



PTSD's risky behavior criterion: Relation with DSM-5 PTSD symptom clusters and psychopathology



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ABSTRACT

A new symptom criterion of *reckless and self-destructive behaviors* (E2) was recently added to posttraumatic stress disorder's (PTSD) diagnostic criteria in *DSM-5*, which is unsurprising given the well-established relation between PTSD and risky behaviors. Researchers have questioned the significance and incremental validity of this symptom criterion within PTSD's symptomatology. Unprecedented to our knowledge, we aim to compare trauma-exposed groups differing on their endorsement status of the risky behavior symptom on several psychopathology constructs (PTSD, depression, distress tolerance, rumination, anger). The sample included 123 trauma-exposed participants seeking mental health treatment (M age=35.70; 68.30% female) who completed self-report questionnaires assessing PTSD symptoms, depression, rumination, distress tolerance, and anger. Results of independent samples t -tests indicated that participants who endorsed the E2 criterion at a clinically significant level reported significantly greater PTSD subscale severity; depression severity; rumination facets of repetitive thoughts, counterfactual thinking, and problem-focused thinking; and anger reactions; and significantly less absorption and regulation (distress tolerance facets) compared to participants who did not endorse the E2 criterion at a clinically significant level. Results indicate the utility of the E2 criterion in identifying trauma-exposed individual with greater posttraumatic distress, and emphasize the importance of targeting such behaviors in treatment.

1. Introduction

Posttraumatic stress disorder (PTSD) severity is positively associated with risky behaviors (Strom et al., 2012; Tull et al., 2015). Thus, a new symptom criterion of *reckless and self-destructive behaviors* (E2) was added to PTSD's diagnostic criteria in *DSM-5* (American Psychiatric Association, 2013). Several researchers have questioned the significance and incremental validity of this symptom criterion within PTSD's symptomatology (Friedman et al., 2011; Miller et al., 2013). Unprecedented to our knowledge, we aimed to compare trauma-exposed groups differing on their endorsement status of E2 on several psychopathology constructs. Results may highlight E2's significance and functional role within PTSD's symptomatology; indicate pathways between this symptom and other posttraumatic psychopathology constructs; and inform treatment implications.

PTSD severity is linked to impulse control difficulties which may manifest as undeliberated reckless and/or self-destructive actions

(reviewed in Moeller et al., 2001). Examples include substance use (James et al., 2014), risky sexual behaviors (Weiss et al., 2014), and deliberate self-harm (Weiss et al., 2015a). Indeed, a study on Veterans receiving treatment for PTSD indicated that a significant number of deaths were related to substance use, suicide, and homicide (Drescher et al., 2003).

Such drastic consequences of engaging in risky behaviors have propelled researchers to examine causal pathways linking possibly risky behaviors and PTSD severity. According to the *self-medication* model, individuals may engage in risky behaviors (e.g., substance use) to manage trauma-related symptoms and associated distress (Chilcoat and Breslau, 1998; Brady et al., 2004); Alternatively, consistent with the *disinhibition* viewpoint of impulsivity, individuals with severe PTSD symptoms struggle to inhibit possibly risky behaviors when perceiving distress-reducing and rewarding situations (Casada and Roache, 2005). The role of *emotional dysregulation* also has been implicated (Weiss et al., 2013). Following the experience of potentially

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traumatic events (PTE), one may engage in risky behaviors to reduce the consequent distress or increase positive affect (Ben-Zur and Zeidner, 2009; Marshall-Berenz et al., 2011). Further, the *compulsive re-exposure* hypothesis states that people with PTSD may engage in sensation-seeking activities to mimic the biological arousal and nervous excitement experienced during exposure to PTEs (Van der Kolk et al., 1985; Joseph, 1997). Lastly, a cognitive explanation highlights the role of reduced attention and restriction in information processing capacity following the experience of a PTE which subsequently increases the likelihood of engaging in risky behaviors (Ben-Zur and Zeidner, 2009).

Attempts have been made to account for the presence and role of risky behaviors within PTSD's symptomatology. First, researchers identified an externalizing subtype of PTSD characterized by high negative emotionality and low constraint in contrast to an internalizing subtype characterized by high negative and low positive affect (Miller, 2003; Wolf et al., 2012). This externalizing subtype is associated with aggression, substance use, and impulsivity compared to the internalizing subtype which is more associated with depression and anxiety (Miller, 2003; Rielage et al., 2010). Second, a new E2 symptom criterion of *reckless and self-destructive behaviors* (e.g., reckless driving, risky sexual behavior, suicidal behavior) was added to the *DSM-5* diagnostic criteria for PTSD (American Psychiatric Association, 2013). This criterion references purposeful engagement in risk-taking behaviors with potential negative consequences (Strom et al., 2012), and accounts for the common *fight system* reactions after PTEs (Guina et al., 2016).

