L. Newton, Ph.D.
Appendix B: EMA Instructions and Quiz

INSTRUCTIONS

Thank you for completing the online questionnaires. You are almost ready to start the second portion of the study – the smartphone surveys!

- Within the next few days, we will send you an email with instructions for downloading the PIEL survey application on your smartphone, which will include a survey file.
- After you begin this portion of the study, you will receive 4 surveys per day for two weeks. Each survey will take you approximately 5 minutes to complete. Please complete as many of the app-based surveys as possible.

Here are some tips for filling-out the app-based surveys:

- Answer questions with how you feel and what you have experienced SINCE YOUR LAST SURVEY, not how you feel in general.
- There are no “wrong” answers on these questionnaires. Give the response that best represents how you feel in that moment. Your answers don’t have to be perfect.
- When you use the 0-100 scale, use the full range of numbers (22, 54, 81), not just rounded numbers (like 25 and 50). For items asking about stress and emotions, save 100s for the most you have ever experienced this feeling.

Remember, you will be awarded SONA credits based on how many surveys you fill out. At the end of the 14 days, you will send your responses back to our research team using email.

- You will receive 0.5 credits for completing less than 50% of the phone surveys, 1 credit for completing between 50-75% of the phone surveys, and 2 credits for completing more than 75% of the phone surveys.
- These credits will be in addition to the 2 credits you will receive for completing the online surveys, for a total of up to 4 SONA credits.

---

QUIZ

1. How will you receive the survey attachment?
   - The researcher will email it to me with instructions for how to get started.
   - It will automatically load when I download the PIEL survey application.
   - I do not need a survey attachment to begin the surveys.

2. How many surveys will you be asked to complete each day on your smartphone?
   - 1
   - 3
3. How should you answer the questions in the survey?
   - With how I feel IN GENERAL
   - With how I have felt SINCE THE LAST SURVEY
   - With how I felt in the PAST WEEK

4. You will be asked to rate your responses from 0 to 100. When providing ratings, you should...
   - Use only rounded numbers (like 25 or 50)
   - Use a full range of numbers (like 56, 73, 82)
   - Use only 0 and 100

5. How will credits be awarded for your participation in the smartphone survey part of the study?
   - I will receive 0.5 credits for completing less than 50%, 1 credit for completing 50-75%, and 2 credits for completing more than 75%
   - I will receive 2 credits for completing any surveys
   - I will receive only receive credit if I complete 100% of the surveys
Appendix C: Participant Emails

EMAIL: INSTRUCTIONS FOR BEGINNING STUDY

Hi [NAME] -

Thank you for your interest in the Stress and Daily Emotions Study conducted by the Stress & Health Lab at the University of Louisville, under the supervision of Principal Investigator Tamara L. Newton, Ph.D. (tamara.newton@louisville.edu; (502) 852-0070).

To learn more about the study and get started with the online survey, please click this link: [REDCap Link]

Best,
Zoe

---

EMAIL: SMARTPHONE SURVEY INSTRUCTIONS

Hi [NAME] -

Thank you for completing the online questionnaires. You are now ready to start the second portion of the study – the phone surveys!

To begin the phone surveys:

1) Go to your app store and download the PIEL Survey app.

2) After downloading that app, open this email on your phone and download the attachment (SDE.survey) to your phone. Open it with the PIEL survey app.

If you have any problems with this process, please let me know and we can troubleshoot.

You will receive 4 surveys per day for two weeks. Each survey will take you approximately 5 minutes to complete. Please complete as many of the app-based surveys as possible. Remember, you will receive research credits based on the number of questionnaires you complete.

Here are some tips for filling-out the app-based surveys:

1) Answer questions with how you feel and what you have experienced SINCE YOUR LAST SURVEY, not how you feel in general.

2) There are no “wrong” answers on these questionnaires. Give the response that best represents how you feel in that moment. Your answers don’t have to be perfect.
3) When you use the 0-100 scale, **use the full range of numbers** (22, 54, 81), not just rounded numbers (like 25 and 50). For items asking about stress and emotions, save 100’s for the most you have ever experienced this feeling.

**Remember, you will be awarded SONA credits based on how many surveys you fill out.** At the end of the 14 days, you will send your responses back to our research team using email. You will receive 0.5 credits for completing less than 50% of the phone surveys, 1 credit for completing between 50-75% of the phone surveys, and 2 credits for completing more than 75% of the phone surveys. These credits will be in addition to the 2 credits you will receive for completing the online surveys, **for a total of up to 4 SONA credits.**

Please let me know if you have any questions. Thank you again!

Best,
Zoe

---

**EMAIL: SURVEY REMINDER (one week after smartphone survey instructions sent)**

Hi [NAME] -

This email is just a reminder for the phone survey portion of the Stress and Daily Emotions Study. It can sometimes feel boring, annoying, or tedious to fill out these surveys. But the more questionnaires you complete, the more we’ll learn about how stress and emotions are impacting people in daily life.

