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# The relationship between dispositional mindfulness, borderline personality features, and suicidal ideation in a sample of women in residential substance use treatment

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## ABSTRACT

Borderline personality disorder (BPD), which is characterized by unstable moods, behavior, and relationships, is also associated with heightened suicidal ideation. Prior research has demonstrated that BPD and suicidal ideation are prevalent among women in substance use treatment. Efforts to treat substance use in this population are made difficult due to the severity of BPD, and it is possible that mindfulness-based interventions specific to substance use could be an effective approach for this population. However, basic research is needed on the relationship between dispositional mindfulness, BPD, and suicidal ideation among women in treatment for substance use to support their associations, which was the purpose of the present study. Pre-existing medical records were reviewed from a residential substance use treatment center. A total of 81 female patients were included in the current study. Patients completed self-report measures of mindfulness, BPD, suicidal ideation, substance use, and impression management at treatment intake. Findings demonstrated dispositional mindfulness to be negatively associated with BPD features and suicidal ideation. With the exception of self-harm, this negative relationship was found even after controlling for age, substance use, and impression management. Future research should examine whether mindfulness-based interventions are an effective treatment for comorbid substance use and BPD.

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## 1. Introduction

Findings from the National Epidemiological Survey on Alcohol and Related Conditions demonstrated a prevalence rate of 2.7% for Borderline Personality Disorder (BPD) in adults, with a higher prevalence in women than men (Trull et al., 2010). Although other epidemiological studies have not demonstrated gender differences in BPD (e.g., Grant et al., 2008), there is research to suggest that women with BPD evidence greater overall symptomatology and comorbid mental health problems (e.g., depression; Silberschmidt et al., 2015). Additionally, the prevalence of BPD in women increases when examined among individuals in substance use treatment. For instance, as many as 66% of patients in treatment for substance use meet criteria for BPD, with the median rate

across studies being 18% (van den Bosch et al., 2002). Research has shown that patients with a substance use disorder and comorbid BPD have more severe dependence symptoms (Preuss et al., 2006), earlier onset of substance use problems (Morgenstern et al., 1997), poorer social functioning (Powell and Peveler, 1996), and greater treatment dropout (Tull and Gratz, 2012). Research has also demonstrated elevated rates of suicidal ideation among individuals with a substance use disorder and BPD relative to a substance use disorder alone (e.g., Preuss et al., 2006).

Despite recovery rates and prognosis for BPD and its associated problems (e.g., suicidal ideation) improving at levels higher than previously assumed (e.g., Zanarini et al., 2010), BPD is a serious and chronic problem for many individuals, and substance use treatment outcomes are worse for patients with comorbid BPD than patients without BPD (Wilson et al., 2006). However, promising results have been found when substance use treatment includes Dialectical Behavior Therapy (DBT; Linehan, 1993a), the most widely accepted and validated treatment for BPD. A recent review of studies for comorbid substance use and BPD found that

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DBT for substance use disorders (DBT-SUD) improved patients' overall functioning, increased the number of days of abstinence, and produced more negative urine drug screens, relative to standard treatment (Kienast et al., 2014). Unfortunately, DBT is an intensive treatment program that requires considerable resources to implement effectively (Swenson et al., 2002), which is often a barrier for most substance use treatment centers. Moreover, the majority of substance use treatment centers employ group therapy as their primary treatment modality (Weiss et al., 2004), making the individual therapy component of DBT difficult to implement due to staff constraints. However, it is well established that many group treatments for substance use employ some type of skills training, usually drawn from cognitive-behavioral therapy (e.g., Litt et al., 2003), which may involve training in certain DBT skills (e.g., emotion regulation training).

