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The cognitive, emotional, and behavioral sequelae of trauma exposure: An integrative approach to examining trauma's effect

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### Abstract

**Objective:** In this study we tested direct pathways from trauma exposure to trauma symptomatology and risky and self-destructive behavior and indirect pathways through two cognitive and affective mechanisms: 1) world assumptions and 2) emotion dysregulation. **Method:** A sample of 270 undergraduate students with an average age of 20.02 years participated in the study (204 females and 65 males, and one participant choosing not to disclose). Participants completed self-report measures assessing trauma exposure, trauma symptoms, emotion dysregulation, world assumptions, and lifetime and past month engagement in any of 38 risky and self-destructive behaviors. **Results:** The direct path from trauma exposure to trauma symptoms was significant and so was the indirect effect of self-worth assumptions on this association. The indirect pathway between trauma symptoms and risky and self-destructive behavior in the past month was significant through difficulties with impulse control when distressed. Trauma symptoms had an indirect effect on the association between trauma exposure and lifetime and past month engagement in risky and self-destructive behavior, while the direct pathway from trauma exposure to lifetime engagement remained significant. **Conclusion:** We offer theoretically and empirically supported integrative pathways that explicate some aspects of trauma exposure's negative sequelae with potential areas for intervention.

*Keywords:* Trauma; psychopathology; shattered assumptions; emotion dysregulation; risky and self-destructive behavior

### Clinical Impact Statement

Trauma exposure is widespread and is associated with negative views about oneself and the world and with difficulties in managing one's emotions, which in part is associated with individuals' risk

for developing psychopathology and engaging in risky and self-destructive behaviors. The findings inform optimal time for intervention and prevention efforts targeting trauma exposure.

Trauma exposure is prevalent in societies worldwide, with pooled rates as high as 70.4% and 30.5% of population-based samples reporting exposure to one and four or more traumatic events, respectively (see Benjet et al., 2016). The long term negative sequelae of psychological and health outcomes associated with trauma exposure (e.g., Anda et al., 2006; Basu et al., 2017; DePrince & Freyd, 2002; Weiss et al., 2015b) make it a clear public health issue (Magruder et al., 2017). Investigating some of the underlying mechanisms that perpetuate the negative sequelae associated with trauma exposure is vital for mitigating its progression. In this study we tested pathways from trauma exposure to complex trauma symptoms and risky and self-destructive behavior, including impulsive eating, self-harm, and substance use. The indirect effect of two cognitive and emotional mechanisms were explored; 1) individual's assumptions about the world and the self and 2) emotion dysregulation. Specifically, we used path analysis to examine the indirect effects of one's negative assumptions about the world and emotion dysregulation on the association between trauma exposure on related symptomatology and risky and self-destructive behavior, respectively.

### **Trauma Exposure, Psychopathology, and World Assumptions**

Exposure to multiple types of trauma, known as cumulative trauma exposure (Martin et al., 2013), has been associated with a multifaceted symptomatology, including dissociation, depression, anxiety, posttraumatic stress, interpersonal difficulties, sexual problems, and sleep disturbances (Briere et al., 2008; Chapman et al., 2004; Elliot & Briere, 1992). Exposure to trauma is also associated with developing a number of internalizing, externalizing, and substance-related disorders (Kessler et al., 1997). Research suggests a dose-response association,

whereby as one is exposed to more trauma types, they experience more negative psychological outcomes (e.g., Anda et al., 2006; Putnam et al., 2013) and more complex and severe the symptomatology (Briere et al., 2008; Cloitre et al., 2009; Courtois, 2004). After trauma exposure cognitive factors play an important role in perpetuating psychopathology. Specifically, attitudes toward and beliefs about the safety and benevolence of the world and self-competence are associated with development of posttraumatic stress (Foa et al., 1997). According to Janoff-Bulman's (1989; 1992) theory of shattered assumptions after trauma exposure, individuals' assumptive worlds are challenged and possibly shattered following trauma exposure. The theory identifies three fundamental assumptions that subsume our core beliefs: 1) benevolence of the world, which refers to the world being a good and safe place with good people; 2) the meaningfulness of the world, including justice, controllability, and randomness of events in one's life, where there is a "self-outcome contingency"; and 3) self-worth – how an individual views themselves and their behavior (Janoff-Bulman, 2010). These core assumptions form a cognitive framework through which people navigate life and construe their work, affecting how they make sense of their experience and maintain a sense of agency in the world.

