Article

Managing Stress and School: The Role of Posttraumatic Stress in Predicting Well-Being and Collegiate Burnout

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Abstract

Experiencing a traumatic event is generally posited to increase vulnerability. Informed by a stress process framework, this study investigated the relation of posttraumatic stress to depressive symptoms, risky drinking, and school burnout in emerging adulthood, a developmental period during which common behavioral and psychological disorders reach their peak. Whether self-control acts as a mechanism linking posttraumatic stress to these outcomes was also examined. Using a short-term longitudinal design ($N = 373$ undergraduate students), we found a direct, positive association between heightened levels of posttraumatic stress and heightened depressive symptoms, risky drinking, and school burnout. Posttraumatic stress was also indirectly linked to depressive symptoms, risky drinking, and school burnout via self-control. Experiences of posttraumatic stress are thought to erode self-control capacity, and depleted self-control is thought to be adversely associated with mental health, decision-making, and school success. Implications for intervention across multiple lines of defense are discussed.

Keywords

Emerging adulthood is marked by transition as individuals explore possible selves in love, work, and worldviews. It is also the developmental period in which common behavioral and psychological disorders reach their peak, including substance abuse and depression (Arnett, 2014; Schwartz, 2016). Rooted in a stress process framework (Pearlin, 1989; Pearlin, Schieman, Fazio, & Meersman, 2005), we posit that emerging adults who have experienced trauma may be at an elevated risk for internalizing and externalizing symptomology as well as difficultly staying engaged and motivated with regard to their daily responsibilities, namely, school. This is because trauma-exposed individuals experience both normative stress associated with their developmental stage as well as context-specific stress related to the traumatic event. Elevated, chronic stress is expected to impair one's self-control, such that the frequent exertion of self-control to manage trauma symptoms drains psychological resources and depletes self-control capacity (Baumeister & Heatherton, 1996; Hofmann, Schmeichel, & Baddeley, 2012; Pearlin & Pioli, 2003). Subsequently, stress coupled with depleted self-control has implications for individual well-being and has been linked to risky behaviors, including poorer mental health and excessive drinking (e.g., Read et al., 2012).

Accordingly, this study examines how posttraumatic stress amplifies vulnerability in a nonclinical collegiate population. We posit that such stress will impair self-control capacity and heighten the risk of detrimental outcomes such as elevated mental health symptomology, instances of risky behaviors, and difficulty completing responsibilities as a student. As recent estimates show that more than half (59%) of college students meet the clinical criteria for trauma exposure, we examine the implications of trauma exposure in this population. The prevalence of trauma exposure means that, on university campuses, there is a need to understand how it manifests in personal and school-based outcomes. This understanding, in turn, can be used to help identify and better serve trauma exposed, at-risk

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students, particularly those who are not engaged in clinical services.

Posttraumatic Stress Through a Stress Process Framework

The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013) describes posttraumatic stress as the development of symptomology following exposure to an extreme stressor that incites feelings of fear or helplessness. Exposure is defined broadly and could include a personal experience, witnessing a horrific event or series of events, or learning about a trauma that occurred to a close family member or friend. Symptomology includes persistently reexperiencing the traumatic event even when an effort is made to avoid recall, as well as increased psychological arousal (e.g., difficultly sleeping, hypervigilance), and restricted responsiveness (e.g., feeling numb, feeling detached from others, diminished interest in significant life activities).

Applying the stress process framework to the study of posttraumatic stress provides insight into how trauma exposure may manifest in psychological and behavioral ways. Over time, there have been several iterations of the stress process framework, but the general tenets of the model remain the same, namely, that acute, primary stressors, such as life events, manifest into secondary stressors that, then, adversely impact mental health and well-being (Pearlin et al., 2005). Within the context of trauma-induced stress, the primary or initial stressor is the traumatic event. The stress of the trauma proliferates into secondary stressors, in this case, posttraumatic stress, so that the individual reexperiences the event through intrusive thoughts, feelings of overstimulation, and/or challenges in suppressing or adaptively coping with the memories and feelings associated with the trauma. The primary and secondary stressors take a toll on the individual and are predicted to present in disruptive ways, including poor mental health and illbeing. Within this theoretical framework, the linking mechanism between stress and maladaptive outcomes is posited to be self-concepts. More specifically, stress is hypothesized to wear down or deplete self-concepts over time, including self-control, self-efficacy, self-esteem, and mastery (Pearlin & Pioli, 2003). Most of these links have been empirically validated across diverse samples (e.g., Thoits, 2010), including emerging adult samples (e.g., Luyckx, De Witte, & Goossens, 2011; Reed, Ferraro, Lucier-Greer, & Barber, 2015), yet less in known empirically regarding self-control.

Pearlin and Pioli (2003) argue that self-control is a component of personal control that reflects the ability to regulate impulses and emotions. Personal control, and thus, self-control, is thought to be learned over the life course. Thus, it has the potential to be a malleable disposition that may be altered by salient life events. We posit that trauma exposure and the reverberating effects of posttraumatic stress have the capability of depleting self-control. Based on the empirical evidence and theoretical suppositions, this is expected to be associated with poorer mental health and decision-making among emerging adults as well as compromised ability to complete daily responsibilities.

Implications of Posttraumatic Stress in Emerging Adulthood

Emerging adulthood is generally defined as a developmental stage that begins in the late teens and concludes by the late 20s although some transition into emerging adulthood sooner than others depending on individual context (Arnett, 2000). Individuals in this developmental period engage in self-exploration as a means to refine their identity and commit to a purpose in life (Arnett, 2000; Sumner, Burrow, & Hill, 2015). It is common in the United States for emerging adults to use higher education as a means to explore future paths. Recent estimates by the U.S. Bureau of Labor Statistics (2017) indicate that 70% of 2016 high school graduates in the United States were enrolled at a college or university.

