

ARE DEFICITS IN MINDFULNESS CORE FEATURES OF
BORDERLINE PERSONALITY DISORDER?

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Dissertation Prepared for the Degree of
DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS

August 2006

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Wupperman, Peggilee, Are Deficits in Mindfulness Core Features of Borderline Personality Disorder? Doctor of Philosophy (Clinical Psychology), August 2006, 100 pp., 3 tables, 4 illustrations, references, 217 titles.

Mindfulness is a core component of dialectical behavior therapy (DBT), a widely utilized treatment for borderline personality disorder (BPD); however, the import of mindfulness in treating BPD has yet to be demonstrated, and the relationship of mindfulness to BPD constructs is unclear. The current study utilized structural equation modeling to examine the relations of mindfulness with BPD features and the underlying constructs of interpersonal problem-solving effectiveness, impulsivity, emotion regulation strategies, and neuroticism in 342 young adults. Mindfulness was significantly related to effectiveness in interpersonal problem-solving, impulsivity and passivity in emotion regulation, and borderline features. Furthermore, mindfulness continued to predict borderline features when controlling for interpersonal problem-solving and impulsive/passive emotion-regulation strategies, as well as when controlling for neuroticism. It is concluded that difficulties with mindfulness may represent a core feature of BPD and that improvement in mindfulness may be a key component of treatment efficacy with BPD. It is recommended that the unique contribution of mindfulness be investigated in future treatment-outcome research.

ACKNOWLEDGEMENTS

Thanks to Craig Neumann, Seth Axelrod, Randall Cox, and Richard Rogers for providing guidance, humor, compassion, and wisdom throughout my training.

Additional thanks and gratitude to my oh-so-cherished support system: Richard, Bi, Gracie, Mike, Jeannie, Joleen, Phillip, Jack, Linda, June, Mystery Players, Lynn, Dode, and Herbert.

Finally, special thanks to the patients in the DBT program at the Yale-New Haven IOP. Your warmth and courage are truly inspiring, and I am grateful to have had the honor of being part of your lives.

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INTRODUCTION

Mindfulness training is a core component of dialectical behavior therapy (DBT; Linehan, 1993a), one of the most effective and widely utilized treatments for borderline personality disorder (BPD; Bohus, Haaf, Simms, Limberger, Schmahl, & Unckel, 2004; Koerner & Linehan, 2000; Koons, Robins, Tweed, Lynch, Gonzalez, & Morse, 2001; Linehan, Heard, & Armstrong, 1993). Mindfulness has been defined as a state in which an individual is focused, aware, and accepting of the present moment, without becoming over-involved in cognitive or emotional reactions to the situation (Kabat-Zinn, 1982). Core mindfulness skills compose the first module in the DBT training program, and mindfulness continues to be taught and monitored throughout the subsequent modules (which include emotional-regulation, interpersonal skills, and distress tolerance). Many believe deficits in mindfulness to be characteristic of individuals with BPD (Cheavens, Rosenthal, Daughters, Nowak, & Kossonc, 2005; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Linehan 1993a); specifically, individuals with BPD appear to have problems with awareness, attention, and acceptance in regard to self, emotions, thoughts, and the environment. Additionally, some suggest that difficulties with mindfulness may play a particularly important role in coping strategies that contribute to BPD-related difficulties with interpersonal effectiveness, impulsivity, and emotional regulation (Cheavens et al., 2005; Linehan, 1993a). However, research has yet to explore the relationship of mindfulness to overall features or characteristic BPD coping strategies.

Borderline Personality Disorder (BPD): Clinical Significance

Borderline personality disorder is a severe and complex disorder characterized by a pervasive pattern of instability, as expressed by marked impulsivity and instability in affect, interpersonal relationships, and identity (American Psychiatric Association, 2000). BPD is relatively common compared to other forms of severe psychopathology, with prevalence rates of 2-4% in the general population (e.g., Swartz, Blazer, George, & Winfield, 1990; Zimmerman & Coryell, 1989). BPD is the most frequently diagnosed personality disorder in clinical settings, with 11% of outpatients and 19-50% of inpatients estimated to meet criteria (Linehan, 1993a; Beck, Freeman, & Davis, 2004). Of patients diagnosed with personality disorders, 33% of outpatients and 63% of inpatients meet BPD criteria (Widiger & Francis, 1989).

BPD has enormous societal costs, comparable to schizophrenia (Linehan & Heard, 1999; Van Asselt, Dirksen, Severens, & Arntz, 2002), and it is associated with suicide attempts (with a 10% fatality rate), self-mutilation, substance abuse, eating disorders, increased utilization of healthcare, less successful outcomes when treating Axis I disorders, and severe impairment in individuals' lives (APA, 2000; Van Asselt et al., 2002; Linehan, 1993a; Paris, 1993; Shea, Widiger, & Klein, 1992; Trull, Sher, Minks-Brown, Durbin, & Burr, 2000). Many individuals with BPD have either no jobs or low-paying jobs far below their abilities (Beck et al., 2004). They tend to be burdens on their family and friends, and they have a greatly increased risk of inducing psychopathology in their offspring (Weiss et al., 1996).

