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Examining the Specific Dimensions of Distress Tolerance That Prospectively Predict Perceived Stress

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Abstract

We examined five dimensions of distress tolerance (i.e., uncertainty, ambiguity, frustration, negative emotion, physical discomfort) as prospective predictors of perceived stress. Undergraduate students (N = 135) completed self-report questionnaires over the course of two assessment sessions (T1 and T2). Results of a linear regression in which the five dimensions of distress tolerance and covariates (i.e., T1 perceived stress, duration between T1 and T2) served as predictor variables and T2 perceived stress served as the outcome variable showed that intolerance of uncertainty was the only dimension of distress tolerance to predict T2 perceived stress. To better understand this prospective association, we conducted a post-hoc analysis simultaneously regressing two subdimensions of intolerance of uncertainty on T2 perceived stress. The subdimension representing beliefs that "uncertainty has negative behavioral and self-referent implications" significantly predicted T2 perceived stress, while the subdimension indicating that "uncertainty is unfair and spoils everything" did not. Results support a growing body of research suggesting intolerance of uncertainty as a risk factor for a wide variety of maladaptive psychological outcomes. Clinical implications will be discussed.

Keywords: perceived stress; distress tolerance, intolerance of uncertainty; prospective; longitudinal

1. Introduction

Perceived stress—the degree to which one perceives life as overwhelming, unpredictable, and out of control—has received considerable attention in the extant literature as it relates to psychological and physiological pathology. Higher levels of perceived stress are associated with social anxiety (Cohen, Kamarck, & Mermelstein, 1983), depressive symptoms (Hewitt, Flett, & Mosher, 1992), rheumatoid arthritis (O'Leary, Shoor, Lorig, & Holman, 1988), and host of other maladaptive outcomes (e.g., Band, Edelmann, Avery, & Brinsden, 1998, Bardeen, Fergus, & Wu, 2013; Singareddy, Moin, Spurlock, Merritt-Davis, & Uhde, 2003). Moreover, some prospective research suggests that greater perceived stress acts as a risk-factor for the development of relatively worse psychological and physiological quality of life (Golden-Kreutz et al., 2005), such as anxiety and depressive symptoms, insomnia, and social dysfunction (Morrison & O'Connor, 2005).

Although a number of studies have examined the extent to which perceived stress is associated with maladaptive outcomes (most commonly using cross-sectional designs), less attention has been paid to understanding how heightened stress perception develops. To our knowledge, the only peer-reviewed research to consider potential psychological risk factors for perceived stress (e.g., experiential avoidance, anxiety sensitivity; Bardeen, Fergus, & Orcutt, 2013a) is cross-sectional, thus precluding temporal inferences. Given evidence suggesting the transdiagnostic status of perceived stress, longitudinal research that attempts to clarify why some individuals are prone to perceiving life events as substantially more stressful than others is critical. By identifying risk-factors for perceived stress, we may be able to intervene before chronic perceived stress leads to severe distress and/or impairment.

Some basic associations between perceived stress and other constructs that have been recognized as putative transdiagnostic risk factors for maladaptive psychological outcomes have been identified. One such putative transdiagnostic risk factor found to be associated with perceived stress is distress tolerance. Distress tolerance is broadly defined as one's capacity to withstand aversive physical and psychological states (Leyro, Zvolensky, & Bernstein, 2010). Although there is not yet consensus regarding the conceptualization of distress tolerance, Zvolensky, Vujanovic, Bernstein, and Leyro (2010) put forth a five-factor model of distress tolerance consisting of distinct dimensions of intolerance (i.e., uncertainty, ambiguity, frustration, negative emotion, physical discomfort). Through exploratory and confirmatory factor analysis, Bardeen, Fergus, and Orcutt (2013b) provided the first known psychometric support for Zvolensky et al.'s model, finding that each of the five lower-order constructs was related, but structurally distinguishable, and loaded on a higher-order distress tolerance construct. The operational definition of each of these constructs is presented briefly below. For an in-depth discussion of these constructs, as well a discussion of (a) alternate models of DT and the distinction between these constructs and (b) theoretically related constructs (e.g., emotion dysregulation) please refer to Leyro et al.'s (2010) review.