This developmental stage is also one marked by heightened mental health and substance use problems, particularly in the early emerging adult years between ages 18 and 25 (Adams, Knopf, & Park, 2014). In comparison to other age groups, emerging adults report higher levels of depressive symptomology and substance abuse (Center for Behavioral Health Statistics and Quality, 2015; Substance Abuse and Mental Health Services Administration, 2014), and younger emerging adults tend to exhibit more symptomology than older emerging adults (e.g., Center for Behavioral Health Statistics and Quality, 2015). Within a nationally representative sample of emerging adults, Adams and colleagues (2014) found that this younger group of emerging adults exhibited higher rates of psychological distress, major depressive episodes, and alcohol dependence than emerging adults over the age of 25, and they also sought treatment less often than older emerging adults, particularly for mental health problems. Thus, identifying factors and experiences that predict poor mental health and substance abuse is important.

Trauma exposure is one such experience that may elevate rates of adverse mental health symptomology and substance abuse. Among emerging adults in college, experiencing a traumatic event is not uncommon. Elhai and colleagues (2012) found that three out of the five college students (59%) met *DSM-5* criteria for trauma exposure. It is important to note that not all individuals who experience a traumatic event experience clinical levels of posttraumatic stress (e.g., van der Velden, Bosmans, van der Meulen, & Vermunt, 2016). For example, in the Elhai et al.'s (2012) study, only half of the students who were exposed to a traumatic event met the clinical criteria for post-traumatic stress disorder (PTSD), yet most experienced some posttraumatic stress symptomology and/or functional impairment. Both clinical stress and elevated stress have important implications for health as well as an individual's ability to manage daily responsibilities, including school.

In emerging adults, trauma exposure tends to elevate mental health symptomology, such that those with trauma exposure

reported more psychological distress than those without a trauma history (e.g., Anders, Frazier, & Shallcross, 2014). Moreover, those with ongoing or multiple trauma experiences reported greater mental health symptomology and psychological distress than those who experienced a single trauma (Krupnick et al., 2004). Additionally, college students who matriculated with elevated posttraumatic stress reported more alcohol misuse and abuse over time (Read et al., 2012). Recent work on the comorbidity of PTSD and alcohol dependence indicates that the links between these two mental health challenges can be bidirectional, such that one increases the risk for the other. However, a stronger association was found when PTSD predicted alcohol dependence than when alcohol dependence predicted PTSD (Berenz et al., 2017).

The link between posttraumatic stress and one's ability to be successful in college has received some empirical support, such that trauma exposure among female college students has been linked to lower grade point averages (Jordan, Combs, & Smith, 2014) and a decreased likelihood of remaining in college (Boyraz, Horne, Owens, & Armstrong, 2013). Because some common manifestations of posttraumatic stress tend to include both hyperarousal and the use of coping strategies such as avoidance (Aupperle, Melrose, Stein, & Paulus, 2012), the present study examined how trauma exposure relates to school burnout. The effects of chronic overarousal are likely to spill over into diverse settings, including school. Although avoidance may be an effective strategy for individuals to disengage from their trauma exposure, these coping behaviors are posited to be counterproductive to success within academic settings.

Posttraumatic Stress and Self-Control

One potential mechanism that can explain the deleterious effects of posttraumatic stress is self-control. Defined as the capacity to inhibit immediate impulsive thoughts, emotions, and/or behaviors (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012), self-control is implicated in an array of social and personal behaviors (Baumeister, Heatherton, & Tice, 1994; Tagney, Baumesiter, & Boone, 2004). For example, low levels of self-control are linked to increased substance abuse among college students (Ford & Blumenstein, 2013), impulsive purchasing (Baumeister, 2002), obesity (Lili, 2014), and increased affective symptomology, such as depression and anxiety (Tangney, Baumeister, & Boone, 2004). Conversely, high self-control brings with it a range of benefits including lower risk of psychopathology, better emotional adjustment to stress, decreased alcohol use, healthier relationships, and, among college students, higher grade point averages and lower school burnout (Seibert, May, Fitzgerald, & Fincham, 2016; Tangney et al., 2004). Despite evidence documenting self-control as central to human functioning, it has largely been unexamined in the context of posttraumatic stress.

This link, however, is not completely absent from the literature. One study conducted by Walter, Gunstad, and Hobfoll (2010) shows that lower self-control predicts higher levels of PTSD symptomology over 3 months. However, these findings

are open to questions as the temporal sequence between self-control and PTSD was measured using only two time points and the inverse relationship was not examined. Under the self-regulatory strength model of self-control, it is also possible that posttraumatic stress can predict levels of self-control. Specifically, under the tenets of the strength model, the capacity to employ self-control is contingent upon a depletable resource (e.g., energy, willpower). As self-control is exerted to manage immediate impulsive responses to stress, it draws from that resource and further reduces the ability to successfully employ self-control in subsequent tasks (Baumeister & Heatherton, 1996). In the context of posttraumatic stress, self-control resources are being consumed to manage the trauma, leading to further consequences associated with low levels of self-control. In fact, research shows PTSD to impair executive functioning processes (e.g., updating, inhibiting, shifting) that are critical in self-control performance (Hofmann et al., 2012; Olff, Polak, Witteveen, & Denys, 2014). Thus, self-control appears pivotal in mediating the effects of the posttraumatic stress on outcomes such as depressive symptomology, risky drinking, and school burnout.

Current Study

Informed by the stress process framework and existing empirical research, this study aimed to take the next steps in theory and empirical development through the evaluation of two primary hypotheses:

Hypothesis 1: Higher levels of posttraumatic stress will be associated with higher levels of depressive symptoms, risky drinking, and school burnout among college students.

Hypothesis 2: The relationship between posttraumatic stress and deleterious outcomes will be indirectly linked through self-control. In other words, higher levels of posttraumatic stress will be associated with lower levels of self-control, which, in turn, will be associated with higher levels of depressive symptoms, risky drinking, and school burnout.