Borderline Personality Disorder: History, Differing Views, and Areas of Agreement

The term “borderline” was introduced in the 1930s to describe patients who did not respond to traditional psychoanalytic treatment and who had problems that were thought to fall somewhere between neurosis and psychosis (Stern, 1938). The term then evolved in the object-relations community to denote both a type of personality organization and an intermediate level of severity of personality functioning. Object relations are conceptualized as dynamic mental representations that result from internalization of relationships with caregivers (Clarkin, Levy, Lenzenweger, & Kernberg, 2004). In this view, a borderline personality organization is related to suboptimal family environments that result in a fixation in the separation-individuation phase of childhood development. It is characterized by identity diffusion (e.g., inconsistency in view of self and others) and the use of primitive defenses such as dissociation and splitting. Object relations are split and organized according to their “good” or “bad” valence, thus preventing the aggressive impulses attached to the bad representations from destroying the good representations (Kernberg, 1996; Kernberg, Selzer, Koenigsber, Carr, & Applebaum, 1989).

In the 1970s, Gunderson and Singer (1975) drew upon extensive empirical research and clinical observations to establish the first operational definition of BPD. This definition was the basis for the BPD criteria in the DSM-III and is similar to the criteria in the DSM-IV (APA, 1987, 2000; Beck et al., 2004). This conceptualization of BPD consists of several eclectic symptoms that constitute a pervasive pattern of instability in emotions, interpersonal relationships, behaviors, and sense of self (see Appendix A). Consistent with

the nature of the DSM, this definition is based on group consensus of signs and symptoms as opposed to underlying theory about etiology.

Substantial research has recently focused on the relationship between attachment and BPD. Several studies have found that individuals with BPD tend to have unresolved attachment, which includes lapses and discrepancies between feeling and thinking while reporting memories of past traumas and attachment relationships (Bateman & Fonagy, 2004a; Fonagy et al., 1996; Patrick, Petit, David, Kistner, & Joiner, 1994). Research indicates that adults with such attachment tend to have had disorganized attachment to their mothers as children (Gunderson, 2005). Disorganized attachment is thought to occur when an individual is subjected to situations in which the parent is simultaneously the source of fear and feelings of safety (van I Jzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). Thus, disorganized attachment is often the result of childhood abuse, neglect, instability, or other traumatic events, especially those events in which parents or caretakers were involved.

Research has recently focused on attachment's role in mentalization, which is defined as the ability to understand and interpret behaviors of self and others in terms of underlying mental states (Bateman & Fonagy, 2003, 2004a, 2004b). The development of mentalization capabilities requires safe, secure child-caregiver relationships with contingent and marked mirroring of the child's emotional expression (see Bateman & Fongy, 2004a). Failures in mentalization may lead individuals to treat internal experiences as external reality. For example, feeling anger may not mean "I am angry at her," as much as it would mean, "She is hateful." Thus, problems with attachment may lead to problems with mentalization, which are thought to underlie the chronic instability in BPD.

A separate line of research has frequently found trauma in the histories of those with BPD (Antz, Dietzel, & Dreessen, 1999; Sabo, 1997; Zanarini, 2000; Yen et al., 2002b). Studies routinely show that BPD is associated with sexual and physical abuse in childhood; however, only rates of sexual abuse are consistently reported to be higher in BPD patients than in those with other personality disorders (Zanarini & Frankenburg, 1997). Research shows that up to 70% of BPD patients report childhood sexual abuse (Zanarini, 2000). However, sexual abuse is not reported by all BPD patients, and all known cases of sexual abuse do not necessarily lead to BPD (Zanarini, 2000). Thus, sexual abuse alone does not appear to be a necessary or sufficient condition for BPD (Bateman & Fonagy, 2004a; Bradley, Jenei, & Westen, 2005).

Some researchers point out that sexual abuse is more likely to occur in families also characterized by other risk factors such as neglect, emotional abuse and withdrawal, invalidation of the child's feelings, inconsistent treatment, abandonment, and failure to protect the child (Bradley et al., 2005; Zanarini et al., 1997). Thus, these factors may interact (with each other or with sexual abuse) to contribute to the development of BPD. This is consistent with research showing that BPD is predicted by abuse, neglect, and unstable and unpredictable early environments (Arntz et al., 1999; Bradley et al.; Helgeland & Torgersen, 2004).

