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Distress Tolerance as a Moderator of Mindfulness-based Relapse Prevention Effects on  
Alcohol and Other Drug Use Outcomes

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**Abstract**

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Distress tolerance refers to the degree to which an individual is able to withstand negative psychological and/or physical states. Empirical literature has indicated that lower distress tolerance is associated with a number of negative alcohol and drug (AOD) use outcomes and psychopathology. Mindfulness meditation focuses on enhancing affect regulation, and may be particularly beneficial for individuals with lower distress tolerance. This secondary analysis tested whether distress tolerance for negative psychological states moderated treatment effects on AOD outcomes in an initial efficacy trial of mindfulness-based relapse prevention (MBRP). It was hypothesized that participants with lower distress tolerance would report fewer AOD use days over the 4-month follow-up if they received MBRP versus treatment as usual (TAU). Participants ( $N=168$ ) in the parent

RCT were recruited from a private, nonprofit agency providing inpatient and outpatient care for individuals with AOD-use disorders. Assessments of 60-day frequency of AOD use, as measured by the Timeline Followback, were conducted at baseline, immediately postintervention, and 2 months and 4 months following the intervention. Distress tolerance, as measured by the Distress Tolerance Scale, was assessed at baseline.

Findings confirmed the hypothesized time x treatment x distress tolerance interaction, and thereby indicated that participants with lower distress tolerance who received MBRP treatment versus TAU experienced a greater curvilinear decrease in AOD use days during the follow-up. Findings suggest that distress tolerance is a clinically relevant client characteristic to consider in matching participants to aftercare treatment and that MBRP may be particularly helpful for individuals with lower distress tolerance.

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## Distress Tolerance as a Moderator of Mindfulness-based Relapse Prevention Effects on Alcohol and Other Drug Use Outcomes

Alcohol and other drug (AOD) use disorders have been considered “chronic relapsing conditions” (Connors, Maisto, & Donovan, 1996; Dixon, McNary, & Lehman, 1998). One review estimated that 40% to 60% of patients treated for AOD dependence return to active AOD use within one year following termination of treatment (McLellan, Lewis, O’Brien, & Kleber, 2000). Given these high relapse rates, understanding predictors of relapse is a priority.

In Marlatt’s (1978) study of common relapse predictors, negative affect emerged as the most common precipitant of a lapse, or initial use of AOD after a period of abstinence. Studies continue to show a strong link between negative affect and relapse (e.g., Hodgins, el Guebaly, & Armstrong, 1995; Litman, Stapleton, Oppenheim, Peleg, & Jackson, 1983; Shiffman, Paty, Gnys, Kassel, & Hickcox, 1996). In fact, Baker and colleagues (2004) suggested that escape or avoidance of negative affect is the chief motive for use and subsequent dependence because AOD use offers negative reinforcement by providing relief from negative affective states. Thus, the ability to tolerate psychological and physical distress may be essential for achieving and maintaining abstinence from AOD.

### *The Role of Distress Tolerance in Relapse*

Distress tolerance has typically been measured using behavioral tasks designed to mimic the physical and psychological stresses experienced during withdrawal. Distress tolerance has been associated with various types and patterns of substance use, including history of smoking cessation (Brown, Lejuez, Kahler, & Strong, 2002), smoking lapse

and relapse (Brandon et al., 2003; Brandon, Vidrine, & Litvin, 2007; Brown et al., 2009), days till relapse for pathological gambling (Daughters, Lejuez, Kahler, Strong, & Brown, 2005a), and abstinence attempts from AOD (Daughters et al., 2005b). Across these various addictive behaviors, the role of distress tolerance has been very similar. Specifically, greater distress tolerance predicts longer periods of abstinence and lower risks of lapse and relapse. Taken together, these findings indicate that being able to tolerate psychological and physical distress may be a crucial skill for achieving and maintaining abstinence from AOD.

