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Domain-General and Domain-Specific Strategies for the Assessment of Distress Intolerance

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Abstract

Recent research has provided evidence that distress intolerance—the perceived inability to tolerate distressing states—varies based on the domain of distress (e.g., pain, anxiety). Although domain-specific assessment strategies may provide information targeted to specific disorders or maladaptive behaviors, domain-general measures have the potential to facilitate comparisons across studies, disorders, and populations. The current study evaluated the utilization of self-report measures of distress intolerance as domain-general measures by examining their association with indices of behavioral avoidance and substance craving. Two groups of participants ($N = 55$) were recruited including a substance-dependent group and a comparison group equated based on the presence of an affective disorder. Results provided support for the validity of domain-general measures for assessing distress intolerance across varied domains. The importance of both domain-general and domain-specific measurement of distress intolerance is discussed.

Keywords

distress intolerance; assessment; substance dependence; affective disorders

Distress intolerance (DI), the perceived inability to tolerate distressing states, is an important feature across psychological symptoms and disorders (see Leyro, Zvolensky, & Bernstein, 2010). DI¹ is hypothesized to increase the aversiveness of distress by amplifying its intensity, thus motivating the use of avoidance-based coping strategies that are associated with negative affective consequences and often take the form of maladaptive behaviors. DI has been associated with a range of disorders such as anxiety (Schmidt, Richey, Cromer, & Buckner, 2007; Schmidt, Richey, & Fitzpatrick, 2006), addictive (Brown, Lejuez, Kahler, Strong, & Zvolensky, 2005; Sirota et al., 2010), eating (Anestis, Selby, Fink, & Joiner, 2007; Corstorphine, Mountford, Tomlinson, Waller, & Meyer, 2007), and personality disorders (Daughters, Sargeant, Bornovalova, Gratz, & Lejuez, 2008) as well as maladaptive behaviors such as self-injury (Nock & Mendes, 2008), substance use (Buckner, Keough, &

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¹In this manuscript, we use the term “distress intolerance.” This construct has commonly been referred to in the literature as “distress tolerance.” Here, we refer to the inverse of distress tolerance in order to facilitate ease of interpretation of comparison with similar and related constructs (e.g., anxiety sensitivity, emotional avoidance) for which higher values are associated with greater pathology. This is consistent with recent applications of this construct (e.g., Gratz & Roemer, 2004; Schmidt et al., 2006).

Schmidt, 2007), dysfunctional eating behaviors (Anestis et al., 2007), and amplified response to somatic symptoms (Bonn-Miller, Zvolensky, & Bernstein, 2009).

Despite the importance of DI, the field has yet to cohere around a gold standard of measurement of this construct. Inconsistency in the utilization of measures and the conceptualization of distress has largely prevented the ability to compare across studies and populations. DI may be conceptualized both in terms of general domains of distress (e.g., emotional distress) as well as specific domains (e.g., frustration or anxiety). For example, in panic disorder, individuals often display a general intolerance of emotional and somatic distress as well as particular intolerance toward anxiety symptoms and sensations. Measures of DI have utilized both distress domain-general (i.e., intolerance of distress broadly defined) and distress domain-specific (i.e., intolerance of a specific type of distress) approaches. However, there is little empirical guidance for the relative validity of these approaches.

Recent evidence has found support for variation in DI based on the domain of distress. For example, McHugh et al. (in press) found strong correlations among measures of emotional DI and among measures of somatic DI, but not between emotional and somatic measures. Similarly, clinical variables have been associated with intolerance of certain distress domains, but not others. In one study, early lapse among smokers was associated with emotional, and not somatic measures (Brown, Lejuez, Kahler, & Strong, 2002). Likewise, a nicotine withdrawal specific DI measure exhibited stronger associations with clinical indices of smoking relative to general somatic and general emotional DI measures (Sirota et al., 2010). Such findings imply that the use of a distress domain-specific approach may yield greater specificity to relevant clinical outcomes. However, the utilization of domain-specific measures exclusively has the potential to create further divergence of the study of DI across disorders and to fail to capture commonalities (e.g., the prediction of dropout from treatment; Daughters et al., 2005). A measure that can be validly applied across distress domains (i.e., capturing distress generally) would be of particular benefit to comparison across studies, and for the consideration of more general disruptions in functioning. At this time, the ability of DI measures to apply across distress domains has not been evaluated and thus it is unclear whether any existing measures are able to capture a general intolerance factor.