There is an on-going debate on the significance and centrality of the E2 criterion in PTSD's symptomatology. Recent factor-analytical models indicate that the E2 symptom in combination with the aggressive/irritable behavior symptom represents an *externalizing* latent factor resulting from deficits in impulse control and emotional regulation (Tsai et al., 2014; Armour et al., 2016a, 2016b). Distinct from the remaining *alteration in arousal and reactivity* (AAR) symptoms, the externalizing latent factor represents overt behaviors rather than internal processes, and passive actions (Tsai et al., 2014), and most strongly associates with hostility and suicidal ideation (Pietrzak et al., 2015). Widely discussed in the literature, the E2 criterion is seen as an integral feature of complex PTSD in response to prolonged and extreme stressors (Cloitre et al., 2011). Indeed, increasingly there is a discussion of a self-harm/reckless subtype of PTSD that may require a different treatment protocol capitalizing on Dialectical Behavior Therapy skills (Guina et al., 2016). Risky behaviors may reflect a desire to avoid or escape aversive emotional states (Cooper et al., 2000), or an avoidance strategy to limit emotional and cognitive reactions following PTEs (Pat-Horenczyk et al., 2007). Thus, people may engage in risky behaviors to cope with PTSD's negative affect (negative alternations in cognition and mood symptoms) and AAR symptoms (Contractor et al., 2014; Roley et al., 2017). Further, research indicates a significant relation between risky behaviors and severity of PTSD's re-experiencing and avoidance symptom clusters (Pat-Horenczyk et al., 2007). Thus, a unique functional role is implicated for the E2 criterion in PTSD's symptomatology.

However, several factor-analytical studies have found low factor loadings for E2 criterion on the externalizing latent construct (0.72 and 0.60 in two independent samples) (Armour et al., 2016b); and on the AAR latent construct (0.41–0.62) (Miller et al., 2013; Liu et al., 2014). Additionally, E2 has low endorsement rates. In a nationally representative sample of American adults ($N = 2953$) with probable lifetime PTSD, 41% of people endorsed E2 referencing any point in their lifetime and 8% endorsed E2 referencing the past month (Miller et al., 2013). Thus, there is speculation that endorsement of E2 is sample-specific (Guina et al., 2016), or only at a higher level of PTSD severity (Miller et al., 2013). Recent network models indicate that the E2 criterion is less connected to other AAR symptoms; and is not a central PTSD symptom (Mitchell et al., in press). In fact, E2 is more associated

with complex PTSD characteristics seen among those exposed to prolonged traumatic experiences (Friedman, 2013). Lastly, E2 has been shown to have poor discriminating ability for those with higher and lower PTSD severity (Miller et al., 2013). Foregoing evidence suggests that the internalizing subtype may be more “prototypical” (Miller et al., 2004). Conclusively, Miller et al. (2013) question if E2 should remain a core symptom of PTSD's diagnostic criteria.

Our study thus attempted to look at the functional role and significance of the E2 criterion not only in relation to PTSD's symptomatology but also in relation to other posttraumatic mental health constructs. PTSD co-occurs with depression (Morina et al., 2013), and is significantly associated with increased rumination (Mitchell et al., 2016), increased anger severity (Kotler et al., 2001), and reduced distress tolerance (Marshall-Berenz et al., 2010). Thus, the transdiagnostic criterion of risky behaviors could probably indicate severity of posttraumatic psychopathology beyond PTSD. Further, given that most studies on this topic have been conducted with military samples (Strom et al., 2012; Guina et al., 2016), we uniquely used a treatment-seeking community sample. We identified trauma-exposed groups who differed on the clinical endorsement status of E2; and examined differences across these groups in PTSD symptom cluster severity. PTSD's 7-factor hybrid model informed our conceptualization of PTSD's symptom clusters based on strong empirical evidence compared to alternative PTSD factor-analytical models, and its ability to provide a more refined categorization of the E2 criterion as an externalizing symptom (Armour et al., 2016b). Additionally, we examined differences across these groups on depression severity, rumination, distress tolerance, and anger. People may engage in risky behaviors to cope with distress and negative affect consequent to excessive rumination (Nolen-Hoeksema et al., 2008; Borders et al., 2012), and consequent to deficient distress tolerance and emotional regulation skills (Cooper et al., 2000). Unsurprisingly, risky behaviors are correlated with increasing depression severity (Borders et al., 2012), and anger (Armour et al., 2016a). We thus hypothesized that trauma-exposed individuals who endorse the E2 criterion at a clinical level will have significantly greater PTSD symptom cluster severity, depression severity, rumination, distress intolerance, and anger.