Many cognitive theorists believe that it is not the abuse, neglect, or unstable environments in and of themselves that lead to BPD, but it is instead the way the child processes the situations and ascribes meaning to them (Arntz, 1994; Beck et al., 2004). According to this view, the abusive, invalidating, and unstable experiences as a child may lead to the formation of dichotomous thinking and pathogenic core beliefs. Research has

supported the assertion that individuals with BPD tend to exhibit dichotomous thinking and endorse the beliefs that they are bad and unacceptable, they are powerless and vulnerable, and the world is dangerous and malevolent (Arntz et al., 1999; Giesen-Bloo & Arntz, 2003; Pretzer, 1990). Thus, cognitive theorists assert that it is these views of self and the world that then lead to emotional dysregulation and other BPD symptomatology.

Finally, some theorists espouse a biosocial explanation of BPD (Linehan, 1993a; Paris, 1993; Stone, 1987). The biosocial model asserts that BPD is primarily a dysfunction of the emotion-regulation system, which is caused by the combination of biological temperament and invalidating environments, as well as their interaction and transactions over time. Invalidating environments in childhood are thought to impede the development of adaptive skills to regulate emotions, which are easily triggered and often painful in persons with a biological vulnerability to heightened affectivity. Invalidating environments contribute to emotional dysregulation by failing to teach the child how to label and modulate emotion, tolerate distress, and trust her or his own emotional reactions as valid interpretations of situations (Farrell, 1994; Linehan, 1993a, 1993b). Extensive literature indicates that one must first learn to become aware of and label distinct emotions before one can then begin to adaptively regulate them (Bateman & Fonagy, 2004a; Greenberg & Saffran, 1984; Mayer, & Geher, 1996; Monsen, Odland, Faugli, Daae, & Eilertsen, 1995). However, invalidating environments may lead individuals to doubt and invalidate their own emotions and interpretation of internal and external events. In such environments, individuals may begin to internalize the environment's denigration and disqualification of their emotions and interpersonal perceptions, eventually judging their own emotions and perceptions as bad or wrong. As a consequence, these individuals are thought to become less aware or

mindful of the emotions and interpretations they experience (Bateman & Fonagy, 2004a; Linehan, 1993a), and thus less able to tolerate or regulate them and more likely to attempt to avoid them (Bijttebier & Vertommen, 1999; Kehrer & Linehan, 1996; Rosenthal, Cheavens, Lejuezb, & Lynch, 2005). Therefore, according to the biosocial model, the interaction between biological temperament and invalidating environments contributes to the mindfulness deficits and emotion dysregulation of BPD, which then contributes to further instability in interpersonal relationships, behavior, cognition, and sense of self (Linehan, 1993a; Paris, 1993). Therefore, the chronic instability experienced by individuals with BPD may be at least partially related to difficulties with mindfulness.

In summary, theories have proposed a variety of paths that lead toward BPD symptomatology. However, most theories that specify etiology include common elements: First, individuals with BPD are likely to have had childhood family environments that were somehow invalidating, whether it be through neglect, instability, or emotional, physical, or sexual abuse (Bradley et al., 2005; Fonagy et al., 1996; Beck et al., 2004; Linehan, 1993a; Zanarini et al., 1997). Second, individuals with BPD symptomatology have difficulty with awareness, understanding, and regulation of emotions; as well as instability in interpersonal relationships and problems with impulsivity and behavioral control (Berg, 1980; Bateman & Fonagy, 2004a; Berlin & Rolls, 2004; Farrell, 1994; Clarkin et al., 1993; Linehan, 1993a; Siever, Torgerson, Gunderson, Livesley, & Kendler, 2002; Stein, 1996). This is consistent with results from recent studies indicating that BPD is largely characterized by three core features: emotion dysregulation, disturbed interpersonal relatedness, and impulsivity/behavioral dyscontrol (Skodol, Gunderson, Pfohl, Widiger,

Livesley, & Siever, 2002a; Skodol, Siever, Livesley, Gunderson, Pfohl, & Widiger, 2002b; Siever et al., 2002).

Emotion Dysregulation and BPD

Emotion regulation involves the following components: awareness and understanding of emotions, willingness to experience emotions, ability to control maladaptive impulsive behaviors when experiencing unpleasant emotions, and capacity to flexibly use modulation strategies that are appropriate to the situation and desired outcome (Gratz & Roemer, 2003; Linehan, 1993a). Substantial research supports the role of emotional dysregulation in individuals with BPD features (Berg, 1980; Berlin & Rolls, 2004; Clarkin, Hull, Cantor, & Sanderson, 1993; Farrell, 1994; Gunderson, 1996; Levine, Marziali, & Hood, 1997; Slodol et al., 2002b; Stein, 1996; Yen, Zlotnick, & Costello, 2002a), and many believe it to be the core component of BPD (Chapman et al., 2005; Linehan, 1993a; Pukrop, 2002; Rosenthal et al., 2005). Research and clinical observation has consistently shown that individuals with BPD appear to exhibit patterns of dysregulated affect, reflected in a tendency to become extremely emotional, depressed, anxious, or angry with mild provocation (Berg, 1980; Berlin & Rolls, 2004; Clarkin et al., 1993; Linehan, 1993a). Furthermore, the DSM-IV lists emotion instability as core element of BPD (APA, 2000).