In recent years there has been a surge of interest in mindfulness-based group interventions for substance use (Chiesa and Serretti, 2014; Zgierska et al., 2009), and mindfulness is a central component to DBT (Linehan, 1993a; Panos et al., 2014). Mindfulness is most commonly defined as "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 1994, p. 4). In essence, mindfulness is a "way of being" where individuals allow all experiences to naturally arise and fall without judging, clinging to, or pushing away experiences, whether pleasant or unpleasant (Kabat-Zinn, 2003). While mindfulness is a treatment target of DBT, research examining the relationship between mindfulness, BPD, and suicidal ideation among substance use samples is nonexistent. Research in this area could help advance our knowledge as to whether mindfulness-based groups could be effective for individuals with comorbid substance use and BPD, or suicidal ideation, when DBT-SUD cannot be provided.

To date, only a handful of studies have examined the relationship between mindfulness and BPD. Wupperman and colleagues (2008) demonstrated that dispositional moment-to-moment mindful attention, which is the tendency to have sustained awareness and attention to what occurs in the present moment of one's everyday life (Brown and Ryan, 2003), was negatively associated with self-reported BPD features in a sample of female undergraduate students, even after controlling for emotion regulation, interpersonal effectiveness, and neuroticism. This relationship was also demonstrated between mindfulness and self-reported BPD features in a sample of women and men with mixed primary mental health diagnoses from an adult psychiatric hospital (Wupperman et al., 2009). It is important to note that this study excluded individuals who required immediate substance use interventions. Baer and colleagues (2004) demonstrated that individuals with a BPD diagnosis reported lower dispositional mindfulness than college students without BPD. Thus, it is possible that low dispositional mindfulness is an underlying vulnerability for BPD features. No known research has examined the relationship between dispositional mindfulness and BPD features in a sample of women in substance use treatment, a population known to have increased rates of BPD.

Additional studies have examined the association between dispositional mindfulness and constructs closely related to, or often associated with, BPD. For example, studies show that dispositional mindfulness is negatively associated with rejection sensitivity (Peters et al., 2015) and impulsivity (Peters et al., 2011) among undergraduate students. Although all of these studies are important, including the studies conducted by Wupperman and colleagues, the overwhelming majority of these studies have utilized non-clinical populations (e.g., undergraduate students) or in populations where substance use was not the primary concern, and did not control for substance use, which can also impact these associated constructs. Thus, the generalizability of these studies to

individuals in substance use treatment, a population with elevated rates of BPD, is unknown.

Given that approximately 1 in 10 patients with BPD will die by suicide (Paris and Zweig-Frank, 2001) and that comorbid substance use disorders increase this risk (Black et al., 2004), it is also important to understand how dispositional mindfulness relates to suicidal ideation. Unfortunately, the majority of the literature on mindfulness and suicidal ideation is conceptual (e.g., Williams and Swales, 2004) or based on DBT studies that demonstrate reduced suicidal ideation and attempts (e.g., Linehan et al., 2006), despite being unable to untangle the effects of mindfulness on suicide-related thoughts and behaviors specifically. However, one study demonstrated dispositional mindfulness to be negatively associated with suicidal ideation in a sample of college students (Lamis and Dvorak, 2013). Still, it is likely that dispositional mindfulness would be inversely related to suicidal ideation among individuals in substance use treatment, as dispositional mindfulness would reflect greater acceptance of all experiences without judgment or attempts to suppress experiences. This, in turn, might lead individuals to reduce reactive behavior when faced with suicidal thoughts, allowing individuals to stop the downward spiral of suicidal thinking (Williams et al., 2006). However, empirical research is needed to support these assumptions.

Finally, when examining the relationships between BPD, suicidal ideation, and dispositional mindfulness, it is important to acknowledge and control for potential confounding variables which may impact study findings. Specific to the current study, impression management, the extent to which individuals portray themselves in an extremely positive manner, perhaps unwilling to endorse even minor individual flaws, is one potential confounding variable to account for. Specifically, prior research has demonstrated that there is an inverse association between impression management and BPD/suicidal ideation (e.g., Linehan and Nielsen, 1983). Additionally, some prior research has documented a positive relationship between impression management and dispositional mindfulness (Baer et al., 2004). Thus, impression management is an important variable to consider in the context of the current study as it may impact reports on the variables of interest (e.g., BPD, mindfulness).