Method

Data were drawn from a short-term longitudinal survey of students enrolled in an introductory family studies class at a Southeastern university. The course fulfills a university-wide requirement and included students from across disciplines. For some classes, participants were offered extra credit at the discretion of the instructor; extra credit was generally less than 1% of the final grade. Students who completed at least one collegiate semester were eligible to participate. Participants engaged in an online survey at two time points, approximately 6 to 8 weeks apart. A consent form, approved by the university's institutional review board, was provided to the participants before they engaged in the survey. Participants were informed that they could stop the survey at any point and could skip questions.

Participants

Participants ranged from 18 to 27 years of age ($M = 19.67$, $SD = 1.34$), although 98.4% of the sample ranged from 18 to 22 years of age. The majority were female (91.5% female). The racial/ethnic background of the sample tended to reflect the demographic characteristics of the university: 74.4% White, 13.1% Latino/Hispanic, 8.5% African America/Black, 2.7% Asian/Pacific Islander, and 1.3% Other. Attrition was minimal between Wave 1 ($N = 373$) and Wave 2 ($N = 354$). A nonsignificant Little's Missing Completely at Random (MCAR) test suggested that the data were missing completely at random, $\chi^2 = 9.167$, $df = 5$, $p = .103$.

Measures

Posttraumatic stress. The predictor variable was measured with the abbreviated 6-item PTSD Civilian Checklist at Wave 1 (Weathers, Litz, Herman, Huska, & Keane, 1993). Participants were asked to consider a list of problems and complaints that people sometimes have in response to stressful life experiences and rate how often they experience various symptoms (e.g., "Repeated, disturbing memories of a stressful experience from the past" and "Feeling distant or cutoff from other people") on a scale from 1 (*not at all*) to 5 (*extremely*). Mean scores were computed ($M = 2.25$, $SD = 0.89$). The majority of the sample (93.1%) reported some level of symptomology, and a quarter of the sample (22.7%) would be considered symptomatic with a mean score between 3 and 5 indicating moderate or greater symptomology.

Self-control. The mediator variable was assessed by the 13-item Brief Self-Control Scale (BSCS; Tangney et al., 2004) at Wave 2. The BSCS assesses self-control related to controlling thoughts, controlling emotions, controlling impulses, regulating behavior and/or performance, and habit breaking. Participants responded 1 (*not at all like me*) to 5 (*very much like me*) on indicators of self-control (e.g., "I often act without thinking through all the alternatives" and "I do things that are bad for me"). Several items were reversed scored, such that higher scores indicate greater self-control. Mean scores were computed ($M = 3.41$, $SD = 0.68$).

Depressive symptoms. This outcome variable was assessed via the 10-item Center for Epidemiological Studies Depression Scale (CES-D; Irwin, Haydari, & Ox man, 1999; Radloff, 1977) at Wave 2. The CES-D is a widely used measure of depressive symptoms in nonclinical samples. Participants are asked to evaluate how they felt and behaved during the previous week. Sample items include, "I could not 'get going'" and "I felt hopeful about the future." Participants responded 0 (*rarely*) to 3 (*most/all of the time*) on items, such as feelings of loneliness, hopelessness, and restless sleep. Some items were reverse coded, such that higher responses indicate more symptomology. Mean scores were computed ($M = 0.96$, $SD = 0.55$).
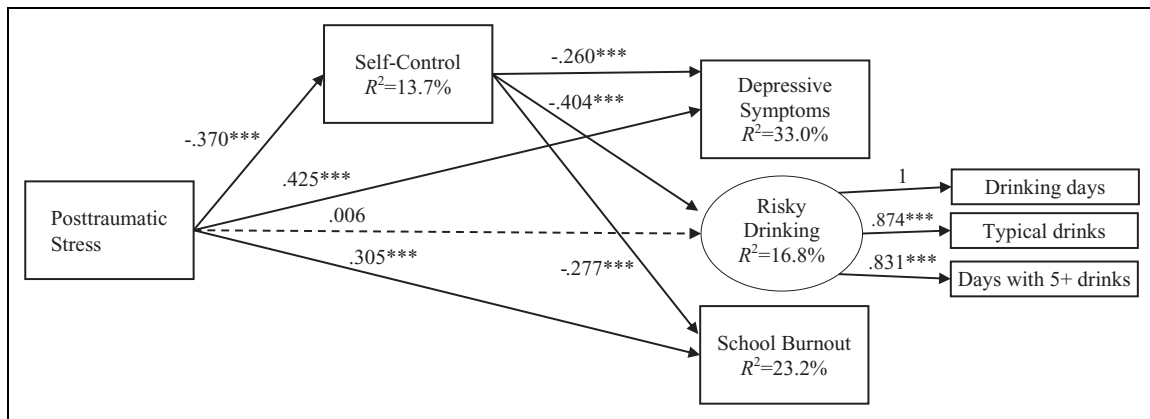
Risky drinking. This outcome variable was examined at Wave 2 and measured as a latent variable with three indicators assessing behaviors in the last 30 days. Indicator 1 asked, "How many days did you have a drink containing alcohol?" with responses ranging from 1 (*never drank all 30 days*) to 7 (*20–30 days*). The mean score ($M = 3.75$, $SD = 1.55$) indicated that, on average, the sample drank 3 to 5 days during the last 30 days. Indicator 2 asked, "How many alcoholic drinks on a typical day were you drinking?" with responses ranging from 1 (*never drank*) to 6 (*10 or more*). The mean score ($M = 2.84$, $SD = 1.16$) indicated that the typical number of alcoholic drinks consumed was between 2 and 3. Indicator 3 asked about the participant's frequency of drinking five or more drinks on one occasion with responses ranging from 1 (*never happened*) to 9 (*more than 10 times*). The mean score ($M = 2.42$, $SD = 1.74$) indicated that, on average, participants engaged in this type of binge drinking 2 times in the last month. The factor loadings on the measurement model ranged from .774 to .886.

