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Intolerance of uncertainty predicts analogue posttraumatic stress following adverse life events

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ABSTRACT

BACKGROUND AND OBJECTIVES: There is evidence that intolerance of uncertainty (IU) is associated with elevated post-traumatic stress (PTS) symptoms. There is a scarcity of research examining whether IU is prospectively related to PTS following exposure to negative life events. Using data from a Dutch student-sample, we examined the degree to which IU predicts post-traumatic stress symptoms associated with negative stressful life events (analogue posttraumatic stress (PTS)).

DESIGN: This was a prospective survey-study.

METHODS: A group of 193 undergraduate students completed self-report measures of Inhibitory IU, Prospective IU, and anxiety sensitivity (at Time 1, T1). One year later (at T2), participants rated adverse life-events experienced between T1 and T2, and completed a questionnaire tapping PTS associated with the most distressing event experienced in this time-frame. We hypothesized that pre-event Inhibitory IU and—to a lesser extent—Prospective IU would predict analogue PTS, after covarying for anxiety sensitivity.

RESULTS: As predicted, pre-event Inhibitory IU predicted post-event analogue PTS, even when controlling for anxiety sensitivity. With respect to distinct analogue PTS clusters, Inhibitory IU predicted PTS avoidance and PTS hyperarousal, but was unrelated to PTS reexperiencing.

CONCLUSIONS: This study confirm that IU, particularly Inhibitory IU, may convey risk for elevated PTS following adverse life events.

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Posttraumatic stress disorder (PTSD) is a mental health condition that may follow exposure to stressful life events. As per DSM-IV, symptoms of PTSD include intrusive recollections of the adverse event, avoidance behavior, and a sense of ongoing threat and hypervigilance (American Psychological Association [APA], 2000); as per DSM-5, PTSD also encompasses negative alterations in cognitions and mood (APA, 2013). Efficacious treatments for PTSD exist (e.g., Foa, Keane, Friedman, & Cohen, 2008). However, a substantial subgroup of patients does not recover from extant treatments. Hence, there is a continued need to enhance knowledge about malleable psychological processes that could be targeted in treatments to improve their effects. Knowledge on risk-factors that temporally precede posttraumatic stress symptomatology is particularly vital to develop more effective preventative interventions; this is important given the limited effectiveness of interventions for PTSD prevention (Qi & Shalev, 2016).

There is increasing evidence that intolerance of uncertainty (IU) is one vulnerability factor that may convey risk for elevated posttraumatic stress (PTS) symptoms (Oglesby, Boffa, Short, Raines, &

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Schmidt, 2016). IU refers to an individual's dispositional inability to tolerate negative responses triggered by the absence of information and sustained by the associated perception of uncertainty (Carleton, 2016). IU encompasses two correlated dimensions, Prospective IU and Inhibitory IU. These dimensions refer to perceptions of threat associated with future uncertainty (e.g., "*Unforeseen events upset me greatly*") and restraint activity due to uncertainty (e.g., "*The smallest doubt can stop me from acting*"), respectively (Carleton, Norton, & Asmundson, 2007). Several studies have shown that IU is cross-sectionally associated with elevated symptom levels of PTS (e.g., Boelen, 2010; Fetzner, Horswill, Boelen, & Carleton, 2013; Oglesby, Gibby, Mathes, Short, & Schmidt, 2017). However, these studies do not speak to the temporal linkage between the concepts. Thus, whether IU is a prospective risk-factor for elevated PTS is largely unknown. One longitudinal study among bereaved individuals found that Prospective IU predicted increased disturbed grief, but not bereavement-related posttraumatic stress severity (Boelen, Reijntjes, & Smid, 2016). In another recent study, Oglesby et al. (2016) found that pre-trauma IU predicted elevated PTSD severity following a campus shooting, even after controlling for anxiety sensitivity. Anxiety sensitivity refers to fears of anxiety-related sensations and worries about these sensations, and has been implicated in the pathogenesis of different mental disorders (Naragon-Gainey, 2010). Oglesby et al. (2016) included anxiety sensitivity in their study considering evidence showing that anxiety sensitivity is also related to PTSD (Marshall, Miles, & Stewart, 2010; Naragon-Gainey, 2010). Moreover, IU and anxiety sensitivity have some similarities with a shared basis in fearing unknown, potentially harmful consequences of events (Carleton, Sharpe, & Asmundson, 2007). Their findings that IU predicted PTSD beyond anxiety sensitivity may have important treatment implications as treatments for PTS may benefit from adding interventions designed to reduce IU.

