

The Application of Mindfulness for Interpersonal Dependency: Effects of a Brief Intervention

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Abstract This study examined the efficacy of a brief mindfulness intervention for alleviating the affective consequences of interpersonal dependency. Seventy undergraduate students with high trait dependency underwent a mood induction to exacerbate the core cognitive and affective features of interpersonal dependency. Participants were then randomly assigned to listen and participate in a 20-min recording of either a mindfulness treatment or a distraction (control) treatment. Relative to those in the distraction group, mindfulness group participants reported greater increases in state mindfulness and greater reductions in state anxiety and state negative affect. Mediation analyses supported the notion that the decentering facet of state mindfulness fully mediated the improvements in both state anxiety and state negative affect. The findings of this study evince that mindfulness training may be a beneficial adjunct for treating interpersonal dependency and possibly dependent personality disorder.

Keywords Mindfulness · Meditation · Decentering · Interpersonal dependency · Dependent personality disorder

Introduction

Interpersonal dependency is a fairly stable, multifaceted personality trait characterized by a need to obtain and maintain supportive relationships (Bornstein 2005; Morgan and Clark 2010). Bornstein (1992) constructed a pantheoretical model of dependency, which is among the most prevailing and comprehensive conceptualizations in the literature. As similar to other theories (e.g., Overholser and Fine 1994), Bornstein's (1992)

model emphasizes the core cognitive and affective features of dependency; individuals with dependency traits view themselves as helpless, weak, and inept, which are collectively referred to as the *helpless self-schema*. Dependent individuals are also plagued with fears of abandonment and experience intense dysphoria when rejected by others. These cognitive and affective features of dependency seem to underlie other dependency-related problems (Bornstein 1992). That is, the *helpless self-schema* and fears of abandonment can activate maladaptive motivations and behaviors (e.g., reassurance-seeking, supplication, inability to function autonomously), thus producing feedback loops that increase dependency-related responding (Bornstein et al. 2005).

Excessive forms of dependency have pernicious effects on an individual's mental health (Bornstein 2012). Given the dependent person's *helpless self-schema* and fears of abandonment, it is not surprising that trait dependency is often coupled with an insecure attachment style (Zuroff and Fitzpatrick 1998). Dependent individuals are exceedingly upset by relationship conflict (Allen et al. 1996) and are more vulnerable to domestic-partner violence (Bornstein 2006). Research also indicates that interpersonal dependency is associated with higher rates of disordered eating (Pritchard and Yalch 2009), somatization symptoms (Bornstein and Gold 2008), physical illness (Bornstein 2012), and suicidality (Loas and Defelice 2012).

Of particular note, anxiety and depression are frequently experienced by dependent individuals and may be integral to a dependency orientation (Bornstein 2005). Approximately 15 % of the variance in anxiety and depression scores can be accounted for by trait dependency (Bornstein 2005; Overholser and Freiheit 1994). Additionally, research implies that dependency is a risk factor for depressive symptoms (Haefffel et al. 2007; Mazure et al. 2000) and is often comorbid with anxiety disorders (e.g., Chambless et al. 2000; Jansen et al. 1994) and depressive disorders (e.g., Huprich et al. 2013).

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As the features and consequences of dependency become more pronounced, dependent personality disorder (DPD) may result. DPD is classified among the Cluster C (i.e., anxious or fearful) personality disorders in the *DSM-IV-TR* (American Psychiatric Association [APA] 2000) and is characterized by “a pervasive and excessive need to be taken care of that leads to submissive and clinging behavior and fears of separation” (APA 2000, p. 725). DPD is one of the most common personality disorders in mental health settings (APA 2000), with a prevalence rate of over 15 % among psychiatric inpatients (Bornstein 2005). Like other personality disorders, DPD tends to be debilitating and resistant to treatment.

Given the significant problems (e.g., anxiety, depression, DPD) linked to interpersonal dependency, it is prudent to develop empirically supported treatments to target this maladaptive personality trait. The literature on treatments for dependency, however, is sparse and equivocal (Bornstein 2004; Versaevl 2012). The lack of sufficiently efficacious treatments for dependency underscores the need for additional treatment development. One novel approach is to integrate mindfulness into therapies for interpersonal dependency and dependent personality disorder to improve the efficacy and clinical significance of such approaches. The application of mindfulness for interpersonal dependency, however, has not been studied empirically.

A widely embraced definition of mindfulness is “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally” (Kabat-Zinn 1994, p. 4). Mindfulness is about cultivating awareness and acceptance of immediate, moment-to-moment experience (e.g., the breath, thoughts, feelings, etc.). Through practicing mindfulness, one learns to disengage from thoughts so as to observe the thinking process with greater objectivity (Shapiro et al. 2006). This shift from personally identifying with, to a broader and more spacious awareness of, thoughts and feelings is referred to as decentering. Decentering is considered to be a primary reason why mindfulness is beneficial (Lau et al. 2006; Shapiro et al. 2006).