In the current study we preliminarily examined the association between dispositional mindfulness, BPD features, and suicidal ideation in a sample of women in residential treatment for a primary substance use disorder. Examining these relationships in a sample of women in substance use treatment is important given the increased rates of BPD and suicidal ideation among substance use populations. Moreover, examining these relations among women specifically is important due to prior research suggesting women, relative to men, with BPD may have more severe symptomatology and comorbid mental health problems (Silberschmidt et al., 2015), and women with substance use disorders report more severe comorbid mental health problems than men with substance use disorders (e.g., Foster et al., 2000). We expected dispositional mindfulness to be inversely associated with BPD symptom severity and suicidal ideation, even after accounting for potential confounding variables (i.e., age, impression management, substance use). We expected this inverse relationship between dispositional mindfulness and BPD to be present when examining different features of BPD (i.e., affective instability, identity problems, negative relationships, and self-harm).

## 2. Method

### 2.1. Procedure and participants

Medical records from a private residential substance abuse

treatment facility, located in the Southeastern United States, were reviewed for the current study. Admission into the treatment facility required patients to be at least 18 years of age or older and have a primary substance use disorder diagnosis. The average length of stay at the residential program is 28–30 days, and the program is largely based on the traditional 12-step model. Upon admission to the facility, and after medical detoxification (if necessary), patients complete an intake assessment, which includes self-report measures (discussed below). The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition – Text Revision (DSM-IV-TR; [American Psychiatric Association, 2000](#)) criteria were used by the facility to diagnose substance use disorders. All diagnoses were made through the consultation of treatment team members, including a licensed psychologist, psychiatrist, general physician, and substance abuse counselor. All study procedures were approved by the Institutional Review Board of the last author.

Records from female patients who were admitted to the treatment facility from January 2012 to May 2013 were reviewed for the current study. This time frame was chosen in order to generate a large enough sample for the planned analyses. All medical records during this time period were included, and there were no exclusion criteria. This resulted in a sample of 81 female patients. The primary substance use diagnoses for this sample were opioid dependence (40.7%), alcohol dependence (35.8%), polysubstance dependence (18.5%), sedative/hypnotic/anxiolytic dependence (2.5%), and amphetamine dependence (2.5%). The majority of patients were non-Hispanic Caucasian (96.3%) with the remainder reporting their race as African American (3.7%). The mean age of patients was 32.30 ( $SD=13.95$ ; Range=18–60). The mean number of years of education completed by patients was 13.59 ( $SD=2.00$ ). Regarding relationship status, 42% of the sample reported they were married, 22.2% were divorced, and the remainder indicated “other” (e.g., dating, single).

## 2.2. Measures

### 2.2.1. Dispositional mindfulness

The Mindful Attention Awareness Scale (MAAS; [Brown and Ryan, 2003](#); [Brown et al., 2011](#)) was used to examine dispositional mindfulness. Specifically, we utilized the 14 item version of the MAAS ([Brown et al., 2011](#)), relative to the 15 item version of the MAAS, which does not contain the item “I drive places on ‘automatic pilot’ and then wonder why I went there.” The treatment facility used the 14 item version since patients cannot drive during treatment and the treatment facility wanted the option to eventually examine pre–post treatment changes in dispositional mindfulness. The MAAS captures an open state of mind, where attention and awareness of what is taking place in the present moment is observed. Items are rated on a 6-point scale (1=Almost always; 6=Almost never). A mean total score was calculated by summing all items and dividing by the total number of items, consistent with prior research using the MAAS in substance use populations (e.g., [Dakwar et al., 2011](#); [Shorey et al., 2015](#)). Thus, total scores on the MAAS can range from 1 to 6. Higher scores on the MAAS reflect a greater disposition toward mindful moment-to-moment attention. The MAAS has excellent psychometric properties ( $\alpha=.77-.90$ ; [Brown et al., 2011](#)).