When compared to controls, individuals with BPD report lower levels of emotional awareness, more intense responses to negative emotions, less ability to coordinate mixed-valence emotions, and more intense reactions to negative emotions (Levine et al., 1997). Moreover, individuals with BPD show higher levels of unpleasant emotions and more numerous short-term fluctuations in negative affect over time than do individuals without BPD (Stein, 1996). Levels of affect intensity and affect dyscontrol are significantly

correlated with number of BPD features, even when controlling for depression levels (Yen et al., 2002a). The association between affect control and BPD features remains significant even when affect intensity is controlled.

Severity of BPD features is also negatively associated with the Trait Meta-Mood Scale, a multiscale measure of emotional repair, defined as the perceived ability to alleviate unpleasant emotions and maintain pleasant moods (Leible & Snell, 2003; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). Not surprisingly, individuals with BPD also feel less able to tolerate negative emotions and report more beliefs that emotions can have harmful consequences (Gratz & Tull, 2005). Because of these strong negative emotions coupled with difficulties in emotion modulation, individuals with BPD may resort to rigid coping strategies, such as chronic passivity, in response to emotions. Research indicates that persons with BPD display a propensity to cope with distressing problems in a passive and helpless manner, often waiting for the external environment to provide solutions to their problems (Chan, 2005; Linehan, Camper, Chiles, Strosahl, & Shearin, 1987; Linehan, 1993a; Zittel, 2004).

Thus, this combination of findings suggests that individuals with BPD experience a greater intensity of negative emotions as well as greater difficulties being aware of these emotions, understanding and accepting these emotions, and regulating these emotions in adaptive and appropriate methods. To address these widely accepted difficulties in emotion regulation, DBT includes training in emotion-regulation as one of the four skills-training modules (Linehan, 1993b). In addition, emotional awareness, acceptance, understanding, and modulation are primary foci in the more interpersonally oriented individual sessions of DBT (Linehan, 1993b).

Impulsivity in BPD

Maladaptive impulsivity is a core feature of BPD (Hurt, Clarkin, Munroe-Blum, & Marziali, 1992; Skodol et al., 2002a; Slodol et al., 2002b). The DSM–IV (APA, 2000) includes impulsivity as a primary element of BPD, and one BPD diagnostic criteria requires “impulsivity in at least two areas that are potentially self-damaging (e.g., spending, sex, substance abuse, reckless driving, binge eating)” (p. 710). Research suggests that the impulsivity displayed in individuals with BPD consists of a combination of inattentiveness and a tendency toward action based on immediate gains or results with little focus on potential negative consequences (Hochhausen, Lorenz, & Newman, 2002; van Reekum et al., 1994).

Research indicates that this maladaptive impulsive behavior in BPD individuals may serve as a coping strategy in an effort to regulate emotions and thus avoid or escape from strong emotional distress (Chapman, Specht, & Cellucci, 2005; Gratz, 2003; Suyemoto & MacDonald, 1995). For example, self-harm is the most salient impulsive behavior in BPD, and 69% to 80% of individuals with BPD engage in self-harm behavior (Clarkin, Widiger, Frances, Hurt, & Gilmore, 1983; Cowdry, Pickler, & Davis, 1985). Self-harm includes intentional and severe self-harming behaviors, such as cutting, burning, and other self-mutilation, that are not meant to be lethal (Kehrer & Linehan, 1996). Individuals who engage in intentional self-harm report that the behavior provides almost immediate relief from seemingly intolerable anxiety, tension, and/or distress (Kemperman et al., 1997; Michel, Valach & Waeber, 1994; Wilkins & Coid, 1991).

One relevant study utilized physiological measures to assess patterns of arousal in male prisoners with BPD features who were exposed to imagery of self-harm behavior

(Haines, Williams, Brain, & Wilson, 1995). Self-harm individuals displayed reductions in negative physiological arousal both when exposed to standardized imagery of self-harm and to imagery related to their latest self-harm episode. This is in direct contrast to the non-self-harm individuals, who displayed increases in negative physiological arousal when exposed to self-harm imagery. Results from another study utilizing similar methods provided further evidence that self-harm behaviors are conditioned strategies for escaping emotional distress (Welch, 2005).

