

The Distress Tolerance Scale: Development and Validation of a Self-Report Measure¹

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This paper presents the development and validation of a self-report measure of emotional distress tolerance. The initial scale was developed in Study 1 (N = 642). The scale evinced expected relations with other measures of affective functioning, supporting its convergent and discriminant validity. Criterion validity was supported by significant negative associations with substance use coping but not enhancement motives. Study 2 (N = 823), extended the results of the initial factor analysis, indicating that the Distress Tolerance Scale (DTS) contains four first-order factors, which are indicators of a single second-order general distress tolerance factor. Study 2 indicated that the DTS was stable over a 6-month interval and the DTS was prospectively associated with alcohol problems among men. In both studies, males reported significantly higher levels of distress tolerance than women.

KEY WORDS: distress tolerance; personality; alcohol; marijuana; affect; borderline personality disorder.

Distress tolerance is defined as the capacity to experience and withstand negative psychological states. Distress may be the result of cognitive or physical processes but manifests in an emotional state often characterized by action tendencies to alleviate the emotional experience. Distress tolerance is considered a meta-emotion construct that consists of one's evaluations and expectations of experiencing negative emotional states in respect to (1) tolerability and aversiveness, (2) appraisal and acceptability, (3) tendency to absorb attention and disrupt functioning, and (4) regulation of emotions, specifically, the consequent strength of action tendencies

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to either avoid or immediately attenuate the experience. First, individuals with low distress *tolerance* are expected to report distress as being unbearable and that they cannot handle being distressed or upset. Second, individual *appraisal* of being distressed is expected to reflect a lack of acceptance of distress, being ashamed of being distressed, and perceiving one's coping abilities as inferior to others. Third, emotional *regulation* of individuals with low distress tolerance is expected to be characterized by great efforts to avoid negative emotions and utilizing rapid means of alleviating the negative emotions they do experience. Fourth, if unable to alleviate negative emotions, individuals with low distress tolerance are expected to report being relatively consumed by the experience, indicating that their attention is *absorbed* by the presence of distressing emotions and that their functioning is significantly disrupted by the experience of negative emotions.

Distress tolerance is a higher-order construct that is manifest in diverse aspects of regulation of affect and behavior. For example, Gross (1998) identified five points at which emotion may be regulated: (1) selection of the situation, (2) modification of the situation, (3) deployment of attention, (4) change of cognitions, and (5) modulation of response. The first four of these are antecedent-focused regulation. Individual differences in distress tolerance may manifest in antecedent processes by tendencies to approach/avoid potentially distressing situations, strength and type of efforts to modify situations to make them less distressing (e.g., coping styles), tendency to have attention *absorbed* by focus on distressing aspects of the situation or to try to avoid attending to distressing aspects of a situation, and altering meaning of the situation (e.g., catastrophizing/minimizing). The fifth, response-focused regulation incorporates modulation of behavioral, experiential, and physiological responses, each of which may be increased or decreased as a function of distress tolerance. For example, individuals with poor distress tolerance may try to suppress expression of emotion or use substances to dampen emotional responses. More broadly, affect regulation includes both the regulation of affect as well as the regulation of behavior by affective processes (Campos, Campos, & Barrett, 1989; Carver, Lawrence, & Scheier, 1996). One's ability to tolerate psychological discomfort (i.e., distress tolerance) may thus influence both the types of strategies one uses to manage affect as well as moderating affective regulatory functions on behavior.

Distress tolerance is a common construct in research on affect dysregulation. For example, Linehan's Dialectical Behavior Therapy (DBT) model indicates that individuals with borderline personality disorder have low distress tolerance (Linehan, 1993). Within Linehan's biosocial model, low distress tolerance is hypothesized to develop from transactions between the individual bio-behavior system and the social environment. Low distress *tolerance* (e.g., perceiving distress as unbearable) is hypothesized to contribute to the observed affect dysregulation by increasing use of impulsive behaviors to alleviate distress. That is, distress tolerance is expected to influence affect *regulation* styles. In addition, the inability to accept distress as a component of life is hypothesized to exacerbate

suffering. Thus, distress tolerance is posited to result in individual differences in the *appraisal* of distress, which in turn may increase the perceived intensity and aversiveness of negative emotions. Subsequently, a primary component of treatment is increasing distress tolerance (Linehan, 1993). Being able to tolerate temporary psychological discomfort and not avoiding difficult emotions has important adaptive value when the experience of such emotions can lead to healthy behavioral change (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Along these lines, a considerable body of research related to Acceptance and Commitment Therapy (ACT) examines the deleterious effects of avoiding or suppressing negative emotional experience and the benefits of accepting and experiencing negative emotions (Blackledge & Hayes, 2001).

The construct of distress tolerance has also been invoked in relation to substance use. Alcohol and other substance use may be considered, in part, an emotion-focused rather than problem-focused coping strategy. Emotion-focused coping is characterized by rapid emotional change in contrast to problem-focused strategies that require greater cognitive resources and result in more gradual emotional change (Lazarus, 1991). An emotion-focused coping strategy, such as alcohol or other substance use, that can result in rapid alleviation of negative emotions can be especially attractive to individuals low in distress tolerance. Between 10 and 25% of adults who consume alcohol, do so partially in order to cope with negative affect (Cooper, Russell, Skinner, Frone, & Mudar, 1992). Consistent use of alcohol to reduce negative affect may suggest that these individuals have difficulties tolerating negative emotions. Using alcohol or marijuana to cope with negative affect is a robust predictor of problematic substance use and it exerts its effect indirectly through consumption as well as directly to problems, over and above consumption (Carey & Correia, 1997; Carpenter & Hasin, 1999; Simons, Gaher, Correia, Hansen, & Christopher, in press). In addition, low distress tolerance has also been linked to relapse following smoking cessation (Brown, Lejuez, Kahler, & Strong, 2002). For example, Brown and colleagues (2002) reported that smokers who had sustained previous quit attempts for at least 3 months persisted longer in mental arithmetic tasks, breath holding, and CO₂ inhalation relative to smokers who had never sustained a quit attempt. College students represent a population at risk for the development of substance-related problems (Substance Abuse and Mental Health Services Administration, 2002; Wechsler, Lee, Kuo, & Lee, 2000). Understanding the relationship between distress tolerance and substance use among college students can provide additional information about the development of substance-related problems.