Although a number of definitions of intolerance of uncertainty have been put forth over the past 20 years, Carleton's (2016) recent review provides one of the most comprehensive operational definitions to date. Carleton (2016) described intolerance of uncertainty as, "an individual's dispositional incapacity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information, and sustained by the associated perception of uncertainty" (p. 31). It is important to note that prior research has considered the unique impact of intolerance of uncertainty and other facets of distress tolerance in relation to criterion

variables (e.g., Banducci, Bujarski, Bonn-Miller, Patel, & Connolly, 2016; Michel, Rowa, Young, & McCabe, 2016). Nonetheless, it warrants underscoring that intolerance of uncertainty is considered a component of distress tolerance within Zvolensky et al.'s (2010) model and structural studies support intolerance of uncertainty as being part of the distress tolerance construct (Bardeen et al., 2013b). Intolerance of ambiguity has been defined as a deficit in the ability to tolerate stimuli perceived as complex, unclear, or subject to conflicting interpretations (McLain, 1993). Although the definitions of intolerance of ambiguity and intolerance of uncertainty are similar and have often been used interchangeably (Grenier, Barrette, & Ladouceur, 2005), these constructs are distinguishable based on time orientation and what is known. Specifically, intolerance of uncertainty is future oriented, whereas intolerance of ambiguity pertains to the present moment (Grenier et al., 2005). Additionally, intolerance of uncertainty is specific to the unknown, whereas intolerance of ambiguity is related to features that are open to interpretation, and for which the best choice is not clear (Carleton, 2016).

Intolerance of frustration is thought to stem from a perceived inability to withstand the distress associated with the difference between the way that something *should* be and the reality of the situation (Harrington, 2005). Whereas intolerance of frustration shares conceptual overlap with other factors of distress tolerance (e.g., intolerance of negative emotion), Bebane, Flowe, and Maltby (2015) found that items assessing intolerance of frustration form a distinct factor from items assessing the other four factors of the distress tolerance construct. Such findings support operationalizing intolerance of frustration independently from the other distress tolerance dimensions. The perceived inability to withstand uncomfortable bodily sensations has been termed intolerance of physical discomfort (Schmidt, Richey, & Fitzpatrick, 2006). Intolerance of physical discomfort differs from related constructs in that it refers to uncomfortable bodily

sensations more generally rather than to a specific type of internal stimuli (e.g., pain tolerance, anxiety sensitivity; Leyro et al., 2010). Finally, intolerance of negative emotion refers to the perceived inability to tolerate negative emotions that result from aversive physical or cognitive processes (Leyro et al., 2010; Simons & Gaher, 2005).

Cross-sectional research has shown that perceived stress is positively associated with intolerance of ambiguity (Kurita, Garon, Stanton, & Meyerowitz, 2013), intolerance of uncertainty (Kurita et al., 2013), intolerance of negative emotion (Kiselica, Rojas, Bornovalova, & Dube, 2015), and intolerance of frustration (Kiselica et al., 2015). Interestingly, although the five distress tolerance dimensions proposed by Zvolensky et al. (2010) are interrelated (Bardeen et al., 2013b), evidence suggests differential unique associations between these dimensions and criterion variables. For example, among these five dimensions of distress tolerance, intolerance of physical discomfort shares the strongest unique association with health anxiety (Fergus, Bardeen, & Orcutt, 2015), intolerance of uncertainty and negative emotions appear to be the lower-order factors most relevant to posttraumatic stress disorder (Banducci et al., 2016), and intolerance of negative emotions does not account for unique variance in generalized anxiety symptoms when accounting for intolerance of uncertainty (Michel et al., 2016). Such findings highlight the importance of further examining whether each of Zvolensky et al.'s five distress tolerance constructs differentially relate to maladaptive outcomes.

Whereas existing research has examined cross-sectional associations between the noted dimensions of distress tolerance and perceived stress (e.g., Kiselica et al., 2015; Kurita et al., 2013), it is currently unknown whether these dimensions may contribute to the development of heightened stress perception. We sought to address this gap in the literature in the present study by examining the five factors of distress tolerance (i.e., uncertainty, ambiguity, frustration,

negative emotion, physical discomfort) put forth by Zvolensky et al. (2010) as prospective predictors of perceived stress over the course of two assessment sessions. As described, cross-sectional research has provided evidence of positive associations between all of the distress tolerance dimensions, except for physical discomfort, and perceived stress. Thus, our goal in the present study was to determine which of these factors provide unique variance, above the other factors, in predicting perceived stress across time. Determining which specific distress tolerance constructs (measured at Time 1) are uniquely related to perceived stress (measured at Time 2) might aid in identifying specific treatment targets for reducing the impact of perceived stress on emotional functioning. Additionally, we accounted for baseline perceived stress in our primary analysis to ensure that any effects of distress tolerance on perceived stress provided incremental explanatory power.