School burnout. This outcome variable was measured at Wave 2 via the School Burnout Inventory (SBI; Salmela-Aro, Kiuru, Leskinen, & Nurmi, 2009). The SBI consists of 9 items measuring three first-order factors of school burnout: (a) exhaustion at school (4 items), (b) cynicism toward the meaning of school (3 items), and (c) sense of inadequacy at school (2 items). Summed scores from the first-order factors comprise a second-order overall school burnout score. Higher composite scores indicate higher burnout. Participants responded to items (e.g., "I feel overwhelmed by my school work" and "I feel a lack motivation in school work and often think of giving up") on a scale from 1 (*completely disagree*) to 6 (*completely agree*). Mean scores were computed ($M = 3.33$, $SD = 1.03$).

Analytic Plan

Two structural equation models (SEMs) were fitted to empirically evaluate the study hypotheses. The first model examined the direct relationship between posttraumatic stress and the outcome variables, including depressive symptoms, risky drinking, and school burnout. The second model examined the indirect effect of the relationships between posttraumatic stress and the outcome variables via self-control. Missing data were accounted for using full information maximum likelihood estimations.

Several fit indices were used to assess model fit, including the Tucker–Lewis index (TLI), the comparative fit index (CFI), and root mean square error of approximation (RMSEA). A TLI and CFI of .95 or greater represent an adequate fit between the data and chosen model, and an RMSEA score of less than .07 indicates good model fit. Given that Model 1 is nested within Model 2, we also evaluated the χ^2 and degrees of freedom values for each model. Improvement in model fit, as tested by a χ^2 difference test, would suggest that the model with the indirect effect (Model 2) fits the data better than the model with only direct effects (Model 1).

Figure 1. Structural equation model examining the relationships between posttraumatic stress, self-control, depressive symptoms, risky drinking, and school burnout, among a sample of emerging adult college students ($N = 373$). Standardized estimates are presented. The dashed line represents a nonsignificant pathway. ***$p < .001$. Tucker–Lewis index = .968, comparative fit index = .989, root mean square error of approximation = .05, and $p = .404$.

Table 1. Correlation Matrix and Descriptive Statistics for All Study Variables.

	1	2	3	4	5	6	7
1. PTSD symptoms (Wave 1)	—						
2. Self-control (Wave 2)	−.37***	—					
3. Depressive symptoms (Wave 2)	.52***	−.42***	—				
4. Number of drinking days in the last 30 days (Wave 2)	.14*	−.34***	.08	—			
5. Number of drinks on a typical drinking day (Wave 2)	.13*	−.32***	.17**	.69***	—		
6. Number of days with 5+ drinks in the last 30 days (Wave 2)	.15**	−.38***	.19***	.63***	.73***	—	
7. Burnout (Wave 2)	.41***	−.39***	.56***	.03	.08	. 15**	—
Scale range	1–5	1–5	0–3	1–7	1–6	1–9	1–6
α	.88	.87	.84	N/A	N/A	N/A	.91
Mean	2.25	3.41	0.96	3.75	2.84	2.42	3.33
Standard deviation	0.89	0.68	0.55	1.55	1.16	1.74	1.03

Note. $N = 373$. PTSD = post-traumatic stress disorder.
*$p < .05$. **$p < .01$. ***$p < .001$.

Indirect effects (using self-control as the linking mechanism between posttraumatic stress symptoms and outcomes) were assessed by estimating asymmetric confidence intervals using bias-corrected bootstrap methods for significance testing (MacKinnon, 2008; MacKinnon, Lockwood, & Williams, 2004). Bootstrapping is the preferred method for assessing mediation; this approach corrects bias in the central tendency of the estimate, which is not accounted for in other methods (MacKinnon et al., 2004). Indirect effects were considered significant at the .05 level when zero was not within the 95% confidence interval (MacKinnon, 2008).

Results

Descriptive statistics (scale range, reliability, mean, and standard deviation) are presented in Table 1. Table 1 also provides a correlation table. Generally, correlations were modest and in the expected direction. School burnout was not associated with number of drinking days in the last 30 days ($r = .033, p = .537$)

nor was it associated with number of drinks on a typical drinking day ($r = .079, p = .137$).

To address Hypothesis 1, the three outcome variables (depressive symptomology, school burnout, and risky drinking) were regressed on the predictor variable (posttraumatic stress symptoms). Model fit was $\chi^2(9) = 96.40, p < .001$, TLI = .737, CFI = .887, and RMSEA = .16, $p < .001$. In this model, posttraumatic stress symptoms at Wave 1 significantly predicted depressive symptoms ($\beta = .521, p < .001$), school burnout ($\beta = .407, p < .001$), and risky drinking ($\beta = .163, p = .004$) at Wave 2.

Model 2 was then fit to evaluate Hypothesis 2. This SEM model examined the potential indirect effects between posttraumatic stress symptoms at Wave 1 and the three outcome variables at Wave 2 (depressive symptoms, school burnout, and risky drinking) via self-control at Wave 2 (see Figure 1). The data fit the model well, $\chi^2(10) = 20.31, p = .026$, TLI = .968, CFI = .989, RMSEA = .05, $p = .404$. In this model, posttraumatic stress symptoms at Wave 1 significantly predicted depressive symptoms ($\beta = .425, p < .001$) and school burnout ($\beta = .305, p < .001$), but not risky drinking ($\beta = .006, p = .777$)

Table 2. Asymmetric Confidence Intervals and Indirect Effects of Self-Control.