2. Method

2.1. Procedure and participants

We collected data from 308 participants seeking mental health services at a Midwest community mental health center. The center staff recruited participants in the waiting room. Inclusionary criteria included age 18 years and older, and fluency in the English language. Following an informed consent statement, participants were presented a web survey of questionnaires at their first or second therapy appointment. Completion of the questionnaires averaged 30 min. We did not provide any compensation for study participation. This study was approved by the Institutional Review Board at University of Toledo.

2.2. Measures

2.2.1. Demographic Information

Information on age, gender, ethnicity, race, employment status, income, relationship status, and years of schooling was obtained.

2.2.2. Stressful Life Events Screening Questionnaire (SLESQ; Goodman et al., 1998)

The SLESQ is 14-item self-report measure assessing 12 types of lifetime PTEs with dichotomous response options (yes or no). One question assesses for any other PTE experiences not assessed by the measure, and an additional item assesses the most distressing PTE. It has good test-retest reliability (averaging 0.73 for the 11 *DSM-IV* based

traumatic events), and good concurrent and convergent validity (Goodman et al., 1998). To be consistent with the *DSM-5* criteria, a probe regarding exposure to PTE via media was added to the question assessing a witnessed PTE. Additionally, questions referencing repeated exposure to details of a traumatic event, and exposure through media or one's occupation were added (Elhai et al., 2012). Participants indicated their most distressing event and responded to subsequent PTSD questions in reference to the indicated PTE.

2.2.3. PTSD checklist for DSM-5 (PCL-5; Weathers et al., 2013)

The PCL-5 is a 20-item self-report measure assessing past month PTSD symptoms stemming from the event identified as most distressing on the SLESQ with a five-point Likert-type response scale ranging from 0 (not at all) to 4 (extremely). In the current study, the PCL-5 had good internal consistency for the overall scale and PTSD subscales conceptualized according to the hybrid model (overall =0.98; intrusions cluster=0.95; avoidance cluster=0.94; negative affect cluster=0.85; anhedonia cluster=0.95; anxious arousal cluster=0.87; dysphoric arousal cluster=0.86; externalizing behavior cluster=0.82). The PCL-5 has good internal consistency, and good convergent and discriminant validity (Bovin et al., 2016). An item-level score of 2 or more indicates a clinical endorsement (Weathers et al., 2013). A cut-off score of 31 and greater indicates probable PTSD (Bovin et al., 2016).

2.2.4. Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001)

It is a 9-item self-report measure assessing *DSM-IV* depression symptoms over the past two weeks with four response options ranging from 0 (not at all) to 3 (nearly everyday) (Kroenke et al., 2001). Cut-off scores of 5, 10, 15 and 20 represent mild, moderate, moderately severe, and severe depression, respectively. It has acceptable internal consistency ($\alpha=0.92$ in the current study), good test-retest reliability, good construct validity, and good diagnostic validity (Kroenke et al., 2001).

2.2.5. Ruminative Thought Style Questionnaire (RTSQ; Brinker and Dozois, 2009)

It is a 20-item scale that assesses rumination with a seven-point Likert-type response scale ranging from 1 (does not describe me at all) to 7 (describes me very well). It has four subscales: problem-focused thoughts, repetitive thoughts, counterfactual thinking (CFT), and anticipatory thoughts. The scale has good convergent validity and excellent internal consistency (Brinker and Dozois, 2009). Tanner et al. (2013) indicated that five items from the original scale did not converge onto the identified factors; hence we used 15 items in the analyses. In the current study, there was good to excellent internal consistency (overall=0.97; problem-focused thoughts=0.94, repetitive thoughts=0.95, CFT=0.87, and anticipatory thoughts=0.82).

2.2.6. Distress Tolerance Scale (DTS; Simons and Gaher, 2005)

The DTS is a 15-item measure assessing one's perceived ability to tolerate emotional distress. It has a response scale ranging from 5 (strongly disagree) to 1 (strongly agree), where higher scores indicate higher distress tolerance ability (Simons and Gaher, 2005). The four components of the DTS include: (1) ability to tolerate emotions (tolerance; $\alpha=0.86$ in the current study); (2) assessment of the emotional situation as acceptable (appraisal; $\alpha=0.81$ in the current study); (3) level of attention to the negative emotion and subsequent functional interference (absorption; $\alpha=0.90$ in the current study); and (4) ability to regulate emotion (regulation; $\alpha=0.89$ in the current study). The DTS has good test-retest reliability, and good to excellent validity (Simons and Gaher, 2005; Leyro et al., 2011). Internal consistency in the present study for the entire scale was 0.95.