Over the past three decades, multi-week interventions have been developed that incorporate mindfulness as a therapeutic technique. Research indicates that mindfulness-based interventions (e.g., mindfulness-based stress reduction; Kabat-Zinn 1982) are effective at treating a wide variety of psychological problems, particularly anxiety and depression (see Hofmann et al. 2010). This is important within the context of treating interpersonal dependency because, as previously discussed, anxiety and depressive symptoms are common among dependent persons.

Research has also investigated the impact of brief (i.e., 1 h or less) mindfulness interventions. Data indicates that a brief mindfulness exercise increases state mindfulness and is more effective at alleviating state distress than an active control condition (Arch and Craske 2006; Broderick 2005; Zeidan et al. 2009; Zeidan et al. 2010). Of particular relevance to the

current research, Broderick (2005) employed an induction procedure; negative mood was first induced in all participants by having them listen and read along with a series of unpleasant self-statements (e.g., “I have too many bad things in my life”). Those who subsequently participated in an 8-min mindfulness exercise reported greater reductions in negative affect, as compared to those assigned to a distraction condition.

It seems reasonable to suspect that a mindfulness-based intervention, even a relatively brief one, could likewise benefit those with trait dependency. This is because mindfulness seems to be well-suited for addressing the cognitive and affective features that sustain problematic dependency.

First, mindfulness appears to be particularly capable of targeting the salient cognitive features of dependency. According to Bornstein’s (1992) model, dependent individuals view themselves as relatively weak, powerless, and ineffective (i.e., the *helpless self-schema*). By developing greater awareness and acceptance, dependent individuals may become less apt to overidentify with these self-perceptions. Mindfulness could help them to recognize that these thoughts are “just thoughts,” as opposed to reflections of the self that are necessarily true. As an example, rather than think “I *am* helpless,” a dependent person engaged in decentering (mindfulness) might observe, “I *am thinking* that I am helpless.” Relating to one’s thoughts in this wider field of awareness may be immensely valuable for dependent individuals and how they see themselves. Research supports the claim that mindfulness aids in disengaging from maladaptive thought patterns (Bootzin and Stevens 2005; Ramel et al. 2004; Shapiro et al. 2008).

Mindfulness training could also target the emotional features of dependency. As previously noted, dependent persons frequently experience anxiety and depressive symptoms. Given the established efficacy of mindfulness for treating anxiety and depression, it seems likely that mindfulness practice would similarly ameliorate the anxiety and depression that are central to dependency. Mindfulness may be especially adept at treating dependency-related fears because mindfulness is thought to serve as a form of therapeutic exposure (Baer 2003). That is, mindfulness could allow a dependent person to engage in prolonged, non-judgmental observation of interpersonal fears, thus facilitating habituation. Research shows that mindfulness-based interventions decrease emotional avoidance (Nice 2008), while augmenting emotion regulatory processes (Arch and Craske 2006; Ortner et al. 2007). Moreover, there is initial evidence that mindfulness mitigates the distress associated with interpersonal rejection (Creswell et al. 2006; Heppner et al. 2008). This latter finding implicates the utility of mindfulness in specifically alleviating the intense fears of rejection and abandonment associated with dependency.

Because mindfulness appears to be a good fit for treating features of dependency, the present study aimed to test mindfulness as an antidote against dependency-related distress.

More specifically, after inducing the cognitive and affective symptoms of dependency, would mindfulness enable highly dependent individuals to de-escalate from this symptomatic state? A conditional aim of this study, based on the theoretical conjectures and research outlined above, was to assess for mediating mechanisms (e.g., decentering) that may be undergirding the benefits of mindfulness.

The current research had three main hypotheses: (a) those participating in a brief (20 min) mindfulness intervention would subsequently report higher scores on a measure of state mindfulness (i.e., on each of the subscales [curiosity and decentering] and on the total score), as compared to those participating in a distraction condition; (b) the brief mindfulness intervention would be more efficacious than the distraction condition at alleviating dependency-related distress, as measured via state anxiety and state negative affect instruments; (c) the reductions in anxiety and negative affect would be mediated by the decentering and/or curiosity subscales of state mindfulness.

Method

Participants

A total of 1,221 undergraduate students completed the Interpersonal Dependency Inventory (IDI; Hirschfeld et al. 1977) at a large Midwestern university to screen for high levels of interpersonal dependency. The mean (44.85) and standard deviation (14.56) of the IDI for the screened sample were similar to normative data (e.g., Bornstein 1997). Respondents who scored at least one standard deviation above the mean on the IDI at this pre-screen (i.e., >58.92, as derived from Bornstein 1997) were eligible to participate in the current study, which was advertised as an investigation of “coping skills for social problems” (mindfulness was not mentioned on recruitment documents). Eligible participants had the option of signing up for a time slot to meet with the experimenter individually at a laboratory on the university campus. Thus, participation was on a first-come, first-serve basis. Eligible participants were informed that they would receive five dollars and a course credit as compensation.