Also, remember that you will receive research credits based on the number of questionnaires you complete. Please let us know if you have any questions or problems with the surveys, the PIEL app, or any other aspects of the study.

We appreciate your participation. **We could not do this study without you!**

Thank you,
Zoe

---

**EMAIL: RETURNING SURVEYS (two weeks after smartphone survey instructions sent)**

Hi [NAME] -

Thank you for all of your hard work – you’re almost done with the phone surveys! **After you complete the final phone survey, an alert will appear asking if you would like to send your results back now or later.** The PIEL app will automatically use our study’s email address (EMAIL ADDRESS) when you return your results.
If you decide to email your responses later, you will need to go to the PIEL Survey home screen and tap the arrow to the right of the survey name (SDE Study) to send your results. **As a reminder, we will not be able to award research credits for the phone surveys until we have received your responses.**

**To ensure that we can award you credit for completing the surveys, please wait to delete your data until we confirm that we have received your results.**

Please let us know if you have any questions or problems with the surveys, the PIEL app, or any other aspects of the study.

Thank you!

Zoe

---

EMAIL: FINAL SURVEY INSTRUCTIONS

Hi [NAME] –

Thank you for completing the phone surveys – you’re almost to the finish line! The final portion of the study is an online survey.

To complete the final questionnaires, please fill out the survey at this link: [REDCap Link]

The surveys will ask for an ID number. Your ID is: [INSERT ID]

Please answer questions honestly to the best of your knowledge. These questionnaires should take approximately 1 hour to complete.

You completed XX% of the phone surveys, which means that you will receive X credit hours for the phone surveys and 1 credit hour for completing the initial online survey. **You will receive an additional 1 credit hour for completing the final survey – for a total of X credits.**

You should see these credit hours show up in your SONA account over the next couple of weeks, but if you have any questions please do not hesitate to reach out.

Thank you again for your participation. This study would not be possible without you!

Zoe
Appendix D: Baseline and Follow-Up Measures

Age ____

Sex assigned at birth
- Male
- Female
- Intersex

Gender
- Female
- Male
- Prefer to self-describe ________________
- Prefer not to say

With which racial or ethnic group(s) do you most identify?
- African-American (non-Hispanic)
- Asian/Pacific Islanders
- White (non-Hispanic)
- Latinx or Hispanic
- Native American or Aleut
- Other ____

What is the highest level of education your mother has completed?
- Less than a high school diploma
- High school diploma
- Some college
- College degree
- Professional or graduate degree
- Not sure

What is the highest level of education your father has completed?
- Less than a high school diploma
- High school diploma
- Some college
- College degree
- Professional or graduate degree
- Not sure
City Stress Inventory

Life in a city can be stressful. We want to know about stress you have experienced in your neighborhood during the PAST YEAR. By “neighborhood,” we mean the streets, houses, or buildings close to your home. By “home,” we mean the house or apartment where you stay at night or on weekends. Some students spend part of their time living on campus, and part of their time living off campus. If this is true for you, we would like to know about stress you have experienced in BOTH neighborhoods.

1. I saw people dealing drugs near my home. (Never, Once, A few times, Often)
2. I saw strangers who were drunk or high hanging out near my home. (Never, Once, A few times, Often)
3. I heard adults arguing loudly on my street. (Never, Once, A few times, Often)
4. I heard neighbors complaining about crime in our neighborhood. (Never, Once, A few times, Often)
5. Someone I knew was arrested or went to jail. (Never, Once, A few times, Often)
6. I saw or heard about a “shooting gallery” near my home. (Never, Once, A few times, Often)
7. People in the neighborhood complained about being harassed by police. (Never, Once, A few times, Often)
8. There was a gang fight near my home. (Never, Once, A few times, Often)
9. I saw cars speeding or driving dangerously on my street. (Never, Once, A few times, Often)
10. A family member was attacked or beaten. (Never, Once, A few times, Often)
11. A family member was stabbed or shot. (Never, Once, A few times, Often)
12. A friend was stabbed or shot. (Never, Once, A few times, Often)
13. A family member was stopped and questioned by the police. (Never, Once, A few times, Often)
14. A friend was robbed or mugged. (Never, Once, A few times, Often)
15. Someone threatened to hurt a member of my family. (Never, Once, A few times, Often)
16. A family member was robbed or mugged. (Never, Once, A few times, Often)
17. How many HOUSES or BUILDINGS in your neighborhood were VACANT or UNOCCUPIED during the past year? (None, Some, About Half, Most)
18. How many neighbors received food stamps in the past year? (None, Some, About Half, Most)
LTVH

H1. Have you ever been involved in a natural disaster, such as a tornado, hurricane, flood, or earthquake?
Yes ... 1
No .... 2