Despite considerable research and theory that invokes the construct of distress tolerance, a self-report measure specifically designed to measure it has not yet been developed. Measurement has generally focused on either potentially related broader constructs such as experiential avoidance (Forsyth, Parker, & Finlay, 2003; Hayes et al., 2004) or has utilized experimental paradigms that measure how long individuals persist with either physically or psychologically stressful tasks (Brown

et al., 2002). In the emotional intelligence literature, mood acceptance has been assessed, however, this was not specific to emotional distress (Mayer & Stevens, 1994).

Experimental measures of distress tolerance have focused on persistence in stressful tasks. Two primary stressors have been utilized, physical and psychological. Physical discomfort has been induced in several ways including, the cold-pressor task (i.e., immersing the hand in ice water), breath hold duration, and 20% carbon dioxide-enriched air inhalation (Brown et al., 2002; Compton, Charuvastra, & Ling, 2001; Zvolensky, Feldner, Eifert, & Brown, 2001). Similarly, the Paced Auditory Serial Addition Task (PASAT-C) examines persistence in a psychologically stressful task (Lejuez, Kahler, & Brown, 2003). In each of these paradigms, level of distress tolerance is measured by how long the individual persists in the task that induces the physical or psychological discomfort. These paradigms have the advantage of an objectively measurable outcome which is not dependent upon self-report. They have the disadvantage of being potentially influenced by the participants' motivation to persist in the task, which may be a function of things other than distress tolerance (e.g., experiment demand characteristics or the reinforcement value of incentives). Additionally, the physical stress paradigms focus on the ability to tolerate pain or physical discomfort, which may not reflect an individual's tolerance for emotional discomfort (e.g., anxiety, sadness, etc.). For example, research utilizing the cold-pressor paradigm has indicated significant associations between pain tolerance and other pain indices (e.g., pain threshold and intensity) but not other affective measures (e.g., depression and anxiety) [Geisser, Robinson, & Pickren, 1992]. Thus, pain tolerance or other physical discomfort paradigms may not be an optimal method of measuring tolerance for general emotional distress. An additional potential concern is the differentiation of distress tolerance, as measured by these experimental paradigms, from task persistence. Research has indicated that task persistence (mirror tracing) predicted smoking cessation at 12-month follow-up independent of other variables, including substance use level and negative affect (Brandon et al., 2003). The experimental approaches to measuring distress tolerance appear to have elements of both distress tolerance and task persistence. Finally, experimental protocols may not be practical for survey research with large sample sizes.

To our knowledge, there is not a self-report measure of distress tolerance *per se*. However, the Acceptance and Action Questionnaire (AAQ; Hayes, 1996; Hayes et al., 2004) measures acceptance/avoidance of experiencing negative affect and may thus be a closely related scale. Forsyth, Parker, and Finlay (2003) examined this measure in respect to substance abuse among a sample of veterans. The results of this study indicated that experiential avoidance was not associated with severity of alcohol or drug problems at intake but avoidance of negative affect did decrease over the course of treatment. However, the heterogeneous content of the AAQ and its focus on experiential avoidance may differentiate it from distress tolerance.

The current paper presents the development of a self-report measure of distress tolerance, examining its psychometric properties, associations with other measures of affect, and criterion validity in respect to substance use variables. We conducted two studies to develop the Distress Tolerance Scale (DTS). In Study 1, we report the development of the scale, examine its psychometric properties, associations with other measures of affective functioning and meta-emotion, and associations with substance use coping motives. We examined three measures of affective functioning (i.e., positive and negative affectivity and affect lability) and three meta-emotion measures (i.e., mood acceptance and typicality and mood regulation expectancies). In Study 2, we report the test–retest reliability, conduct a confirmatory factor analysis of the scale, and examine prospective associations between the DTS and alcohol-related problems.

STUDY 1

Method

Participants

Participants were 642 students recruited from two state universities; all participated in research for partial fulfillment of course requirements. Participants were recruited through announcements in classes. Women made up 70% of the sample. The sample ranged in age from 18 to 26 ($M = 19.90$, $SD = 1.64$); 89% were White, 7% Black, 1% Asian, 1% multiracial, and 2% other ethnicities. Portions of this dataset were used in another study (Simons et al., in press).

Measures

Distress Tolerance. Sixteen items were generated based on theoretical relevance and review of related scales. Based on the conceptual analysis in the introduction, four types of items were developed reflecting perceived ability to *tolerate* emotional distress (e.g., I can't handle feeling distressed or upset), subjective *appraisal* of distress (e.g., My feelings of distress or being upset are not acceptable), attention being *absorbed* by negative emotions (e.g., When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels), and *regulation* efforts to alleviate distress (e.g., When I feel distressed or upset I must do something about it immediately). Items were rated on a 5-point scale: (5) *Strongly disagree*, (4) *Mildly disagree* (3) *Agree and disagree equally*, (2) *Mildly agree*, (1) *Strongly agree*. High scores represent high distress tolerance.