The present study was designed to maintain a high participant retention rate. Participants were able to complete both assessment sessions online and within the course of one academic semester. A number of longitudinal studies of similar length, examining related constructs (e.g., trait anxiety, general distress, depression), have been conducted with undergraduate samples (e.g., Hankin, Abramson, Miller, & Haeffel, 2004; Kassel, Bornovalova, & Mehta, 2006; Schmidt et al., 1997; Towbes & Cohen, 1996). Undergraduate students experience many stress-inducing developmental tasks (e.g., achieving independence, preparing for relationship commitment, choosing a career path, developing new support circles; Towbes & Cohen, 1996), and thus, are a particularly relevant population for examining changes in perceived stress in a relatively short period of time.

2. Method

2.1. Participants and Procedure

Data for the present study was collected as part of a larger study investigating emotion regulation and related constructs. Participants (N =135; 62% of those who agreed to be contacted for T2) were recruited from introductory psychology courses at a Midwestern University in the United States. The sample had an average age of 21.9 years (SD = 2.2), consisted of 84 women and 51 men, and 65% self-identified as White, 15% as Black, 7% as Asian, 1% as American Indian or Alaska Native, 11% endorsed "other", while 1% preferred not to respond. Nine percent of participants self-identified as being of Hispanic/Latina ethnicity.

Institutional review board approval of study procedures was received prior to data collection. Participants completed a battery of random-ordered questionnaires at two time points over the course of one semester. A secure online survey program was used to obtain informed consent and administer study measures at both time points. Participants were compensated for completing each study session with credit for their introductory psychology course. The T1 session was available for completion starting at the beginning of the semester and up until 30 days until the end of the semester. T1 completers who agreed to be contacted for T2 (n = 219 out of 407 who completed T1) were emailed a link to complete the second on-line session (T2) 25 days after T1 completion. The option to complete T2 remained available to T1 completers up until the end of the semester. The interval between T1 and T2 varied (M = 36.8 days; SD = 10.6; range 26–84 days). However, the large majority of the sample (90%) completed T2 within 50 days of T1.

2.2. Measures

Perceived Stress. The Perceived Stress Scale (PSS; Cohen et al., 1983) is a 10-item self-report measure that assesses the degree to which one perceives life events to be overwhelming, unpredictable, and out of one's control (e.g., "In the last month, how often have you found that

you could not cope with all things that you had to do?"). Participants rate how often each item pertained to them in the past month on 5-point scale (0 = *never* to 4 = *very often*), with higher scores indicating greater perceived stress. The PSS has demonstrated adequate psychometric properties (Cohen et al., 1983). In the present sample, the PSS exhibited adequate internal consistency at T1 ($\alpha = .84$) and T2 ($\alpha = .80$).

Uncertainty. The Intolerance of Uncertainty Scale (IUS; original French version: Freeston et al., 1994; English version: Buhr & Dugas, 2002) is a 27-item self-report measure that assesses beliefs about uncertainty and its consequences (e.g., "When it's time to act, uncertainty paralyses me."). Participants rate the degree to which each statement is characteristic of them on 5-point scale (1 = *Not at all characteristic of me* to a 5 = *Entirely characteristic of me*), with higher scores indicating greater intolerance of uncertainty. The English version of the IUS has demonstrated adequate psychometric properties, including excellent internal consistency, retest reliability over a five-week period, and construct validity (Buhr & Dugas, 2002).