### 2.2.2. Borderline personality disorder (BPD) features

The Personality Assessment Inventory ([Morey, 1991](#)) BPD scales were used to examine BPD features. The PAI contains 24 items that assess BPD features, including affective instability (mood fluctuations; difficulty regulating emotions; 6 items), identity problems (feelings of uncertainty about life and unfulfillment; 6 items), negative relationships (history of betrayal and exploitation in

relationships; 6 items), and self-harm (impulsivity that can result in self-harm; 6 items). Items are scored on a 4-point scale (1=False; 4=Very True). A total score can be obtained by summing all 24 items, and subscales can be obtained for the 4 different features assessed. The PAI-BPD scales have demonstrated high internal consistency ( $\alpha=.88$ ) and good convergent and discriminant validity ([Magyar et al., 2012](#); [Morey, 1991](#); [Trull, 2001](#)). [Morey \(1991\)](#) reports that average scores on the PAI scales are *T* scores of 59 or below, with scores from 60 to 69 indicative of potential problems and scores of 70 or higher reflecting serious problems and likely diagnostic consideration. It should be noted that [Jacobo et al. \(2007\)](#) suggest that *T* scores of 65 or higher on the PAI-BPD scale optimally differentiates patient who do and do not meet diagnostic criteria for BPD.

### 2.2.3. Suicidal ideation

The PAI ([Morey, 1991](#)) was also used to measure suicidal ideation. The suicidal ideation subscale of the PAI contains 12 items that are intended to measure suicidal ideation by the way of hopelessness, suicidal thoughts, and active suicidal plans. The suicidal ideation subscale of the PAI has been able to differentiate individuals with a previous history of suicide attempts from those with no such history ([Morey, 1991](#)). Items are scored on a 4-point scale (1=False; 4=Very True). *T* Scores of 60–69 are “atypical” and scores of 70 or above indicate a “significant warning sign” for suicide. As with other PAI subscales, the suicidal ideation subscale has demonstrated good psychometric properties ( $\alpha=.85-.93$ ; [Karlin et al., 2005](#); [Morey, 1991](#)).

### 2.2.4. Alcohol use

The Alcohol Use Disorders Identification Test (AUDIT; [Saunders et al., 1993](#)), a 10 item self-report measure, examined alcohol use in the 12 months prior to treatment entry. The AUDIT evaluates the intensity and frequency of alcohol use, symptoms that might indicate dependence or tolerance to alcohol, and negative consequences associated with alcohol use. The AUDIT, in addition to being one of the most widely used measures for alcohol use, has excellent psychometric properties ( $\alpha=.86$ ; [Babor et al., 2001](#)).

### 2.2.5. Drug use

The Drug Use Disorders Identification Test (DUDIT; [Stuart et al., 2003](#); [2004](#)), a 14 item self-report measure, examined drug use in the 12 months prior to treatment entry. The DUDIT examines the frequency of drug use and symptoms that may indicate tolerance or dependence, and specifically examines 7 different classes of drugs (cannabis, cocaine, hallucinogens, stimulants, sedatives/hypnotics/anxiolytics, opiates, and other substances [e.g., steroids, inhalants]). The DUDIT has demonstrated good psychometric properties in clinical populations ( $\alpha=.90$ ; [Stuart et al., 2004](#); [2008](#)).

### 2.2.6. Impression management

The Positive Impression Management (PIM) subscale of the PAI ([Morey, 1991](#)) was utilized to examine impression management. The 9 item PIM scale was designed to examine whether the individual is portraying him or herself in an extremely positive manner, perhaps unwilling to endorse even minor individual flaws. As with the other PAI items, items are scored on a 4-point scale (1=False; 4=Very True) and have demonstrated adequate psychometric properties ( $\alpha=.71-.77$ ; [Karlin et al., 2005](#); [Morey, 1991](#)).