Trauma exposure can shatter or alter some of these fundamental assumptions, leading one to see the world as less meaningful, less benevolent, and experience less self-worth (DePrince & Freyd, 2002; Janoff-Bulman, 1989;1992). Empirical studies support this association and show that trauma exposure is associated with a lower degree of optimism in one's assumptive world (e.g., Foa et al., 1999; Schuler & Boals, 2016). Increased negativity in fundamental assumptions was also related to increased psychological distress and trauma symptomatology following trauma exposure or bereavement (Currier et al., 2009; Elklit et al., 2007; Goldenberg & Matheson, 2005; Grills-Taquechel et al., 2011; van Bruggen et al., 2018). Further, diminished or

increased negativity in world assumptions mediated the association between cumulative trauma exposure and depressive symptoms in a sample of female survivors of intimate partner violence (Lilly et al., 2011) and in a university sample of undergraduate students (Lilly, 2010). There is enough support to suggest that individuals who experience a disruption in their core world assumptions following trauma exposure are at increased risk of experiencing higher trauma symptoms. Building on this work, we examined the indirect path between cumulative trauma exposure and trauma symptoms through the three domains of fundamental assumptions and expanded the pathway to include risky and self-destructive behavior.

### **Trauma, Emotion Regulation, and Risky and Self-Destructive Behavior**

Broadly, risky and self-destructive behaviors encompass various behaviors that are characterized by impulsivity and the potential for negative consequences (Horvath & Zuckerman, 1993), such as drug use, self-harm, aggression, gambling, impulsive eating, risky sexual behavior, reckless behavior, and alcohol use (Sadeh & Baskin-Sommers, 2017). These behaviors are prevalent among those exposed to trauma and tend to co-occur, with individuals likely to engage in more than one type of risky and self-destructive behavior (e.g., Baskin-Sommers & Sommers, 2006; Jacobsen et al., 2001). Higher cumulative trauma exposure and symptomatology are also associated with higher engagement in such behaviors, including unsafe sexual activity, substance abuse, self-harm, suicidal behavior, reckless driving, offending, and aggression (e.g., Beckley et al., 2018; Blevins et al., 2016; Delker & Freyd, 2014; Green et al., 2005; Krause et al., 2006; Sadeh & McNeil, 2013; Weiss et al., 2013; Weiss et al., 2015b). Risky and self-destructive behaviors are part of the diagnostic criteria of Posttraumatic Stress Disorder (PTSD) in the Diagnostic and Statistical Manual of Mental Disorders, fifth Edition (DSM-5; American Psychiatric Association, 2013). However, we know that not everyone who is exposed

to trauma engages in risky and self-destructive behavior, and thus, it is important to unpack the mechanisms that contribute to some individuals' susceptibility to engage in these behaviors.

One mechanism that has been proposed as likely to maintain the association between trauma exposure and symptomatology and risky and self-destructive behavior is emotion dysregulation (Kerig, 2019; Weiss et al., 2015a). Emotion regulation is a multifaceted construct and refers to a constellation of general abilities, including the ability to choose adaptive strategies to regulate emotions and behaviors flexibly depending on the situation and individual goals, to manage impulsive behavior in the face of heightened negative emotions, and to be aware and accepting of emotions (Gratz & Roemer, 2004). Difficulties relying on any or all of the aforementioned abilities is indicative of emotion dysregulation (Gratz & Roemer, 2004). Empirical studies support the association between trauma symptoms and emotion dysregulation generally and emotion regulation strategies specifically (e.g., suppression and dissociation; Ehring & Quack, 2010; Tull et al., 2007; Tull et al., 2018). Further, there is empirical support to show that emotion dysregulation mediated the association between trauma symptomatology and risky behaviors generally in trauma-exposed inpatients (Weiss et al., 2015b) and risky sexual behavior specifically in a community sample of trauma-exposed women (Weiss et al., 2019). Weiss and colleagues (2019) provided prospective evidence for the mediating effect of specific emotion dysregulation dimensions on the association between trauma symptoms at baseline and risky sexual behavior at a follow-up time point.