Although some evidence supports models of the IUS that consist of more than two factors (e.g., Berenbaum, Bredemeier, & Thompson, 2008; Buhr & Dugas, 2002; Freeston et al., 1994), a review of factor analytic studies of the IUS suggests that the majority of evidence to date favors a two-factor model (see Birrell, Meares, Wilkinson, & Freeston, 2011). Sexton and Dugas (2009) used exploratory and confirmatory factor analysis to identify two IUS subfactors. Factor 1 represents beliefs that "uncertainty has negative behavioral and self-referent implications." Factor 2 represents beliefs that "uncertainty is unfair and spoils everything." These two factors have demonstrated high internal consistency and concurrent validity (Sexton & Dugas 2009). The two factors found by Sexton and Dugas (2009) directly map onto the two factors found in a 12-item short form of the IUS (Carleton, Norton, & Asmundson, 2007), labeled inhibitory

uncertainty (Sexton & Dugas, 2009, IUS Factor 1) and prospective uncertainty (Sexton & Dugas's, 2009, IUS Factor 2), respectively. Direct comparisons of the two versions of the IUS have led to conclusions that "overall, the clinicians and researchers can use either version of the IUS with confidence, due to their sound psychometric properties" (Khawaja & Yu, 2010, p. 97). Because the full 27-item version of the IUS was administered, extant recommendations that either the full-length or short form version is appropriate for use, and concerns of the practice of scoring only a subset of short form items when the parent scale was administered (Smith, McCarthy, & Anderson, 2000), we used the full-length IUS.[1] In the present sample, internal consistency for the IUS Total Score and subscale scores was excellent (α = .92 to 96).

Ambiguity. The Multiple Stimulus Types Ambiguity Tolerance-I (MSTATI; McLain, 1993) is a 22-item self-report measure that assesses one's perceived ability to tolerate stimuli and situations for which information is perceived as being insufficient, or open to multiple interpretations (e.g., "I would rather avoid solving a problem that must be viewed from several different perspectives"). Participants rate the degree to which they agree with each on 7-point scale (1 = *Strongly disagree* to 7 = *Strongly agree*), with higher scores indicating greater intolerance of ambiguity. The MSTATI has demonstrated adequate psychometric properties, including internal consistency and discriminant and convergent validity (McLain, 1993). In the present sample, the MSTATI demonstrated adequate internal consistency (α = .82).

Frustration. The Frustration Discomfort Scale (FDS; Harrington, 2005) is a 28-item self-report measure that assesses one's perceived capacity for withstanding frustration across four domains representing entitlement (e.g., "I can't stand having to wait for things I would like now"), discomfort intolerance (e.g., "I can't stand doing tasks that seem too difficult"), achievement (e.g., "I can't bear the frustration of not achieving my goals"), and emotional

intolerance (e.g., “I can’t bear disturbing feelings”). Participants rate the degree to which each statement is consistent with their own beliefs on a 5-point scale (1 = *Absent* to 5 = *Very Strong*), with higher scores indicating greater intolerance of frustration. The FDS has shown adequate psychometric properties, including internal consistency, construct validity, and discriminative validity in differentiating between undergraduate students and a clinical sample seeking treatment (Harrington, 2005). In the present sample, the FDS demonstrated excellent internal consistency ($\alpha = .96$).

Negative Emotion. The Distress Tolerance Scale (DTS; Simons & Gaher, 2005) is a 15-item self-report measure that assesses one’s perceived ability to withstand the distress associated with uncomfortable emotional experiences across the following four domains: tolerance (e.g., “I can’t handle feeling distressed or upset”), (2) appraisal (e.g., “Being distressed or upset is always a major ordeal for me”), (3) absorption (e.g., “When I feel distressed or upset, all I can think about is how bad I feel”), and (4) regulation (e.g., “When I feel distressed or upset, I must do something about it immediately”). Participants rate the degree to which each statement is consistent with their own beliefs on a 5-point scale (1 = *Strongly agree* to 5 = *Strongly disagree*). Although lower scores typically indicate greater intolerance of negative emotion, item values were reversed and summed for the present so that the direction of the scale was consistent with the other distress tolerance variables (i.e., higher scores indicate greater intolerance of negative emotion). The DTS has demonstrated adequate psychometric properties, including internal consistency, retest reliability over a 6-month period, and construct validity (Simons & Gaher, 2005). In the present sample, the DTS demonstrated excellent internal consistency ($\alpha = .94$).