Seventy-eight undergraduate students arrived to the laboratory and completed all study procedures. However, eight participants were excluded for scoring below the normative mean on the IDI (i.e., < 45.53, as derived from Bornstein 1997) when assessed at the laboratory-phase of the study. For these eight participants, the drop in IDI scores from higher than one standard deviation above mean at the pre-screen to less than the mean in the laboratory (the time between these assessments ranged anywhere from 24 h to 10 weeks) may indicate that these respondents do not have enduring dependency traits; their data were excluded from analyses in order to maintain the integrity of a highly interpersonally dependent

sample. Therefore, to be included in the final sample, participants must have scored higher than one standard deviation above the mean on the IDI at the pre-screen and higher than the mean at the laboratory assessment.

The mean age of the final sample ($N=70$) was 19.1 years, and 90 % of participants was female (see Table 1). Participants identified themselves as Non-Hispanic White (85.7 %), Asian (5.7 %), Multiracial (4.3 %), Hispanic or Latino (2.9 %), and African American (1.4 %). Participants in this study reported elevated levels of dependency. The sample’s mean of 63.7 on the IDI was considerably higher than the normative one standard deviation above mean (i.e., 58.92, as obtained from Bornstein 1997); about 73 % of the sample scored higher than 58.92 on the IDI, thus demonstrating that as a whole, participants were exceedingly dependent.

Measures

Anxiety (State) State Trait Anxiety Inventory—State Form (STAI-S; Spielberger et al. 1970) is a widely used self-report measure of state anxiety. The STAI-S includes 20 items that are rated on a scale from 1 (*not at all*) to 4 (*very much so*). The total score was calculated by summing the 20 items (after reverse scoring nine of the items). Scores on the STAI-S have been shown to increase from before to after a stressful event, which implies that the STAI-S reflects the influence of transient situational factors existing at the time of testing (Rule and Traver 1983). The STAI-S is positively correlated with other measures of state anxiety and has shown good divergent validity (Spielberger et al. 1995). In the current sample, Cronbach’s α was excellent at Time 1 (.91), Time 2 (.94), and Time 3 (.93).

Negative Affect (State) The negative affect subscale of the Positive and Negative Affect Schedule (PANAS-NA; Watson et al. 1988) is comprised of 10 items reflecting negative mood (e.g., “upset”). PANAS-NA assesses “subjective

Table 1 Percentages/means (and standard deviations) for demographic data according to treatment group

	Mindfulness ($n=35$)	Distraction ($n=35$)	<i>P</i> diff.	Total ($N=70$)
Demographic data				
Age	19.1 (1.2)	19.0 (1.1)	.764	19.1 (1.2)
Gender (female)	88.6 %	91.4 %	.690	90.0 %
Race (Caucasian)	82.9 %	88.6 %	.495	85.7 %
Interpersonal dependency inventory	64.0 (12.3)	63.5 (8.1)	.837	63.7 (10.3)
Toronto Mindfulness Scale—Trait	3.1 (0.6)	3.0 (0.5)	.445	3.0 (0.6)

Note. The *P*diff column shows significance levels based on *t* and χ^2 tests of group differences

distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear, and nervousness” (Watson et al. 1988; p. 1063). For this study, the state version of the PANAS-NA was employed; participants were asked to indicate, “how you feel right now” on a five-point response scale from 1 (*very slightly*) to 5 (*extremely*). Summing the ten items produces a total score, which was used in the present study. Previous research on the PANAS-NA has shown excellent convergent and discriminant validity, and that the measure is sensitive to mood fluctuations (Watson and Clark 1997). This scale exhibited high levels of internal consistency (Cronbach’s α) in the current sample at Time 1 (.90), Time 2 (.94), and Time 3 (.88).

Mindfulness (State) The Toronto Mindfulness Scale- State (TMS-S; Lau et al. 2006) is a questionnaire that assesses state mindfulness. This instrument is designed to be administered immediately after a mindfulness practice session. It consists of 13 items, which are rated on a 6-point Likert scale ranging from 0 (*not at all*) to 5 (*very much*). A sample item is “*I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things ‘really’ are.*” The 13 items of the TMS-S encompass two subscales: curiosity (i.e., the motivation to learn more about one’s experience) and decentering (i.e., the shift from personally identifying with thoughts and feelings to relating to one’s experience in a wider field of awareness). These two factors have been supported by exploratory and confirmatory factor analyses (Lau et al. 2006). The total and subscale scores were calculated by taking the mean of the appropriate items. The TMS-S correlates positively with trait mindfulness and meditation experience (Ortner et al. 2007) and exhibits good discriminant validity (Lau et al. 2006). Scores on the TMS-S have also been shown to increase significantly following mindfulness interventions (Altmaier and Maloney 2007; Lau et al. 2006). The instructions for this measure were slightly modified to refer to the participants’ experiences when listening to the audio recording. Cronbach’s α was strong for the curiosity subscale (.90), the decentering subscale (.85), and the total scale (.91).