Positive and negative affectivity were assessed by the General Temperament Survey (Clark & Watson, 1990). Positive affectivity (27 items) is a temperament dimension characterized by active engagement with the environment, being energetic and enthusiastic, and a tendency toward positive affect across situations

(Clark & Watson, 1999). The positive affectivity scale has demonstrated good internal consistency ($\alpha = .84$) and criterion validity in previous research (Watson, Clark, McIntyre, & Hamaker, 1992). Negative affectivity represents the tendency to experience frequent and intense negative emotion and to have difficulty adjusting to everyday frustrations (Watson et al., 1992). A shortened 20-item version of the scale was used for negative affectivity and both measures used a 4-point rating scale (1 = *false*, 2 = *mostly false*, 3 = *mostly true*, 4 = *true*) [Stice, Myers, & Brown, 1998]. Previous research with the adapted scale indicates good internal consistency ($\alpha = .95$) and temporal stability over a 1-month interval ($r = .83$).

Affect lability was assessed by the 54-item Affective Lability Scale (Harvey, Greenberg, & Serper, 1989). Affect lability refers to the frequency, speed, and range of changes in affective states. Items are rated on 4-point anchored rating scales that range from (1) *very unresponsive* to (4) *very responsive*. We used participants' total scores in this study ($\alpha = .95$).

Negative Mood Regulation Expectancies. The Negative Mood Regulation Expectancies questionnaire (NMR; Catanzaro & Mearns, 1990) is a 30-item scale assessing an individual's beliefs about his/her ability to regulate negative affect. All items have the stem "When I'm upset, I believe that . . ." Sample expectancies include: "I can find a way to relax" and "I won't be able to get myself to do anything about it." Items are rated on 5-point scales ranging from (1) *strong disagreement* to (5) *strong agreement*. Coefficient alphas have ranged from .86 to .92 across samples. Test-retest correlations range from .67 (men) to .78 (women) over a 6–8-week interval.

Mood Acceptance and Typicality. Two 6-item scales assessed mood acceptance (e.g., There's no need to change it) and mood typicality (e.g., I feel this mood often) [Mayer & Stevens, 1994]. Individuals are instructed to answer each question in regards to their current mood. The measure is thus not specific to distress. Items are rated on 5-point scales (1 = *definitely does not describe my mood*, 5 = *definitely describes my mood*). Previous research indicates these meta-emotion scales are internally consistent ($\alpha s \geq .75$) and demonstrate expected relations with other measures of affective functioning (e.g., alexithymia and positive affect).

Lifetime alcohol and marijuana use frequency were each assessed by 7-point scales (0 = *never used in my life*, 6 = *more than 300 days*).

Alcohol and Marijuana Use Motives. Parallel items assessed coping (e.g., I drink to forget my worries; I use marijuana to forget my worries) and enhancement motives (e.g., I drink because I like the feeling) for alcohol (Cooper, 1994; Simons, Correia, Carey, & Borsari, 1998) and marijuana (Simons et al., 1998). The coping scales are 4 items and the enhancement scales are 5 items, rated on a 5-point rating scale (1 = *almost never/never*, 5 = *almost always/always*). These scales are internally consistent ($\alpha s = .89-.92$ [marijuana], $.88-.90$ [alcohol]) and exhibit expected relations with alcohol and marijuana use and problems (Cooper, 1994; Simons et al., 1998).

Procedure

Participants completed questionnaires on-line under the supervision of a research assistant. Participants had adequate space to protect their privacy. Previous research supports the reliability of Internet based assessment of substance use and affect (Christopher & Simons, 2002; Miller et al., 2002). Participants did not place their name on the questionnaires, thus ensuring their anonymity. All participants provided written informed consent prior to participation.

Results

We conducted a factor analysis on the 16-items of the DTS using Stata 8.2 (StataCorp, 2003). Communalities were estimated by the squared multiple correlation coefficients. The eigenvalue > 1 rule and the scree plot both suggested a single factor structure (Floyd & Widaman, 1995). The eigenvalues for the first four extracted factors were 5.53, .90, .69, and .36. We thus retained a single factor. All but two items loaded strongly on the factor (i.e., $\geq .46$). Item 6 ($-.12$) and item 15 (.34) did not and were dropped from the scale (dropping them simultaneously and sequentially yielded the same conclusions). The remaining 14 items were then reanalyzed. The eigenvalues for the first four extracted factors were 5.39, .71, .54, and .29. A one-factor solution accounted for 88% of the variance. Table I reports the item means, standard deviations, and factor loadings from the one-factor rotated solution. The alpha coefficient for the 14-item scale was .89. Women ($M = 3.09$, $SD = 0.75$) reported less distress tolerance than men ($M = 3.25$, $SD = 0.75$; $t(640) = -2.45$, $p = .015$); a small effect, Cohen's $d = .21$.

Correlations between the DTS and the other measures are presented in Table II. As expected, the DTS is negatively associated with measures of affective distress (i.e., negative affectivity, $r = -.59$) and dysregulation (i.e., lability, $r = -.51$) and positively correlated with positive affectivity ($r = .26$). In addition, the DTS was positively associated with mood regulation expectancies ($r = .54$) and was more strongly associated with mood acceptance ($r = .47$) than mood typicality ($r = .17$). The DTS was negatively associated with both alcohol ($r = -.23$) and marijuana ($r = -.20$) coping motives among participants reporting using the respective drugs at least once in their lifetime. In contrast, associations with enhancement motives were not significant. Thus, the pattern and strength of correlations indicate good convergent, discriminant, and criterion validity.