Physical Discomfort. The Somatosensory Amplification Scale (SSAS; Barsky, Wyshak, Klerman, 1990) is a 10-item self-report measure that assesses the degree to which one

experiences somatic sensations as unpleasant and difficult to tolerate (e.g., "Even something minor, like an insect bite or a splinter, really bothers me"). Participants rate the degree to which each statement is generally characteristic of them on a 5-point scale (1 = *Not at all characteristic* to 5 = *Completely characteristic*), with higher scores indicating greater intolerance of physical discomfort. The SSAS has shown adequate psychometric properties, including internal consistency, convergent validity (Fergus & Valentiner 2010), and retest reliability over a 10-week period (Barsky et al. 1990). In the present sample, the DTS demonstrated adequate internal consistency ($\alpha = .82$).

3. Results

3.1. Preliminary Analyses

Descriptive statistics and bivariate correlations are presented in Table 1. As expected, all five of the T1 distress tolerance constructs were positively correlated with T2 perceived stress (*r*s from .21 to .45; *p*s < .001). Participants who completed both study sessions ($n = 135$) were compared to those who only participated in the T1 session ($n = 272$) on demographics (i.e., age, gender, race/ethnicity) and primary variables of interest measured at T1. Results revealed no significant differences between T1 completers and those who completed both T1 and T2 assessment sessions on the following variables: age, race/ethnicity, perceived stress, intolerance of ambiguity, intolerance of negative emotion, and intolerance of physical discomfort. However, the T2 sample consisted of significantly more women than the sample who only completed T1 (62% and 51%, respectively; $\chi^2 = 3.42$, $p = 0.03$). Additionally, participants who only completed T1, compared to those who also completed T2, reported significantly higher levels of intolerance of uncertainty ($t[405] = 2.23$, $p = .03$; $M = 62.45$, $SD = 23.42$, and $M = 57.11$, $SD = 20.96$, respectively) and intolerance of frustration ($t[405] = 2.37$, $p = .02$; $M = 76.38$, $SD = 21.37$, and M

= 71.08, *SD* = 21.54, respectively). Differences in intolerance of uncertainty and frustration were small in size (Cohen's *d* = 0.24 and 0.25, respectively).

3.2. Primary Analytic Model

Multiple linear regression analyses were used to examine the prospective relations among the five dimensions of distress tolerance at T1 and perceived stress at T2. The interval between time points was included as a covariate in the model to account for duration effects (i.e., session interval). Additionally, T1 perceived stress served as a covariate in the model. The maximum variance inflation factor (VIF) among the predictors was 2.30, well below conventional guidelines (>10; Cohen, Cohen, West, & Aiken, 2003) for indicating problems with multicollinearity. The predictor variables accounted for significant variance in T2 perceived stress (R^2 = .37, p < .001). As expected, T1 perceived stress was a positive significant predictor of T2 perceived stress after accounting for the interval between time points and the five DT constructs, p < .001 (see Table 2). Session interval was not a significant predictor of T2 perceived stress. T1 intolerance of uncertainty was the only distress tolerance construct to significantly predict T2 perceived stress after accounting for the interval between time points and the four other DT constructs (p = .02). The nature of the relation was positive with greater intolerance of uncertainty at T1 predicting greater perceived stress at T2 even after accounting for perceived stress at T1.

3.3. Post Hoc Analysis

Given that intolerance of uncertainty was the only dimension of distress tolerance that was a significant prospective predictor of perceived stress, we conducted a post-hoc follow-up analysis to better understand the nature of the prospective relationship between these constructs. Specifically, the two factors of intolerance of uncertainty described above (i.e., IU-Factor 1 and

IU-Factor 2; Sexton & Dugas, 2009) were simultaneously regressed on T2 perceived stress. The IU-Factor 1 subscale (uncertainty has negative behavioral and self-referent implications) was a positive significant predictor of T2 perceived stress (R^2 = .21, B = .23, β = .42, 95 CI = [0.07, 0.39], p = .004). The IU-Factor 2 subscale (uncertainty is unfair and spoils everything) was not a significant predictor of T2 perceived stress (B = .03, β = .04, 95 CI = [-0.17, 0.23], p = .78).