Mindfulness (Trait) The Toronto Mindfulness Scale- Trait (TMS-T; Davis et al. 2009) is a 13-item self-report measure of trait mindfulness, which was derived from the TMS-S. Davis and colleagues (2009) converted the TMS-S to the TMS-T by changing the wording in each item from past to present tense (e.g., “*I experience my thoughts more as events in my mind than as a necessarily accurate reflection of the way things ‘really’ are.*”). As similar to the TMS-S, items are rated on a 6-point Likert scale ranging from 0 (*not at all*) to 5 (*very much*). The TMS-T is positively associated with other mindfulness measures, and TMS-T scores are significantly higher for meditators than for non-meditators (Davis et al. 2009). Only the total score of the TMS-T was used in this study, which is the

mean of all 13 items. The scale exhibited an acceptable level of internal consistency (Cronbach’s α = .79).

Interpersonal Dependency The Interpersonal Dependency Inventory (IDI; Hirschfeld et al. 1977) is one of the most frequently used self-report measures of interpersonal dependency (Loas et al. 2002). The IDI contains 48 items, each of which is rated on a 4-point scale anchored with the terms *Not characteristic of me* (1) to *Very characteristic of me* (4). IDI scores are positively correlated with other self-report measures of dependency (Cogswell et al. 2010; Hirschfeld et al. 1983) and predict important types of dependency-related behavior in laboratory, clinic, and field settings (Bornstein and Kennedy 1994; Hirschfeld et al. 1983). IDI scores also predict the presence and severity of DPD symptoms (Loas et al. 2002). Research implies that the measure has adequate discriminant validity (Bornstein 1997). The IDI also has good test-retest reliability over 16-, 28-, 60-, and 84-week intervals, with reliability coefficients (r) ranging from .74 at 16 weeks to .71 at 84 weeks (Bornstein 2005). The mean (45.53) and standard deviation (13.39) of the IDI have been found for a large, undergraduate sample (Bornstein 1997). A Cronbach’s α of .72 was found for the IDI in this study.

Procedures

Upon arriving to a psychology research laboratory, each participant was asked to read and sign an informed consent. Those willing to participate were escorted into an individual study room to complete a set of questionnaires, which included a demographics form, IDI, TMS-T, as well as the STAI-S and PANAS-NA (Time 1).

Dependency-Mood Induction Once finished, the experimenter returned to the room to administer the dependency-mood induction. An induction procedure is an optimal methodological approach for meeting the goals of this study because in real-world settings, treatment techniques are implemented for symptomatic clients. Therefore, it makes sense to activate the core cognitive and affective features of dependency to increase the ecological validity of implementing an intervention.

The mood induction was constructed by integrating procedures developed by Broderick (2005) and Bornstein et al. (2005). While similar, this integrated induction has not been used in prior studies in its current form. Barber’s *Adagio for Strings*, a gloomy song used in Broderick’s (2005) manipulation, was played as background music throughout the dependency-mood induction. In total, the induction procedure was approximately 10 min long and included two stages:

- (1) The first part of the mood induction was adapted from Broderick’s (2005) depression manipulation, which

instructed participants to read a series of negative self-statements (e.g., “I have too many bad things in my life”). To redesign this for the purposes of the current study, dependency terms were acquired from a dependency-priming manipulation conducted by Bornstein and colleagues (2005). These dependency terms (e.g., weak) were then framed as self-statements that would ostensibly activate the core cognitive (i.e., *the helpless self-schema*) and affective (e.g., fears of abandonment) features that underlie dependency problems (Bornstein 1992). Each participant listened and read along with these 16 dependency self-statements (e.g., “I am weak and powerless” and “My close friends are likely to abandon me”), which were presented on the computer via a PowerPoint slide-show (one statement per page for 15 s each). Participants were instructed to “experience each statement as if it were written for you.”

- (2) The last slide prompted the participant to “write about a recent time in which you felt rejected or abandoned by someone you care about.” This was included to make the induction personally relevant and to further activate abandonment concerns. Participants were provided a pen and lined paper to record their story for 5 min.

Subsequent to the mood induction, the experimenter returned to the study room to have the participant complete another STAI-S and PANAS-NA (Time 2). Participants were then assigned, based on a blocked randomization procedure, to either a mindfulness treatment or a distraction (active control) treatment. Blocked randomization served to maintain an equal balance of participants across the treatment conditions.