Risky and self-destructive behavior following trauma exposure has been conceptualized as a form of specific maladaptive regulatory strategies that serve to afford individuals an escape from emotional distress and internal suffering (Briere & Runtz, 2002; Hayes et al., 1996; Kerig, 2017). When a person is emotionally overwhelmed and lacks emotion regulation abilities, they

may utilize maladaptive strategies to regulate their emotion such as repressing or avoiding emotions or engaging in emotion-driven maladaptive behavior such as self-harm, unsafe sexual activity or substance use to help avoid one's internal distress. Taken together, some trauma-exposed individuals who experience trauma symptoms and emotion dysregulation may yield to risky and self-destructive behavior as a form of maladaptive coping.

### **Current Study**

Previous studies have assessed trauma's effect on the different facets of psychological functioning separately. Given the complex psychological sequelae of trauma exposure, we tested a path model that integrates cross-sectional associations among cognitive (i.e., world assumptions), emotional (i.e., emotion dysregulation), and behavioral (i.e., risky and self-destructive behaviors) factors implicated by such exposure. Specifically, we tested the direct effect of cumulative trauma exposure on trauma symptoms and engagement in past month and lifetime risky and self-destructive behavior. We also tested the indirect pathways between trauma exposure and symptomatology through three core world assumptions: benevolence of the world, meaningfulness of the world, and self-worth. We also assessed the indirect effect of cumulative trauma exposure on lifetime and past month engagement in risky and self-destructive behavior through trauma symptoms and intervening pathways via emotion dysregulation abilities. The emotion dysregulation abilities included in the path analysis model depended on the bivariate correlations observed with the risky and self-destructive behavior variables.

## **Method**

### **Participants**

The sample consisted of 270 undergraduate students (65 males and 204 females, with one participant choosing not to disclose) from a Canadian university in Toronto, recruited through an

undergraduate student research portal and received course credit for their participation. Their age ranged from 16 to 39 ( $M = 20.02$ ,  $SD = 3.36$ ), with one participant choosing not to disclose. The sample was composed of 25.19% Arab, 20.74% Asian, 16.30% white, 11.48% black/African Canadian, 2.59% Latin American, and 0.37% Indigenous (19.63% identified as other and 3.70% were missing). The majority of participants identified as Christian (37.0%) followed by non-religious (21.9%), Muslim (17.0%), Hindu (8.9%), Sikh (4.4%), Jewish (3.0%), and Buddhist (2.6%) (4.1% chose other and 1.1% were missing).

### Measures

**Trauma Symptom Checklist (TSC-40;** Elliott & Briere, 1989). The TSC-40 is a self-report scale that assesses trauma symptoms experienced in the past month on a 4-point Likert-type scale from 0 (never) to 3 (often), without making reference to exposure to specific traumatic events. The TSC-40 has 6 subscales: Anxiety, Depression, Dissociation, Sexual Abuse Trauma Index, Sexual Problems, and Sleep Disturbances. The total score of trauma symptomatology was obtained by summing all item endorsements and used in this study to represent the complexity and severity of multifaceted trauma symptomatology experienced by participants ( $\alpha = .92$ ). Higher total scores are indicative of higher trauma symptoms. Examples items include *headaches, flashbacks, sadness, memory problems, and feeling that things are “unreal”*.

**Traumatic Events Questionnaire (TEQ;** Vrana & Lauterbach, 1994). The TEQ assesses exposure to different trauma types. Participants were asked to indicate whether they have been exposed to the trauma event by choosing 1 (yes) or 0 (no). One item pertaining to exposure to physical and sexual abuse was split into two items asking about each type of abuse and two items pertaining to exposure to emotional abuse and domestic violence as a child were added for a total of 14 items (see Table 1). The total score representing cumulative trauma exposure was

computed by summing participants' responses on each item with a possible total score ranging between 0 and 14 ( $\alpha = .72$ ). Higher scores are indicative of higher cumulative lifetime trauma exposure. Example items include *Have you been in a natural disaster such as a tornado, hurricane, flood or major earthquake?*; *Have you been a victim of a violent crime such as rape, robbery, or assault?*