4. Discussion

Previous research has suggested the possibility that dimensions of distress tolerance may be important in understanding how perceived stress develops. However, given the cross-sectional nature of these previous studies, temporal inferences regarding the relations among the variables of interest could not be made. Additionally, previous research provided little guidance regarding the degree to which each dimension of distress tolerance provided unique variance, above and beyond other distress tolerance factors, in predicting perceived stress. To our knowledge, the present study is the first to address these temporal relations, as well as the first to examine these associations simultaneously to determine which dimensions of distress tolerance incrementally contribute to our understanding of perceived stress.

Consistent with previous research, at the bivariate level, each of the dimensions of distress tolerance was significantly associated with perceived stress at T1 and T2. The nature of the relations was positive; as distress intolerance increased for each dimension, so did perceived stress. However, only T1 intolerance of uncertainty accounted for unique variance in T2 perceived stress scores when accounting for the overlap among the dimensions of distress tolerance and T1 perceived stress. Large autoregressive effects can be expected when measuring constructs such as perceived stress over time, especially over a relatively short time; and thus, it

is notable that the prospective relation between intolerance of uncertainty and perceived stress remained significant even after accounting for T1 perceived stress.

Finding that intolerance of uncertainty was the only distress tolerance dimension that prospectively predicted perceived stress suggests that there is something specific to intolerance of uncertainty, relative to the other distress tolerance dimensions, that is particularly important for understanding changes in perceived stress across time. To better understand this prospective association, we conducted a post-hoc analysis simultaneously regressing the two subdimensions of intolerance of uncertainty on T2 perceived stress. The intolerance of uncertainty dimension representing uncertainty-related negative self-referent beliefs, as well as beliefs that uncertainty reduces one's ability to modulate distress to pursue goal-relevant behavior (i.e., IU-Factor 1) was a significant predictor of T2 perceived stress. However, the intolerance of uncertainty dimension representing beliefs that an uncertain future is unfair and distressing was not a significant predictor of T2 perceived stress.

One tenable explanation for this pattern of findings is that beliefs that one has a relative lack of ability to modulate distress in the face of uncertainty may result in an increase in perceived stress in uncertainty-related contexts, which in turn, increases cognitive load, thus making it more difficult to regulate distress in these situations. Consistent with this explanation, chronic perceived stress has been shown to impair the ability to regulate affective states (Holzel et al., 2010; Liston et al., 2009). Impairment in the ability to regulate distress might further support one's inhibitory uncertainty beliefs (e.g., "When I am uncertain, I can't function very well," Buhr & Dugas, 2002) and subsequently result in maintenance or exacerbation of perceived stress. Beliefs that uncertainty has negative behavioral and self-referent implications may be further maintained through avoidance behaviors that reduce exposure to opportunities that would

disconfirm those beliefs (e.g., worry, a cognitive avoidance strategy, and physical avoidance of contexts that trigger uncertainty-related beliefs both reduce physiological arousal in the short-term; Boswell, Thomson-Hollands, Farchione, & Barlow, 2013). Indeed, research has found that intolerance of uncertainty, and primarily a shortened version of IU-Factor 1, is associated with avoidance behaviors in response to aversive states (i.e., panic symptoms; Carleton, Fetzner, Hackl, & McEvoy, 2013). Future longitudinal research is needed to examine the possibility that avoidance behaviors contribute to the relation between intolerance of uncertainty and perceived stress.

Although the present study improves our understanding of temporal relations between dimensions of distress tolerance and perceived stress, study limitations must be acknowledged. In particular, relations among the study variables might have been inflated as a result of our monomethod assessment. Use of behavioral indicators of distress tolerance (e.g., Paced Auditory Serial Addition Task; Lejuez, Kahler, & Brown, 2003), especially intolerance of uncertainty (visual search task; Fergus et al., 2013) may be particularly useful to alleviate this concern in future research. As a matter of convenience (participants could complete both sessions within the same academic semester), a relatively short amount of time took place between the two assessment sessions (M = 36.8 days). Although a number of prospective studies of similar length, measuring related constructs, have been conducted in undergraduate samples (e.g., Hankin et al., 2004; Kassel et al., 2006; Schmidt et al., 1997), replication of studies results over a longer period of time is recommended to increase confidence in the reliability of findings (i.e., ensure temporal stability). Finally, replication of study results in general population and clinic samples (e.g., patients with emotional disorders; Carleton et al., 2012) is suggested to ensure generalizability of study results.