H2. Have you ever been involved in a man-made disaster, such as a fire, train crash, car accident, or building collapse?
Yes ... 1
No .... 2

H3. Have you ever been involved in direct combat experience in a war, police shootout, or gang fight?
Yes ... 1
No .... 2

H4. Have you ever lived in a war zone? (For example, the Persian Gulf or Bosnia).
Yes ... 1
No .... 2

H5. Have you ever had a serious accident at work, at home, or somewhere else?
Yes ... 1
No .... 2

H6. Have you ever been exposed to dangerous chemicals or radioactivity?
Yes ... 1
No .... 2

H7. Have you ever been shot at, stabbed, struck, kicked, beaten, punched, slapped around, or otherwise physically harmed?
Yes ... 1
No .... 2

Have you ever been threatened with any kind of a weapon, like a knife, gun, baseball bat, frying pan, scissors, stick, rock or bottle?
Yes ... 1
No .... 2

H9. Has anyone ever threatened you in a face-to-face confrontation?
Yes ... 1
H10. Have you ever been actually assaulted with any kind of a weapon, like a knife, gun, baseball bat, frying pan, scissors, stick, rock, or bottle?
Yes ... 1
No .... 2
ALREADY TOLD YOU ABOUT THIS....3, SPECIFY Q#________

H12. Were you ever physically abused?
Yes ... 1
No .... 2
ALREADY TOLD YOU ABOUT THIS.........3 , SPECIFY Q#________

H13. Has anyone--male or female--ever forced or coerced you to engage in unwanted sexual activity?
Yes ... 1
No .... 2
ALREADY TOLD YOU ABOUT THIS.........3 , SPECIFY Q#________

H14. Did anyone, male or female ever attempt to--but not actually-- force you to engage in unwanted sexual activity?
Yes ... 1
No .... 2
ALREADY TOLD YOU ABOUT THIS.........3 , SPECIFY Q#________

H15. Other than what we just talked about, has anyone ever actually touched private parts of your body or made you touch theirs against your wishes?
Yes ... 1
No .... 2
ALREADY TOLD YOU ABOUT THIS.........3 , SPECIFY Q#________

H16. Have you ever had an immediate family member, romantic partner, or very close friend who was murdered?
Yes ... 1
No .... 2

H17. Have you ever seen or been present when someone was murdered or seriously injured?
Yes ... 1
No .... 2

H18. Have you ever had an immediate family member, romantic partner, or very close friend commit suicide?
Yes ... 1
No .... 2

H19. Have you ever seen a dead or mutilated body, other than at a funeral, or in the movies or newspaper?
Yes... 1
No.... 2

H20. Have you ever seen or been present when another person was shot at, stabbed, struck, kicked, beaten, slapped around, or otherwise physically harmed?
Yes... 1
No.... 2

H21. Have you ever seen or been present when another person was raped, sexually attacked, or made to engage in unwanted sexual activity?
Yes..... 1
No...... 2

H22. Has anyone ever intentionally damaged or destroyed property owned by you or by someone in your household?
Yes... 1
No.... 2

H23. Has anyone ever stolen something from you by using force or the threat of force like in a stick-up, mugging, or car-jacking?
Yes... 1
No.... 2

H24. Has anyone ever tried to--but not actually--steal something from you by using force or the threat of force like in a stick-up, mugging, or car-jacking?
Yes... 1
No.... 2

H25. Has anyone ever tried to or actually broken in to your house, garage, shed, or storage room when you were not there?
Yes... 1
No.... 2

H26. Has anyone ever tried to or actually broken in to your house, garage, shed, or storage room when you were there?
Yes... 1
No.... 2
H27. Has anyone ever stolen something directly from you without the threat or use of force (for example purse-snatching or pick-pocket)?
   Yes... 1
   No.... 2

H28. Have you ever been kidnapped or held captive?
   Yes... 1
   No.... 2

H29. Have you ever been stalked by anyone? For example, has anyone ever followed or spied on you?
   Yes... 1
   No.... 2

H30. Have you ever been in any other situation in which you were in danger of death or serious physical injury, or in which you felt intense fear, helplessness, or horror?
   Yes... 1
   SPECIFY: ______________________
   No.... 2
### PROMIS Depression

**In the past SEVEN (7) DAYS....**

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I felt worthless.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>2. I felt that I had nothing to look forward to.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>3. I felt helpless.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>4. I felt sad.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>5. I felt like a failure.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>6. I felt depressed.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>7. I felt unhappy.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>8. I felt hopeless.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
</tbody>
</table>

**Total/Partial Raw Score:**

**Prorated Total Raw Score:**

**T-Score:**

### PROMIS Anxiety

**In the past SEVEN (7) DAYS....**

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I felt fearful.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>2. I felt anxious.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>3. I felt worried.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>4. I found it hard to focus on anything other than my anxiety.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>5. I felt nervous.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>6. I felt uneasy.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>7. I felt tense.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
</tbody>
</table>