Mindfulness Treatment Those assigned to the mindfulness condition practiced mindfulness by listening to an audio recording. This 20-min audio recording (UCLA Mindful Awareness Research Center, 2009) offered instruction on mindfulness by directing the participant’s attention to the breath, which served as an “anchor” throughout the exercise. The participant was guided to notice when the mind wanders into thoughts and feelings and to then return attention to breathing with acceptance and non-judgment. It was expected that this mindfulness task would help participants to disengage from the cognitive and emotional features of dependency, which had just been activated by the induction. The recording also provided silent practice periods and occasional prompts during these periods to escort the participant’s attention back to the breath.

Distraction Treatment Participants assigned to the distraction group followed a modified version of Broderick’s (2005) thought distraction protocol. Participants listened to an audio recording that instructed them to use their “imagination and concentration to focus on each of the following ideas.” A neutral idea (e.g., “a freshly painted door”) was then presented

audibly every 30 s. The distraction condition was created to mirror the inactive components of the mindfulness intervention as closely as possible and to be consistent with previous research (e.g., Broderick 2005). Participants listened to this recording for a total of 20 min, as akin to the mindfulness group.

Following the treatment condition, the experimenter returned to the study room to have participants complete the TMS-S and the final STAI-S and PANAS-NA (Time 3). Participants were subsequently debriefed, given a one-page debriefing summary that included the names of psychological resources on campus, and were compensated with five dollars and a course credit.

Results

Demographic Data

To compare the mindfulness group ($n=35$) and distraction group ($n=35$) on demographic data, independent samples t tests and chi-square tests of independence were used (see Table 1). The groups did not significantly differ on any of the demographic characteristics. Importantly, no group differences were found for the IDI or TMS-T.

Manipulation Check

As the dependency-mood induction was intended to produce distress, paired t tests were used to evaluate changes in state mood from Time 1 to Time 2. Results revealed that scores increased following the dependency-mood induction for both the STAI-S, $t(69)=5.95$, $p<.001$, and the PANAS-NA, $t(69)=6.38$, $p<.001$. This suggests that the mood induction achieved the desired effect of exacerbating state anxiety and state negative affect. In addition, bivariate correlations showed that IDI scores significantly predicted STAI-S at Time 2, $r(68)=.36$, $p<.05$, and PANAS-NA at Time 2, $r(68)=.33$, $p<.05$. In other words, the more dependent participants generally reported higher levels of state anxiety and state negative affect following the mood induction. This would be expected for an induction procedure that aims to activate dependency-related distress.

State Mindfulness by Treatment Group

To evaluate the hypothesis that the mindfulness condition would be more successful than the control condition at increasing state mindfulness, a regression analysis was performed using baseline TMS-T and pooled treatment group ($N=70$) as predictors of TMS-S (see Table 3). For the treatment group in this and all other regression analyses, the distraction group was coded as 0, while the mindfulness group was coded as 1. TMS-T scores were entered as a covariate in the regression analysis to partial

out the variance in participants’ baseline levels of trait mindfulness. When controlling for TMS-T, treatment group significantly predicted, and accounted for 7 % of the variance in, TMS-S ($\beta = 0.27$), $t(67) = 2.58$, $p < .05$. The positive β value implies that the mindfulness condition was superior to the distraction condition at enhancing state mindfulness, even in the presence of baseline trait mindfulness.

As a test of the hypothesis that the mindfulness group would report higher levels of state curiosity and state decentering than the control group, independent samples t tests were conducted on the TMS-S subscales. The mindfulness group ($M = 3.58$, $SD = 0.89$) reported significantly higher scores on TMS-S-Curiosity than the distraction group ($M = 3.05$, $SD = 0.95$), $t(68) = -2.43$, $p < .05$. Similarly, for the TMS-S-Decentering, the mindfulness group ($M = 3.39$, $SD = 0.74$) reported significantly higher scores than the distraction group ($M = 2.95$, $SD = 0.86$), $t(68) = -2.27$, $p < .05$. These results evince that the mindfulness group was indeed successful in enhancing both the curiosity and decentering facets of state mindfulness.

State Mood Measures by Treatment Group

As an exploration of any differences between treatment groups on the state mood measures, independent samples t tests were used on STAI-S and PANAS-NA scores at each of the three administrations to locate group differences (see Table 2). The only significant finding was for the PANAS-NA at Time 2; that is, the mindfulness group ($M = 20.9$, $SD = 10.6$) reported more negative affect than the distraction group ($M = 16.2$, $SD = 7.1$) after the dependency-mood induction, $t(59.7) = -2.20$, $p < .05$. Likewise, for the STAI-S at Time 2, there was a marginally significant difference between the mindfulness ($M = 50.5$, $SD = 14.6$) and distraction groups ($M = 43.5$, $SD = 15.0$), $t(68) = -1.98$, $p = .05$.