Given the important role of distress tolerance, measurement issues of this construct have received increasing attention in the literature (McHugh et al., 2011; Zvolensky, Leyro, Vujanovic, & Bernstein, 2010). As cited above, research on AOD relapse has primarily featured behavioral tasks to assess distress tolerance. Among the available self-report measures, only the Distress Tolerance Scale (DTS; Simons & Gaher, 2005) was developed specifically to examine the relationship between distress tolerance and AOD use. The DTS comprises a single, second-order general distress tolerance factor with four first-order indicators (ability to tolerate emotional distress, subjective appraisal of distress, regulation efforts to alleviate distress, attention being absorbed by negative emotions; Simons & Gaher, 2005). Although this measure has evinced good reliability and predictive validity, it has been used with primarily nonclinical samples, such as college students and non-treatment-seeking community members (e.g., Buckner, Keough, & Schmidt, 2007; Howell, Leyro, Hogan, Buckner, & Zvolensky, 2010; Zvolensky et al., 2009). Therefore, research is warranted to examine the reliability, validity and clinical utility of the DTS in a clinical sample of individuals with AOD-use disorders.

### *Distress tolerance and MBRP*

Marlatt and colleagues (Bowen, Chawla, & Marlatt, 2010) developed and evaluated mindfulness-based relapse prevention (MBRP), a manual-guided, group-based, outpatient intervention for problematic AOD use. This program is based on the theoretical and empirical support for the effectiveness of mindfulness meditation in the treatment of chronic pain (MBSR; Kabat-Zinn, 1990) and depression (MBCT; Segal, 2002). MBRP has integrated traditional cognitive-behavioral relapse prevention techniques (Marlatt & Gordon, 1985) with mindfulness meditation to help individuals: 1) to develop awareness and acceptance of thoughts, feelings, and sensations, particularly those involving urges to use AOD, and 2) to utilize these skills as a coping strategy in the face of high-risk situations, such as interpersonal conflicts that elicit negative affect (Witkiewitz, Marlatt, & Walker, 2005). An initial randomized controlled trial of MBRP supported the efficacy and feasibility of the treatment (Bowen et al., 2009). MBRP was compared to treatment as usual (TAU), a program largely based on 12-step principles and process-oriented groups. Results indicated that, relative to TAU participants, MBRP participants significantly decreased AOD use and craving, and increased their acceptance and ability to act with awareness during the four months following treatment (Bowen et al., 2009).

The practice of mindfulness meditation is a helpful tool in promoting awareness and acceptance of psychological and physiological reactions to negative affect and AOD withdrawal. One of the primary tenets of mindfulness meditation is that the adoption of a curious and accepting stance in the face of unpleasant and distressing experiences changes the meaning of these experiences, thereby increasing distress tolerance (Bishop

and colleagues, 2004). Indeed, mindfulness-based interventions are designed to address acceptance and affect tolerance among people with AOD-use disorders, which may make them particularly beneficial for individuals with low distress tolerance.

A few studies to date have tested this hypothesis. For example, Brown and colleagues (2008) examined a distress tolerance treatment (i.e., combined exposure, meditation and acceptance and commitment therapy) for smokers with an early lapse history. Findings indicated that this treatment enabled participants, who were previously unable to quit smoking for more than 72 hours, to achieve a median of 24 days of continuous abstinence and 40.5 days of non-continuous abstinence. Additionally, studies testing the efficacy of dialectical behavior therapy (DBT)--a treatment that incorporates mindfulness activities to increase distress tolerance--in treating AOD-use disorders have collectively shown that DBT reduces emotion intensity and substance-use cravings as well as AOD use (Axelrod, Perepletchikova, Holtzman, & Sinha, 2011; Linehan, Schmidt, Dimeff, Craft, Kanter, & Comtois, 1999; Rizvi, Dimeff, Skutch, Carroll, & Linehan, 2011). Taken together, these studies indicate that a mindfulness-based approach may be particularly beneficial for those with low distress tolerance. However, studies to date have focused on smokers or individuals with co-occurring borderline personality disorders. The generalizability of these findings in a more general population with AOD-use disorders has not been examined.