Research indicates that other maladaptive impulsive behaviors, such as substance abuse, binge eating, and aggression, may also be attempts by individuals with BPD to regulate or escape from distressing situations and emotions (Chan, 2005; Kehrer & Linehan, 1996; Ottenbreit & Dobson, 2004; Paxton & Diggins, 1997). For example, cravings and relapses in substance abusers with BPD were more likely to be triggered by negative emotional states, tension, social rejection, and negative physical states than were cravings and relapses in substance abusers without BPD (Kruegelbach, McCormick, Schulz, & Grueneich R., 1993). Other research suggests that that impulsive aggressive behavior and overt hostility may serve as emotion-regulation strategies (Jakupcak, Lisak, & Roemer, 2002; Jakupcak, Tull, Roemer, 2005). This is congruent with experimental results showing that aggressive behavior functions as an attempt to regulate affective states (Bushman, Baumeister, & Phillips, 2001).

This combination of findings indicates that maladaptive impulsive behaviors in individuals with BPD may actually be problem-solving efforts focused on reducing or avoiding emotions when faced with seemingly unbearable situations (Evans, Williams, O'Loughlin, & Howells, 1992; Kehrer & Linehan, 1996; Maris, 1971). Consistently, when

compared with psychiatric controls and non-clinical populations, self-harm individuals with BPD tend to report less confidence in their problem-solving skills and generate fewer solutions to problematic vignettes (Evans et al., 1992; McLeavey, Daly, Murray, O’Riordan, & Taylor, 1987; Platt & Spivack, 1975a). Individuals with BPD also report more maladaptive soothing behaviors in response to emotional arousing problems than did depressed individuals or non-psychiatric controls (Sansone, Fine, & Mulderig, 1991). The latter finding is consistent with research showing that self-harm individuals who are presented with emotionally distressing problems on a revised Means-End Problem Solving Test (Platt & Spivack, 1975a) offer more inappropriate impulsive solutions (such as aggression toward others, self-harm, binge eating, and substance abuse) than do psychiatric controls (Kehrer & Linehan, 1996). To address this maladaptive impulsive behavior, DBT includes distress-tolerance training as a means to help BPD patients learn to tolerate emotional distress without engaging in maladaptive behaviors (Linehan, 1993b).

Interpersonal Difficulties and BPD

Individuals with BPD tend to have extensive and pervasive problems with interpersonal relationships (Allen & Whitson, 2004; Linehan, 1993a; Beck et al., 2004; Skodol et al., 2002a; Skodol et al., 2002b), to the extent that the DSM-IV lists unstable interpersonal relationships as a core element of BPD (APA, 2000). Moreover, a factor-analysis of the prototype validity of the DSM-IV borderline construct found that the criterion of unstable relationships demonstrated the highest diagnostic efficiency of all criteria (Johansen, Karterud, & Pedersen, 2004).

Research shows that depressed BPD patients report greater interpersonal sensitivity and more paranoid ideation than do depressed patients with no personality disorder (PD),

as well as more anger and lower cooperativeness than depressed patients with other PDs (Joyce, Mulder, & Luty, 2003). Interpersonal sensitivity, impulsivity, and aggression have also been shown to predict borderline features in college and community populations (Cheavens, Rosenthal, Daughters, Nowak, Kosson et al., 2005). Additionally, an examination of individuals with post-traumatic stress symptoms found that individuals who met BPD criteria exhibited more functional impairment on social and occupational measures than did those who did not meet criteria (Connors, Davidson, & Hughs, 2002).

Additional research (Chan, 2005) found that women with BPD had more chaotic and intense relationships than did controls, and that a significant part of these interpersonal problems was caused by the use of an avoidance style of interpersonal problem-solving. Findings indicated that the much of the difficulties maintaining supportive relationships were the result of combined tendencies to ignore problems, attempt to have others solve problems for them, and engage in maladaptive behaviors (e.g., attacking others) in response to feelings of shame. Another study (Douglas, 2000) focused on self-harm DBT outpatients with marked borderline features. When compared to normative samples, these patients demonstrated deficits in overall interpersonal problem-solving ability, including more avoidance of problems through procrastination, passivity in response, and dependence on others to solve their problems. These patients also reported less confidence in their problem-solving ability, feelings of low personal control in problem-solving tasks, and views of problems as unsolvable and as threats to their well-being. Those who met full BPD criteria displayed more deficits in interpersonal problem-solving than did those who were below diagnostic threshold.