**Total/Partial Raw Score:**

**Prorated Total Raw Score:**

**T-Score:**
**PCL-5**

**Instructions:** Below is a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

<table>
<thead>
<tr>
<th>In the past month, how much were you bothered by:</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Repeated, disturbing, and unwanted memories of the stressful experience?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Repeated, disturbing dreams of the stressful experience?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Feeling very upset when something reminded you of the stressful experience?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Avoiding memories, thoughts, or feelings related to the stressful experience?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. Trouble remembering important parts of the stressful experience?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>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)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. Blaming yourself or someone else for the stressful experience or what happened after it?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. Loss of interest in activities that you used to enjoy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
EMOTION REGULATION QUESTIONNAIRE (ERQ)

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>strongly disagree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>strongly agree</td>
</tr>
</tbody>
</table>

1. ___ When I want to feel more **positive** emotion (such as joy or amusement), I **change what I’m thinking about**.

2. ___ I keep my emotions to myself.

3. ___ When I want to feel less **negative** emotion (such as sadness or anger), I **change what I’m thinking about**.

4. ___ When I am feeling **positive** emotions, I am careful not to express them.

5. When I’m faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
6. I control my emotions by not expressing them.

7. When I want to feel more positive emotion, I change the way I'm thinking about the situation.

8. I control my emotions by changing the way I think about the situation I'm in.

9. When I am feeling negative emotions, I make sure not to express them.

10. When I want to feel less negative emotion, I change the way I'm thinking about the situation.

**Rumination Scale**

People think and do many different things when they feel depressed. Please read each of the items below and indicate whether you almost never, sometimes, often, or almost always think or do each one when you feel down, sad, or depressed. Please indicate what you generally do, not what you think you should do.

1 almost never 2 sometimes 3 often 4 almost always

1. think “What am I doing to deserve this?”
2. analyze recent events to try to understand why you are depressed
3. think “Why do I always react this way?”
4. go away by yourself and think about why you feel this way
5. write down what you are thinking about and analyze it
6. think about a recent situation, wishing it had gone better
7. think “Why do I have problems other people don’t have?”
8. think “Why can’t I handle things better?”
9. analyze your personality to try to understand why you are depressed
10. go someplace alone to think about your feelings
Difficulties in Emotion Regulation Scale (DERS)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item.

1 = almost never  2 = sometimes  3 = about half the time
4 = most of the time  5 = almost always

_____ 1) I am clear about my feelings.
_____ 2) I pay attention to how I feel.
_____ 3) I experience my emotions as overwhelming and out of control.
_____ 4) I have no idea how I am feeling.
_____ 5) I have difficulty making sense out of my feelings.
_____ 6) I am attentive to my feelings.
_____ 7) I know exactly how I am feeling.
_____ 8) I care about what I am feeling.
_____ 9) I am confused about how I feel.
_____ 10) When I’m upset, I acknowledge my emotions.
_____ 11) When I’m upset, I become angry with myself for feeling that way.
_____ 12) When I’m upset, I become embarrassed for feeling that way.
_____ 13) When I’m upset, I have difficulty getting work done.
_____ 14) When I’m upset, I become out of control.
_____ 15) When I’m upset, I believe that I will remain that way for a long time.
_____ 16) When I’m upset, I believe that I will end up feeling very depressed.
_____ 17) When I’m upset, I believe that my feelings are valid and important.
_____ 18) When I’m upset, I have difficulty focusing on other things.
_____ 19) When I’m upset, I feel out of control.
_____ 20) When I’m upset, I can still get things done.
_____ 21) When I’m upset, I feel ashamed at myself for feeling that way.
_____ 22) When I’m upset, I know that I can find a way to eventually feel better.
_____ 23) When I’m upset, I feel like I am weak.
_____ 24) When I’m upset, I feel like I can remain in control of my behaviors.
_____ 25) When I’m upset, I feel guilty for feeling that way.
_____ 26) When I’m upset, I have difficulty concentrating.
_____ 27) When I’m upset, I have difficulty controlling my behaviors.
_____ 28) When I’m upset, I believe there is nothing I can do to make myself feel better.
_____ 29) When I’m upset, I become irritated at myself for feeling that way.
When I’m upset, I start to feel very bad about myself.
When I’m upset, I believe that wallowing in it is all I can do.
When I’m upset, I lose control over my behavior.
When I’m upset, I have difficulty thinking about anything else.
When I’m upset, I take time to figure out what I’m really feeling.
When I’m upset, it takes me a long time to feel better.
When I’m upset, my emotions feel overwhelming.

Sleep Timing Questionnaire Items

This questionnaire asks about when you normally sleep. We are interested in getting as accurate a picture as we can of the times when you normally go to bed and get up. Please think carefully before giving your answers and be as accurate and as specific as you can be. Please answer in terms of a recent “normal average week,” not one in which you traveled, vacationed or had family crises. Thanks.