## 2.3. Data analytic strategy

All analyses were conducted using SPSS version 21.0. We first conducted bivariate correlations between all study variables. Next,

to examine our main hypothesis, that dispositional mindfulness would remain associated with BPD features and suicidal ideation after controlling for alcohol use, drug use, age, and impression management, we used hierarchical multiple regression analyses. In the first step, alcohol use, drug use, age, and impression management were entered as predictors of BPD features and suicidal ideation. In the second step, dispositional mindfulness was added as a predictor. This allowed us to determine the extent to which dispositional mindfulness added unique variance to the prediction of BPD/suicidal ideation by examining the change in  $R^2$  from the first to the second model (Cohen et al., 2003). Analyses were conducted separately for each of the BPD scales and suicidal ideation.

### 3. Results

From the total sample, 38 patients (46.9%) had a  $T$  score of 70 or higher on the total BPD scale, indicating a large portion of the sample had severe BPD symptoms (Morey, 1991). For suicidal ideation, 23 patients (28.3%) had a  $T$  score of 60 or higher, suggesting atypical or serious suicidal ideation was present (Morey, 1991).  $T$  scores for all PAI variables were utilized in the remaining analyses. As displayed in Table 1, correlations showed that dispositional mindfulness was negatively and significantly associated with all of the BPD subscales and total score, as well as suicidal ideation and was positively and significantly associated with impression management. Impression management was negatively and significantly associated with all BPD subscales and total score and suicidal ideation. Interestingly, alcohol use was negatively and significantly associated with all BPD subscales (except identity problems), the total BPD score, and suicidal ideation. Drug use was positively and significantly associated with all BPD subscales and total score, as well as suicidal ideation. Age was negatively and significantly associated with all BPD scales and suicidal ideation.

Findings from the hierarchical multiple regression analyses are presented in Table 2. As displayed, dispositional mindfulness remained significantly associated with affective instability, identity problems, negative relationships, the total BPD score, and suicidal ideation. Dispositional mindfulness accounted for an additional 6–10% of the variance in these models. Dispositional mindfulness did not remain significantly associated with self-harm with the control

variables in the model. Impression management remained negatively associated with the total BPD score, affective instability, and identity problems. Drug use remained positively associated with negative relationships and self-harm.

### 4. Discussion

Findings from our preliminary study with a sample of women in treatment for substance use demonstrated dispositional mindfulness to be negatively associated with BPD features, including affective instability, identity problems, negative relationships, and self-harm, as well as suicidal ideation. With the exception of self-harm, this inverse relationship remained even after controlling for age, alcohol use, drug use, and impression management, all known correlates of BPD and suicidal ideation. These findings are consistent with previous research on the relationship between dispositional mindfulness and BPD in non-clinical and psychiatric samples (Baer et al., 2004; Wupperman et al., 2008; 2009). However, our results extend these previous findings by being the first study to examine this relationship with different facets of BPD (e.g., affective instability, identity problems). Our findings are also consistent with previous research on the relationship between dispositional mindfulness and suicidal ideation (Lamis and Dvorak, 2013), although this is the first known study to demonstrate this relationship in a clinical population known to be at-risk for increased suicidal ideation. As discussed below, pending replication and extension in future research, these findings may hold important implications for substance use treatment among individuals with co-morbid BPD and/or suicidal ideation.

Theoretically, reduced dispositional mindfulness would be consistent with the tendency for individuals with BPD and/or suicidal ideation to avoid awareness of uncomfortable emotions, sensations, thoughts, and situations (e.g., Anderson and Crowther, 2012; Chapman et al., 2005). Having a reduced ability to have mindful awareness of all experiences may promote some individuals, namely those with BPD features and/or suicidal ideation, to engage in destructive behaviors (e.g., substance use; self-injury; suicide attempts) to cope with their unpleasant experiences. Our findings, combined with previous research (e.g., Wupperman et al., 2008), and theoretical conceptualizations of BPD and suicidal behavior (e.g., Linehan, 1993a), suggest that deficits in