#### *Current Study Aim and Hypotheses*

To build on the research literature to date, this study evaluated the basic psychometric properties of the DTS in a clinical sample of people with AOD-use disorders. Regarding concurrent validity, mindfulness theory suggests that being able to

observe and approach psychological distress with acceptance is associated with affect tolerance (Bishop et al., 2004). It was therefore hypothesized that greater mindfulness would be associated with greater distress tolerance (Dimeff & Linehan, 2008). To understand the potential clinical utility of the DTS within a clinical population, we also tested whether distress tolerance at baseline moderated treatment effects on AOD outcomes over the 4-month follow-up in the context of an initial efficacy trial of MBRP. Specifically, we hypothesized that MBRP participants with lower baseline distress tolerance would report greater reductions in AOD use days during the follow-up period than TAU participants and MBRP participants with higher baseline distress tolerance.

## METHOD

### *Participants*

Participants ( $n = 168$ ) in the larger parent study (Bowen et al., 2009) were recruited from a private, nonprofit agency providing inpatient and outpatient care for individuals with AOD-use disorders. Approximately 57% of the outpatient and 2% of inpatient clients in this setting seek substance abuse treatment due to legal mandate, and 19% of outpatient and 75% of inpatient clients are homeless. Approximately 55% of clients complete treatment as recommended by the treatment agency.

Interested individuals ( $N = 260$ ) were screened, and 29% ( $n = 73$ ) failed to meet eligibility criteria. Exclusion criteria included current psychosis, dementia, imminent suicide risk, significant withdrawal risk, need for more intensive treatment, not completing inpatient or intensive outpatient treatment, or having less than 8 weeks until completion of aftercare. Individuals excluded from participation were those did not complete the inpatient or intensive outpatient treatment prior to entry in the MBRP trial

( $n = 49$ ), had less than 8 weeks until completion of aftercare ( $n = 9$ ), active psychosis ( $n = 10$ ), scheduling conflicts ( $n = 4$ ), and active suicidality ( $n = 1$ ). Of those who were eligible ( $n = 187$ ), approximately 10% ( $n = 18$ ) declined participation or failed to attend the appointment to complete baseline, and one individual chose not to be randomized. Among the remaining participants, 93 were randomized to MBRP, and 75 were randomized to TAU.

### *Measures*

The demographic questionnaire assessed gender, race, ethnicity, marital status, employment status, education level, and annual income from legal sources. This questionnaire was used to describe the sample at baseline, and to be congruent with previous analyses conducted for the parent study (Bowen et al., 2009). Race was used as a covariate in all analyses. Primary drug of choice (alcohol, cocaine/crack, methamphetamines, opiates/heroin, marijuana, and other) was also assessed and was used for the baseline sample description.

The Timeline Followback (TLFB; Sobell & Sobell, 1992) assessed daily AOD use. At baseline, participants were asked to report on the 60 days prior to initial admission in inpatient or outpatient treatment. For the remaining three assessments, participants were asked to report on a 60-day interval immediately posttreatment, 2 months following treatment, and 4 months following treatment. The TLFB has demonstrated good reliability and validity (Sobell, Brown, Gloria, & Sobell, 1996). We calculated number of days participants used AOD in the 60-day intervals and used them as outcome variables in the main analyses (i.e., AOD frequency).

Distress tolerance was measured by the DTS (Simons & Gaher, 2005) at baseline. The DTS contains 15 items rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items include “Feeling distress or upset is unbearable to me” (tolerance), “My feelings of distress or being upset are not acceptable” (appraisal), “I’ll do anything to avoid feeling distressed or upset” (regulation), and “When I feel distressed or upset, all I can think about is how bad I feel” (absorption). Higher scores indicate higher tolerance for psychological distress. In initial studies with college students, DTS factors demonstrated good internal consistency ( $\alpha = .72 - .82$ ) as well as convergent and discriminant validity. The second-order scale displayed fair test-retest reliability ( $r = .61$ ) over a 6-month interval (Simons & Gaher, 2005).