Discussion

Results from Study 1 suggest that the 14-item distress tolerance scale is an internally consistent, single factor measure. It evidences expected correlations with other measures of affect yet has good discriminant validity. Specifically, it

Table I. Study 1 Item Mean, Standard Deviation, Factor Loadings for the DTS

	<i>M</i>	<i>SD</i>	Factor loading 1	Factor loading 2
1. Feeling distressed or upset is unbearable to me.	3.38	1.17	.57	.56
2. When I feel distressed or upset, all I can think about is how bad I feel.	3.24	1.19	.64	.65
3. I can't handle feeling distressed or upset.	3.67	1.18	.69	.70
4. My feelings of distress are so intense that they completely take over.	4.06	1.15	.73	.74
5. There's nothing worse than feeling distressed or upset.	3.17	1.33	.60	.59
6. My feelings of distress or being upset are just an acceptable part of life.	2.54	1.14	-.12	—
7. I can tolerate being distressed or upset as well as most people.	2.22	1.09	-.49	-.49
8. My feelings of distress or being upset are not acceptable.	3.79	1.07	.49	.48
9. I'll do anything to avoid feeling distressed or upset.	3.02	1.13	.46	.45
10. Other people seem to be able to tolerate feeling distressed or upset better than I can.	3.54	1.18	.63	.64
11. Being distressed or upset is always a major ordeal for me.	3.77	1.17	.75	.75
12. I am ashamed of myself when I feel distressed or upset.	3.85	1.18	.62	.62
13. My feelings of distress or being upset scare me.	4.00	1.12	.69	.69
14. I'll do anything to stop feeling distressed or upset.	3.30	1.24	.53	.51
15. When I feel distressed or upset, I must do something about it immediately.	2.99	1.11	.34	—
16. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.	3.38	1.20	.70	.70

Note. *N* = 633 due to missing data on some items. Factor loading 1 and 2 refer to the results of the first and second factor analyses in Study 1.

Table II. Study 1 Correlation Matrix

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. DTS	1.00										
2. GTSN	-.59	1.00									
3. GTSP	.26	-.20	1.00								
4. ALS	-.52	.66	-.21	1.00							
5. Acc.	.47	-.48	.23	-.40	1.00						
6. Typ	.17	-.25	.04	-.20	.44	1.00					
7. NMR	.54	-.58	.46	-.48	.46	.19	1.00				
8. A-cop (<i>n</i> = 598)	-.23	.31	-.13	.31	-.18	-.09	-.21	1.00			
9. A-enh (<i>n</i> = 598)	-.08	.12	-.02	.19	.02	-.06	-.06	.42	1.00		
10. Mj-cop (<i>n</i> = 324)	-.20	.13	-.15	.17	-.14	-.04	-.18	.30	.17	1.00	
11. Mj-enh (<i>n</i> = 324)	-.08	.02	-.13	.06	.00	.01	-.06	.16	.36	.57	1.00

Note. *N* = 642, $r \geq .08$, $p < .05$, $r \geq .13$, $p < .001$. For the alcohol items (*n* = 598) $r > .08$, $p < .05$. For marijuana items (*n* = 324) $r \geq .11$, $p < .05$. DTS = Distress Tolerance Scale, GTSN = Negative affectivity, GTSP: Positive affectivity, ALS: Affect Lability Scale, Acc.: Mood acceptance, Typ.: Mood typicality, NMR: Negative Mood Regulation, A: Alcohol, Mj: Marijuana, Enh: Enhancement motives, Cop: Coping Motives.

shared 26% of the variance with affect lability. Thus, the construct is associated with the speed and range of changes in affective states but is not isomorphic with a labile or reactive mood. Similarly, it shared 35% of the variance with negative affectivity, indicating that distress tolerance is not simply a tendency to experience frequent and intense negative emotion. Finally, it shared 29% of the variance with negative mood regulation expectancies. Thus, distress tolerance is not simply a function of perceived ability to regulate negative affect. Though this pattern of associations is encouraging, it should also be noted that they are within the range of associations sometimes observed in multimeasure assessments of affect. For example, Watson and Clark (1992) reported an average correlation of .74 for several measures of depression, .63 for measures of anxiety, and .48 for measures of anger. However, these authors also reported an average discriminant correlation of .57 between measures of depression and anxiety, comparable to the strength of association between the DTS and the measures discussed above. Thus, our results provide good preliminary evidence of the discriminant validity of the scale. Men reported more distress tolerance than women, suggesting gender differences either in tolerating emotional distress or in self-reporting tolerance for emotional distress. Alternatively, this could be due to the covariation with negative affectivity. We explore this further in Study 2. Finally, distress tolerance was negatively associated with endorsement of alcohol and marijuana coping but not enhancement motives, suggesting that low distress tolerance is associated with an increased propensity to use substances for the purpose of alleviating negative affect. These relationships provide initial support for the construct validity of the DTS.

STUDY 2

A second study was conducted to test a confirmatory factor analysis (CFA) model of the DTS to verify results of the EFA from Study 1. In addition, Study 2 employs a 6-month prospective design to evaluate the test-retest reliability of the measure. Furthermore, the study evaluates the criterion validity of the DTS by examining prospective associations with alcohol-related problems. The DTS is expected to be prospectively associated with alcohol-related problems while controlling for baseline problems, use frequency during the assessment interval, and negative affectivity.

Method

Participants

Participants were 823 students recruited from a state university. Participants received financial compensation for their time. Women made up 67% of the sample. The sample ranged in age from 18 to 26 ($M = 19.90$, $SD = 1.60$); 94%

were White, 1% Black, 1% Asian, 1% Native American, 2% multiracial, and 1% other ethnicities. Participants were recruited through e-mail, fliers on campus, and announcements in classes. All participants provided written informed consent prior to participation. This is a subset of data from a previous study (Simons & Carey, 2005). The previous manuscript does not include analyses of the DTS.