2.2.7. Dimensions of Anger Reaction Scale-5 (DARS-5; Forbes et al., 2004)

It is a 5-item self-report measure assessing dimensions of anger reactions, mainly one's disposition towards anger in stressful situations (Forbes et al., 2004). Response options include a 5-point Likert rating scale ranging from 1 (none of the time) to 5 (all of the time). This unidimensional measure has good convergent validity (Forbes et al., 2004), and an internal consistency coefficient of 0.91 in the current study.

2.3. Exclusions, missing data, and sample characteristics

The sample of 308 participants was restricted to those endorsing at least one PTE on the SLESQ ($n=133$). Further, the sample was restricted to those not missing more than 30% of items on the PCL-5, PHQ-9, RTSQ, DTS, or DARS-5 ($n=123$). Subsequent missing data was minimal. For the PCL-5, six participants were missing one item, one participant was missing two items, and one participant was missing three items. For the PHQ-9, 8 participants were missing one item, and one participant was missing two items. For the RTSQ, seven participants were missing one item, and one participant was missing four items. For the DTS, 9 participants were missing one item, one participant was missing two items, and one participant was missing four items. For the DARS-5, three participants were missing one item. We used list-wise deletion to address missing data for each analysis.

The sample of 123 participants averaged 35.72 years in age ($SD=12.07$); majority of the sample was female ($n=84$; 68.30%). Participants averaged 12.98 years of schooling ($SD=2.73$); majority were employed full-time ($n=59$; 48.00%) and had an annual income of less than \$24,999 ($n=74$; 60.20%). Most were single ($n=49$; 39.80%) or married ($n=38$; 30.90%) at the time of assessment. Further, the majority identified themselves as not Hispanic or Latino ($n=99$; 81.80%). Majority identified themselves as Caucasian ($n=114$; 92.70%). Detailed information on demographics and psychopathology constructs is provided in Table 1.

2.4. Data analyses

Based on benchmarks of skewness > 2 and kurtosis > 7 (Curran et al., 1996), none of the scales violated normality. The sample was divided into groups based on whether they endorsed PTSD's risky behavior criterion at a clinical level ($> / = 2$) (Weathers et al., 2013). Several *t*-test for independent samples were used to compare the two groups on the severity of six PTSD clusters (intrusions, avoidance, negative affect, anhedonia, dysphoric arousal, anxious arousal); depression; anger reactions; rumination facets (problem-focused thoughts, repetitive thoughts, CFT, and anticipatory thoughts); and distress tolerance facets (tolerance, appraisal, absorption, regulation). We tested the assumption of homogeneity of variances across groups with Levene's Test of Equality of Variances. When the *F* value was significant ($p < 0.05$), the *t*-test estimate assuming unequal variances was used. We used the Bonferroni correction to account for multiple comparisons (0.05/16), and hence a *p* value of < 0.003 to determine significance. Cohen's *d* estimates were computed as effect sizes where a small effect size was indicated by 0.02 and higher, medium effect size was indicated by 0.50 and higher, and large effect size was indicated by 0.80 and higher (Cohen, 1988; Durlak, 2009).

3. Results

The sample sizes for groups that endorsed E2 at a clinical level versus those that did not were 39 (31.70%) and 84 (68.30%), respectively. The sample sizes for the two groups varied slightly for each analysis based on list-wise deletion. Levene's Test of Equality of Variances *F* value was not significant for most constructs (excluding

Table 1
Descriptive information on demographics and psychopathology constructs.

	Mean	SD
Age (n=123)	35.72	12.07
Years of schooling (n=122)	12.98	2.73
PCL-5 total (n=115)	25.79	23.56
PCL-5 – Intrusions (n=121)	6.13	6.19
PCL-5 – Avoidance (n=122)	2.64	2.71
PCL-5 – Anhedonia (n=121)	3.89	4.10
PCL-5 – Negative affect (n=120)	5.02	4.73
PCL-5 – Dysphoric arousal (n=123)	2.98	2.81
PCL-5 – Anxious arousal (n=121)	2.51	2.67
RTSQ total (n=115)	75.43	32.79
RTSQ – Repetitive thoughts (n=120)	17.58	7.73
RTSQ – Counterfactual thinking (n=121)	15.78	7.06
RTSQ – Problem focused thinking (n=121)	16.71	9.13
RTSQ – Anticipatory thinking (n=122)	7.12	3.79
DTS total (n=112)	48.78	15.26
DTS – Tolerance (n=120)	9.48	3.54
DTS – Absorption (n=122)	9.75	3.70
DTS – Appraisal (n=118)	19.38	5.77
DTS – Regulation (n=119)	9.82	3.54
PHQ-9 total (n=114)	9.92	6.98
DARS-5 total (n=120)	12.19	5.42
		n (%)
Gender (n = 123)	Male	39 (31.70%)
	Female	84 (68.30%)
Employment Status (n = 123)	Part time	20 (16.30%)
	Full time	59 (48%)
	Retired	5 (4.10%)
	Unemployed	33 (26.80%)
	Unemployed student	6 (4.90%)
Current annual household income (n=123)	Less than \$24,999	74 (60.20%)
	\$25,000 or higher	49 (39.80%)
Current Relationship Status (n=123)	Single	49 (39.80%)
	Living with significant other	12 (9.80%)
	Married	38 (30.90%)
	Divorced, separated, or widowed	24 (19.50%)
Ethnicity (n=121)	Hispanic or Latino	14 (11.60%)
	Not Hispanic or Latino	99 (81.80%)
Race (could endorse multiple choices; n=123)	Caucasian	114 (92.70%)
	African American	7 (5.70%)
	Asian	0 (0%)
	American Indian/Alaskan Native	1 (0.8%)
	Native Hawaiian/Other Pacific Islander	1 (0.8%)
	Unknown	2 (1.60%)
Probable PTSD (> / =31; n=123)	Yes	50 (40.70%)
	No	73 (59.30%)