Please think of GOOD NIGHT TIME as the time at which you are finally in bed and trying to fall asleep.

On the night before a work day or school day, what is your usual GOOD NIGHT TIME? __:____ pm/am

On a night before a day off (e.g. a weekend), what is your usual GOOD NIGHT TIME? __:____ pm/am

Please think of GOOD MORNING TIME as the time at which you finally get out of bed and start your day.

Before a work day or school day, what is your usual GOOD MORNING TIME? __:____ am/pm

Before a day off (e.g. a weekend), what is your usual GOOD MORNING TIME? __:____ am/pm
**Posttraumatic Growth Inventory - SF**

Indicate for each of the statements below the degree to which this change occurred in your life as a result of stressful or traumatic experiences, using the following scale.

0 = *I did not experience this change as a result of this stress.*
1 = *I experienced this change to a very small degree as a result of this stress.*
2 = *I experienced this change to a small degree as a result of this stress.*
3 = *I experienced this change to a moderate degree as a result of this stress.*
4 = *I experienced this change to a great degree as a result of this stress.*
5 = *I experienced this change to a very great degree as a result of this stress.*

<table>
<thead>
<tr>
<th>Possible Areas of Growth and Change</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>1. I changed my priorities about what is important in life.</td>
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<td>2. I have a greater appreciation for the value of my own life.</td>
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<td>3. I have a better understanding of spiritual matters.</td>
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<td>4. I established a new path for my life.</td>
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<td>5. I have a greater sense of closeness with others.</td>
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<td>6. I know better that I can handle difficulties.</td>
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<td>7. I am able to do better things with my life.</td>
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<td>8. I have a stronger religious faith.</td>
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<td>9. I discovered that I'm stronger than I thought I was.</td>
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<tr>
<td>10. I learned a great deal about how wonderful people are.</td>
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</tr>
</tbody>
</table>
## Appendix E: EMA Survey

<table>
<thead>
<tr>
<th>Construct</th>
<th># of qs</th>
<th>Question text</th>
<th>Answer responses</th>
<th>Question type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID check</td>
<td>1</td>
<td>I am enrolled in this study and am answering these questions about myself</td>
<td>Yes/No</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Momentary Stress (adapted from Karvounides et al., 2016)</td>
<td>1</td>
<td>On a scale of 0 to 100, with 0 being no stress and 100 being worst stress possible, what number best describes your level of stress SINCE YOUR LAST SURVEY?</td>
<td>0 = no stress 100 = worst stress possible</td>
<td>VAS</td>
</tr>
<tr>
<td>Stressors (Almeida et al., 2002)</td>
<td>1</td>
<td>Please select the stressful situations you have experienced SINCE YOUR LAST SURVEY (check all that apply) (stressors)</td>
<td>1. Argument or disagreement 2. School or work problems 3. Problems at home 4. Discrimination on the basis of race, sex, or age 5. Something happening to close friend or relative 6. Other (write-in option) 7. I did not experience any stressful situations</td>
<td>Select all</td>
</tr>
<tr>
<td>Emotion Regulation Strategies (adapted from Short et al., 2017)</td>
<td>8</td>
<td>Please rate how much you have used each of the following strategies to help manage stress SINCE YOUR LAST SURVEY. Since my last survey… 1. I thought about things in a different way 2. I tried not to think about the things that are making me upset 3. I tried to accept the way things are 4. I could not stop thinking about the things that are making me upset 5. I tried to think about a way to fix the problem 6. I kept my emotions to myself 7. I did something impulsive to make myself feel better (e.g., using alcohol/drugs, spending money) 8. I went out of my way to avoid thoughts, situations, or activities that would make me upset again</td>
<td>0 = I have not used this at all 100 = I have used this an extreme amount</td>
<td>VAS</td>
</tr>
<tr>
<td>State Difficulties in Emotion Regulation (adapted from S-DERS; Lavender et al., 2015)</td>
<td>4</td>
<td>Please read each statement and indicate how much it applies to your emotions RIGHT NOW. 1. I feel ashamed with myself for feeling this way. 2. I am having difficulty controlling my behaviors. 3. I am acknowledging my emotions.</td>
<td>0 = Not at all 25 = Slightly 50 = Moderately 75 = Quite a bit 100 = Extremely</td>
<td>VAS</td>
</tr>
<tr>
<td>Depression (PROMIS – Depression – Short Form adapted)</td>
<td>4</td>
<td>At the moment, I…</td>
<td>0 = Not at all 25 = Slightly 50 = Moderately 75 = Quite a bit 100 = Extremely</td>
<td>VAS</td>
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<td>------------------------------------------------------</td>
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<td></td>
<td></td>
<td>1. feel hopeless 2. feel helpless 3. feel depressed 4. feel worthless</td>
<td></td>
<td></td>
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<tr>
<td>Anxiety (PROMIS – Anxiety – Short Form adapted)</td>
<td>4</td>
<td>At the moment, I…</td>
<td>0 = Not at all 25 = Slightly 50 = Moderately 75 = Quite a bit 100 = Extremely</td>
<td>VAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. feel tense 2. feel worried 3. feel anxious 4. feel nervous</td>
<td></td>
<td></td>
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<tr>
<td>PTS Symptoms (4-item version of PCL-5)</td>
<td>4</td>
<td>Below is a list of problems that people sometimes have in response to a very stressful experience. Please read each statement carefully, then rate how much you have been bothered by that problem since your last survey.</td>
<td>0 = Not at all 25 = Slightly 50 = Moderately 75 = Quite a bit 100 = Extremely</td>
<td>VAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Repeated, disturbing, and unwanted memories of the stressful experience? 2. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)? 3. 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)? 4. Feeling jumpy or easily startled?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix F: Panel Plots Grouped by Trauma Exposure
Figure A1. Panel plots by trauma exposure for state emotion dysregulation. Note: ED = emotion dysregulation. Errant lines on plots are an artifact of missing data points from surveys that were not completed.
Figure A2. Panel plots by trauma exposure for maladaptive strategy use. Errant lines on plots are an artifact of missing data points from surveys that were not completed.
Figure A3. Panel plots by trauma exposure for adaptive strategy use. Errant lines on plots are an artifact of missing data points from surveys that were not completed.
Figure A4. Panel plots by trauma exposure for adaptive strategy use. Errant lines on plots are an artifact of missing data points from surveys that were not completed.
Appendix G: Sample Diagnostic Output