Apart from Oglesby et al.'s study, no research to date has examined associations of pre-trauma IU with post-trauma PTS symptoms. The current study aimed to further examine this linkage, using data from a Dutch student sample (for other studies using this same data set, see e.g., Boelen & Lenferink, 2018). In an attempt to replicate Oglesby et al.'s (2016) findings, we investigated whether IU assessed *before* the occurrence of an adverse life event would be prospectively associated with increased PTS symptoms *after* the event, expecting the two constructs to be significantly linked. Participants in Oglesby et al.'s study had been exposed to a campus shooting; participants in the current study were exposed to a variety of negative life events, that were not all traumatizing in the sense of DSM-IV/DSM-5 (APA, 2000; 2013). Accordingly, we referred to the PTS assessed in this study as "analogue PTS". Notably, there is some evidence that negative life events (other than traumatic events as per DSM-IV and DSM-5) can give rise to PTS symptoms (Mol et al., 2005). Thus, our current study could shed some light on the degree to which Oglesby et al.'s (2016) findings generalize to emotional distress associated with other, milder adverse events. Moreover, expanding Oglesby et al.'s study that focused on overall IU, we examined the potential distinct impact of pre-event Prospective IU and Inhibitory IU on post-event analogue PTS. Although there is no previous prospective research investigating this issue, cross-sectional research (e.g., Fetzner et al., 2013) led us to hypothesize that Inhibitory IU would be a stronger predictor than Prospective IU. Again following Oglesby et al., we examined the relationship of IU with analogue PTS while controlling for anxiety sensitivity. This was motivated by the fact that, as noted, anxiety sensitivity is a known correlate of PTS (Marshall et al., 2010; Olatunji & Fan, 2015) and we wished to examine the specific role of IU after taking into account this established correlate, thereby mirroring the Oglesby et al. (2016) study.

Method

Participants and procedure

Data were available from undergraduate students in the Netherlands participating in an internet-based survey-study addressing cognitive behavioral variables in depression and anxiety symptoms.

The study included two assessment waves, with Time 2 (T2) following one year after Time 1 (T1). Participants were recruited via posters and announcements on university internet website. At T1, participants participated in return for course credits. At T2, they received €5 financial compensation. All participants provided informed consent. For the current study, we selected participants with complete data at T1 and T2. Participants who explicitly noted (on the Life Events Scale) that they were unable to think of a stressful life event experienced during the preceding year were excluded from further analyses. The final sample included 193 students with a mean age of $M = 21.3$ ($SD = 2.0$) years, including 173 (89.6%) women.

Measures

Intolerance of uncertainty scale short form (IUS-12)

At T1, participants completed the IUS-12 (Carleton et al., 2007) a 12-item measure with 7 items tapping Prospective IU (e.g., "I can't stand being taken by surprise") and 5 items tapping Inhibitory IU (e.g., "When it's time to act, uncertainty paralyses me"). Items were scored on 5-point scale (1 = not at all characteristic of me; 5 = entirely characteristic of me). The IUS-12 has excellent psychometric properties (e.g., Carleton et al., 2007). In the present sample, the α of the Prospective subscale was .85, and of the α of Inhibitory subscale was .82.

Anxiety sensitivity index (ASI)

As T1, participants also completed the ASI, a 16-item questionnaire developed by Peterson and Reiss (1992) designed to measure fear of anxiety-related sensations. Items (e.g., "It scares me when my heart beats fast") are scored on 5-point scales ranging from 0 = very little to 4 = very much. The ASI has good psychometric properties (e.g., Vujanovic, Arrindell, Bernstein, Norton, & Zvolensky, 2007). In the present study, Cronbach's α was .88.