Measures

Distress Tolerance. The DTS developed in Study 1 was used. High scores represent higher tolerance for emotional distress.

Alcohol use in the past 6 months was assessed with a 9-point anchored rating scale: (0) *no use* to (8) *more than once a day*.

Alcohol-related problems in the past 6 months were assessed by the Rutgers' Alcohol Problem Index (RAPI). The scale consists of 23 items rated on a 5-point scale ranging from (1) *never* to (5) *more than 10 times*. This scale is internally consistent ($\alpha s \geq .85$) and has evinced expected relations with alcohol use in previous research (White & Labouvie, 1989).

Negative affectivity was assessed by the General Temperament Survey (Clark & Watson, 1990). See Study 1 for description of the scale.

Procedure

Participants completed questionnaires on-line under the supervision of a research assistant. Participants had adequate space to protect their privacy and provided informed consent for participation. Previous research supports the reliability of Internet based assessment of affect (Christopher & Simons, 2002) and alcohol use (Miller et al., 2002). Responses were identified by a user-defined code, thus ensuring their anonymity. Participants received \$10 for the baseline assessment and \$15 for a 6-month follow-up assessment. Average time interval was 216 days ($SD = 70.78$). Seventy-eight percent of participants returned for a 6-month follow-up and 95% were successfully matched to their T1 data ($n = 613$). Attrition analyses indicated that participants who completed the T2 assessment ($n = 613$) compared to those who did not ($n = 210$) tended to be older ($M = 19.97$, $SD = 1.58$ vs. $M = 19.68$, $SD = 1.61$; $t(821) = -2.29$, $p = .022$) and drank less frequently ($M = 2.87$, $SD = 1.56$ vs. $M = 3.15$, $SD = 1.57$; $t(817) = 2.27$, $p = .023$). There was no difference in alcohol problems ($M = 31.86$, $SD = 10.97$ vs. $M = 32.43$, $SD = 10.29$; $t(817) = 0.66$, $p = .508$). There were no significant differences on the other measures. The n varies across analyses due to missing data.

Results

We first conducted a confirmatory factor analysis (CFA) on the 14-item DTS using the T1 data to provide replication of the results from Study 1. The CFA

model was estimated using LISREL 8.54 (Jöreskog & Sörbom, 2001) with covariance matrices as input using maximum likelihood estimation. Incremental fit indexes (i.e., NNFI and CFI) greater than .95 represent acceptable fit (Hu & Bentler, 1999). SRMR values less than .08 and RMSEA values less than .06–.08 indicate acceptable fit (Browne & Cudeck, 1993; Hu & Bentler, 1999). The initial single factor model did not fit the data well $\chi^2(77, N = 817) = 855.71$, $p < .001$; NNFI = .92; CFI = .93; RMSEA = 0.12; SRMR = 0.068. We thus randomly divided the sample into an estimation and validation group and tested and replicated a hypothesized model with a single second-order factor predicting four first-order factors [*Tolerance* (3 items), *Appraisal* (6 items), *Absorption* (3 items), and *Regulation* (3 items)], see Table III. For this multifactor model, we reintroduced item 15 in order to have three items on the Regulation scale. This structure was hypothesized based upon the conceptual analysis in the introduction and the four types of items developed for the initial scale (i.e., perceived ability

Table III. Item Mean, Standard Deviation, and Factor Loadings for the DTS for Study 2

	<i>M (SD)</i>	Factor loading
Tolerance		.89
1. Feeling distressed or upset is unbearable to me.	3.00 (1.15)	.61
3. I can't handle feeling distressed or upset.	3.44 (1.24)	.76
5. There's nothing worse than feeling distressed or upset.	3.22 (1.35)	.67
Appraisal		.90
7. I can tolerate being distressed or upset as well as most people.	3.84 (1.06)	–.53
8. My feelings of distress or being upset are not acceptable.	3.85 (1.04)	.51
10. Other people seem to be able to tolerate feeling distressed or upset better than I can.	3.52 (1.19)	.67
11. Being distressed or upset is always a major ordeal for me.	3.80 (1.15)	.79
12. I am ashamed of myself when I feel distressed or upset.	3.73 (1.24)	.64
13. My feelings of distress or being upset scare me.	3.99 (1.10)	.80
Absorption		.95
2. When I feel distressed or upset, all I can think about is how bad I feel.	2.91 (1.17)	.72
4. My feelings of distress are so intense that they completely take over.	3.99 (1.21)	.74
16. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.	3.38 (1.21)	.76
Regulation		.63
9. I'll do anything to avoid feeling distressed or upset.	3.17 (1.20)	.71
14. I'll do anything to stop feeling distressed or upset.	3.51 (1.17)	.86
15. When I feel distressed or upset, I must do something about it immediately.	3.11 (1.14)	.45

Note. $N = 817$. Item factor loadings are standardized loadings for the first-order factors. For the Tolerance, Appraisal, Absorption, and Regulation factors, standardized loadings on the higher-order Distress Tolerance general factor are reported.