**World Assumptions Scale (WAS; Janoff-Bulman, 1989).** The WAS consists of 32 items asking about world assumptions. The items are rated on a 6-point Likert scale from 1 (strongly agree) to 6 (strongly disagree). The items sample eight world assumptions that form three primary domains. The total scores computed from summing responses on each of the items for the three primary domains of world assumptions were used in this study: 1) benevolence of the world (e.g., *The world is a good place*;  $\alpha = .83$ ), 2) meaningfulness of events and their distribution (e.g., *If people took preventive actions, most misfortune could be avoided*;  $\alpha = .67$ ), and 3) self-worth (e.g., *I am very satisfied with the kind of person I am*;  $\alpha = .80$ ). Higher total scores on each of the three primary domains indicated higher negative assumptions.

**Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004).** The DERS assesses six domains of emotion dysregulation: nonacceptance of negative emotions, difficulty engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. Participants were asked to rate each item using a 5-point Likert scale from 1 (almost never) to 5 (almost always). The total DERS score was used to represent overall difficulties in emotion regulation and separate subscale scores were used to represent the six domains of emotion dysregulation ( $\alpha$ s  $> .83$ ). Higher scores were indicative of higher emotion dysregulation. Examples of items are

*When I'm upset, I become angry with myself for feeling that way; When I'm upset, I have difficulty getting work done; and I experience my emotions as overwhelming and out of control.*

**Risky, Impulsive, and Self-Destructive Behavior Questionnaire (RISQ;** Sadeh & Baskin-Sommers, 2017). The RISQ has 38 items asking about lifetime and past month engagement in risky and self-destructive behavior. The items sample drug-related behavior, self-harm, aggression, gambling, impulsive eating, risky sexual behavior, reckless behavior, and heavy alcohol use. The overall score was used to represent engaging in general risky and self-destructive behavior over one's lifetime and in the past month. Lifetime engagement was coded as 1 (engaged at least once) or 0 (never engaged in this behavior) with a total score representing the number of different types of behaviors one has engaged in in their lifetime ( $\alpha = .94$ ). Past month engagement in these behaviors was coded on a 5-point Likert-type scale from 0 (never) to 4 (very often) and summed for a total score representing frequency of engagement in the past month ( $\alpha = .75$ ), with higher scores indicative of more frequent engagement.

### **Procedure**

After indicating consent, the participants completed a demographic questionnaire, followed by the TSC-40, the TEQ, the WAS, the DERS, and the RISQ. Upon completion of the study, participants were provided with a debriefing form. All procedures were approved by the institutional research ethics board.

### **Data Analysis**

First, we calculated descriptive statistics for all the variables used in this study. Then we calculated correlations among these variables. Finally, we tested the path analysis model that tests the effect of trauma exposure and symptomatology on lifetime and past month engagement in risky and self-destructive behavior directly and indirectly through world assumptions and

emotion dysregulation abilities. The path analysis model was estimated using R software with the lavaan package (version 0.6-7; Rosseel, 2012). Maximum likelihood estimation was used with robust standard errors and fit statistics to adjust for multivariate non-normality (Yuan & Bentler, 2000). Full-information maximum likelihood was used to account for the missing ratings. Model fit was evaluated using the standardized root mean square residual (SRMR), the root mean square error of approximation (RMSEA), the comparative-fit index (CFI), and the Tucker-Lewis index (TLI).

## Results

### Frequency of Trauma Exposure

In our sample more than 66% of participants reported exposure to multiple trauma types. Only 14.7% of the sample reported no lifetime exposure to any of the trauma types. In Table 2, we report the rates of exposure to specific trauma types.