Life events scale

At T2, participants completed the Life Events Scale, developed by Garnefski and Kraaij (2001), to assess exposure to stressful life events. The measure contains negative life events commonly reported by community members (e.g., divorce, confrontation with violence, traffic accident). Participants rated whether they had experienced these events (i) before the age of 16, and/or (ii) between the age of 16 and one year prior to T2, (iii) in the previous year prior to T2, or (iv) never. We added events deemed relevant to students, including relationship break-up, serious interpersonal conflict, and academic problems. For some events, participants were asked to rate whether these had happened to themselves and/or others (e.g., physical illness of oneself; physical illness of a close other). In the current study, we only focused on events that occurred in the previous year prior to T2. From all these events, participants were also asked to selected the event that was most distressing.

Posttraumatic symptom scale self report version (PSS-SR)

At T2, participants completed the PSS-SR (Foa, Riggs, Dancu, & Rothbaum, 1993; Dutch version by Engelhard, Arntz, & Van den Hout, 2007), a 17-item measure providing an index of overall PTS symptom severity and the DSM-IV-based symptom-clusters of re-experiencing, avoidance, and hyperarousal. The instrument is psychometrically sound (Foa et al., 1993). Participants were instructed to complete the PSS-SR, keeping in mind the event from the previous year that they considered to be most distressing (as indicated on the Life Events Scale). Items were rated on 4-point scales (0 = not at all, to 3 = five or more times per week/almost always). In the present study, Cronbach's α's were .87 (total scale), .72 (re-experiencing), .76 (avoidance), and .70 (hyperarousal).

Results

Descriptive and preliminary analyses

Means, standard deviations, score ranges, and zero-order correlations for all variables are shown in Table 1. Among other things, correlations showed that pre-event anxiety sensitivity, Inhibitory IU, and (albeit less strongly) Prospective IU were correlated with post-event analogue PTS levels. In addition, pre-event anxiety sensitivity was significantly correlated with both pre-event IU subscales.

Categories of negative life events from the Life Events Scale experienced in the preceding year were endorsed as follows (ordered from highest to lowest): (i) mental problems of close others ($n = 53$, 27.5%); (ii) relationship breakup ($n = 42$, 21.8%); (iii) physical illness of close others ($n = 31$, 16.1%); (iv) interpersonal conflict ($n = 29$, 15.0%); (v) having a physical illness oneself ($n = 17$, 8.8%); (vi) alcohol/drug abuse by close others ($n = 13$, 6.7%); (vii) having mental problems oneself ($n = 12$, 6.2%); (viii) death of close others ($n = 10$, 5.2%); (ix) suicide attempts of close others ($n = 9$, 4.7%); (x) academic problems ($n = 5$, 2.6%); (xi) witnessing/experiencing interpersonal violence ($n = 4$, 2.1%); (xii) witnessing/experiencing traffic accident ($n = 3$, 1.6%); (xiii) confrontation with crime ($n = 2$, 1.0%); (xiv) sexual abuse ($n = 2$, 1.0%); and (xv) suicide attempt of self ($n = 1$, 0.5%).

The following events were selected as reference events for the PSS-SR: (i) mental problems of close others ($n = 26$, 13.5%); (ii) physical illness of close others ($n = 26$, 13.5%); (iii) relationship breakup ($n = 24$, 12.4%); (iv) interpersonal conflict ($n = 22$, 11.4%); (v) having mental problems oneself ($n = 12$, 6.2%); (vi) having physical illness oneself ($n = 10$, 5.2%); (vii) academic problems ($n = 8$, 4.1%); (viii) death of close others ($n = 7$, 3.6%); (ix) alcohol/drug abuse by close others ($n = 6$, 3.1%); (x) suicide attempts of close others ($n = 4$, 2.0%); (xi) confrontation with interpersonal violence ($n = 3$, 1.6%); (xii) witnessing/experiencing traffic accident ($n = 3$, 1.6%); (xiii) parental divorce ($n = 2$, 1.0%). Forty participants (20.7%) experienced none of the events listed in the Life Events Scale during the preceding year and used another distressing event as anchor-event for the PSS-SR; the survey included a blank space were participants could type-write these events, if so wished; examples of events reported, included financial difficulties, repeated failure at driving license exams.