In this study, all 15 DTS items were used to conduct the initial factor analyses. In DTS summary scores for the main analyses, however, only 14 items were used. The rationale for the use of these 14 items is provided in the results section. To build the interactions for the moderation hypotheses in the main analyses, the summary scores of the 14 DTS items were centered based on the grand mean.

Mindfulness was measured by the Five Factor Mindfulness Questionnaire at baseline assessment (FFMQ; Baer, Smith, & Allen, 2004), and the sum of subscale scores were used to evaluate convergent validity of the DTS. The FFMQ is made up of 36 items taken from a variety of mindfulness questionnaires. Items include statements such as, “I pay attention to whether my muscles are tense or relaxed,” and “I notice the smells and aromas of things.” Items are rated on a 5-point Likert-type scale ranging from 1 (never or very rarely true) to 5 (almost always and always true). Higher scores indicate greater levels of mindfulness. FFMQ subscales have demonstrated good internal consistency ( $\alpha$

= .75 - .91), test-retest reliability ( $r = .65$  -.83) and a clear factor structure (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). In the current study, the reliability of FFMQ was .91.

### *Procedure*

All study procedures were reviewed and approved by the Institutional Review Board at University of Washington. Individuals who completed inpatient or intensive outpatient treatment were invited to participate in the study and were screened over the phone using the eligibility criteria described above. Eligible participants were then asked to complete a web-based baseline assessment conducted at the treatment agency, with research staff available to offer assistance. At baseline, participants reported AOD use in the 60 days prior to entering inpatient or outpatient treatment, level of distress tolerance and mindfulness, and demographic variables. Upon completion of baseline assessment, participants were randomly assigned to either the TAU or the MBRP condition using a web-based random number sequencer.

TAU was based primarily on the 12-step approach (Lile, 2003) and included process-oriented discussion and psychoeducation. TAU groups met 1 to 2 times a week and each group lasted 1.5 hours. Sessions were led by licensed chemical dependency professionals with a wide range of clinical experience. No regular homework was assigned in these groups. In the MBRP condition, participants attended weekly, 2-hour group sessions for 8 weeks in lieu of standard aftercare. Each session consisted of 20 to 30 minutes of meditation practices and relapse-prevention related discussions such as practicing mindfulness skills in the face of high-risk situations (Bowen, Chawla & Marlatt, 2010). These sessions were conducted by Master's-level therapists, all of whom

received extensive training, ongoing supervision, and engaged in meditation practice. Participants were assigned daily exercises and were provided with meditation CDs produced by Kabat-Zinn (2002). When the 8-week program ended, participants returned to their regular aftercare.

For all participants, web-based assessments were conducted immediately postintervention, and 2 months and 4 months following the intervention. Participants could choose to complete the assessments on their own or complete them using the procedures described for baseline. If participants did not complete an assessment, research assistants contacted them to obtain AOD data over the phone. Participants received \$45 gift cards for completing the baseline and postintervention assessments and \$50 gift cards for completing the two- and four-month follow-up assessments.

#### *Data Analysis Plan*

Prior to analyses, all data were inspected for outliers, collinearity and normality of distributions using descriptive statistics and graphs.

*Psychometric tests.* Because the DTS was being tested within a new population, we first conducted a principal component analysis (PCA) to initially explore its structure. Based on results of the PCA, PFA was conducted to confirm the factor structure. Reliability of the final DTS scale items was estimated using Cronbach's alpha, with .8 and above indicating good internal consistency (Field, 2005). For tests of convergent validity, bivariate correlations were conducted. These analyses were conducted using SPSS 17, and where applicable, the alpha level was set at  $p = .05$ .

*Moderation analyses.* Random-intercept Poisson regression models were used to test the hypothesis that distress tolerance at baseline moderated treatment effects on AOD

use days over the 4-month follow-up. The random-intercept model was used to account for individual heterogeneity in the outcome variable (see Hedeker, 2004). Analyses were conducted using Stata 10 (StataCorp, 2007), and the alpha level was set at  $p = .05$ . All confidence levels were set to 95%. Poisson regression, which is appropriate for handling count variables, was implemented given that the dependent variable was positively skewed. All predictors were centered on the mean to avoid collinearity and to facilitate interpretation of parameter estimates in interactions (Aiken & West, 1991; Cohen, Cohen, West, & Aiken, 2003).