**Table 1**

*Frequency of specific types of trauma exposure based on reports on the TEQ*

Trauma type	N	% of sample
1. Witnessed industrial, farm, or car accident, or fire or explosion	270	28.1
2. Experienced a natural disaster	270	14.1
3. Victim of violent crime (e.g., rape, robbery, or assault)	270	17.4
4. Childhood sexual abuse	270	10.0
5. Childhood physical abuse	270	15.9
6. Childhood emotional abuse or neglect	270	25.2
7. Witnessed domestic violence as a child	270	41.1
8. Adult unwanted sexual experiences involving threat or force	270	10.7
9. Adult abusive relationship	269	10.0
10. Witnessed someone being mutilated, serious injured or violently killed	269	12.6

11. Serious danger of losing one's life or being seriously injured	269	25.2
12. Mutilation, serious injury, or violent or unexpected death of someone close	270	48.9
13. Other traumatic event	269	21.2
14. Other experience that you can't tell about	269	27.5
No trauma exposure <sup>^</sup>	265	14.7
One type of trauma exposure <sup>^</sup>	265	18.5
More than one type of trauma exposure <sup>^</sup>	265	66.8

*Note.* <sup>^</sup> calculated based on a total of 265 participants; 5 participants had missing data on one of the TEQ items and therefore total scores were not computed.

### Correlations Among Variables

The correlations among all the variables are presented in Table 2 along with their mean and *SD*. Notably, cumulative trauma exposure was significantly positively correlated with trauma symptoms, negative beliefs about the benevolence of the world and self-worth, difficulties controlling impulsive behaviors when distressed, lack of access to effective emotion regulation strategies, and higher lifetime and past month engagement in risky and self-destructive behaviors. Trauma symptoms were significantly correlated with all other variables, including world assumptions, total emotion dysregulation and its dimensions and past month and lifetime risky and self-destructive behavior. The three core assumptions about the world were all significantly and positively associated with each other. All emotion dysregulation dimensions were positively and significantly correlated except for a nonsignificant association between lack of emotion awareness and difficulties engaging in goal-directed behavior when distressed. all emotion dysregulation dimensions were significantly and positively correlated with past month risky and self-destructive behavior. Of the emotion dysregulation dimensions, difficulties engaging in goal-directed behavior and controlling impulsive behavior when distressed and lack



5.Self-worth	.19*	.45*	.28*	.32*	1									
DERS														
6.Total	.14*	.62*	.26*	.20*	.53*	1								
7.Nonaccept	.00	.42*	.19*	.09	.38*	.75*	1							
8.Goals	.12	.41*	.18*	.11	.27*	.69*	.46*	1						
9.Impulse	.13*	.53*	.17*	.10	.32*	.79*	.47*	.55*	1					
10.Aware	.06	.17*	.22*	.13*	.43*	.40*	.13*	.00	.15*	1				
11.Strategy	.20*	.61*	.23*	.23*	.44*	.86*	.59*	.61*	.68*	.15*	1			
12.Clarity	.07	.44*	.18*	.23*	.48*	.69*	.42*	.28*	.44*	.46*	.46*	1		
RISQ														
13.Past month	.24*	.47*	.24*	.09	.16*	.40*	.21*	.24*	.42*	.13*	.38*	.22*	1	
14.Lifetime	.32*	.29*	.08	.05	.13*	.17*	.09	.14*	.20*	.00	.21*	.06	.37*	1
Mean	3.08	31.98	25.47	43.81	35.37	94.00	14.74	17.36	13.41	15.40	20.34	12.63	6.77	9.50
SD	2.59	17.59	6.03	6.56	7.87	24.03	6.27	4.97	5.59	4.99	7.70	3.98	6.66	8.47

Note. \*  $p < .05$ . WAS *World Assumptions Scale*; DERS *Total Difficulties in Emotion Regulation Scale Total Score*; DERS *Nonaccept Emotional Nonacceptance Subscale*; DERS *Goals Difficulties Engaging in Goal-Directed Behavior When Distressed Subscale*; DERS *Impulse Difficulties Controlling Impulsive Behaviors When Distressed Subscale*; DERS *Aware Lack of Emotional Awareness Subscale*; DERS *Strategy Lack of Access to Effective Emotion Regulation Strategies Subscale*; DERS *Clarity Lack of Emotional Clarity Subscale*; RISQ *Risky, Impulsive, and Self-Destructive Behavior Questionnaire*