Predictor	Outcome	[Lower Limit, Upper Limit]	Significance of the Indirect Effect
Posttraumatic stress symptomology	Depressive symptomology	[.040, .085]	<.001
Posttraumatic stress symptomology	School burnout	[.077, .168]	<.001
Posttraumatic stress symptomology	Risky drinking	[.169, .330]	<.001

Note. Significant indirect effects are indicated by a confidence interval that does not include zero.

at Wave 2. There was a significant, negative relationship between posttraumatic stress and self-control ($\beta = -.370$, $p < .001$). In turn, self-control was significantly and inversely associated with depressive symptoms ($\beta = -.260$, $p < .001$), risky drinking ($\beta = -.404$, $p < .001$), and school burnout ($\beta = -.277$, $p < .001$); lower levels of self-control were associated with higher levels of depressive symptomology, risky drinking, and school burnout.

Significance testing for the indirect effects was conducted using bootstrapping procedures. Posttraumatic stress was indirectly linked to each of the outcome variables via self-control (see Table 2). Furthermore, the relationship between posttraumatic stress and risky drinking was nonsignificant when accounting for the indirect effect of self-control. The relationship between posttraumatic stress and depressive symptoms as well as the relationship between posttraumatic stress and school burnout remained significant. Finally, results from the χ^2 difference test, $\chi^2(1) = 76.08$, $p < .001$, showed that the addition of self-control within the model significantly improved model fit.

Discussion

In the present research, we evaluated how posttraumatic stress influences depressive symptoms, risky drinking, and school burnout in emerging adults. We used short-term longitudinal survey data from a sample of undergraduate college students from diverse areas of study. Informed by a stress process framework, we predicted that higher levels of posttraumatic stress symptoms would be related to higher levels of adverse outcomes, and the data were consistent with this hypothesis. Furthermore, it was expected that self-control would serve as a mechanism to help explain the relationship between posttraumatic stress and the aforementioned adverse outcomes. As expected, the indirect effect via self-control was found to be a significant and meaningful linking mechanism between posttraumatic stress and all the outcome variables. It was especially salient in the relationship between posttraumatic stress and risky drinking, such that the direct effect between those two variables was no longer significant when self-control was included in the model. These findings align with previous work rooted in stress process theory and are consistent with our hypotheses.

Overall, study findings underscore the enduring influence of traumatic events and highlight the role self-control plays in linking posttraumatic stress symptomology to deleterious outcomes, findings that provide a novel contribution to the posttraumatic stress literature. This study does not substantiate casual relationships between posttraumatic stress and self-control (see limitations), but we are able to build on prior research which has found that self-control can serve as an important point of intervention to improve negative outcomes. Under the tenets of the strength model, self-control functions like a muscle, such that it can be engaged and strengthened over time by practicing adaptive habitual behaviors (Gillebaart & de Ridder, 2015). For example, practicing adaptive behaviors such as squeezing a handgrip exercise, using your nondominant hand to complete everyday tasks, and engaging in physical exercise has shown improvements in laboratory self-control assessments (Muraven, 2010); decreases in intimate partner violence tendencies (Finkel, DeWall, Slotter, Oaten, & Foshee, 2009); and reductions in alcohol use, caffeine consumption, smoking, and perceived stress (Oaten & Cheng, 2006). Our findings suggest that when this self-control "muscle" is repeatedly engaged to the point of exhaustion, it can also be depleted after extended use. Specifically, chronic, elevated levels of posttraumatic stress were associated with lower levels of self-control. In line with Pearlin's stress process model, we saw that posttraumatic stress eroded a vital self-concept, self-control. Depleted levels of self-control were, then, associated with heightened risk of internalizing and eternalizing symptomology, including mental health, decision-making, and behavior in critical life domains, such as school.

Current findings suggest that the experience of posttraumatic stress, including reoccurring and invasive thoughts of trauma, increases the vulnerability of emerging adults. Emerging adults who experience symptoms from trauma exposure need access to quality care for treatment. The next section identifies multiple "lines of defense" to support emerging adult mental health needs. In other words, we discuss possible individuals and institutions who are available to recognize mental health challenges of emerging adults and point them toward trauma-informed care.

Implications for Practice

Previous research has found that 59% of a college student sample met criteria for trauma exposure (Elhai et al., 2012). In the current study, 93.1% of the sample reported some level of posttraumatic symptomology, and 22.7% were considered to have moderate symptomology. This indicates that there are a considerable number of students who are likely being impacted by clinical and subclinical levels of posttraumatic stress. In accordance with our model, these individuals could be at risk of, or

currently enduring, the adverse outcomes of increased depressive symptoms, risky drinking behaviors, and school burnout. Intervention in this pattern is important for this age-group, as career preparation and the establishment of identity are key developmental tasks that are negatively impacted by these outcomes (Arnett, 2014). Sustained mental health symptomology and regularly engaging in risky behaviors could have a long-term impact on job trajectory and overall quality of life for these individuals. Furthermore, early intervention is necessary because unchecked mental health symptomology and risky drinking have been linked to detrimental and even fatal health complications (Whiteford et al., 2013).

Although much of this discussion will be dedicated to possible prevention and intervention strategies geared toward college settings given the nature of the sample, we begin with a focus on how family may serve as a source of support for emerging adult college students. Consistent evidence suggests that parent–child relationships still matter during college (e.g., Carlson, 2014; Reed, Duncan, Lucier-Greer, Fixelle, & Ferraro, 2016; Tsai, Telzer, & Fuligni, 2013). In terms of prevention, equipping parents with age-appropriate strategies for connecting with their students may keep the doors of communication open between parents and children and increase the likelihood that students will turn to their parents for advice and support. Given their history and investment in their emerging adult children, parents may also be able to reliability and validly detect changes in their students' mental health and school burnout and recommend intervention strategies to curtail the changes.