Consistently, research indicates that persons with BPD-related features (i.e., persons who are actively self-harm, who abuse substances, and/or experience intense dysphoria) demonstrate less effective and more avoidant interpersonal problem-solving on the Means-End Problem Solving Tasks (MEPS) than do persons without such severe features (Evans et al., 1992; Intagliata, 1978; McLeavey et al., 1987; Platt et al., 1973; Platt & Spivack, 1975a). Moreover, because of the widely accepted deficits in interpersonal problem-solving evidenced by individuals with BPD, training in interpersonal problem-solving skills is one of the four skills-training modules of DBT (Linehan, 1993b). Thus, deficits in interpersonal problem-solving appear to play an important role in the interpersonal difficulties experience by persons with BPD.

Avoidance And BPD Symptomatology

Recent research suggests that much of the overall symptomatology of BPD may be related to the reluctance of individuals with BPD to experience situations or emotions that are unpleasant or uncomfortable (Chapman, et al., 2005; Levine et al., 1997; Linehan, 1993a). In an effort to cope with their intense negative emotions and emotion-regulation difficulties, people with BPD appear to display a tendency to engage in experiential avoidance, or the unwillingness to experience and process specific emotions, body sensations, thoughts, and behaviors (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Rosenthal et al., 2005). Individuals with BPD seem to respond to negative affect or distressing situations by attempting to avoid the emotions, cognitions, and sensations that are elicited (Chapman et al., 2005; Kehrer & Linehan, 1996; Linehan, 1993a; Rosenthal et al., 2005). It is possible that high levels of emotional distress, routinely experienced by borderline individuals, may increase the likelihood of utilizing experiential avoidance to

momentarily escape from the intense pain and discomfort that tends to be associated with such distress (Chapman et al., 2005; Teasdale et al., 2002). Avoidance of such experiences can involve distraction, denial, thought suppression, excessive passivity, substance abuse, self-harm, other impulsive behaviors, disengagement, and dissociation (Ottenbreit & Dobson, 2004).

Consistently, a study of borderline features in prison inmates found borderline severity to be positively associated with avoidance of thoughts and internal experiences (Chapman et al., 2005). Levels of BPD features are also correlated with decreased social-support seeking and increased avoidance/escape in response to stressors (Bijttebier & Vertommen, 1999). Moreover, substance abusers with BPD use more avoidance/escape reactive methods than do substance abusers without BPD (Kruegelbach, McCormick, Schulz, & Grueneich, 1993).

BPD severity is also positively related to several measures of more specific avoidant-coping strategies, including thought suppression, mental disengagement, denial, and substance abuse (Chapman et al., 2005). Consistently, the borderline-personality scale on the Millon Clinical Multiaxial Inventory (MCMI-III) displayed moderately positive associations with avoidant-coping methods such as self-distraction, behavioral disengagement, denial, and alcohol/drug use (Vollrath, Alnaes, & Torgersen, 1998). Furthermore, clinical literature also indicates that persons with BPD display high rates of clinical difficulties related to experiential avoidance, including bulimic symptomatology (Paxton & Diggins, 1997), dissociative episodes (Linehan, 1993a; Wagner & Linehan, 1998), and alcohol/drug use (Grilo, Walker, Becker, Edell, & McGlashan, 1997; Malow, West, Williams, & Sutker, 1989).

Unfortunately, the short-term effect of thought suppression and other forms of experiential avoidance is usually a reduction in the unpleasant or uncomfortable events or emotions, thus reinforcing the avoidance. However, efforts to control or suppress one's mood and thoughts can actually cause those experiences to continue or even escalate over time (Gold & Wegner, 1995; Hayes et al., 2005; Salkovskis & Campbell, 1994) and may also result in maladaptive avoidance behaviors including self-harm, substance abuse, dissociation, or chronic passivity (Chapman et al., 2005; Linehan, 1993a; Polusny & Follette, 1995).

For example, measures of experiential avoidance are positively related to depression, anxiety, agoraphobia, trauma symptoms, fear of intimacy, and general psychological distress (Hayes et al., 2004). Longitudinal research shows that peak levels of avoidant coping predict increased depressive symptoms, whereas peak levels of emotional processing predict decreased symptoms (Hayes, Beevers, Feldman, Laurenceau, & Perlman, 2005). Furthermore, research shows that thought suppression, or the attempts to inhibit thoughts associated with negative affect, mediates the association between childhood maltreatment and psychological distress in adults (Krause, Mendelson, & Lynch, 2003).

Experiential avoidance also appears to impact the severity of BPD features. Thought suppression and avoidant coping-styles are predictive of both self-harm and severity of BPD features in female prison inmates (Chapman et al., 2005). Thought suppression also mediates the association between negative affect and psychological distress in both clinical and nonclinical populations (Lynch, Robins, Mendelson, & Krause, 2001), as well as the relationship between negative affective intensity/reactivity and BPD features in a

college/community sample (Rosenthal et al., 2005). Additionally, outpatients with BPD reported more experiential avoidance and anxiety sensitivity than did those without BPD (Gratz & Tull, 2005). Anxiety sensitivity, or the propensity to believe that anxiety symptoms will have harmful consequences, is a vulnerability for psychopathology, possibly because of its association with avoidant coping (Zvolensky & Forsyth, 2002). Consistent with this hypothesis, experiential avoidance mediated the relationship between anxiety sensitivity and borderline symptoms (Gratz & Tull). Mechanisms by which avoidance may increase borderline symptoms include: increasing harmful categorization of emotion, increasing ruminatory response style, and lowering distress-tolerance capacity.