Further analyses became necessary to test the hypothesis that the mindfulness condition would result in greater reductions in state anxiety and state negative affect than the control

Table 2 Means (and standard deviations) for state anxiety and state negative affect over three administrations according to treatment group

	Mindfulness ($n = 35$)		Distraction ($n = 35$)	
State anxiety				
STAI-S (Time 1)	39.60	(13.14)	37.66	(12.04)
STAI-S (Time 2)	50.51	(14.60)	43.51	(14.99)
STAI-S (Time 3)	34.09	(11.34)	35.77	(13.37)
State negative affect				
PANAS-NA (Time 1)	15.69	(7.34)	12.89	(3.82)
PANAS-NA (Time 2)	20.91	(10.56)	16.17	(7.14)
PANAS-NA (Time 3)	12.43	(4.21)	12.54	(4.53)

STAI-S State Trait Anxiety Inventory—State Form, PANAS-NA Negative Affect Subscale of the Positive and Negative Affect Schedule

condition. In accordance with recommendations by Wei and Zhang (2001), regression analyses were conducted to partial out the substantial imbalance in pre-treatment outcome measures (see Table 3). When controlling for pre-treatment scores on the STAI-S (Time 2), treatment group significantly predicted, and accounted for 5.3 % of the variance in, post-treatment STAI-S (Time 3), ($\beta = -0.24$), $t(67) = -2.63$, $p < .05$. Moreover, when controlling for pre-treatment scores on the PANAS-NA (Time 2), treatment group significantly predicted, and accounted for 3.6 % of the variance in, post-treatment PANAS-NA (Time 3), ($\beta = -0.20$), $t(67) = -2.13$, $p < .05$. As evidenced by the negative β values, the mindfulness condition had greater efficacy at alleviating state anxiety and state negative affect.

Mediation Analyses

Baron and Kenny’s (1986) and Kazdin’s (2007) criteria for testing mediation were used to examine the hypothesis that the effects of treatment group on anxiety and negative affect were mediated by the decentering and/or curiosity facets of state mindfulness. As previously noted, analyses indicated that treatment group was related to both mindfulness subscales (i.e., curiosity and decentering), as well as therapeutic change. To investigate the remaining conditions for mediation, four hierarchical regression analyses were performed on pooled groups ($N = 70$).

Table 3 Regression analyses for treatment group predicting state mindfulness, state anxiety, and state negative affect

	B	SE B	β
TMS-S (Time 3)^a			
TMS-T (Time 1)	0.64	0.14	0.46**
Treatment group	0.42	0.16	0.27*
STAI-S (Time 3)^b			
STAI-S (Time 2)	0.59	0.07	0.72**
Treatment group	-5.78	2.20	-0.24*
PANAS-NA (Time 3)^c			
PANAS-NA (Time 2)	0.33	0.04	0.71**
Treatment group	-1.69	0.79	-0.20*

TMS-S Toronto Mindfulness Scale—State, TMS-T Toronto Mindfulness Scale—Trait; Treatment Group (Distraction coded as 0, Mindfulness coded as 1), STAI-S State Trait Anxiety Inventory—State Form, PANAS-NA Negative Affect Subscale of the Positive and Negative Affect Schedule

* $p < .05$; ** $p < .001$

^a For TMS-S (Time 3): $R^2 = .233$ for TMS-T (Time 1, $p < .001$); $\Delta R^2 = .070$ for treatment group ($p < .05$)

^b For STAI-S (Time 3): $R^2 = .436$ for STAI-S (Time 2, $p < .001$); $\Delta R^2 = .053$ for treatment group ($p < .05$)

^c For PANAS-NA (Time 3): $R^2 = .434$ for PANAS-NA (Time 2, $p < .001$); $\Delta R^2 = .036$ for treatment group ($p < .05$)

The first two hierarchical regression analyses were used to test curiosity as a mediator (see Table 4); post-treatment outcome scores (STAI-S and PANAS-NA at Time 3) were treated as criterion variables predicted by their corresponding pre-treatment scores (Time 2) in the first step, the curiosity subscale of the TMS-S in the second step, and treatment group in the final step. When controlling for the variance in pre-treatment outcome measures and treatment group, TMS-S-Curiosity did not predict post-treatment STAI-S, ($\beta=-0.16$), $t(66)=-1.71$, $p=.09$, nor post-treatment PANAS-NA, ($\beta=-0.02$), $t(66)=-0.16$, $p=.87$. These analyses imply that there is little reason to believe that state curiosity mediated reductions in the outcome measures.