In college settings, professors and other evaluators of student performance may be valuable parties to educate on how posttraumatic stress is associated with adverse academic outcomes. These individuals, particularly those teaching smaller sections of students, are primary witnesses of symptoms of school burnout, including exhaustion, cynicism, and a sense of inadequacy. If trained in recognizing these patterns as possible trauma indicators, college instructors are ideally placed for identifying at-risk students and encouraging them to connect with appropriate services. Academic advisors may also be an important resource as they see students across multiple semesters and may be able to notice change in academic performance and motivation.

In contrast to burnout, symptoms of depression and risky drinking are likely to be exhibited in private or manifest in more subtle ways. As such, advocacy for evaluation and treatment would be most effectively executed by peers and among staff who have more intimate contact with students, such as dormitory aids or recreation and student center staff. Success in this level of intervention has been seen in sexual assault prevention programs on college campuses (Vladutiu, Martin, & Macy, 2011). In their meta-analysis, Vladutiu, Martin, and Macy (2011) found intervention to be most effective when campus-wide advertising and public service announcements are integrated with smaller setting workshops, all of which offer specific education about identifying risk factors and enacting appropriate intervention and advocacy.

An additional source for identifying and referring students facing posttraumatic stress symptomology could be nonclinical student support services, such as student wellness centers and student religious organizations. Once referred for services, family life educators and school counselors will be better service providers if they are equipped with a foundational knowledge of trauma-informed care and tools to identify students in need of this care (Substance Abuse and Mental Health Services Administration, 2014). In order to aid in this process, brief assessments, such as the 6-item measure used in this study, may help identify those struggling with posttraumatic stress. It is equally important that students are referred to service providers who are appropriately prepared to help them, so making training in evidence-based, trauma-informed treatment available to these providers is essential to aid students in recovering from trauma and mitigating adverse outcomes.

As previously noted, not all individuals who experience a traumatic event experience posttraumatic stress (e.g., van der Velden et al., 2016). Brewin, Andrews, and Valentine (2000) conducted a meta-analysis to identify risk factors that predicted the development of posttraumatic stress. Factors such as gender (being a female), younger age when the trauma occurred, and having experienced childhood abuse and adversity were modestly associated ($r \leq .19$) with the development of diagnosable posttraumatic stress (i.e., PTSD), but other posttrauma factors were more salient predictors of PTSD, namely, lack of social support ($r = .40$). This is a reminder of the importance of creating community on college campuses and having mechanisms in place to identify students who are isolated. This is in line with recent research that found social support to be a critical buffer of the effects of adverse experiences on mental health among a college student sample (Reed et al., 2015). The combination of formal systems (e.g., service providers trained in trauma-informed care) and informal networks of care (e.g., sources of social support) is needed to create community (Mancini & Bowen, 2013) and address the manifestation of posttraumatic stress on college campuses.

Limitations and Future Directions

Although the findings of this study speak to important issues among emerging adults regarding the manifestations of trauma, study limitations merit discussion. First, the sample was comprised of predominantly female participants and younger college students. Also, this model may not reflect the experiences of emerging adults not enrolled in college. Their experiences of trauma, stress, and outcomes may be different, but surveying college students was done intentionally so as to look at the issue of school burnout as an adverse outcome of posttraumatic stress.

Additionally, there are constraints inherent to the use of self-report measures, such that participants may have been motivated to answer in a way that made them appear more socially desirable. This is especially relevant considering the stigma attached to some of the constructs being measured, such as mental health and underaged consumption of alcohol. The

study was conducted in a way to mitigate these issues, including reminders of confidentiality, as well as an online administration of surveys that maximized the opportunity for participant privacy. Future research into the relationship between posttraumatic stress, self-control, and adverse outcomes would be enhanced by including additional informants such as peers and family members. This could be powerful in the measurement of self-control and risky drinking, as these constructs have behavioral indicators.

One strength of this study is that it was conducted longitudinally, with 6 to 8 weeks between data collection points. Although this allowed for temporal relations to be examined, 6 to 8 weeks can still be considered a relatively short period of time in comparison to the full length of emerging adulthood. Future studies should also collect information about the adverse outcomes of interest over a longer period and with additional waves of data collection. In this way, we could more effectively evaluate the long-term effects and trajectory of posttraumatic stress over an extended period of time. This would also allow us to be more precise in explicating the role of self-control. To evaluate self-control as a mediator, measures of posttraumatic stress symptomology as Wave 1, self-control at Wave 2, and outcome variables at Wave 3 are needed; to account for change overtime, assessments of these variables would be needed at each wave. Future work may also consider including other salient variables in these analyses, such as age of the trauma and levels of social support.

Despite these limitations, this study provides support for the stress process approach and provides insight into the relationships among posttraumatic stress, self-control, and the adverse outcomes of depression, risky drinking, and school burnout. The present data provide valuable insight into the experiences and needs of individuals in college and suggest possible points of prevention and intervention in the development of adverse outcomes. With these actionable ways to manage posttraumatic stress, emerging adults can have a better quality of life as they develop their identities and futures.

Author Contribution

Mallory Lucier-Greer contributed to conception, design, analysis, and interpretation; drafted the manuscript; critically revised the manuscript; gave final approval; and agreed to be accountable for all aspects of work ensuring integrity and accuracy. Davina Quichocho contributed to interpretation; drafted the manuscript; critically revised the manuscript; gave final approval; and agreed to be accountable for all aspects of work ensuring integrity and accuracy. Ross W. May contributed to conception, design, analysis, and acquisition; drafted the manuscript; critically revised the manuscript; gave final approval; and agreed to be accountable for all aspects of work ensuring integrity and accuracy. Gregory S. Seibert contributed to acquisition and interpretation; drafted the manuscript; critically revised the manuscript; gave final approval; and agreed to be accountable for all aspects of work ensuring integrity and accuracy. Frank D. Fincham contributed to conception, design, acquisition, and interpretation; critically revised the manuscript; gave final approval; and agreed to be accountable for all aspects of work ensuring integrity and accuracy.