**Table 1**  
Bivariate correlations, means, and standard deviations among study variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. MAAS	–	0.27 <sup>†</sup>	0.00	–0.11	0.02	–0.38 <sup>***</sup>	–0.35 <sup>**</sup>	–0.41 <sup>***</sup>	–0.23 <sup>†</sup>	–0.44 <sup>***</sup>	–0.30 <sup>**</sup>
2. Impression management		–	0.31 <sup>**</sup>	–0.58 <sup>***</sup>	0.47 <sup>**</sup>	–0.53 <sup>***</sup>	–0.53 <sup>***</sup>	–0.56 <sup>***</sup>	–0.51 <sup>***</sup>	–0.68 <sup>***</sup>	–0.31 <sup>**</sup>
3. AUDIT			–	–0.58 <sup>***</sup>	0.42 <sup>***</sup>	–0.25 <sup>†</sup>	–0.22	–0.31 <sup>**</sup>	–0.32 <sup>†</sup>	–0.35 <sup>**</sup>	–0.25 <sup>†</sup>
4. DUDIT				–	–0.61 <sup>***</sup>	0.31 <sup>**</sup>	0.41 <sup>***</sup>	0.57 <sup>***</sup>	0.57 <sup>***</sup>	0.59 <sup>***</sup>	0.35 <sup>**</sup>
5. Age					–	–0.27 <sup>†</sup>	–0.37 <sup>**</sup>	–0.47 <sup>***</sup>	–0.49 <sup>***</sup>	–0.51 <sup>***</sup>	–0.24 <sup>†</sup>
6. BPD-AI						–	0.44 <sup>***</sup>	0.57 <sup>***</sup>	0.33 <sup>**</sup>	0.74 <sup>***</sup>	0.34 <sup>**</sup>
7. BPD-IP							–	0.68 <sup>***</sup>	0.40 <sup>**</sup>	0.79 <sup>***</sup>	0.34 <sup>**</sup>
8. BPD-NR								–	0.53 <sup>**</sup>	0.86 <sup>***</sup>	0.46 <sup>***</sup>
9. BPD-SH									–	0.73 <sup>***</sup>	0.29 <sup>**</sup>
10. BPD-total										–	0.45 <sup>**</sup>
11. Suicidal ideation											–
<i>M</i>	3.64	40.09	12.87	23.77	32.30	60.97	66.74	66.59	66.82	68.72	54.32
<i>SD</i>	0.89	11.23	12.81	15.13	13.95	12.26	11.86	11.80	16.50	12.91	12.39

Note: MAAS=Mindful attention awareness scale; AUDIT=Alcohol use disorders identification test; DUDIT=Drug use disorders identification test; BPD-AI=Borderline personality affective instability; BPD-IP=Borderline personality identity problems; BPD-NR=Borderline personality negative relationships; BPD-SH=Borderline personality self harm; BPD-Total=Borderline personality total