Results from the present study support a growing body of research suggesting intolerance of uncertainty as a risk factor for a wide variety of maladaptive psychological outcomes and a potentially important treatment target (Carleton et al., 2012). To date, there are a number of treatments that broadly address distress intolerance as one component of much larger treatment packages (e.g., dialectical behavior therapy [DBT; Linehan, 1993], acceptance and commitment therapy [ACT; Hayes, Strosahl, & Wilson, 1999], Unified Protocol [Barlow, Allen, & Choate, 2004]). Additionally, a brief treatment (6 sessions) has been developed that specifically focuses on distress tolerance and has been shown to be effective in significantly reducing depressive symptoms in an inpatient sample (Bornovalova, Gratz, Daughters, Hunt, & Lejuez, 2012). These treatments tend to use a variety of standard cognitive-behavioral techniques (e.g., exposure, cognitive restructuring, acceptance and mindfulness) without explicitly addressing intolerance of uncertainty (Einstein, 2014). Einstein (2014) suggests a number of techniques that may be helpful with two primary targets of intolerance of uncertainty that are believed to maintain emotional distress, a lack of clarity regarding uncertainty-related somatic sensations and beliefs related to the need for predictability. Interventions that emphasize intolerance of uncertainty-related specific treatment components (see Einstein, 2014) may increase the speed with which treatment gains are observed, thus decreasing the need for the use of broader treatment packages administered over long periods of time. The development of brief intolerance of uncertainty interventions may also prevent the progression of perceived stress into clinically significant pathology (Einstein, 2014). Future research extending our understanding of the link between intolerance of uncertainty and perceived stress will be important in the development of such interventions.

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Declaration of interest: The authors declare no conflicts of interest regarding this submission.

Footnote

[1]Because Carleton et al.'s (2007) 12 item short version of the IUS is used frequently, we repeated our primary analysis, substituting the 12 item total score for the 27 item total score. The magnitude of the intolerance of uncertainty effect was reduced from $\beta = .25$ ($p = .02$) to $\beta = .18$ ($p = .08$). Relations between all other predictors and the outcome variable were consistent with our initial analysis; statistically significant findings remained significant and nonsignificant findings were unchanged. Readers should keep in mind that the practice of using select items from a larger parent scale, administered in its entirety, has been criticized on the grounds that the disposed of items that come before and after those items that are retained may influence participant responding (Smith et al., 2000). As such, caution is warranted in drawing inferences from this finding, especially given the small degree of change in the magnitude of the effect in our relatively small sample.

Table 1

Descriptive Statistics and Correlations for Study Variables

Variables	1	2	3	4	5	6	7	8
1. Session interval	--							
2. T1 Perceived Stress	-.03	--						
3. T2 Perceived Stress	.04	.57***	--					
4. T1 Uncertainty	-.10	.59***	.45***	--				
5. T1 Ambiguity	.06	.47***	.21*	.32***	--			
6. T1 Frustration	-.05	.51***	.29***	.68***	.29***	--		
7. T1 Negative Emotion	-.04	.53***	.31***	.29***	.37***	.30***	--	
8. T1 Physical Discomfort	.04	.29***	.23**	.48***	.21*	.53***	.07	--
Means	36.84	18.10	16.58	57.11	81.00	71.08	39.72	25.10
Standard Deviations	10.60	7.14	6.68	20.96	14.78	21.54	14.00	7.47

Note. $N = 135$. T1 = Time 1; T2 = Time 2.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2

Hierarchical Multiple Regression Analysis Predicting T2 Perceived Stress

Predictor	B	β	95 CI	sr^2
Session interval	.05	.08	[-0.04, 0.14]	.006
T1 Perceived Stress	.47	.50***	[0.27, 0.66]	.117
T1 Uncertainty	.08	.25*	[0.01, 0.15]	.026
T1 Ambiguity	-.04	-.10	[-0.12, 0.03]	.007
T1 Frustration	-.04	-.14	[-0.11, 0.03]	.008
T1 Negative emotion	.02	.05	[-0.06, 0.10]	.002
T1 Physical discomfort	.05	.05	[-0.11, 0.20]	.001

Note. $N = 135$. T1 = Time 1; T2 = Time 2; Session interval = duration between T1 and T2.

***$p < .001$, *$p < .05$.

$R^2 = .37$***