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References

Adams, S. H., Knopf, D. K., & Park, M. J. (2014). Prevalence and treatment of mental health and substance use problems in the early emerging adult years in the United States: Findings from the 2010 national survey on drug use and health. *Emerging Adulthood*, *2*, 163–172. doi:10.1177/2167696813513563

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Anders, S. L., Frazier, P. A., & Shallcross, S. L. (2014). Changes in functioning following potentially traumatic life events in college students. *Psychological Trauma: Theory, Research, Practice, and Policy*, *6*, S99–S106. doi:10.1037/a0033835

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*, 469–480. doi:10.1037//0003-066X.55.5.469

Arnett, J. J. (2014). *Adolescence and emerging adulthood*. New York, NY: Pearson Education.

Aupperle, R. L., Melrose, A. J., Stein, M. B., & Paulus, M. P. (2012). Executive function and PTSD: Disengaging from trauma. *Neuropharmacology*, *62*, 686–694. doi:10.1016/j.neuropharm.2011.02.008

Baumeister, R. F. (2002). Yielding to temptation: Self-control failure, impulsive purchasing, and consumer behavior. *Journal of Consumer Research*, *28*, 670–676. doi:10.1086/338209

Baumeister, R. F., & Heatherton, T. F. (1996). Self-regulation failure: An overview. *Psychological Inquiry*, *7*, 1–15. doi:10.1207/s15327965pli0701_1

Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego, CA: Academic Press.

Berenz, E. C., Roberson-Nay, R., Latendresse, S. J., Mezuk, B., Gardner, C. O., Amstadter, A. B., & York, T. P. (2017). Posttraumatic stress disorder and alcohol dependence: Epidemiology and order of onset. *Psychological Trauma: Theory, Research, Practice, and Policy*, *9*, 485–492. doi:10.1037/tra0000185

Boyraz, G., Horne, S. G., Owens, A. C., & Armstrong, A. P. (2013). Academic achievement and college persistence of African American students with trauma exposure. *Journal of Counseling Psychology*, *60*, 582–592. doi:10.1037/a0033672

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*, *68*, 748–766. doi:10.1037/0022-006X.68.5.748

Carlson, C. L. (2014). Seeking self-sufficiency: Why emerging adult college students receive and implement parental advice. *Emerging Adulthood*, *2*, 257–269.

Center for Behavioral Health Statistics and Quality. (2015). *Behavioral health trends in the United States: Results from the 2014 National Survey on Drug Use and Health* (HHS Publication No. SMA 15-4927, NSDUH Series H-50). Rockville, MD: Author.

de Ridder, D. T., Lensvelt-Mulders, G., Finkenauer, C., Stok, F. M., & Baumeister, R. F. (2012). Taking stock of self-control: A meta-analysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Review*, *16*, 76–99. doi:10.1177/1088868311418749

Elhai, J. D., Miller, M. E., Ford, J. D., Biehn, T. L., Palmieri, P. A., & Frueh, B. C. (2012). Posttraumatic stress disorder in DSM-5: Estimates of prevalence and symptom structure in a nonclinical sample of college students. *Journal of Anxiety Disorders*, *26*, 58–64. doi:10.1016/j.janxdis.2011.08.013

Finkel, E. J., DeWall, C. N., Slotter, E. B., Oaten, M., & Foshee, V. A. (2009). Self-regulatory failure and intimate partner violence perpetration. *Journal of Personality and Social Psychology*, *97*, 483–499. doi:10.1037/a0015433

Ford, J. A., & Blumenstein, L. (2013). Self-control and substance use among college students. *Journal of Drug Issues*, *43*, 56–68. doi:10.1177/0022042612462216

Gillebaart, M., & Ridder, D. T. (2015). Effortless self-control: A novel perspective on response conflict strategies in trait self-control. *Social and Personality Psychology Compass*, *9*, 88–99. doi:10.1111/spc3.12160

Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends in Cognitive Sciences*, *16*, 174–180. doi:10.1016/j.tics.2012.01.006

Irwin, M., Haydari, A., & Oxman, M. N. (1999). Screening for depression in the older adult: Criterion validity of the 10-item Center for Epidemiological Studies Depression Scale (CES-D). *Archives of Internal Medicine*, *159*, 1701–1714. doi:10.1001/archinte.159.15.1701

Jordan, C. E., Combs, J. L., & Smith, G. T. (2014). An exploration of sexual victimization and academic performance among college women. *Trauma, Violence, & Abuse*, *15*, 191–200. doi:10.1177/1524838014520637

Krupnick, J. L., Green, B. L., Stockton, P., Goodman, L., Corcoran, C., & Petty, R. (2004). Mental health effects of adolescent trauma exposure in a female college sample: Exploring differential outcomes based on experiences of unique trauma types and dimensions. *Psychiatry: Interpersonal and Biological Processes*, *67*, 264–279. doi:10.1521/psyc.67.3.264.48986

Lili, W. (2014). Body mass index, obesity, and self-control: A comparison of chronotypes. *Social Behavior and Personality: An International Journal*, *42*, 313–320. doi:10.2224/sbp.2014.42.2.313.

Luyckx, K., De Witte, H., & Goossens, L. (2011). Perceived instability in emerging adulthood: The protective role of identity capital. *Journal of Applied Developmental Psychology*, *32*, 137–145. doi:10.1016/j.appdev.2011.02.002

MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis*. New York, NY: Lawrence Erlbaum.

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, *39*, 99–128.

Mancini, J. A., & Bowen, G.L. (2013). Families and communities: A social organization theory of action and change. In G.W. Peterson & K.R. Bush (Eds.), *Handbook of marriage and the family* (pp. 781–813). New York, NY: Springer.

Muraven, M. (2010). Building self-control strength: Practicing self-control leads to improved self-control performance. *Journal of Experimental Psychology*, *46*, 465–468.