### Path analysis model

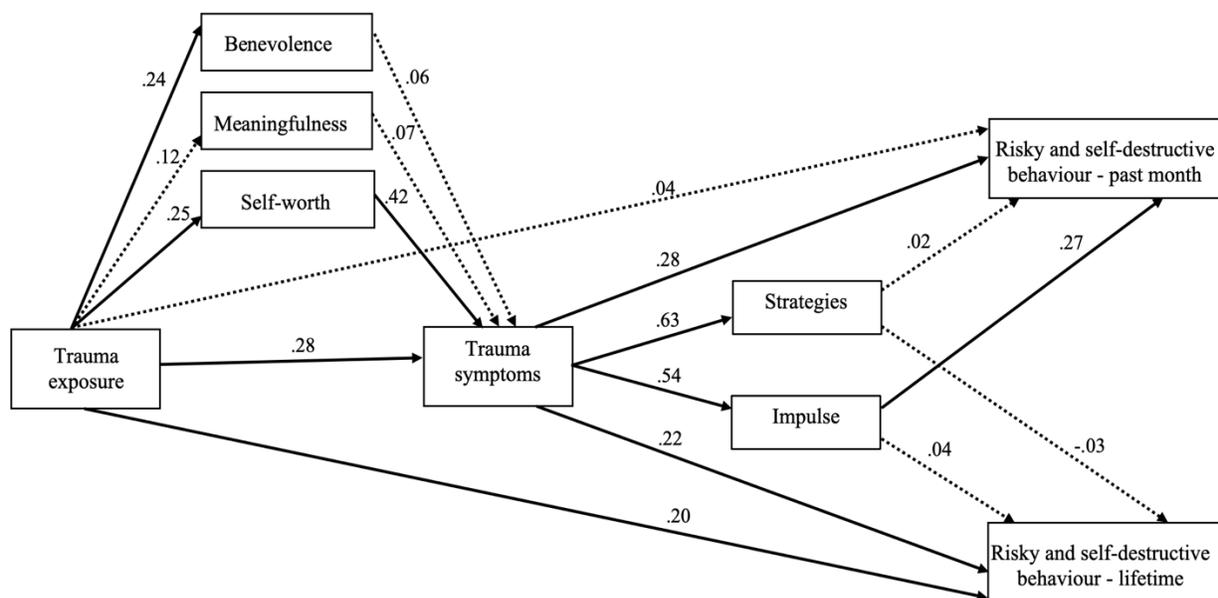
The path analysis model was estimated using data from participants reporting exposure to at least one traumatic event ( $n = 226$ ). The model fit the data well ( $CFI = .97$ ,  $TLI = .93$ ,  $RMSEA = .07$ , and  $SRMR = .04$ )<sup>1</sup>. Completely standardized regression coefficients are in Figure 1. The indirect effects of benevolence and meaningfulness of the world on the association between trauma exposure and symptomatology were not significant with  $\beta = .01$ ,  $p = .355$  and  $\beta = .01$ ,  $p =$

<sup>1</sup> We ran the same path analysis model with all participants, and we obtained very similar results in terms of model fit and significant direct and indirect paths. Specifically, the model fit the data well with  $CFI = .98$ ,  $TLI = .94$ ,  $RMSEA = .06$ ,  $SRMR = .04$  (See supplemental material for the figure outlining the standardized regression coefficients).

.343, respectively. The indirect effect of assumptions about self-worth, however, was significant with  $\beta = .10$ ,  $p = .001$ , meaning that higher negative beliefs about one's self-worth offered an indirect pathway from trauma exposure to higher symptoms. Higher trauma symptoms total score significantly predicted higher emotion dysregulation (i.e., strategies and impulse dimensions) and past month and lifetime engagement in risky and self-destructive behavior total scores (all  $ps < .05$ ). The indirect effect of difficulties controlling impulsive behavior when distressed on the association between trauma symptoms and past month RISQ score was significant, with  $\beta = .15$ ,  $p = .006$ , but not on the association between trauma symptomatology and lifetime RISQ score, with  $\beta = .02$ ,  $p = .671$ . The indirect effects of lack of access to effective emotion regulation strategies on the associations between trauma symptoms and RISQ past month and lifetime scores were nonsignificant ( $\beta = .01$ ,  $p = .862$  and  $\beta = -.02$ ,  $p = .692$ , respectively). The indirect effects of trauma symptoms on the associations between trauma exposure and RISQ past month and lifetime scores were significant with  $\beta = .08$ ,  $p = .021$  and  $\beta = .06$ ,  $p = .025$ , respectively.