to *tolerate* emotional distress, subjective *appraisal* of distress, attention being *absorbed* by negative emotions, and *regulation* efforts to alleviate distress) as well as examining the results of the previous CFA model. For Group 1, the 15-item single factor model did not fit well $\chi^2(90, N = 397) = 505.34, p < .001$; NNFI = .91; CFI = .92; RMSEA = 0.11; SRMR = 0.073. The hypothesized hierarchical four-factor model fit significantly better $\chi^2(87, N = 397) = 300.81, p < .001$; NNFI = .95; CFI = .96; RMSEA = 0.078; SRMR = 0.057, ($\Delta\chi^2(3, N = 397) = 204.53, p < .001$). Results for Group 2 closely replicated Group 1 and supported the hypothesized hierarchical four-factor model. The single factor model did not fit well $\chi^2(90, N = 420) = 563.21, p < .001$; NNFI = .92; CFI = .93; RMSEA = 0.12; SRMR = 0.072. The hypothesized hierarchical four-factor model fit significantly better $\chi^2(87, N = 420) = 328.18, p < .001$; NNFI = .96; CFI = .96; RMSEA = 0.080; SRMR = 0.059, ($\Delta\chi^2(3, N = 420) = 235.03, p < .001$). The factor loadings for the final model on the full sample are presented in Table III; $\chi^2(87, N = 817) = 517.39, p < .001$; NNFI = .96; CFI = .96; RMSEA = 0.077; SRMR = 0.053. The alpha coefficient for the second-order factor (i.e., the mean of the first-order factors) was .82 (T1)–.85 (T2). Alpha coefficients for the first-order factors were Tolerance .72 (T1)–.73 (T2), Appraisal .82 (T1)–.84 (T2), Absorption .78 (T1)–.77 (T2), and Regulation .70 (T1)–.74 (T2).

Scale means and correlations are presented in Table IV. For the remainder of the paper we focus on the second-order scale. Test–retest reliability for the second-order scale over a 6-month interval was good (intra-class $r = .61$). Men reported more distress tolerance than women (T1 $M = 3.34, SD = 0.78$ vs. $M = 3.10, SD = 0.74, t(819) = -4.30, p < .001$; Cohen's $d = .32$). We conducted a regression analysis to partial out the effect of negative affectivity to determine if the observed gender difference on the DTS might be explained by shared variance

Table IV. Study 2 Scale Means and Correlations

	<i>M (SD)</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Gender	—	1.00								
2. DTS-G	3.43 (0.76)	.14	1.00							
3. Tolerance	3.22 (1.00)	.13	.85	1.00						
4. Appraisal	3.79 (0.82)	.07	.82	.58	1.00					
5. Absorption	3.43 (1.00)	.14	.85	.65	.67	1.00				
6. Regulation	3.26 (0.92)	.11	.72	.49	.45	.41	1.00			
7. Negative Affectivity	2.29 (0.64)	-.13	-.57	-.40	-.58	-.61	-.25	1.00		
8. T1 RAPI	32.54 (10.96)	.13	-.23	-.20	-.19	-.17	-.19	.16	1.00	
9. T2 RAPI	31.14 (9.29)	.09	-.17	-.16	-.12	-.12	-.14	.12	.70	1.00
10. T2 use frequency	3.22 (1.26)	.15	.01	.01	.04	.07	-.08	-.06	.48	.59

Note. $N = 817$ for the DTS and negative affectivity inter-correlations, $r \geq .07$, $p < .05$; $r > .13$, $p < .0001$. Correlations with the RAPI and use frequency are presented for the alcohol analysis sample ($N = 543$), $r \geq .12$, $p < .01$. DTS-G: the higher-order scale formed from the means of the first-order subscales. Gender is coded Men = 1, Women = 0.

between gender and negative affectivity. However, the effect of gender remained significant ($b = .12, p = .013$) after partialling out negative affectivity, suggesting that this difference is not merely due to differences in level of negative affectivity.

We examined the association between the DTS and alcohol problems among the 543 participants who reported using alcohol between the T1 and T2 assessments. Means and correlations are presented in Table IV. The DTS was not associated with T2 alcohol use frequency ($r = .01, p = .74$) but was associated with use-related problems (T1 $r = -.23, p < .0001$; T2 $r = -.17, p = .0001$). The RAPI scores were moderately positively skewed. A log transformation of the RAPI scores was used for the regression analysis.

We regressed T2 RAPI scores on gender, use frequency during past 6 months (T2), T1 RAPI scores, negative affectivity (T1), and the DTS (T1). The analysis examines prospective associations between distress tolerance and T2 alcohol-related problems while controlling for use frequency during the follow-up period and negative affectivity and alcohol-related problems at the baseline assessment (see Table V). At Step 1, gender, T2 use frequency, T1 RAPI scores, and negative affectivity were entered, $F(4, 543) = 190.41, p < .0001, R^2 = .58$. At Step 2, T1 DTS was entered, $F(1, 537) = 0.60, p = 0.44, (\Delta R^2 = .00)$. At Step 3 an interaction between gender and T1 DTS was entered, $F(1, 536) = 6.38, p = .012, (\Delta R^2 = .01, \text{model } R^2 = .59)$. A negative affectivity* gender interaction was also tested but was not significant ($p = .905$) and was not included in the final model. Examining the simple slopes indicated that the DTS was significantly associated

Table V. Regression Analysis of T2 Alcohol Problems

Variable	<i>B</i>	<i>SE B</i>	<i>p</i> -value	β
Step 1				
Gender	−0.01	0.02	.441	−.02
T1 Alcohol problems	0.48	0.03	<.001	.53
T2 Alcohol use	0.07	0.01	<.001	.35
Negative affectivity	0.02	0.01	.090	.05
Step 2				
Gender	−0.01	0.02	.494	−.02
T1 Alcohol problems	0.47	0.03	<.001	.53
T2 Alcohol use	0.07	0.01	<.001	.35
Negative affectivity	0.01	0.01	.305	.03
DTS	−0.01	0.01	.438	−.03
Step 3				
Gender	0.16	0.07	.021	.29
T1 Alcohol problems	0.46	0.03	<.001	.52
T2 Alcohol use	0.07	0.01	<.001	.36
Negative affectivity	0.01	0.01	.261	.04
DTS	0.01	0.01	.511	.03
Gender × DTS	−0.05	0.02	.012	−.33

Note. $N = 543$. Step 1 $R^2 = .58$, Step 2 $\Delta R^2 = .00$, Step 3 $\Delta R^2 = .01$, Full model $R^2 = .59, F(6, 536) = 129.28, p < .0001$. Gender is coded Men = 1, Women = 0.

with problems for men but not women. The simple slope of alcohol problems on the DTS was $b = .01$, $p = .511$ (women) and $b = -.04$, $p = .012$ (men).