To test decentering as a mediator, post-treatment outcome scores (STAI-S and PANAS-NA at Time 3) were regressed on their corresponding pre-treatment scores (Time 2) in the first step, the decentering subscale of the TMS-S in the second step, and treatment group in the final step (see Table 5). After

Table 4 Hierarchical regression analyses for state curiosity (mindfulness) predicting state anxiety and state negative affect

	<i>B</i>	<i>SE B</i>	β
STAI-S (Time 3)^a			
Step 1			
STAI-S (Time 2)	0.54	0.07	0.66**
Step 2			
STAI-S (Time 2)	0.52	0.07	0.64**
TMS-S-Curiosity (Time 3)	-2.76	1.15	-0.21*
Step 3			
STAI-S (Time 2)	0.56	0.07	0.69**
TMS-S-Curiosity (Time 3)	-2.02	1.18	-0.16
Treatment group	-4.55	2.28	-0.19
PANAS-NA (Time 3)^b			
Step 1			
PANAS-NA (Time 2)	0.31	0.04	0.66**
Step 2			
PANAS-NA (Time 2)	0.31	0.04	0.66**
TMS-S-Curiosity (Time 3)	-0.32	0.42	-0.07
Step 3			
PANAS-NA (Time 2)	0.33	0.04	0.71**
TMS-S-Curiosity (Time 3)	-0.07	0.43	-0.02
Treatment group	-1.65	0.84	-0.19

TMS-S-Curiosity Toronto Mindfulness Scale—State-Curiosity Subscale; Treatment Group (Distraction coded as 0, Mindfulness coded as 1); *STAI-S* State Trait Anxiety Inventory—State Form; *PANAS-NA* Negative Affect Subscale of the Positive and Negative Affect Schedule

* $p < .05$; ** $p < .001$

^a For STAI-S (Time 3): $R^2 = .436$ for Step 1 ($p < .001$); $\Delta R^2 = .045$ for Step 2 ($p = 0.019$); $\Delta R^2 = .029$ for Step 3 ($p = ns$)

^b For PANAS-NA (Time 3): $R^2 = .434$ for Step 1 ($p < .001$); $\Delta R^2 = .005$ for Step 2 ($p = ns$); $\Delta R^2 = .031$ for Step 3 ($p = ns$)

Table 5 Hierarchical regression analyses for state decentering (mindfulness) predicting state anxiety and state negative affect

	<i>B</i>	<i>SE B</i>	β
STAI-S (Time 3)^a			
Step 1			
STAI-S (Time 2)	0.54	0.07	0.66**
Step 2			
STAI-S (Time 2)	0.53	0.07	0.65**
TMS-S-Decenter (Time 3)	-5.29	1.21	-0.36**
Step 3			
STAI-S (Time 2)	0.56	0.07	0.69**
TMS-S-Decenter (Time 3)	-4.70	1.24	-0.32**
Treatment Group	-3.56	2.09	-0.14
PANAS-NA (Time 3)^b			
Step 1			
PANAS-NA (Time 2)	0.31	0.04	0.66**
Step 2			
PANAS-NA (Time 2)	0.31	0.04	0.66**
TMS-S-Decenter (Time 3)	-1.39	0.45	-0.27*
Step 3			
PANAS-NA (Time 2)	0.32	0.04	0.69**
TMS-S-Decenter (Time 3)	-1.21	0.47	-0.23*
Treatment group	-1.12	0.79	-0.13

TMS-S-Decenter Toronto Mindfulness Scale—State-Decentering Subscale; Treatment Group (Distraction coded as 0, Mindfulness coded as 1); *STAI-S* State Trait Anxiety Inventory—State Form; *PANAS-NA* Negative Affect Subscale of the Positive and Negative Affect Schedule

* $p < .05$; ** $p < .001$

^a For STAI-S (Time 3): $R^2 = .436$ for Step 1 ($p < .001$); $\Delta R^2 = .126$ for Step 2 ($p < .001$); $\Delta R^2 = .018$ for Step 3 ($p = ns$)

^b For PANAS-NA (Time 3): $R^2 = .434$ for Step 1 ($p < .001$); $\Delta R^2 = .070$ for Step 2 ($p = .003$); $\Delta R^2 = .015$ for Step 3 ($p = ns$)

partialling out pre-treatment scores and treatment group, TMS-S-Decentering had a significant, inverse relationship with both post-treatment STAI-S, ($\beta=-0.32$), $t(66)=-3.80$, $p < .001$, and post-treatment PANAS-NA, ($\beta=-0.23$), $t(66)=-2.59$, $p < .05$. Moreover, in the final step, treatment group became a nonsignificant predictor in both the STAI-S model, ($\beta=-0.14$), $t(66)=-1.70$, $p = .09$, and the PANAS-NA model, ($\beta=-0.13$), $t(66)=-1.42$, $p = .16$. These findings are consistent with the notion that decentering fully mediated reductions in the outcome measures.

Discussion

This study produced several noteworthy findings regarding interpersonal dependency and how mindfulness could be applied as a treatment. The novel dependency-mood induction proved to raise state anxiety and state negative affect in a

sample of highly dependent undergraduates. Evidently, participants identified with the weak and helpless self-perceptions and fears of abandonment.