<sup>†</sup>  $p < 0.05$

<sup>\*\*</sup>  $p < 0.01$

<sup>\*\*\*</sup>  $p < 0.001$

**Table 2**  
Hierarchical multiple regression analyses predicting BPD features and suicidal ideation.

Model 1	BPD total $\beta$ $R^2=0.54$	Affective instability $\beta$ $R^2=0.29$	Identity problems $\beta$ $R^2=0.30$	Negative relationships $\beta$ $R^2=0.41$	Self-harm $\beta$ $R^2=0.40$	Suicidal ideation $\beta$ $R^2=0.14$
AUDIT	−0.02	−0.14	0.02	0.03	0.02	−.007
DUDIT	0.22	−0.07	0.11	0.33*	0.33*	0.21
Age	−0.14	−0.00	−0.11	−0.14	−0.19	0.00
Impression management	−0.48***	−0.53***	−0.42**	−0.31**	−0.24*	−0.17
Model 2	$R^2=0.63$ ( $\Delta R^2=0.09$ )	$R^2=0.36$ ( $\Delta R^2=0.07$ )	$R^2=0.36$ ( $\Delta R^2=0.06$ )	$R^2=0.51$ ( $\Delta R^2=0.10$ )	$R^2=0.42$ ( $\Delta R^2=0.02$ )	$R^2=0.20$ ( $\Delta R^2=0.06$ )
AUDIT	−0.04	−0.15	0.01	0.01	0.01	−0.08
DUDIT	0.22*	−0.07	0.11	0.32*	0.33*	0.20
Age	−0.17	−0.03	−0.14	−0.18	−0.21	−0.03
Impression management	−0.37***	−0.44**	−0.34**	−0.20	−0.19	−0.08
MAAS	−0.31***	−0.27**	−0.24*	−0.32***	−0.13	−0.26*

Note: MAAS=Mindful attention awareness scale; AUDIT=Alcohol use disorders identification test; DUDIT=Drug use disorders identification test

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

dispositional mindfulness are an important correlate of BPD and, therefore, are a potentially important target of intervention for women in substance use treatment with these comorbid problems. However, it is not clear whether low dispositional mindfulness represents a risk factor for, or is a feature of, BPD. Longitudinal research is needed to help answer this important theoretical question.

Although dispositional mindfulness accounted for significant variance in BPD features and suicidal ideation above and beyond alcohol use, drug use, impression management, and age, there was considerable variance still unaccounted for in these outcomes. Thus, additional research should examine other facets of dispositional mindfulness and their relation to BPD and suicidal ideation. That is, the measure we utilized to examine dispositional mindfulness, the MAAS, only examines the moment-to-moment quality of attention and awareness that is part of dispositional mindfulness, although dispositional mindfulness is believed to include additional qualities, such as non-judgment, non-reactivity, openness to experience, and curiosity, to name a few (Davis et al., 2009; Desbordes et al., 2014). The inclusion of these qualities of dispositional mindfulness may provide a more comprehensive picture of the relationship between mindfulness and BPD features and suicidal ideation, as well as determine whether various qualities of mindfulness have differential relations with different features of BPD/suicidal ideation.

It is worth noting that, in our sample, alcohol was inversely associated with BPD features in the bivariate correlations and was unrelated to BPD in the hierarchical regression analyses. This is surprising given the high comorbidity between BPD and alcohol use disorders (e.g., Trull et al., 2000) and the positive association between alcohol use and BPD symptoms in prior research (e.g., Stepp et al., 2005). However, drug use was positively associated with BPD features in the correlation analyses and in a few of the regression models. It is possible that, in our sample, women with elevated BPD features were more likely to use drugs than alcohol and additional research is needed to replicate this finding before firm conclusions can be made regarding this unexpected relationship.

Other areas for future research on this topic include longitudinal studies that examine the prospective ability of dispositional mindfulness to account for BPD symptoms and suicidal ideation. We are unaware of any study to date, with any population, which has examined these relationships longitudinally. Because it is possible that BPD leads to lower dispositional mindfulness, longitudinal studies will help to disentangle the temporal order of these relationships. It would also be informative for future research to examine whether deficits in dispositional mindfulness

mediate the relationship between certain hypothesized etiological factors that result in BPD, such as childhood abuse, which would be consistent with theoretical conceptualizations of mindfulness and BPD. In addition, these relationships should be examined among men in substance use treatment, who also demonstrate high rates of BPD and suicidal ideation (e.g., Tull et al., 2011).