Regression analyses

We conducted a linear regression to examine associations of pre-event Prospective IU and pre-event Inhibitory IU with post-event analogue PTS, while controlling for pre-event anxiety sensitivity. Table 2 summarizes the outcomes. Pre-event Inhibitory IU, but not Prospective IU and anxiety sensitivity significantly predicted post-event overall analogue PTS severity (i.e., PSS-SR total scores). Next, three linear regression analyses were conducted with all three DSM-IV based PTS clusters serving as separate dependent variables. Outcomes (Table 2) revealed that all regression models were significant. Pre-event anxiety sensitivity (but not pre-event Inhibitory and Prospective IU) was associated with post-event analogue PTS reexperiencing. Pre-event Inhibitory IU (but not Prospective IU and anxiety sensitivity) predicted post-event analogue PTS avoidance and hyperarousal.[1,2,3]

Table 1. Zero order correlations, means, and standard deviations.

Measure	1	2	3	4	5	6	7	*M*	(*SD*)	Range
1. Anxiety Sensitivity Index	–							25.47	7.90	16–68
2. Inhibitory IU	.54***							11.47	3.70	5–24
3. Prospective IU	.38***	.61***						19.94	5.41	7–34
4. Analogue PTS total	.22**	.29**	.16*					9.94	7.14	0–40
5. Analogue PTS intrusion	.28**	.27**	.19**	.86***				2.86	2.49	0–11
6. Analogue PTS avoidance	.11	.21*	.09	.92***	.71***			3.68	3.42	0–18
7. Analogue PTS hyperarousal	.21**	.29**	.16*	.82***	.56***	.61***	–	3.38	2.40	0–11

Note. IU = intolerance of uncertainty. PTS = posttraumatic stress.
*$p < .05$.**$p < .01$.***$p < .001$.

Table 2. Summary of regression analyses with inhibitory IU, prospective IU, and anxiety sensitivity predicting analogue posttraumatic stress total and subscale scores.

	R^2	F	β	t	sr^2
Dependent variable = analogue PTS total	.090	6.25***			
Anxiety sensitivity			.09	1.08	.006
Inhibitory IU			.26	2.72**	.036
Prospective IU			−.03	−0.72	.001
Dependent variable = analogue PTS reexperiencing	.098	6.84**			
Anxiety sensitivity			.19	2.27*	.024
Inhibitory IU			.16	1.65	.013
Prospective IU			.02	0.22	< .001
Dependent variable = analogue PTS avoidance	.046	3.02*			
Anxiety sensitivity			< .001	< 0.01	< .001
Inhibitory IU			.24*	2.46*	.031
Prospective IU			−.05	−0.60	.002
Dependent variable = analogue PTS hyperarousal	.091	6.30***			
Anxiety sensitivity			.08	0.91	.004
Inhibitory IU			.28	2.87*	.040
Prospective IU			−.04	−0.41	.001

Note. IU = intolerance of uncertainty. PTS = posttraumatic stress.
*$p < .05$.**$p < .01$.***$p < .001$.

Discussion

This study examined whether Prospective and Inhibitory IU are prospectively related to the severity of analogue PTS symptoms connected with a negative life event. A main finding was that Inhibitory IU but not Prospective IU predicted analogue PTS symptom levels. The results were significant, even after controlling for baseline anxiety sensitivity, a known correlate of PTS symptomatology (Marshall et al., 2010; Olatunji & Fan, 2015). Our results are thus consistent with prior findings suggesting that IU is involved in PTSD (Fetzner et al., 2013; Oglesby et al., 2017). In addition, our findings corroborate results reported by Oglesby et al. (2016) who found pre-trauma IU to be a significant predictor of elevated PTS severity following a campus shooting. Building and expanding on this prior work, we distinguished between Inhibitory and Prospective IU, with findings revealing that Inhibitory IU but not Prospective IU was a predictor of analogue PTS severity. This accords with prior cross-sectional findings (Fetzner et al., 2013) and suggests that PTS symptomatology is more strongly linked with inactions and passivity arising from inability to endure uncertainty, than with persistent worrying about the future.

Oglesby et al. (2016) found pre-trauma IU to predict PTSD reexperiencing and PTSD hyperarousal, but not DSM-5 based avoidant clusters of PTSD avoidance and PTSD numbing. We also found Inhibitory IU to predict PTS arousal; however, different from this prior study, Inhibitory IU predicted analogue PTS avoidance, but not PTS reexperiencing. It makes intuitive sense that when individuals with an elevated inclination to respond to uncertain situations with inactivity and inhibited action (reflected in elevated Inhibitory IU) are confronted with adverse events, they will be prone to avoid memories and reminders of that event. That said, the linkage of IU with different PTS clusters warrants further scrutiny taking into account differences between Oglesby et al.'s and our findings.