Note. *All reported percentages are *valid percentages* to account for missing data.

repetitive thoughts and counterfactual thinking). Hence, the *t*-test estimate assuming equal variances across groups was used for all analyses excluding those for the constructs of repetitive thoughts and counterfactual thinking. See Table 2 for a detailed description of the *t*-test analytical results.¹

¹ The 2 groups do not differ significantly in age, $t(121) = -0.79$, $p = 0.43$; gender distribution, $\chi^2(1) = 0.32$, $p = 0.57$; proportion of Caucasians, $\chi^2(1) = 0.73$, $p = 0.39$; proportion of African-Americans, $\chi^2(1) = 2.22$, $p = 0.14$; proportion of American Indians, $\chi^2(1) = 2.17$, $p = 0.14$; proportion of Native Hawaiians, $\chi^2(1) = 0.47$, $p = 0.49$; ethnic background, $\chi^2(2) = 0.97$, $p = 0.62$; employment status, $\chi^2(4) = 2.40$, $p = 0.66$; income levels, $\chi^2(1) = 1.96$, $p = 0.16$; relationship status, $\chi^2(3) = 2.82$, $p = 0.42$; and years of schooling; $t(120) = 1.22$, $p = 0.23$.

Among the 50 participants who scored at/above the cut-off score of 31 indicating clinically significant levels of PTSD severity, the PCL-5 total score averaged 49.48 ($SD = 13.57$). Among those who endorsed E2 at a clinically significant level, 34 participants had probable PTSD (87.20%). Among those who did not endorse E2 at a clinically significant level, 16 participants had probable PTSD (19%). Results indicated that participants who endorsed E2 reported greater PCL-5 total score severity ($M = 48.14$, $SD = 15.86$) compared to participants who did not endorse E2 ($M = 15.19$, $SD = 18.71$); $t(113) = -9.24$, $p < 0.001$; Cohen's $d = 1.90$.

Results related to the severity of PTSD symptom clusters were significant. Results indicated that participants who endorsed E2 reported greater intrusion severity, $t(119) = -7.55$, $p < 0.001$, Cohen's $d = 1.46$; and greater avoidance severity, $t(120) = -5.82$, $p < 0.001$, Cohen's $d = 1.12$, compared to participants who did not endorse E2. Participants who endorsed E2 reported greater anhedonia severity, $t(119) = -7.04$, $p < 0.001$, Cohen's $d = 1.36$; and greater negative affect severity, $t(118) = -7.13$, $p < 0.001$, Cohen's $d = 1.42$, compared to participants who did not endorse E2. Participants who endorsed E2 reported greater dysphoric arousal severity, $t(121) = -8.18$, $p < 0.001$, Cohen's $d = 1.65$; and greater anxious arousal severity, $t(119) = -8.04$, $p < 0.001$, Cohen's $d = 1.58$, compared to participants who did not endorse E2.