Categorization of Emotion

One potential harmful effect of experiential avoidance is that it can lead to the inflexible categorization of internal events as negative and harmful, thus contributing to further avoidance and to distress when those events occur (Hayes et al, 1999; Williams et al., 2002). Researchers point out that human beings can learn to categorize internal events and then generalize them to any setting (Cheavens et al., 2005; Hayes et al., 1999; Hayes et al., 2004; Linehan, 1993a). For example, an individual may categorize a set of situational signals, physical sensations, and behavioral urges as *anxiety* and appraise it as *bad* or *intolerable*. This aversive state can then be remembered or expected (e.g., "I felt anxious when I asserted myself. Anxiety is bad, so I better not assert myself" or "I will get anxious if I go to the party, so I will stay home"). Similarly, a person may also categorize others' behavior and act accordingly (e.g., "I feel upset/bad when my partner criticizes me. It's mean to make someone feel bad. Therefore, when my partner criticizes me, my partner is being mean").

Because unpleasant experiences of anxiety can occur in response to thoughts and emotions themselves (i.e., internal events), distress and discomfort cannot be avoided solely by avoiding external situations. Thus, the focus of avoidance can become the negatively evaluated thoughts and emotions themselves. For example, if an individual evaluates anxiety as *bad* or *unbearable*, that individual may not only avoid situations that evoke anxiety, but may also actively avoid or suppress anxiety-related thoughts and emotions. For persons with BPD, who have often had extensive experiences of having their emotions invalidated and judged as *bad* or *overreactions* (Linehan, 1993a), these negative evaluations may generalize to all emotions that are even mildly unpleasant or uncomfortable, thus setting the stage for extensive experiential avoidance elicited by a wide range of external and internal cues (Chapman et al., 2005; Linehan, 1993a). Furthermore, at times when unpleasant or uncomfortable emotions cannot be immediately avoided, these emotions will tend to evoke marked distress, which is characteristic of persons with BPD, and which can potentially lead to more extreme and maladaptive efforts (e.g., impulsive behaviors) to avoid those emotions in the future (Linehan, 1993a, Rosenthal et al., 2005).

Ruminatory Response Styles

However, attempts to avoid negative thoughts and emotions can lead to a rebound and intrusion of those experiences, thus contributing to ruminatory responses to negative thoughts and emotions (Beevers, Wenzlaff, Hayes, & Scott, 1999; Brewin, Reynolds, & Tata, 1999; Segal, Williams, & Teasdale, 2002; Wenzlaff & Luxton, 2003). Rumination consists of persistent thoughts that focus attention on discrepancies between the present self or circumstances and the ideal self or circumstances, as well as the resulting negative

feelings and their possible causes (Nolen-Hoeksema, 1991; Nolen-Hoeksema & Morrow, 1991). Ruminative thoughts are not goal-directed and do not lead to plans to address any problems or symptoms (Conway, Csank, Holm, & Blake, 2000). Substantial research shows that individuals who ruminate in response to negative emotions experience increased depressive symptoms, depressive episodes, anxiety, negative affect, reactivity to negative stimuli, and general distress (Conway, et al., 2000; Nolen-Hoeksema & Morrow; Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Schwartz, & Koenig, 1996; Wupperman & Neumann, 2006). Hence, this pattern of mood-related intrusive/automatic thoughts and rumination on those thoughts appears to be a central process in depression and depressive relapses, and many believe this pattern is also involved in the escalation of other negative affect such as anger and shame, as well as behavioral dysregulation and impulsivity (MacCoon & Newman, 2003; Miller et al., 1995; Schwartz, & Koenig, 1996; Teasdale, 1999).

Rumination is reinforced by feedback loops that include the effects of depressive symptoms on cognitive processes (e.g., mood-congruent memories and difficulties with attention control) and physical symptoms (e.g., fatigue and lack of energy; Teasdale, Segal, & Williams, 1995). Ironically, one common method utilized to alleviate rumination is to attempt to avoid negative thoughts and emotions (Ottenbreit & Dobson, 2004; Segal et al., 2002), which can then lead to additional intrusive thoughts and thus the further perpetuation of the cycle of avoidance, intrusion, and rumination. This pattern of fluctuation between experiential avoidance and rumination impairs the ability to experience and express emotions, to take goal-directed action to address any problems, to have flexibility in assessing multiple possible interpretations or solutions, and to integrate

and make meaning of experiences (Hayes, Beevers, Feldman, Laurenceau, & Perlman, 2005; Lyubomirsky, Tucker, Caldwell, & Berg, 1999; Nolen-Hoeksema et al., 1993).