Figure A5. Histogram of standardized level-1 residuals for emotion dysregulation.

Figure A6. QQ plot of standardized level-1 residuals for emotion dysregulation.
Figure A7. Scatter plot of standardized level-1 residuals for emotion dysregulation by marginal predicted values.

Figure A8. Scatter plot of standardized level-1 residuals for emotion dysregulation by level-2 combined mental health symptoms.
Figure A9. Boxplot of standardized level-1 residuals for emotion dysregulation by trauma exposure group.

Figure A10. Histogram of standardized level-2 residuals for emotion dysregulation (intercepts).
Figure A11. QQ plot of standardized level-2 residuals for emotion dysregulation (intercepts).

Figure A12. Histogram of standardized level-2 residuals for emotion dysregulation (slopes).
Figure A13. QQ plot of standardized level-2 residuals for emotion dysregulation (slopes).
CURRICULUM VITAE

Zoe Bridges-Curry
University of Louisville
zoe.bridges-curry@louisville.edu

EDUCATION

Expected 2023
Ph.D., Clinical Psychology
University of Louisville, Louisville, KY
Dissertation Title: Connections between polyvictimization, daily stress, emotion regulation, and mental health symptoms: An ecological momentary assessment study

2017
Master of Professional Studies (MPS), Clinical Psychological Science
University of Maryland, College Park, MD
Thesis: A little help from my friends: The mediating role of social support in the relation between childhood polyvictimization and intimate partner violence

2015
Post-Baccalaureate Pre-Medical Certificate
Georgetown University, Washington, DC
Summa cum laude

2009
Bachelor of Arts, Sociology/Anthropology
Swarthmore College, Swarthmore, PA
Graduated with honors

HONORS AND AWARDS

2022
Stanley A. Murrell Scientist Practitioner Award, University of Louisville

2018-2020
University Fellowship, University of Louisville

2019, 2020
Graduate Student Council Travel Funding Award, University of Louisville

2019
Graduate Network in Arts and Sciences Student Research Award, University of Louisville
2017  ISTSS Complex Trauma Special Interest Group endorsement for poster: Polyvictimization and Delinquency in Black and Latino Youth

2009  Bramson Prize for Senior Honors Thesis: White Working-Class Masculinity in Union Organizing

PUBLICATIONS

Peer Reviewed Publications


In Preparation

Bridges-Curry, Z., Eshelman, L.R., & Messman-Moore, T.L. Masculinity, emotion dysregulation, and mental health: A transdiagnostic latent profile approach.

Other Publications


PRESENTATIONS

Oral Presentations

Bridges-Curry, Z., Cerrillos, A., & Newton, T.L. Cumulative trauma and latent patterns of emotion regulation strategy use: Transdiagnostic associations with mental and


Bridges-Curry, Z. Communicating Psychological Science. Colloquium Series, University of Louisville Department of Psychological & Brain Sciences (April 2021).


Poster Presentations


**Bridges-Curry, Z. & Dike, J.** *Direct and Indirect Effects in the Relation between Childhood Polyvictimization and Adolescent Revictimization.* International Society for Traumatic Stress Studies Annual Conference (November 2018).