The purpose of the current study was to evaluate DI self-report measures as domain-general assessment tools in substance use and affective disorders relative to both distress domain-specific behavioral persistence measures and drug craving. Drug craving was selected as an important clinical index of DI. Motivation for use may be particularly elevated in the context of distress among those with greater DI. Thus, craving in response to distress provides a clinically-meaningful index of DI reflecting a response to distress that further motivates behavior consistent with avoidance. A number of important links between DI and substance use disorders have been identified (Brandon et al., 2003; Brown et al., 2002; Hajek, 1991; O’Cleirigh, Ironson, & Smits, 2007; Zvolensky, Feldner, Eifert, & Brown, 2001; Zvolensky et al., 2009). Given that DI is also linked to affective disorders, we controlled for the presence of affective disturbance to understand the unique contribution of substance abuse.

The specific aims of this investigation are as follows. First, whether DI can be conceptualized as a domain-general or a domain-specific construct was evaluated through the administration of three behavioral measures, each capturing a different domain of distress. Second, associations between self-report measures and behavioral persistence and substance craving were evaluated. Finally, differences between individuals diagnosed with substance dependence and a comparison sample matched based on the presence of an affective disorder were evaluated. We hypothesized that (a) DI would emerge as a domain-

specific construct as assessed by the intraclass correlation among behavioral persistence measures, (b) self-report DI measures would be adequately associated with measures to support use as domain-general measures, (c) DI would be associated with self-reported craving, and (d) substance dependence status would be associated DI controlling for the impact of affective disorders.

Methods

Participants

Participants were recruited from three sources for this study. The substance dependence group was recruited from an urban outpatient methadone maintenance clinic. Criteria for eligibility included a current diagnosis of substance dependence for any illicit drug. The comparison group was recruited from community advertisements and from an urban outpatient treatment center specializing in the treatment of anxiety and related disorders. We aimed to equate groups with respect to the proportion diagnoses with an affective disorder and gender. Subsamples with no current or past Axis I disorder, as well as those meeting criteria for a current anxiety or unipolar mood disorder, all of whom had no history of substance abuse or dependence were recruited. History of bipolar or psychotic disorders, no previous experience with a computer, and inability to read or provide informed consent were exclusion criteria.

A total of 57 participants provided informed consent and were enrolled in the trial. Two participants were discontinued prior to completion of study procedures and one participant did not complete the breath holding task. This participant was included in all possible analyses. Of the 55 participants included in analyses, 25 were in the substance dependence group and 30 were in the comparison group, including subsamples of 19 participants with an affective disorder and 11 with no psychological disorder. See Table 1 for sample characteristics.

Procedures

After providing informed consent, all participants completed a breath alcohol test a digital breathalyzer to confirm absence of recent alcohol use. Then a diagnostic interview was conducted to assess inclusion/exclusion criteria, after which participants completed a battery of self-report questionnaires. Following completion of these measures, participants were read a standardized script introducing the remaining study procedures. Participants were informed that they would complete a series of challenging tasks and that if they were among the top performers on the tasks that they would be entered into a raffle to win a \$40 cash prize. This was used as an incentive for persisting at the study tasks, consistent with previous studies that have used these inductions (Brown et al., 2002). Participants then completed the behavioral persistence tasks. Task order was counterbalanced to minimize ordering effects. Finally, participants were provided with a standard debriefing and compensated for their participation.

Measures

Participants completed both interviewer-administered and self-report measures. The Structured Clinical Interview for *DSM* Disorders (SCID; First, Spitzer, Gibbon, & Williams, 1996) was administered by trained raters and was used to evaluate inclusion/exclusion criteria. Four self-report indices of DI and one self-report measure of craving were also administered. Craving was assessed via self-report using a 1–10 Likert-scale asking participants to rate the degree to which they had an urge for drugs at that moment. The Anxiety Sensitivity Index (ASI; Peterson & Reiss, 1992) is a 16-item measure of the sensitivity to symptoms of anxiety. The ASI has demonstrated strong internal consistency (α

= .82–.91; Peterson & Reiss, 1992). The Discomfort Intolerance Scale (DIS) is a 7-item measure intolerance of somatic symptoms, which has yielded good psychometric properties (e.g., $\alpha = .72$ –.91 for subscales; Schmidt, et al., 2006). The Distress Tolerance Scale (DTS; Simons & Gaher, 2005) is a 15-item measure of distress intolerance, which has demonstrated strong reliability and validity (e.g., $\alpha = .89$; Simons & Gaher, 2005). The Frustration Discomfort Scale (FDS; Harrington, 2005) is a 35-item measure of perceived ability to tolerate frustration; studies support strong internal consistency reliability and validity (e.g., $\alpha = .84$ –.88 for subscales; Harrington, 2005).