All models included the following covariates: 1) a linear time variable ( $t$ ), which modeled linear change from baseline, postintervention, and 2- and 4-month follow-ups (coded as 0, 1, 2 and 3, respectively); (2) a quadratic time variable ( $t^2$ ); (3) dummy-coded treatment effects (1= MBRP, 0=TAU); (4) DTS summary score; (5) dichotomous race/ethnic background (1=European-American, 0=Other racial groups); (6) number of treatment hours attended; (7)  $t$  x treatment interaction; (8)  $t^2$  x treatment interaction; (9)  $t$  x DTS interaction; (10)  $t^2$  x DTS interaction; (11) DTS x treatment interaction; (12)  $t$  x treatment x DTS interaction; (13)  $t^2$  x treatment x DTS interaction. Self-reported racial identity was included as a covariate in all analyses because the MBRP group contained a higher proportion of European-American participants than the TAU group (Bowen et al., 2009). Number of treatment hours was also included as a covariate since MBRP participants received more treatment hours than TAU participants during the 8-week intervention period.

## RESULTS

### *Sample Description*

Participants (36.3% women) ranged from 18 to 70 years of age ( $M = 40.45$  years,  $SD = 10.28$ ). Over half of the participants identified as non-Hispanic European Americans (53.6%). African American participants accounted for close to one-third of the sample (28.6%), and the rest of the sample was composed of Native American/Alaska Native (7.7%) and Hispanic/Latino (6.0%) individuals. About 41.3% were unemployed, 62.3% earned less than \$4,999 per year, and 71.6% had a high school diploma. Participants reported their primary choice of AOD being alcohol (45.2%), cocaine/crack (36.2%), methamphetamines (13.7%), opiates/heroin (7.1%), marijuana (5.4%), and “other” (1.9%). Approximately 19.1% reported polysubstance use.

### *Principal Component and Factor Analyses*

In the PCA with varimax rotation, the eigenvalue  $> 1$  rule and the scree plot both suggested a two-factor structure (Floya & Widaman, 1995). The eigenvalues for the first two extracted factors were 8.42 and 1.03, accounting for 56.14% and 6.87% of the variance, respectively. Two items (item 6 and 15) crossloaded onto more than one factor, as loadings were greater than .45 for both factors (Tabachnick & Fidell, 2000). To address cross-loading, we examined communality values of all items. Item 6 exhibited relatively low communality (.59). Additionally, the factor plot revealed that item 6 was not closely related to other items. Based on the recommended procedures for handling crossloading (Tabachnick & Fidell, 2007), item 6 was dropped from the scale. Item 15 was retained because of higher communality value (.66) and its position in the factor plot.

The remaining 14 items were reanalyzed using PFA with varimax rotation. Only one factor was extracted with an eigenvalue of 8.28. A test of internal consistency indicated that the reliability of the resulting 14-item scale was good ( $\alpha = .95$ ). Factor loadings, communalities, and percent of variance can be found in Table 1.

### *Convergent Validity*

Pearson correlations were conducted to test convergent validity of the revised scale. As hypothesized, the DTS was positively correlated (all  $ps < .001$ ) with all five FFMQ subscales: Observing ( $r = .28$ ), describing ( $r = .41$ ), acting with awareness ( $r = .42$ ), non-judging of inner experience ( $r = .41$ ), and non-reactivity to inner experience ( $r = .47$ ). These results supported the DTS's convergent validity (see Table 2 for means and standard deviations of the DTS and FFMQ subscales).

### *Moderation Analyses*

The longitudinal random-intercept Poisson model was significant, Wald  $\chi^2(13, N = 162) = 3595.33, p < .001$ . As shown in Table 3, the hypothesized linear time and quadratic time x treatment x distress tolerance interactions were also significant. As shown in Figure 1, participants with lower distress tolerance who received MBRP versus TAU showed a greater curvilinear decrease in AOD use days during the follow-up.