**Bridges-Curry, Z., Glenn, L., Chin, D., Somerville, K., & Felton, J.** *How does that make you feel? For adolescent males, it may be better not to know.* Journal of Clinical Child and Adolescent Psychology (JCCAP) Future Directions Forum (June 2017).

**GRANT PROPOSALS**

**Bridges-Curry, Z. & Newton, T. L.** *A person-centered approach to understanding connections between lifetime trauma exposure and self-rated health in older adults.* Submitted to the Stress Measurement Network, National Institute on Aging (R24AG048024; R01AG030153).

**RESEARCH EXPERIENCE**

**2018 – Present** Stress & Health Lab, University of Louisville  
Graduate Research Assistant  
Principal Investigator: Tamara Newton, Ph.D.

- **Trauma and Health Comparison**  
  Designed and recruited undergraduate participants for an online survey study (ages 18-25). Tested associations between polyvictimization, emotion regulation, and health outcomes using mixture modeling and mediation analyses.

- **Profiles and Patterns in Intimate Partner Violence**  
  Used network analysis to identify central PTSD symptoms in a sample of divorced mid-life women recruited for a previous study in the lab. Identified patterns of IPV and lifetime trauma and tested associations with indicators of physical and cognitive health.

- **Adolescent Polyvictimization and Health in Emerging Adulthood**  
  Longitudinal study using data from the LONGSCAN dataset. Identified latent classes of trauma exposure and tested longitudinal associations with self-rated health.

**2017 – 2018** Counseling Psychology Research Center, University of Maryland, College Park  
Research Assistant  
Principal Investigator: Karen O’Brien, Ph.D.
Recruited and collected data for study examining the efficacy of a dating violence intervention for male undergraduate students.

Assisted with literature search for meta-analysis of interventions used to train medical professionals in end-of-life communication.

2016 – 2017 Comprehensive Assessment and Intervention Program, University of Maryland, College Park
Research Assistant
Principal Investigator: Andres De Los Reyes, PhD

- Collected self-report and physiological data for study of socially anxious adolescents and parents.
- Administered tasks and measures to elicit and assess participants’ anxiety in social situations, including Cyberball and Trier social stress test.

2014 – 2015 Culture and Emotions Lab, Georgetown University
Research Assistant
Principal Investigator: Yulia Chentsova Dutton, PhD

- Coded and transcribed videos of students describing emotional experiences for study examining the influence of attitudes about positive and negative emotion on expression.

**CLINICAL EXPERIENCE**

2022 – Present John D. Dingell VA Medical Center, Detroit, MI
Interprofessional Mental Health Intern
Provide individual and group therapy to veterans enrolled in outpatient and intensive outpatient treatment for mood, anxiety, personality, substance use, and posttraumatic stress disorders. Interventions include Acceptance and Commitment Therapy (ACT), Cognitive Behavior Therapy (CBT), Dialectical Behavior Therapy (DBT), Exposure/Response Prevention (ERP), and Motivational Interviewing (MI). Conduct quality improvement projects to advance veteran care and increase employee retention.
Supervisors: Eric Miller, Ph.D. (Mental Health Clinic), Samantha Manring, Ph.D. (Substance Use Disorders Clinic)

2021 – 2022 Behavioral Wellness Center/Louisville OCD Clinic, Louisville, KY
Adult and Adolescent Therapy Practicum
Provided evidence-based outpatient treatment for patients seeking treatment for anxiety, OCD, and PTSD, including exposure-based interventions and Cognitive Processing Therapy (CPT).
Supervisor: Melissa Gibson, Psy.D.

2021 – 2022 Louisville Center for Eating Disorders, Louisville, KY
*Intensive Outpatient Practicum*
Provided individual and group therapy for adult and adolescent patients enrolled in intensive outpatient program for eating disorder treatment. Individual interventions included Family-Based Treatment (FBT) and enhanced CBT (CBT-E) for eating disorders. Groups include DBT skills, meal therapy, perfectionism, exposure, and positive affect groups.
Supervisor: Melissa Gibson, Psy.D.

2021 Personalized Treatment Study, University of Louisville
*Study Therapist*
Conducted network analysis to identify central symptoms and provide personalized treatment for eating disorders and associated symptomatology.
Supervisor: Cheri Levinson, Ph.D.

2020-2021 Noble H. Kelley Psychological Services Center, Louisville, KY
*Eating and Anxiety Practicum*
Provided evidence-based individual therapy for outpatient clients seeking treatment for anxiety and trauma, including CBT, CPT, DBT, and Prolonged Exposure (PE). Led eating disorder support group.
Supervisors: Cheri Levinson, Ph.D., & Alex Pruitt, Psy.D.

2018-2020 Noble H. Kelley Psychological Services Center, Louisville, KY
*Integrative Intervention Practicum*
Provided individual therapy for outpatient clients using CBT, DBT, and Unified Protocol.
Supervisor: Richard Lewine, Ph.D.