A number of limitations should be considered in the interpretation of our findings. First, all participants were students and the large majority was women; thus, our sample was relatively homogeneous in terms of age, gender, and educational level which limits the generalizability of our findings. Secondly, we focused on traumatic stress symptoms associated with relatively mild negative life events, hence referred to as analogue PTS. This means that caution should be applied in generalizing our findings to PTSD symptomatology connected with traumatic events as defined in DSM-IV and DSM-5. However, there is evidence that more common stressors—including problems with health, relationships, and work—can cause PTS symptoms that are similar in nature and intensity compared to PTS symptoms associated with events encompassing more severe traumatizing features (Mol et al., 2005). It is, therefore, relevant for future work to further examine the role of IU and its

components in predicting PTSD symptoms and other negative psychological outcomes associated with a broad range of adverse events. Another limitation is that all data were obtained using an internet-based survey; thus, common method variance may have affected results. Notable too is that pre-event Inhibitory IU predicted a small amount of variance in post-event PTS; it would be interesting to examine if the impact of pre-event IU is more pronounced in other, including more severely distressed samples. A final limitation is that our use of a DSM-IV based measure of PTS implicates that our findings do not necessarily generalize to DSM-5 PTS symptomatology.

Notwithstanding these considerations, our findings add to prior evidence that IU is an risk factor for increases in PTS following adverse life events, particularly inhibition of action following apprehension of uncertainty, implicated in Inhibitory IU. If future work replicates this finding, it could be fruitful to examine if interventions mitigating IU are effective in preventing the development and maintenance of PTS following exposure to negative life events. It is encouraging that IU is amenable to interventions such as exposure to uncertainty and problem solving training (Boswell, Thompson-Hollands, Farchione, & Barlow, 2013). Preventive interventions for traumatic stress may benefit from the inclusion of such interventions.

Notes

1. To explore whether gender affected outcomes, we performed all regression analyses again, controlling for gender; outcomes were similar to the ones without gender as a control variable. Outcomes were also similar when the small group of men was excluded from the analyses. In both additional rounds of analyses, the same variables emerged as significant predictors in the models.
2. In a prior study based on the current data (Boelen & Lenferink, 2018), trait mindfulness—tapped using the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003)—predicted levels of PTS. Although the current study was designed to expand Oglesby et al.'s study (2018) and, therefore, focused on IU, we explored whether the outcomes of the current regression analyses changed when trait mindfulness was controlled. This was not the case: Inhibitory IU continued to predict analogue total PTS, reexperiencing, and hyperarousal when controlling MAAS-scores.
3. For exploratory reasons, we examined if outcomes of these regressions changed considerably when anxiety sensitivity was not included as a covariate. This was not the case. Four significant regression equations emerged with Inhibitory IU but not Prospective IU predicting analogue overall PTS and PTS clusters: Regression predicting PTS total, $F = 8.79$, $R^2 = .085$, $p < .001$, $\beta_{\text{Inhibitory IU}} = .30$ ($p = .001$), $\beta_{\text{Prospective IU}} = -.02$ ($p = .793$); regression predicting PTS reexperiencing, $F = 7.53$, $R^2 = .073$, $p < .001$, $\beta_{\text{Inhibitory IU}} = .25$ ($p = .005$), $\beta_{\text{Prospective IU}} = .04$ ($p = .691$); regression predicting PTS avoidance, $F = 4.55$, $R^2 = .046$, $p = .012$, $\beta_{\text{Inhibitory IU}} = .24$ ($p = .007$), $\beta_{\text{Prospective IU}} = -.05$ ($p = .546$); regression predicting PTS hyperarousal, $F = 9.04$, $R^2 = .087$, $p < .001$, $\beta_{\text{Inhibitory IU}} = .31$ ($p < .001$), $\beta_{\text{Prospective IU}} = -.03$ ($p = .735$).

Disclosure statement

No potential conflict of interest was reported by the author.

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