Oaten, M., & Cheng, K. (2006). Longitudinal gains in self-regulation from regular physical exercise. *British Journal of Health Psychology*, *11*, 717–733. doi:10.1348/135910706X96481

Olff, M., Polak, A. R., Witteveen, A. B., & Denys, D. (2014). Executive function in Posttraumatic Stress Disorder (PTSD) and the influence of comorbid depression. *Neurobiology of learning and memory*, *112*, 114–121. doi:10.1016/j.nlm.2014.01.003

Pearlin, L. I. (1989). The sociological study of stress. *Journal of Health and Social Behavior*, *30*, 241–256. Retrieved from http://www.jstor.org/stable/2136956

Pearlin, L. I., & Pioli, M. F. (2003). Personal control: Some conceptual turf and future directions. In S. H. Zarit, L. I. Pearlin, K. W. Schaie, S. H. Zarit, L. I. Pearlin, & K. W. Schaie (Eds.), *Personal control in social and life course contexts* (pp. 1–21). New York, NY: Springer.

Pearlin, L. I., Schieman, S., Fazio, E. M., & Meersman, S. C. (2005). Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior*, *46*, 205–219. doi:10.1177/002214650504600206

Radloff, L. S. (1977). The CES-D scale: A self report depression scale for research in the general population. *Applied Psychological Measurements*, *1*, 385–401. doi:10.1177/014662167700100306

Read, J. P., Colder, C. R., Merrill, J. E., Ouimette, P., White, J., & Swartout, A. (2012). Trauma and posttraumatic stress symptoms predict alcohol and other drug consequence trajectories in the first year of college. *Journal of Consulting and Clinical Psychology*, *80*, 426–439. doi:10.1037/a0028210

Reed, K., Duncan, J., Lucier-Greer, M., Fixelle, C., & Ferraro, A. J. (2016). Helicopter parenting and emerging adult self-efficacy: Implications for mental and physical health. *Journal of Child and Family Studies*, *25*, 3136–3149. doi:10.1007/s10826-016-0466-x

Reed, K., Ferraro, A. J., Lucier-Greer, M., & Barber, C. (2015). Adverse family influences on emerging adult depressive symptoms: A stress process approach to identifying intervention points. *Journal of Child and Family Studies*, *24*, 2710–2720. doi:10.1007/s10826-014-0073-7

Salmela-Aro, K., Kiuru, N., Leskinen, E., & Nurmi, J. E. (2009). School Burnout Inventory (SBI): Reliability and validity. *European Journal of Psychological Assessment*, *25*, 48–57. doi:10.1027/1015-5759.25.1.48

Seibert, G. S., May, R. W., Fitzgerald, M. C., & Fincham, F. D. (2016). Understanding school burnout: Does self-control matter? *Learning and Individual Differences*, *49*, 120–127. doi:10.1016/j.lindif.2016.05.024

Substance Abuse and Mental Health Services Administration. (2014a). *SAMHSA's concept of trauma and guidance for a trauma informed approach* (HHS Publication No. (SMA) 14-4884). Rockville, MD: Author.

Substance Abuse and Mental Health Services Administration. (2014b). *Results from the 2013 National Survey on Drug Use and Health: Summary of national findings* (HHS Publication No. (SMA) 14-4863). Rockville, MD: Author.

Sumner, R., Burrow, A. L., & Hill, P. L. (2015). Identity and purpose as predictors of subjective well-being in emerging adulthood. *Emerging Adulthood*, *3*, 46–54. doi:10.1177/2167696814532796

Schwartz, S. J. (2016). Turning point for a turning point: Advancing emerging adulthood theory and research. *Emerging Adulthood*, *4*, 307–317. doi:10.1037/a0039678

Tangney, R. F., Baumeister, A. L., & Boone (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, *72*, 271–322. doi:10.1111/j.0022-3506.2004.00263.x

Thoits, P. A. (2010). Stress and health: major findings and policy implications. *Journal of Health and Social Behavior*, *51*, S41–S53. doi:10.1177/0022146510383499

Tsai, K. M., Telzer, E. H., & Fuligni, A. J. (2013). Continuity and discontinuity in perceptions of family relationships from adolescence to young adulthood. *Child Development*, *84*, 471–484. doi:10.1111/j.1467-8624.2012.01858.x

U.S. Bureau of Labor Statistics. (2017). College enrollment and work activity of 2016 high school graduates [Press Release]. Retrieved from https://www.bls.gov/news.release/hsgec.nr0.htm

van der Velden, P. G., Bosmans, M. G., van der Meulen, E., & Vermunt, J. K. (2016). Pre-event trajectories of mental health and health-related disabilities, and post-event traumatic stress symptoms and health: A 7-wave population-based study. *Psychiatry Research*, *246*, 466–473. doi:10.1016/j.psychres.2016.10.024

Vladutiu, C. J., Martin, S. L., & Macy, R. J. (2011). College-or university-based sexual assault prevention programs: A review of program outcomes, characteristics, and recommendations. *Trauma, Violence, & Abuse*, *12*, 67–86.

Walter, K. H., Gunstad, J., & Hobfoll, S. E. (2010). Self-control predicts later symptoms of posttraumatic stress disorder. *Psychological Trauma: Theory, Research, Practice, and Policy*, *2*, 97–101. doi:10.1037/a0018958

Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A., & Keane, T. M. (1993, October). *The PTSD checklist: Reliability, validity, and diagnostic utility*. Paper presented at the 9th annual meeting of the International Society for Traumatic Stress Studies, San Antonio, TX.

Whiteford, H. A., Degenhardt, L., Rehm, J., Baxter, A. J., Ferrari, A. J., Erskine, H. E., & Burstein, R. (2013). Global burden of disease attributable to mental and substance use disorders: Findings from the global burden of disease study 2010. *The Lancet*, *382*, 1575–1586. doi:10.1016/S0140-6736(13)61611-6

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