2018-2021 Noble H. Kelley Psychological Services Center, Louisville, KY
*Adult Assessment Practicum*
Conducted semi-structured assessment interviews and flexible batteries of psychological assessments for adult outpatients to address a range of referral questions, including ADHD, serious mental illness, and other diagnoses. Scored tests and wrote reports based on clients’ performance. Provided feedback to clients.
Supervisor: David Winsch, Ph.D.
2017 – 2018  Salvation Army Harbor Light Center, Washington, DC
*Adult Assessment Experience*
Conducted structured assessment interviews to justice-involved clients enrolled in residential treatment for substance use. Trained undergraduate and graduate research assistants to administer the Structured Clinical Interview for DSM-IV (SCID-IV).
Supervisors: Julia Felton, Ph.D., & Michael Meinzer, Ph.D.

2017 – 2018  Maryland ADHD Program, University of Maryland, College Park
*Study Therapist*
Administered brief motivational interviewing and behavioral activation intervention for college students with ADHD to reduce problem drinking and substance use.
Supervisors: Michael Meinzer, Ph.D., & Andrea Chronis-Tuscano, Ph.D.

2015 – 2016  Potomac Behavioral Solutions, Washington, DC
*Clinical & Research Coordinator*
Provided clinical and administrative support to multi-disciplinary team offering evidence-based treatment for anxiety, personality, and eating disorders. Completed intakes, provided skills coaching, and co-led DBT groups.
Supervisors: Sarah Bellovin-Weiss, Ph.D., & Joanna Marino, Ph.D.

**COMMUNICATIONS & ADVOCACY EXPERIENCE**

2012 – 2015  BerlinRosen, Washington, DC
*Senior Associate (2012-2013), Freelance Media Specialist (2013-2015)*
- Provided media outreach assistance to political organizations, research foundations, medical groups, and national labor unions. Served as organizational spokesperson.
- Planned and staffed press events. Prepared principals and academic experts for print, radio, and TV interviews. Coordinated with allied groups and academic institutions for joint releases and press events.

2010 – 2012  American Rights at Work, Washington, DC
*Press Secretary*
• Led media outreach and communication strategy for state and national campaigns. Served as organizational spokesperson.

2009 – 2010  AFL-CIO, Washington, DC  
*Media Outreach Fellow*

Summer 2008 Public Citizen, Washington, DC  
*Congress Watch Intern*

**VOLUNTEER AND LEADERSHIP EXPERIENCE**

2020  
**Suicide Prevention Subcommittee,** Provost’s Committee on Student Wellbeing, University of Louisville – Louisville, KY

2019  
**Annual Convention Planning Committee,** Kentucky Psychological Association – Louisville, KY

2014 – 2016  
**Hotline Crisis Counselor/Backup Supervisor,** DC Rape Crisis Center – Washington, D.C.  
• Provided crisis counseling to callers to DC Rape Crisis Center hotline. Served as backup supervisor, mandated reporter, and training facilitator for hotline volunteers.

May 2014  
**Volunteer,** VIDA Medical Program – Guatemala  
• Conducted medical and psychological evaluations for patients living in underserved rural communities.

2011 – 2013  
**Volunteer,** Capital Hospice – Washington, DC  
• Offered support to patients and families receiving hospice care.

**PROFESSIONAL SERVICE**

Journal of Interpersonal Violence—ad hoc reviewer  
Co-reviewer with Dr. Tamara Newton

Journal of Interpersonal Violence—ad hoc reviewer  
Co-reviewer with Dr. Julia Felton

Journal of Psychopathology and Behavioral Assessment —ad hoc reviewer  
Co-reviewer with Dr. Julia Felton

**PROFESSIONAL AFFILIATIONS**

Association for Behavioral and Cognitive Therapies (ABCT)  
Association for Psychological Science (APS)
International Society for Traumatic Stress Studies (ISTSS)
Complex Trauma SIG
Diversity and Cultural Competency SIG
Trauma and Substance Use Disorders SIG

RECENT CLINICAL TRAINING

- Star Behavioral Health Providers (SBHP) Tier One: Military Culture and the Deployment Cycle Training
- Star Behavioral Health Providers (SBHP) Tier Two: Issues Commonly Associated with Military Service Training
- Star Behavioral Health Providers (SBHP) Tier Three: Prolonged Exposure Therapy Training
- APA Substance Abuse Disorder (SUD) Curriculum for Psychology Students
- LGBTQ+ Affirming Healthcare Series, University of Louisville
- Medical University of South Carolina (MUSC) Provider Training for Cognitive Behavioral Therapy of Insomnia (CBT-I)

TECHNICAL SKILLS

- SPSS for data management and statistical analysis.
- AMOS for advanced data analysis.
- R for network analysis, multilevel modeling, and other advanced data analysis.
- LatentGOLD for mixture modeling.
- G*Power for statistical power analysis.