We conducted a final exploratory analysis using stepwise regression to examine relationships between the four first-order factors and T2 RAPI scores. The stepwise analysis began with a full model, locking in gender, use frequency during the past 6 months (T2), T1 RAPI scores, and negative affectivity (T1). Based upon the results of the analysis of the general distress tolerance factor above, the T1 DTS first-order factors and each of their gender interactions were included. At each step, the distress tolerance terms were evaluated to be either removed or entered into the model. The procedure, thus, alternates between backward elimination and forward selection. The criterion for terms entering the model were p -values less than or equal to .10. The criterion for removing the terms from the model were p -values greater than or equal to .15. This procedure, though not guaranteeing the “best” model, provides a parsimonious, empirically determined model of the relevant sub-factors. This procedure resulted in the *Regulation* factor ($b = .02$, $p = .085$) and its gender interaction ($b = -.05$, $p = .003$) being retained in the model, $F(6, 536) = 129.97$, $p < .001$, $R^2 = .59$. The simple slope of alcohol problems on the *Regulation* factor was $b = .02$, $p = .085$ (women) and $b = -.03$, $p = .021$ (men).

Discussion

Results from Study 2 were congruent with Study 1, indicating a single higher-order distress tolerance factor. However, the CFA revealed a more complex structure of four first-order factors: Tolerance, Appraisal, Absorption, and Regulation. This factor structure was replicated in two random samples of the data. For the current study, analyses were primarily focused on the single higher-order factor. Test–retest reliability over a 6-month interval was good. Consistent with the findings of Study 1, men reported higher levels of distress tolerance than women. This difference remained significant after partialling out the effect of negative affectivity, suggesting that the observed difference is not simply due to men reporting lower negative affectivity. Distress tolerance exhibited relatively small but significant associations with alcohol-related problems but was not associated with use frequency. Thus, the association between distress tolerance and problems cannot be accounted for solely by the level of alcohol consumption. This is consistent with past research indicating stronger associations between psychological variables (e.g., impulsivity) and problematic use whereas socioenvironmental variables (e.g., social norms) are often better predictors of more normative use (Glantz, Weinberg, Miner, & Collier, 1999; Simons, 2003). Using substances to alleviate psychological discomfort may result in use behavior that is unpredictable, not conform well to other contingencies (e.g., drinking at inappropriate times of the day in response to negative affect), and thus have greater potential of causing conflict with environmental demands.

Finally, in addition to the mean difference in DTS scores across gender, the results of the regression analysis indicated that the association between alcohol-related problems and distress tolerance was stronger for men than women. Specifically, distress tolerance prospectively predicted alcohol-related problems after controlling for negative affectivity and problems at baseline and use frequency during the follow-up interval among men but not women. This is consistent with previous research indicating that, relative to women, men are more likely to report using alcohol for coping with negative affect (Rutledge & Sher, 2001). This suggests that men who have low tolerance for emotional distress are more likely to experience alcohol-related problems. Although this was a small effect, it is notable in that the reduced model (controlling for negative affectivity, use frequency, and T1 problems) accounted for 58% of the variance. Results of the stepwise analysis indicated that, of the first-order factors, the *Regulation* factor was the primary factor associated with alcohol-related problems.

General Discussion

This article presents the development of a self-report measure of distress tolerance, evaluates its psychometric properties, and provides initial support for its construct validity. Results of both Study 1 and Study 2 indicated the presence of a general distress tolerance factor. However, the CFA analysis in Study 2 detected a more complex structure consisting of four first-order factors (Tolerance, Appraisal, Absorption, and Regulation). This structure was replicated in random estimation and validation samples of the data. We thus present the 15-item scale with a single second-order general distress tolerance factor and four first-order factors as the final structure of the scale. The internal consistency of the higher-order scale was good, while the lower-order scales exhibited adequate though generally lower internal consistency. Results of Study 2 indicate that the DTS is a temporally stable measure over a 6-month interval. For the current study, we focused on the higher-order distress tolerance factor. This is consistent with the organizing theoretical rationale for the research and both Study 1 and Study 2 provide comparable measures of this. The existence of a reliable lower-order structure will be beneficial for studies using latent variable models, as the 15-item scale offers four indicators of the higher-order distress tolerance construct.

Results from both studies indicate that men reported higher degrees of distress tolerance than women. Study 2 demonstrated that this difference remained significant after partialling out negative affectivity, suggesting that this difference is not simply due to characteristic differences in reported negative affect. Further research is needed to examine alternative potential sources (e.g., social desirability, affect intensity) of this difference. Study 1 provided initial evidence for the convergent and discriminant validity of the scale. Distress tolerance demonstrated moderate negative associations with measures of affect dysregulation and positive

associations with an index of positive affectivity. In respect to meta-emotion measures, it evidenced moderate positive associations with a measure of general mood acceptance and mood regulation expectancies but was markedly less associated with a measure of mood typicality. Furthermore, the pattern of correlations with substance use motives provides evidence of criterion validity. As expected, distress tolerance was negatively associated with alcohol and marijuana coping motives (e.g., I drink to forget my worries; I use marijuana because it helps me when I feel depressed or nervous) but not associated with enhancement motives (e.g., I drink to have fun). Finally, Study 2 indicated significant prospective associations between the DTS and alcohol-related problems among men while controlling for negative affectivity. Furthermore, a stepwise analysis of the first-order factors indicated that the *Regulation* factor was the primary predictor of alcohol-related problems. Thus, the pattern of associations across studies provides promising evidence of its convergent, discriminant, and criterion validity.