## DISCUSSION

The first aim of the study was to evaluate the basic psychometric properties of the DTS in a clinical sample of individuals with AOD-use disorders. Results of principal component and factor analyses indicated a one-factor solution, which is consistent with how the DTS has been implemented in other studies (e.g., Buckner, Keough, & Schmidt, 2007; Howell, Leyro, Hogan, Buckner, & Zvolensky, 2010; Zvolensky et al., 2009), and

corresponds to findings from the preliminary DTS development study (Simons and Gaher, 2005). As predicted, DTS was also positively associated with all mindfulness subscales, suggesting its convergent validity in this clinical sample. Taken together, these findings provide some psychometric support for the use of the DTS in a clinical sample with AOD-use disorders.

The second aim of this study was to assess whether distress tolerance at baseline would moderate treatment effects on AOD outcomes in an initial efficacy trial of MBRP. As hypothesized, individuals with lower distress tolerance who received MBRP reported greater reductions in AOD use frequency throughout the 4-month follow-up relative to participants with lower distress tolerance who received TAU. This finding suggests that individuals with lower distress tolerance may have learned how to better cope with craving from MBRP and thereby avoid using AOD in the face of negative emotions.

MBRP participants reported lower rates of AOD use throughout 2-month follow up compared to TAU participants (Bowen et al., 2009). At 4-month follow-up, rates of AOD use were similar between conditions. Results of this study indicate that AOD use days were similar among individuals with higher distress tolerance at 4-month follow-up, regardless of conditions. This may be attributed to two factors. First, given that this is a sample of treatment-seeking individuals with AOD-use disorders, there may have been a greater tendency to use AOD to cope with emotions, regardless of level of distress tolerance. Second, previous studies used behavioral methods (e.g., duration of abstinence from cigarette smoking) to identify participants with low distress tolerance (e.g., Brown et al., 2008). It is possible that the self-report DTS measure used in this study is not as sensitive as behavioral methods in differentiating among levels of distress tolerance.

Future research may wish to establish reliable cut-offs for levels of distress tolerance that are more highly predictive of AOD use treatment outcomes.

### *Limitations*

Limitations of the study deserve mention. While the TLFB is considered a gold standard of AOD use assessment, the use of this retrospective self-report method is a potential limitation. Confidence in the accuracy of AOD self-report could be further bolstered in future studies using biovalidation (Buchan, Tims, & Diamond, 2002; Carroll, 1995). The brevity of the follow-up period is another concern. It limited our ability to test whether the moderating effect could reach beyond the 4-month follow-up. Additionally, the larger parent study found that treatment effects were not maintained at the 4-month follow-up, which suggests that the addition of ongoing support for meditation practice (e.g., sitting groups) would likely improve longer-term treatment outcomes (Bowen et al., 2009). Although follow-up rates were comparable to those in similar studies (Edwards & Rollnick, 1997; Farrington, Petrosino, & Welsh, 2001), attrition is another limitation of the current study because it can reduce power and bias study findings. Despite these limitations, this study offers initial support for the use of the DTS in a clinical sample and for the distress tolerance construct as a treatment moderator in a sample of individuals with AOD-use disorders.

### *Conclusion*

Despite its limitations, this study serves as an important step towards understanding the role of distress tolerance in mindfulness-based interventions. This is particularly important given the recent surge in mindfulness-based interventions and the need to examine potential moderators and underlying mechanisms of change. Current

findings suggest that distress tolerance may be a crucial client characteristic to consider in matching participants to an optimal aftercare treatment: for individuals with lower distress tolerance, it may be more beneficial to receive acceptance and mindfulness-based treatment in treatment aftercare programs. Future studies may seek to replicate these promising findings within larger samples, across longer timeframes and with other addictive behaviors.