Results for the RTSQ and DTS subscales were mixed. Participants who endorsed E2 reported more ruminative repetitive thoughts, $t(100.34) = -3.19$, $p = 0.002$, Cohen's $d = 0.58$; and greater ruminative counterfactual thinking, $t(97.22) = -4.04$, $p < 0.001$, Cohen's $d = 0.74$, compared to participants who did not endorse E2. Participants who endorsed E2 reported more ruminative problem-focused thinking compared to participants who did not endorse E2; $t(119) = -3.30$, $p = 0.001$; Cohen's $d = 0.67$. The results for group differences in ruminative anticipatory thoughts were marginally significant; $t(120) = -3.06$, $p = 0.003$; Cohen's $d = 0.60$. Further, participants who endorsed E2 reported lower scores on the DTS subscales of absorption, $t(120) = 3.34$, $p = 0.001$, Cohen's $d = 0.63$; and regulation, $t(117) = 3.23$, $p = 0.002$, Cohen's $d = 0.62$, compared to participants who did not endorse E2. Finally, participants who endorsed E2 reported greater depression severity, $t(112) = -4.02$, $p < 0.001$, Cohen's $d = 0.84$; and more anger reactions; $t(118) = -3.10$, $p = 0.002$, Cohen's $d = 0.60$, compared to participants who did not endorse E2.

4. Discussion

The current study addressed the functional role and significance of the newly proposed PTSD's E2 criterion (*reckless and self-destructive behaviors*) in posttraumatic symptomatology. Our findings indicate that the clinical endorsement of the E2 criterion was associated with several clinically-relevant outcomes, including PTSD symptom severity, depression severity, rumination, distress tolerance, and anger. Our results support the clinical utility of the E2 criterion for PTSD's symptomatology and other mental health constructs.

First, our results suggest that the endorsement of E2 criterion was related to higher PTSD severity. Specifically, participants endorsing E2 at a clinical level reported significantly greater severity of intrusion, avoidance, anhedonia, negative affect, dysphoric arousal, and anxious arousal symptoms compared to participants who did not endorse E2 at a clinical level. Further, our findings are consistent with the broader literature on the link between PTSD and risky behaviors. PTSD diagnosis (present versus absent) and symptom severity are associated with greater engagement in risky behaviors (Weiss et al., 2012, 2015e). Several theoretical explanations for this association have been proposed. Individuals with greater PTSD symptom severity may engage in risky behaviors to manage trauma-related symptoms and associated distress (Chilcoat and Breslau, 1998; Brady et al., 2004); or to regulate emotional experiences (Weiss et al., 2012, 2013). Further, people with greater PTSD severity may exhibit difficulty inhibiting risky behaviors

Table 2
Results of the independent samples *t*-tests.

	Endorsed E2			Did not endorse E2			95% CI - Mean difference	<i>t</i>	df	Cohen's <i>d</i>
	(= / > 2)			(< 2)						
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>				
PCL-5 Intrusions	11.32	5.36	38	3.76	5.00	83	-9.54; -5.57	-7.55^p < 0.001	119	1.46
PCL-5 Avoidance	4.49	2.45	39	1.77	2.39	83	-3.64; -1.79	-5.82^p < 0.001	120	1.12
PCL-5 Anhedonia	7.10	3.55	39	2.37	3.42	82	-6.07; -3.40	-7.04^p < 0.001	119	1.36
PCL-5 Negative affect	8.74	3.70	39	3.22	4.09	81	-7.05; -3.99	-7.13^p < 0.001	118	1.42
PCL-5 DA	5.44	1.93	39	1.85	2.40	84	-4.46; -2.72	-8.18^p < 0.001	121	1.65
PCL-5 AA	4.84	2.11	38	1.45	2.18	83	-4.23; -2.56	-8.04^p < 0.001	119	1.58
RTSQ Repetitive thoughts ^a	20.41	5.50	37	16.33	8.27	83	-6.62; -1.54	-3.19^p = 0.002	100.34	0.58
RTSQ CFT ^a	19.03	5.08	37	14.35	7.35	84	-6.98; -2.38	-4.04^p < 0.001	97.22	0.74
RTSQ Problem-focused	20.68	7.84	37	14.96	9.15	84	-9.14; -2.28	-3.30^p = 0.001	119	0.67
RTSQ Anticipatory thinking	8.63	3.69	38	6.44	3.66	84	-3.61; -0.77	-3.06 ^p =0.003	120	0.60
DTS Tolerance	8.57	3.83	37	9.89	3.35	83	-0.05; 2.69	1.91 ^p =0.06	118	0.37
DTS Absorption	8.16	3.95	38	10.48	3.36	84	0.94; 3.69	3.34^p = 0.001	120	0.63
DTS Appraisal	17.43	5.87	37	20.27	5.53	81	0.62; 5.05	2.54 ^p =0.01	116	0.50
DTS Regulation	8.34	3.69	38	10.51	3.26	81	0.84; 3.49	3.23^p = 0.002	117	0.62
PHQ-9 total	13.71	6.17	34	8.31	6.71	80	-8.05; -2.73	-4.02^p < 0.001	112	0.84
DARS-5 total	14.37	5.65	38	11.18	5.04	82	-5.22; -1.15	-3.10^p = 0.002	118	0.60

Note. Significant results are bolded; AA is anxious arousal; DA is dysphoric arousal; CFT is counterfactual thinking.