Certainly one direction for future research is to examine the effectiveness of mindfulness-based interventions for substance use among women with comorbid BPD and/or suicidal ideation. Indeed, group-based mindfulness interventions for substance use have received increasing empirical support in recent years (Chiesa and Serretti, 2014) and are less resource intensive to implement than DBT-SUD. However, we are unaware of any study that has specifically examined whether these mindfulness-based interventions for women in substance use treatment are also effective for individuals with comorbid BPD and/or suicidal ideation. Preliminary evidence suggests that a mindfulness-based intervention reduced substance use and aggression from pre-to-post treatment among a small sample of women ( $N=14$ ) arrested for domestic violence and court-referred to both substance use and aggression treatment (Wupperman et al., 2012). Given that women court-referred to domestic violence and substance use treatments is a population with high rates of BPD (Shorey et al., 2012), mindfulness-based interventions may be effective for women with comorbid BPD, substance use, and suicidal ideation. Our findings support the relationship between these variables and suggest that mindfulness-based interventions may be appropriate for this population. Still, larger, randomized controlled trials of mindfulness-based interventions for this population is warranted.

The present study is not without its limitations that should be addressed in future research. Our sample was comprised of primarily non-Hispanic Caucasian women, who were in residential substance use treatment, limiting the generalizability of our findings to more diverse and non-substance abusing samples. Moreover, all women were from the same treatment facility. Future research should utilize more diverse samples, drawn from various populations (e.g., substance use treatment, community) to enhance generalizability. The sample size for the current study was relatively small, although it was larger than previous research examining dispositional mindfulness and BPD features in a clinical sample (Wupperman et al., 2009). Still, larger samples should be employed. The cross-sectional design of the study precludes the determination of causality among study variables and, therefore, longitudinal studies are needed to examine whether dispositional mindfulness predicts BPD features over time, whether BPD features predict mindfulness deficits, or whether there is a reciprocal relationship among variables. We also did not ask about previous

suicide attempts, and future research should include this in their examination between mindfulness and suicidal ideation.

The assessment of dispositional mindfulness also has limitations. There is no doubt that the MAAS is one of the most widely used measures of dispositional mindfulness, and its psychometric properties and construct validity are well established (Brown and Ryan, 2003; Brown et al., 2011). However, there is an ongoing debate as to whether dispositional mindfulness should be assessed as a unidimensional or multidimensional construct (Baer et al., 2009). Indeed, there are additional self-report measures of dispositional mindfulness which contain two (Davis et al., 2009), four (Baer et al., 2004), and five (Baer et al., 2006) factors. Future research should examine various self-report measures of dispositional mindfulness as they relate to BPD features. We also did not have access to individual items for each self-report measure, only total scores, and thus are unable to report internal consistencies for our sample. Although the measures used in the current study have demonstrated strong psychometric properties in previous samples, we recognize the importance of including reliability estimates with the current sample (e.g., Tavakol and Dennick, 2011), and future research should include such estimates. Due to the preliminary nature of our study we did not control for family-wise error. The treatment facility does not include an assessment of additional personality traits that may be important to control for (e.g., Big Five personality traits) and future research should control for these factors. Finally, the treatment facility where charts were reviewed does not conduct structured diagnostic interviews, either for substance use or comorbid mental health problems. Thus, we are unable to determine if patients had additional mental health diagnoses other than substance use that may have impacted study findings. Using structured diagnostic interviews in future research will provide more confidence in diagnoses.

In summary, these are the first empirical findings to demonstrate a relationship between dispositional mindfulness, BPD features, and suicidal ideation in a sample of women in residential substance use treatment, a population at heightened risk for BPD and suicidal ideation. Moreover, dispositional mindfulness remained associated with BPD features and suicidal ideation even after controlling for age, alcohol use, drug use, and impression management. These findings, combined with theoretical understandings of mindfulness and the treatment of BPD/suicidal ideation, raise the possibility that mindfulness-based interventions for women in substance use treatment may help to reduce BPD features and suicidal ideation. When DBT-SUD cannot be implemented due to staff, resource, and training constraints, mindfulness-based groups may provide an alternative treatment route for this high-risk population. However, as our study is preliminary, additional research is needed to replicate and extend our findings before firm conclusions can be made regarding treatment implications.

### Conflict of interest

Drs. Shorey and Stuart receive consulting compensation from Cornerstone of Recovery.

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