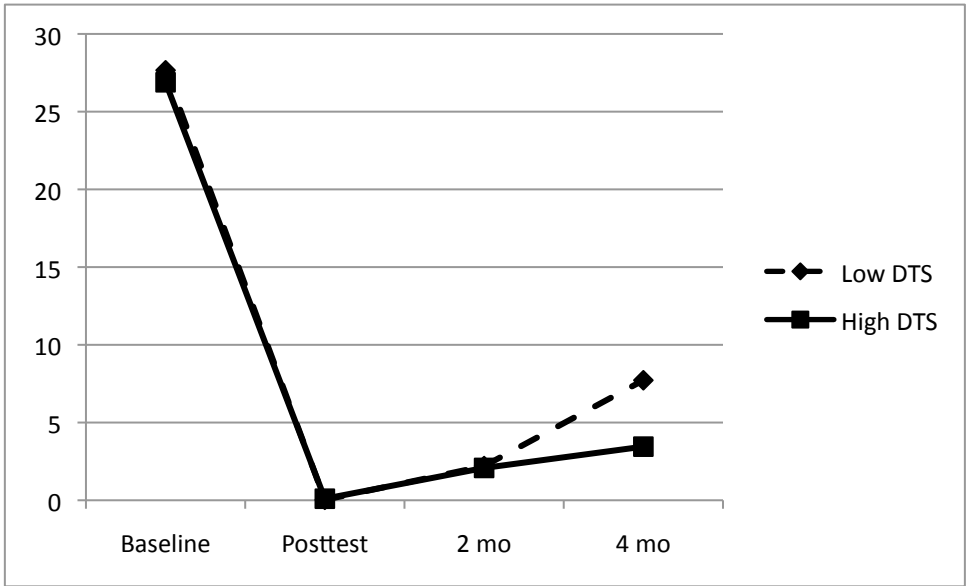
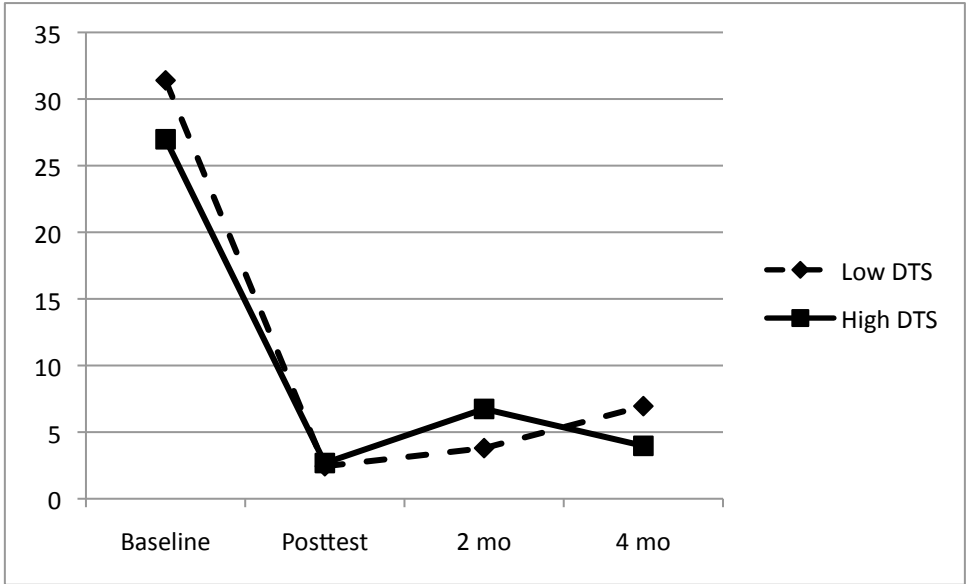
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*Figure 1.* Graphs of observed mean AOD use days by assessment point, treatment groups, and level of distress tolerance. For clarity of presentation, two groups were formed using a median split to represent different levels of distress tolerance; however, the analyses included distress tolerance as a continuous predictor. The upper panel depicts the means for the TAU group, and the lower panel depicts the means for the MBRP group.