^a indicates that *t*-test estimates assuming unequal variances were reported.

when perceiving distress-reducing situations (Casada and Roache, 2005); may engage in thrill-seeking activities to elicit or intensify physiological arousal (Van der Kolk et al., 1985; Joseph, 1997); or may engage in risky behaviors because of information processing deficits consequent to the experience of PTEs (Ben-Zur and Zeidner, 2009). Future research comparing these mechanistic models can enhance an understanding of the functional relationship between PTSD cluster-level severity and risky behaviors.

Consistent with study hypotheses, the E2 criterion significantly related to other clinically relevant domains. Specifically, participants reported significantly greater depression severity, rumination, and distress intolerance when they endorsed (versus did not endorse) E2 at a clinically significant level. Regarding the well-established association between depression and risky behaviors (Auerbach et al., 2007; Borders et al., 2012), patients with major depressive disorder exhibit deficits in executive functioning, including impairments in decision-making, problem-solving, and planning (Fossati et al., 2001). For instance, these individuals display altered sensitivity to reward and punishment, preferring behaviors associated with immediate reward, even when such behaviors are disadvantageous (Must et al., 2006). Such cognitive deficits accompanied by the heightened negative affect in depression (American Psychiatric Association, 2013) may make it more difficult for individuals to modulate the intensity and duration of their emotional experiences (Mennin et al., 2015). As such, individuals with severe depression symptoms may rely on emotionally-avoidant strategies (e.g., risky behaviors) that function to immediately reduce or distract attention away from experienced negative affect (Heatherton and Baumeister, 1991). Indeed, evidence suggests that individuals engage in risky behaviors as a means of avoiding or distracting from depression symptoms (Alvy et al., 2011), particularly when they experience difficulties tolerating emotional distress (Tull and Gratz, 2013).

As expected, facets of rumination, including problem-focused thoughts, repetitive thoughts, and CFT, were also higher among trauma-exposed individuals who endorsed (versus did not endorse) E2 at a clinically significant level. Researchers have proposed two pathways through which rumination may be associated with risky behaviors. First, rumination has been found to exacerbate negative mood and maladaptive thought patterns (Nolen-Hoeksema and Morrow, 1993; Lyubomirsky and Nolen-Hoeksema, 1995), which may increase the motivation for risky behaviors (Crepaz and Marks,

2001; Cooper et al., 2016). Second, individuals may engage in risky behaviors in an attempt to control ruminative thinking (to distract from or alleviate distress; Caselli et al., 2006; Nolen-Hoeksema et al., 2007). For instance, evidence suggests that individuals may use alcohol to reduce self-focused attention (Hull, 1981). Consistent with this theory and results of the present study, rumination has been linked to greater involvement in risky behaviors (Caselli et al., 2010; Borders et al., 2012). Of note, the difference among individuals who endorsed (versus did not endorse) E2 at a clinically significant level on a fourth facet of rumination, anticipatory thoughts, was only marginally significant. Unlike the other facets of rumination, that of anticipatory thoughts assesses future-oriented rumination, or the anticipation of upcoming events, such as worry associated with the anticipation of threat. While extensive worry has been linked to deleterious mental health outcomes (Behar et al., 2009), future work is needed to better understand the potential contribution of future-oriented rumination to engagement in risky behaviors in particular.

Partially consistent with the study hypothesis, two facets of distress tolerance – absorption and regulation – were significantly elevated among trauma-exposed individuals who endorsed (versus did not endorse) E2 at a clinically significant level. Whereas literature indicates mixed findings for the relations among distress tolerance facets and risky behaviors (De Lisle et al., 2014; Van Eck et al., 2015; Shorey et al., in press), results of the current study are consistent with Simons and Gaher (2005) who found that only absorption and regulation were associated with alcohol use. Our findings suggest that individuals who become overwhelmed and engrossed by negative emotions are more likely to engage in risky behaviors. These individuals may exhibit difficulties concentrating and accomplishing important tasks because they are unable to focus on external/internal experiences other than the distressing emotions. As such, they may engage in risky behaviors in an attempt to regain control of attention being absorbed by negative emotions. Our results also underscore the role of regulation efforts to alleviate distress in risky behaviors. Indeed, a growing body of research suggests that risky behaviors may serve an emotion-regulating function (Weiss et al., 2015c, 2015d). For instance, risky behaviors may alleviate or distract from emotion states perceived as aversive. Alternatively, the short-term pleasure associated with risky behaviors may counter or distract from aversive emotions that an individual is unwilling to approach, tolerate, or accept.