### **Figure 1**

*Path analysis model with standardized regression coefficients*



*Note.* Solid lines indicate that regression coefficients are significant  $p < .05$ . Dashed lines indicate that regression coefficients are not significant  $p > .05$ . The three domains of world assumptions were allowed to correlate with each other and so were the two dimensions of emotion dysregulation and past month and lifetime risky and self-destructive behavior (all  $ps < .05$ ). These associations are not depicted in the figure to reduce clutter.

The model explained small amounts of variance in the three world assumption variables with 1.5%, 5.9%, and 6.2% of the variance in meaningfulness, benevolence, and self-worth, respectively. The model accounted for 36.1% of the variance in trauma symptoms variable and 39.7% and 29.2% of the variance in lack of access to effective emotion regulation strategies and difficulties controlling impulsive behavior when distressed variables, respectively. Finally, 26.7% and 13.0% of the variance was explained in the past month and lifetime engagement in risky and self-destructive behavior variables, respectively.

### Discussion

This study tested the role of world assumptions and emotion dysregulation in perpetuating trauma exposure's widespread effect, from psychopathology to risky and self-destructive behavior. The path analysis model demonstrated both direct and indirect effects at

different levels of the sequelae of trauma exposure. These findings have important public health and clinical implications, which we discuss below.

Cumulative trauma exposure had a significant direct effect on trauma symptoms and lifetime risky and self-destructive behavior, supporting trauma exposure as a risk factor for psychopathology and lifetime engagement in such behavior, above and beyond other mechanisms included in the path analysis model. This finding is consistent with the literature reviewed and has important public health implications. Particularly, investing in public policy and preventative efforts to reduce incidence of trauma exposure and adverse life events is certainly warranted. Magruder and colleagues (2017) offer a multi-level public health framework outlining preventative efforts with the first and broadest step being the reduction or protection against the incidence of trauma exposure. The authors include at that level such things as educational programs for high risk communities, bullying programs at schools, interpersonal programs to strengthen the family unit and caregiving system, and promotion of social and economic equality, among others. The authors then highlight intervention efforts to mitigate trauma exposure's negative sequelae as well as associated illness and disability. Our pathways also speak to the cascade effect of trauma exposure and potential areas for intervention.

When we investigated the indirect pathways in trauma exposure's negative sequelae, we found that higher negative assumptions about the benevolence of the world and self-worth were both significantly associated with higher cumulative trauma exposure, consistent with previous research (e.g., Kaler, 2009; Lilly, 2010), suggesting that these two domains of assumptions are most impacted and challenged after trauma exposure. However, self-worth was the only domain of world assumptions to offer a significant indirect path between cumulative trauma exposure and symptomatology, which extends previous research that shows that lower self-worth is a

unique and consistent predictor of trauma symptoms (Grills-Taquechel et al., 2011; van Bruggen et al., 2018). Self-worth in particular, plays an important role in the perpetuation of psychopathology (Zeigler-Hill, 2011). However, it is notable that the amounts of variance accounted for in the three world assumptions variables suggest that there are likely other factors, above and beyond trauma exposure that would explain negativity in one's assumptions about the world or moderate that association, which should be explored in future research (e.g., social supports; Grills-Taquechel et al., 2011). Nevertheless, negative beliefs about one's self-worth are potentially important to assess in treatment-seeking individuals with trauma histories. Clinicians can utilize cognitive strategies to work with individuals to rebuild their shattered assumptions (Janoff-Bulman, 1999), which may help mitigate trauma symptomatology and its ensuing consequences, such as risky and self-destructive behaviors.