A valid self-report measure of distress tolerance is useful in several research endeavors. For example, it could be used in treatment outcome research for borderline personality disorder. One target of Linehan's (1993) DBT model is increasing distress tolerance, yet there are few instruments available to assess change in this domain. Likewise, results of the present study, in addition to previous research on smoking (Brown et al., 2002) suggest that low levels of distress tolerance may pose a liability for developing substance use problems or relapsing following treatment. Further research on this issue is warranted and may benefit from the use of multiple methods of assessment. Assessing tolerance for different domains of distress (e.g., physical discomfort, pain, psychological stress, dysphoria) utilizing different methods of assessment (e.g., experimental paradigms, self-report measures) can increase understanding of the construct and its role in substance use.

Several limitations of the studies should be noted. First, the samples were composed of relatively well-adjusted college students. The extent to which this measure will be a reliable and valid indicator in clinical samples is uncertain. Further research on the scale's ability to differentiate groups that are theoretically expected to exhibit low distress tolerance (e.g., individuals with borderline personality disorder) is necessary to provide additional evidence of construct validity. Second, the samples were predominantly white and the extent to which the results generalize to other populations is uncertain. Third, evidence for the validity of the scale was limited to examining associations with other general measures of affective functioning and substance use variables. Research examining the relationship between this self-report measure, the more established experimental paradigms for assessing distress tolerance, and the AAQ (Hayes et al., 2004) is needed. In addition, understanding of the construct of distress tolerance can be further advanced by examining associations with potentially related constructs such as anxiety sensitivity and affect intensity.

Anxiety sensitivity refers to beliefs about the consequences of the experience of anxiety (Reiss, Peterson, Gursky, & McNally, 1986). Individuals with

high degrees of anxiety sensitivity believe that anxiety symptoms themselves will cause or signify impending illness, embarrassment, and/or cause additional anxiety (Reiss et al., 1986). Thus, the anxiety symptoms themselves are interpreted as having negative consequences and are feared. Anxiety sensitivity appears to be a construct that may be related to distress tolerance though with a more specific focus on anxiety symptoms rather than a range of distress that may include sadness, disappointment, frustration, and other forms of negative affect. Future research may benefit from exploring associations between these constructs. Affect intensity has been identified as a theoretical precursor to the development of low distress tolerance. Specifically, Linehan (1993) suggests that individuals may be biologically predisposed to experience more intense emotions and have heightened emotional reactivity. This may in turn lead to habitual avoidance of and marked efforts to inhibit the experience of emotional distress, which may interfere with the development of more adaptive approaches to managing and accepting distress as a common, though potentially difficult, component of life. Both the DTS and the Affect Intensity Measure (AIM; Larsen, 1985; Larsen & Diener, 1987) include items related to the intensity of emotional experience. However, the scales differ in that the AIM assesses intensity of both positive and negative emotion and focuses more on the experience of the emotion. In contrast, the DTS focuses only on distress and includes items related to the regulation of emotion, acceptance of distressing emotions, and expectations of ability to tolerate and function adequately when distressed. Future research is needed to examine the discriminant validity of these constructs and to examine this hypothesized functional relationship between affect intensity and the development of distress tolerance. Research employing multi-trait multi-method analyses is needed to provide further knowledge of the convergent and discriminant validity of self-report and behavioral measures of distress tolerance and other related constructs.

Despite the construct of distress tolerance being invoked in diverse theoretical models of psychopathology (e.g., borderline personality disorder, substance abuse), measurement of distress tolerance has received a limited range of research, focusing primarily on experimental paradigms. The Distress Tolerance Scale represents a psychometrically sound assessment option for assessing this construct via self-report.

APPENDIX: DTS SCALE

Directions: Think of times that you feel distressed or upset. Select the item from the menu that best describes your beliefs about feeling distressed or upset.

1. Strongly agree
2. Mildly agree
3. Agree and disagree equally
4. Mildly disagree
5. Strongly disagree

	Scale
1. Feeling distressed or upset is unbearable to me.	Tolerance
2. When I feel distressed or upset, all I can think about is how bad I feel.	Absorption
3. I can't handle feeling distressed or upset.	Tolerance
4. My feelings of distress are so intense that they completely take over.	Absorption
5. There's nothing worse than feeling distressed or upset.	Tolerance
6. I can tolerate being distressed or upset as well as most people.	Appraisal
7. My feelings of distress or being upset are not acceptable.	Appraisal
8. I'll do anything to avoid feeling distressed or upset.	Regulation
9. Other people seem to be able to tolerate feeling distressed or upset better than I can.	Appraisal
10. Being distressed or upset is always a major ordeal for me.	Appraisal
11. I am ashamed of myself when I feel distressed or upset.	Appraisal
12. My feelings of distress or being upset scare me.	Appraisal
13. I'll do anything to stop feeling distressed or upset.	Regulation
14. When I feel distressed or upset, I must do something about it immediately.	Regulation
15. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.	Absorption

Scoring: Item 6 is reverse scored. Subscale scores are the mean of the items. The higher-order DTS is formed from the mean of the four subscales.

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