Given the inconsistency of use and lack of established gold standard in the self-report measurement of DI, a recent study examined the concordance among these four self-report measures of DI to identify the items across measures that best captured the core DI construct (McHugh & Otto, 2010). Among the items of these four measures, 10 items were consistently found to exhibit the strongest associations with the latent DI factor (i.e., $r > .60$). The authors proposed the utilization of these 10 items as a new scale that may provide consistency to the study of DI by building upon research done in measure development to date, while utilizing only the best performing items in terms of concordance with the core construct. The resultant Distress Intolerance Index (DII; McHugh & Otto, 2010) demonstrated strong internal consistency reliability ($\alpha = .92$). The items of this scale provide a good representation of the type of items included across the other DI scales (e.g., “I can’t handle feeling distressed or upset” from the DTS). Scores from each of these 10 items, as administered in the format of the original scales, were standardized and combined to form a composite score for the purpose of this analysis.

Behavioral Persistence Measures

Three behavioral persistence were administered that assessed frustration, pain, and respiratory discomfort, respectively. For each of these tasks, time to discontinuation was used as an index of behavioral persistence. Frustration was induced using the Computerized Mirror Tracing Persistence Task (MTPT-C; Strong et al., 2003). This task is commonly used in the DI literature as a measure of persistence at a frustrating task. Participants were instructed to trace shapes on a computer with the mouse as if they were tracing a mirror-image of the shape (in other words the feedback is reversed). When the participant makes an error or pauses, the task restarts and a loud buzzing noise occurs. Participants are instructed to persist as long as possible, but are given the opportunity to discontinue at any time.

Pain was induced using the cold pressor test. The cold pressor test is widely applied as a measure of pain tolerance. In this study, participants were asked to submerge their non-dominant hand in a container of water maintained at a temperature of 0–2 degrees Celsius for as long as possible (with a maximum of 90 seconds). Breath holding was used to induce respiratory distress. Participants were instructed to exhale and then to hold their breath for as long as possible. This procedure was conducted once, followed by a 60 second break, and then repeated. The longer duration was used as the data point for discontinuation consistent with previous investigations of tolerance of respiratory discomfort (Zvolensky et al., 2001).

Statistical Analysis

To evaluate the hypothesis that behavioral indices of DI would not correlate sufficiently to justify consideration as a homogeneous construct, an intraclass correlation was calculated. A statistically significant intraclass correlation in the magnitude of a small effect size or lower ($r < .23$) according to Cohen’s standards (Cohen, 1988) was used as a criterion for supporting the heterogeneity of these constructs. Correlations between self-report measures and the behavioral persistence tasks were calculated to evaluate the degree of agreement between these methods. Correlations in the medium effect size range or larger ($r > .24$) were

interpreted as support for the utilization of self-report measures as domain-general measures. Additionally, correlations between these measures and baseline (i.e., pre-induction) drug craving were calculated. Finally, individuals with and without substance dependence were compared with respect to the self-report DI measure using independent samples *t*-tests.

Results

All primary measures were evaluated for normality and outlier values; no violations of normality or skewness were noted. Results of the manipulation check suggested successful elicitation of frustration following the MTPT-C as assessed by a paired-sample *t*-test ($t[54] = p < .001$). The intraclass correlation approached .00 (95% CI = $-.14, .17, ns$) and was not statistically significant, implying that the behavioral persistence measures could not be collapsed into a composite score reflecting a homogeneous construct. Table 2 includes the full and partial correlations among the three persistence tasks.

Correlations between self-report measures and the behavioral persistence tasks and substance craving are presented in Table 3. The DII exhibited significant correlations in the magnitude of medium effect size with both the cold pressor test ($r = -.33, p < .05$) and the MTPT-C ($r = -.31, p < .05$). A small and non-significant correlation with the breath holding task was noted ($r = -.14, ns$). The ASI and FDS also demonstrated strong correlations across behavioral tasks with *r*s ranging from $-.29$ to $-.43$ and $-.30$ to $-.38$, respectively. There were no significant correlations between the DIS or DTS and any behavioral task.

In evaluating current craving in the substance dependent group ($n = 25$), strong and statistically significant associations between current craving and DI were found for the DII ($r = -.45, p < .05$), the FDS ($r = -.42, p < .05$), and the DTS ($r = -.41, p < .05$), but not the ASI or DIS.

Results indicated a subtle trend level effect for the DII ($t[53] = 1.72, p = .09, d = 0.47$), characterized by greater DII scores in the SD group in the magnitude of a medium effect size. This effect was significant for the ASI ($t[53] = 3.86, p < .001, d = 1.03$) and the FDS ($t[53] = 4.04, p < .001, d = 1.09$), but not the DIS ($t[53] = 1.26, p = .21, d = 0.34$) or the DTS ($t[53] = -0.42, p = .68, d = -0.11$).

Discussion

This study evaluated the utilization of self-report measures as distress domain-general measures of DI that could capture variance across domain-specific behavioral measures. These findings contribute to a growing body of evidence suggesting that DI has distress domain-specific components (McHugh et al., in press; Sirota et al., 2010), and add to prior investigations by administering behavioral measures assessing several domains of distress to facilitate evaluation of their covariance. Results of an intraclass correlation evaluating overlap among domains of distress yielded an association close to zero when considering all three domains.