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Table 1. *Item Mean, Standard Deviation, Factor Loadings, Communalities, and Percent Variance for Principal Factors Extraction and Varimax Rotation on DTS items without Item 6*

Item	<i>M (SD)</i>	Factor loading	Communality
1. Feeling distressed or upset is unbearable to me.	2.96 (1.30)	.78	.60
2. When I feel distressed or upset, all I can think about is how bad I feel.	2.99 (1.25)	.73	.53
3. I can't handle feeling distressed or upset.	3.18 (1.25)	.83	.69
4. My feelings of distress are so intense that they completely take over.	3.60 (1.30)	.78	.61
5. There's nothing worse than feeling distressed or upset.	3.13 (1.30)	.79	.63
6. I can tolerate being distressed or upset as well as most people.	2.72 (1.17)	—	—
7. My feelings of distress or being upset are not acceptable.	3.43 (1.20)	.79	.63
8. I'll do anything to avoid feeling distressed or upset.	2.95 (1.21)	.76	.66
9. Other people seem to be able to tolerate feeling distressed or upset better than I can.	3.06 (1.24)	.79	.62
10. Being distressed or upset is always a major ordeal for me.	3.17 (1.29)	.84	.71
11. I am ashamed of myself when I feel distressed or upset.	3.32 (1.23)	.70	.49
12. My feelings of distress or being upset scare me.	3.38 (1.29)	.81	.65
13. I'll do anything to stop feeling distressed or upset.	3.13 (1.21)	.81	.66
14. When I feel distressed or upset, I must do something about it immediately.	2.83 (1.19)	.58	.34
15. When I feel distressed or upset, I cannot help but concentrate on how bad the	3.07 (1.21)	.74	.55

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distress feels.

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Percent of variance

59.13%

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Table 2. Mean and Standard Deviation for DTS and FFMQ Subscales at Baseline

Variables	<i>M</i>	<i>SD</i>	N
DTS	47.46	13.87	151
DTS without item 6	44.23	13.40	153
FFMQ- Observing	25.45	6.60	157
FFMQ- Describing	27.18	6.28	153
FFMQ- Acting with awareness	26.86	6.55	156
FFMQ- Non-reactivity	21.28	4.89	156
FFMQ- Non-judgment	26.27	6.47	148

*Note.* DTS = Distress Tolerance Scale; FFMQ = Five-Factor Mindfulness Questionnaire.

Table 3. *Random-intercept Models Evaluating the Moderating Effects of DT on the Relationship between Treatment and Days of AOD Use (N=163)*

Predictors	<i>IRR</i>	<i>CI (95%)</i>	<i>z</i>	<i>P</i>
t	.60	.58 - .63	-24.14	< .001
t <sup>2</sup>	1.79	1.69 - 1.89	20.60	< .001
DTS	.94	.63 - 1.40	-.32	.75
Total treatment hrs	.98	.95 - 1.01	-1.09	.28
Race	1.14	.71 - 1.83	.55	.58
Treatment	.23	.13 - .38	-5.67	< .001
t x treatment	.99	.93 - 1.04	-.45	.65
t <sup>2</sup> x treatment	1.88	1.70 - 2.08	12.43	< .001
DTS x treatment	1.30	.73 - 2.31	.90	.37
DTS x t	.98	.94 - 1.03	-.70	.48
DTS x t <sup>2</sup>	.97	.91 - 1.03	-.88	.38
DTS x t x treatment	.92	.87 - .98	-2.50	.01
DTS x t <sup>2</sup> x treatment	.87	.77 - .97	-2.43	.02

*Note.* For all models: t = linear time predictor (0=baseline, 1=posttest, 2=2-months f-u, 3=4-month f-u), t<sup>2</sup> = quadratic time predictor. DT = Distress Tolerance. *IRR* = incident rate ratio or the rate of increase/decrease outcome variable based on a one-unit change in the predictor, where *IRR* values greater than one indicate rate increases, and values less than one indicate rate decreases. *CI (95%)* = 95% confidence intervals. The treatment variable was dummy coded with MBRP treatment group=1, TAU=0. Self-reported race was dummy coded with 1 = European-American, 0 = Other racial groups.

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