Although trauma symptoms were associated with all six emotion dysregulation dimensions, difficulties controlling impulsive behavior when distressed was the only dimension that offered an indirect path from trauma symptoms to past month risky and self-destructive behavior. The same was not true of the path to lifetime engagement in such behaviors. Lack of access to effective emotion regulation strategies also did not have an indirect effect on the paths between trauma symptoms and past month and lifetime engagement in risky and self-destructive behavior. The unique indirect path to past month engagement in risky and self-destructive behavior via difficulty regulating impulsive behavior when distressed, lends support to the characterization of such behaviors as reflecting impulsivity (Horvath & Zuckerman, 1993) and their likely function to escape distress or extreme emotions (e.g., Briere & Runtz, 2002; Hayes et al., 1996). Our finding that emotion dysregulation is associated with proximal risky and self-destructive behavior is consistent with prospective work that showed that aspects of emotion

dysregulation predicted risky sexual behavior within an 8-month period (Weiss et al., 2019) and in cross sectional work examining risky behavior in the past two years (Weiss et al., 2015b).

Trauma symptoms also offered an indirect path from higher cumulative trauma exposure to higher lifetime and past month risky and self-destructive behavior. This finding is consistent with Delker and Freyd's (2014) model whereby higher trauma exposure had an indirect effect on higher problematic substance use in the past year via posttraumatic symptoms in the past year. Therefore, trauma symptoms appear to be another important factor above and beyond emotion dysregulation and trauma exposure in potentially perpetuating risky and self-destructive behavior.

The relatively high levels of variance explained in trauma symptoms and emotion dysregulation speak to the strong evidence to date that supports the associations among these variables and trauma exposure (e.g., Anda et al., 2006; Courtois, 2014; Weiss et al., 2013;2019), which may then place individuals at increased risk of engaging in risky and self-destructive behavior when distressed. It is also important to note that not all individuals who have been exposed to trauma go on to engage in risky and self-destructive behaviors as reflected in the moderate amount of variance explained in those variables in our model, and there may be other motives to pursue such behaviors, such as for pleasure or thrill seeking (see Horvath & Zuckerman, 1993). There is also room for other intervening variables that may buffer those pathways, including early intervention, social support, and other protective factors that should be examined in conjunction with the negative trauma sequelae in future research.

Nonetheless, it may still be important to assess and target current psychopathology and emotion dysregulation when working with individuals with trauma histories who also demonstrate risky and self-destructive behavior. Current transdiagnostic treatment approaches

incorporate emotion regulation skills training with patients with emotional disorders, posttraumatic stress disorder, and borderline personality with self-destructive behavior (e.g., Bryant et al., 2013; Ellard et al., 2010; Gratz et al., 2014). These programs help individuals develop the skills needed to tolerate distress, accept emotions, practice emotional and cognitive flexibility, and maintain adaptive behavior and reduce maladaptive behavior when emotionally aroused. Newby and colleagues' (2015) systematic review supports the effectiveness of transdiagnostic psychological treatments for anxiety (including posttraumatic stress disorder) and depressive disorders, which is promising since many of the individuals with trauma histories develop such disorders (e.g., Kessler et al. 1997).

This study provides important clinical and theoretical implications but presents with some limitations that can be addressed in future research. Our study utilized cross-sectional data with a model that was based on theoretically driven associations among the variables of interest. Therefore, we cannot make any causal inferences about the direction of the associations and prospective studies should replicate our findings. Nonetheless, the directions chosen in our model are based on prospective studies examining similar underlying cognitive and affective mechanisms (e.g., Schuler & Boals, 2016; Weiss et al., 2019). Further, all of the measures in our study were self-report which may have inflated the associations among our variables. It may be worthwhile to use physiological measures of traumatic stress (e.g., cortisol levels) or emotion dysregulation (e.g., respiratory sinus arrhythmia) and potentially assess behavioral emotion regulation after laboratory simulations of distressing or emotional situations. Finally, our study was limited to an undergraduate student sample. Nonetheless, our sample presented with high rates of trauma exposure and risky and self-destructive behavior similar to previous work utilizing undergraduate samples (e.g., Delker & Freyd, 2014).

Overall, our model demonstrates the pathways between cumulative trauma exposure and related cognitive, emotional, and behavioral functioning. The reported rates of trauma exposure suggest that our public health system should invest in the prevention of trauma exposure in order to mitigate chronic psychological suffering and public health costs. We have shown that negative assumptions about the world, particularly about one's self-worth, and emotion dysregulation in conjunction with trauma-related psychopathology are all potentially important targets for intervention among trauma-exposed individuals. These associations should be followed up with prospective designs and certainly highlight the need for early preventative efforts.

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