Of the available self-report measures, the DII—a domain-general measure comprised of items from self-report DI measures—and the FDS appear to best capture variance across both domains of behavioral persistence and current drug craving. Given that the FDS also was particularly elevated in the substance dependent group (see below), it is possible that frustration is a particularly relevant type of distress for this group. The evaluation of the use of the DII and FDS as domain-general measures that capture other clinical variables (e.g., self-injury) is needed.

When evaluating group differences between those with a substance dependence diagnosis and a group matched based on presence of an affective disorder, the substance dependent group demonstrated greater DI across measures with effect sizes ranging from small to large. This finding suggests that there may be greater elevations in DI among those with substance dependence, beyond the contribution of affective disorders and provides further support that the ASI, FDS, and DII may best represent DI more broadly relative to other self-report measures.

Given the general nature of many of the items of the DII (e.g., I'll do anything to stop feeling distressed or upset. I can't handle feeling distressed or upset.), this measure could be easily modified for use as a brief domain-specific measure. For example, altering instructions to ask participants to define distress in a particular way (e.g., pain) may allow for a domain-specific modification of a domain-general measure while allowing consistency of measure items. Although the ASI and FDS exhibited somewhat stronger associations with the behavioral measures and the FDS also exhibited strong agreement with current craving, the potential for the new DI measure to be modified in this way makes it a particularly promising candidate for the domain-general and domain-specific measurement of DI. Testing of the reliability and validity of this strategy will be necessary to determine its ultimate utility.

This study has several limitations. First, given the sample size, the ability to evaluate higher-order factors associated with DI was not possible and the ability to detect significant associations, particularly in the substance-dependent subsample was limited. Second, this study was cross-sectional in nature and thus the ability of these measures to predict response to distress and clinical symptoms prospectively and the stability of these associations over time is unknown. Third, the evaluation of domain-specificity is necessarily limited by the domains selected for evaluation. We chose domains linked to previous applications of DI. Nonetheless, the evaluation of other domains of distress, such as anxiety, and their links to disorders and problem behaviors is an important area for further study.

In summary, distress intolerance has long been identified as a core process across a range of psychological disorders and symptoms (Leyro et al., 2010); however, the study of this construct has been limited by inconsistency in its measurement. This study provides support for a domain-specific conceptualization of DI, but also the utility of domain-general measurement strategies for capturing DI across domains. The use of domain-general strategies will facilitate the understanding of DI as a transdiagnostic variable and comparison across studies. Given the increased attention to transdiagnostic treatments (McHugh, Murray, & Barlow, 2009), the evaluation of DI as a factor that can be applied across behaviors and states is of particular utility to the field. Future study of measurement strategies is needed to bring a greater consistency of measurement and definition of DI to better advance the understanding of this important construct. Moreover, studies of the association between DI and other relevant affective variables (e.g., emotion regulation, experiential avoidance) and evaluation of this construct in children and adolescents (to evaluate developmental factors) and relative to important group differences (e.g., sex differences) will be of particular importance.

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Table 1

Sample Characteristics

Variable	Group		
	SD (n = 25)	AC (n = 30)	Total (N = 55)
age	41.9 (SD = 10.0)	35.5 (SD = 10.4)	36.8 (SD = 11.2)
% female	20%	23%	22%
% Caucasian	92%	80%	87%
% Hispanic/Latino	4%	3%	4%
% affective disorder	68%	63%	66%

Note. SUD = substance use disorder, AC = affective comparison

Table 2

Correlations (Partial Correlations) among DI Behavioral Measures

Measure	CP	BH	MT
CP	1.00		
BH	.25 (.18)	1.00	
MT	.32* (.28*)	.27* (.21)	1.00

Note. CP = cold pressor test; BH = breath holding; MT = Mirror Tracing Persistence Task;

* $p < .05$

Table 3

Correlations between Self-report Measures and Outcomes

Outcome	Self-Report Measure				
	DII	ASI	DIS	DTS	FDS
Cold Pressor	-.33*	-.29*	-.24	.24	-.32*
Breath Holding	-.14	-.43**	.15	.05	-.30*
MTPT-C	-.31*	-.35**	-.10	.23	-.38**
Drug Craving ^a	-.45*	-.15	-.15	.41*	-.42*

Note. DII = Distress Intolerance Index; ASI = Anxiety Sensitivity Index; DIS = Discomfort Intolerance Scale; DTS = Distress Tolerance Scale; FDS = Frustration Discomfort Scale; MTPT-C = Computerized Mirror Tracing Persistence Task.

^a *n* for craving correlations = 25.

* $p < .05$

** $p < .01$.