Finally, our results provide support for greater anger reactions

among trauma-exposed individuals who endorsed (versus did not endorse) E2 at a clinically significant level. This finding is unsurprising given evidence that PTSD's E2 symptom in combination with PTSD's aggressive/irritable behavior symptom comprises an externalizing latent factor (Tsai et al., 2014; Armour et al., 2016b), which is strongly associated with hostility (Pietrzak et al., 2015). Indeed, past research indicates that aggressive behaviors frequently co-occur with other risky behaviors (Baskin-Sommers and Sommers, 2006). The co-occurrence among aggressive and other risky behaviors may stem from shared risk factors (e.g., peer, family, and neighborhood characteristics; Cotter et al., 2016; Flouri and Sarmadi, 2016). Alternatively, underlying factors that dispose individuals towards aggressive and other risky behaviors may overlap (e.g., emotion dysregulation; Weiss et al., 2015c). Finally, engagement in aggressive behaviors may subsequently increase risk for other risky behaviors and vice versa. For instance, alcohol intoxication may impair behavioral inhibition (Fillmore, 2003), thereby facilitating aggressive behavior (Bushman and Cooper, 1990). Conversely, aggressive behavior may contribute to the experience of more negative emotions (e.g., shame; Weiss et al., 2015b) that further drive other risky behaviors, such as alcohol use.

Of note, PTSD symptom severity has been linked to depression severity (Morina et al., 2013), rumination (Seligowski et al., 2015) distress tolerance difficulties (Marshall-Berenz et al., 2010), and anger (Olatunji et al., 2010). Thus, it is possible that greater PTSD symptom severity accounted for the relations between endorsement of E2 and the constructs of depression, rumination, distress tolerance, and anger reactions (as opposed to endorsement of E2 *per se*). Future research could explicate the potentially unique role of endorsement of E2 in such clinically relevant outcomes.

Our findings have important clinical and theoretical implications. First, results may aid researchers and clinicians in identifying individuals who are at greatest risk for negative outcomes following traumatic exposure. Specifically, our findings underscore the potential utility of the E2 criterion in identifying trauma-exposed individuals who experience (or are at risk for experiencing) more severe PTSD and depression symptoms, and greater rumination, distress intolerance, and anger. Second, results highlight the potential utility of intervening with trauma-exposed individuals who endorse the E2 criterion as a means of reducing negative outcomes associated with traumatic exposure. Given evidence that treatments aimed at reducing risky behaviors may also improve mental health outcomes (Hien et al., 2004), clinicians may choose to directly target risky behaviors in treatments for trauma-exposed individuals. Alternatively, treatments may be implemented that target the shared mechanisms of risky behaviors and trauma-related negative outcomes (e.g., emotion regulation and impulsivity; Tull et al., 2015).

Third, results add to evidence indicating a significant functional role of the E2 criterion in PTSD's symptomatology and other posttraumatic mental health constructs. The E2 criterion showed evidence of clinical utility particularly in relation to PTSD symptoms. As expected, E2 had the strongest convergence with PTSD constructs, while having relative discrimination from other mental health constructs (e.g., mean $d=1.43$ for PTSD versus mean $d=0.62$ for other constructs). In other words, E2 related to all post-trauma constructs, but its strongest associations were with constructs more narrowly specific to PTSD itself. Finally, our findings support prior work on PTSD subtypes (Miller et al., 2003, 2004); specifically the idea of an externalizing cluster characterized by low constraint, risky behaviors, and high negative emotionality. Endorsement of risky behaviors related to negative emotionality constructs such as depression, and rumination; and to low constraint indicators such as anger reactions.

Several limitations must be considered when interpreting the current study findings. First, the cross-sectional nature of the data precludes determination of the precise causal nature of the relationships of interest. Future studies should address this concern through prospective, longitudinal investigations. Second, there was an exclusive

reliance on self-report measures, responses to which may be influenced by an individual's willingness and/or ability to report accurately. Future studies would benefit from the inclusion of standardized clinical interviews for PTSD and depression, and multimodal measures of rumination and distress tolerance. Finally, although our focus on a treatment-seeking community sample is a strength, our findings may not generalize to other populations.

Despite these limitations, this is the first study to examine DSM-5 PTSD's E2 criterion in relation to posttraumatic psychopathology. Irrespective of whether the E2 criterion is retained in PTSD's symptomatology in subsequent DSM revisions, the current study results emphasize that E2 endorsement relates to increasing posttraumatic distress. Such findings raise the clinical question of targeting risky and/or self-destructive behaviors in treatment. Consistent with the Research Domain Criteria (Cuthbert, 2014), there is a possibility that the biological and emotional markers/mechanisms underlying E2 are transdiagnostic; and hence an important area of future research.

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