Replicating previous research (e.g., Zeidan et al. 2010), the brief mindfulness intervention was found to be superior to the distraction condition at increasing mindful attention. The mindfulness group reported higher scores on both mindfulness subscales (i.e., curiosity and decentering) at post-treatment.

It was next hypothesized that, relative to distraction, the mindfulness treatment would result in a greater reduction in state anxiety and state negative affect. The treatment groups, however, did not start out as equal; as evidenced by a marginally significant difference on the STAI-S and a significant difference on the PANAS-NA at Time 2, the mindfulness group reported more anxiety and negative affect at pre-treatment. This was not anticipated because (a) participants were randomly assigned to the treatment conditions and (b) through Time 2, all participants underwent the same study procedures; it was only *after* the Time 2 assessments that the groups were treated in a systematically different way (i.e., the introduction of the treatment conditions). Thus, it is believed that the mindfulness group was, simply by chance, more symptomatic than the distraction group at pre-treatment.

Statisticians (see Wei and Zhang 2001) recommend correcting for imbalances in pre-treatment outcome variables. When controlling for the imbalance in STAI-S and PANAS-NA at Time 2, the mindfulness intervention was associated with greater reductions in anxiety and negative affect at post-treatment, relative to the distraction condition. As consistent with other investigations (e.g., Broderick 2005), these results imply that mindfulness confers some advantage over thought distraction. The prospect that mindfulness training ameliorates dependency-related distress better than distraction is augmented by this study's design, which allowed for a direct comparison of these two techniques without introducing therapist factors.

Finally, the curiosity and decentering facets of mindfulness were examined as potential mediators of treatment gains. In line with previous findings (Lau et al. 2006), decentering was a much better predictor of outcome than curiosity. Decentering accounted for 12.6 % of the variance in reductions in anxiety and 7 % of the variance in reductions in negative affect (see Table 5). Unlike the curiosity subscale, decentering remained a significant predictor of the decreases in STAI-S and PANAS-NA, even in the presence of treatment group (i.e., distraction vs. mindfulness). The discovery that treatment group was no longer a significant predictor in both the STAI-S and PANAS-NA models is congruent with the idea that decentering fully mediated treatment gains. As articulated by Lau and colleagues (2006), decentering appears to be a principal ingredient of change in mindfulness-based interventions. These results further imply that decentering

helps dependent individuals to disengage from the cognitive and affective features of dependency, which had been previously activated by the mood induction.

There are a number of limitations associated with the current research. The proposed mediators (i.e., curiosity and decentering) were assessed at the same time as the post-treatment outcome variables. Given this design, it is impossible to firmly establish that increases in decentering preceded, and therefore potentially mediated, reductions in anxiety and negative affect. Although the results of this study are consistent with, and provide preliminary support for, a mediation model, it could also be that changes in anxiety and negative affect produced the changes in decentering.

It should be noted that this study did not examine the impact of mindfulness on interpersonal dependency, *per se*. The state anxiety and state negative affect instruments merely served as proxies for studying dependency symptoms, given that dependency is strongly linked to anxiety/depression (Bornstein 2005; Overholser and Freiheit 1994). The current study would have benefited from the use of more relevant outcome variables. Unfortunately, a valid measure of state dependency does not exist.

As the vast majority of participants in the study were White (86 %), female (90 %) college students, the ability to generalize results to the broader dependent population is limited and awaits replication using a more demographically-diverse, treatment-seeking sample. Nevertheless, the observed imbalance in gender representation is typical when recruiting dependent individuals, as females tend to score higher than males on trait measures of interpersonal dependency (Bornstein 2005). Additionally, although participants in this study reported substantial levels of dependency, it is unknown to what extent their dependency scores represent clinically meaningful problems (e.g., meeting criteria for DPD).

Because dependency is associated with numerous psychological and interpersonal consequences, it is critical for researchers to redouble their efforts in developing efficacious treatments in this area. The purpose of this line of research is not necessarily to determine if mindfulness is superior to existing techniques (e.g., cognitive restructuring, interpersonal skills training, etc.). Rather, as described by Bornstein (2005), the key to successful treatment is targeting the cognitive, affective, motivational, and behavioral features of dependency with an *array* of therapeutic approaches. In other words, an integrative, multimodal intervention that incorporates mindfulness (e.g., as similar to dialectical behavior therapy; Linehan 1993) may prove to have the greatest benefit for dependent clients. Future treatment development should address the challenge of integrating change and acceptance techniques by referring to other dialectical models (e.g., Hayes et al. 1999; Linehan 1993).

This study provides the first empirical evidence that mindfulness may be an important adjunct for alleviating the

symptoms of interpersonal dependency and possibly even DPD. Considering the incipient nature of this research, applying these findings to clinical practice is severely limited without future validation. Certainly, these preliminary results imply that the intersection between mindfulness and dependency merits further refinement and study.

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