Low Distress-Tolerance

Finally, chronic avoidance precludes habituating to emotionally aversive stimuli; as a result, these stimuli continue to evoke aversive emotional reactions (Hayes et al., 1996; Hayes et al., 1999; Wegner, 1994). Once avoidant behavior becomes prevalent, it can then impede the development of tolerance for both aversive external stimuli and aversive emotions and thoughts themselves. Low tolerance of aversive emotions (termed “distress tolerance” in DBT; Linehan, 1993b) may lead to continued and even increased avoidant behavior (Hayes et al., 1999; Linehan, 1993a), thus creating a vicious spiral and potentially leading to recurring maladaptive coping strategies. Persistent avoidance of emotion or unwelcome thoughts may also reinforce beliefs that emotions and thoughts are destructive and may decrease feelings of mastery and self-efficacy (Cheavens et al., 2005; Teasdale et al., 2002). Additionally, at times when attempts to avoid thoughts and emotions are unsuccessful, individuals accustomed to chronic avoidance may react with intense distress and extreme efforts to suppress the experience at any cost, which may include harmful behaviors such as self-harm, substances, or even suicide. Consequently, the combination of an immediate reduction in distress through avoidance, followed by longer-term increases in avoidance, distress, and potential for maladaptive coping, can easily establish a self-strengthening loop that is likely to be very resistant to change (Hayes et al., 2005).

Thus, this combination of findings suggests that the tendency toward chronic experiential avoidance is a strategy utilized by individuals with BPD in attempts to cope with their intense negative affect and BPD symptoms (Chapman et al., 2005; Gratz & Tull,

2005). However, the combination of intense negative affect and chronic avoidance appears to actually increase distress and BPD symptoms (Cheavens et al., 2005; Rosenthal et al., 2004). Consequently, this avoidance of experience – which is related to deficits in mindfulness - may play a role in the general instability in interpersonal, emotional, and behavioral functioning that are characteristic of the disorder.

Mindfulness and Psychopathology

Mindfulness has been defined as the purposeful awareness of and attention to the present (including emotions, thoughts, behaviors, and sensations) in an open and nonjudgmental manner (Kabat-Zinn, 1982). *Awareness* in mindfulness includes a continual background awareness of both internal and external stimuli. *Attention* involves purposely focusing awareness, thus providing heightened sensitivity to a limited array of chosen experience (Westen, 1999). A key aspect of mindfulness is the open and nonjudgmental nature of both the awareness and attention (Brown & Ryan, 2003). According to Teasdale (1999), mindfulness means being intentionally aware of one's experience in each moment, open to what is occurring and free from the control of habitual, automatic cognitions and behaviors that are often associated with wanting things (e.g., oneself, one's emotions, etc.) to be different than they are.

Although mindfulness has its roots in the Buddhist culture, Western researchers and clinicians who incorporate mindfulness into mental health programs usually focus on mindfulness skills independently of the religious and cultural traditions (Brown & Ryan, 2003; Kabat-Zinn, 1982; Linehan, 1993b; Segal, Williams, & Teasedale, 2002). Clinical interventions based on mindfulness training have become widespread and have appeared frequently in recent empirical literature. As of 1997, more than 240 hospitals and clinics

across the world were offering programs based on mindfulness training (Salmon, Santorelli, & Kabat-Zinn, 1998). This number does not include interventions that include mindfulness training as a component of the total psychotherapeutic treatment, such as dialectical behavioral therapy (DBT; Linehan, 1993a, 1993b), mindfulness-based cognitive therapy for depression (MBCT; Segal et al., 2002), and acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999).

Research shows that training in mindfulness skills has positive effects on a variety of well-being outcomes, reducing problematic conditions such as anxiety, depression, depressive relapses, stress, eating disorders, attention difficulties, and chronic pain (Kabat-Zinn, 1982; Kabat-Zinn et al., 1992; Kristeller & Hallett, 1999; Miller, Fletcher, & Kabat-Zinn, 1995; Segal et al., 2002). Mindfulness training has also been found to improve general health and psychological functioning (see Baer, 2003 for review).

Brown and Ryan (2003) developed the Mindful Attention Awareness Scale (MAAS) to measure individual differences in levels of dispositional mindfulness. The MAAS is a self-report measure that assesses general attention to and awareness of emotions, thoughts, actions, external situations, and physical sensations. Research utilizing the MAAS indicates that individuals vary widely in their levels of trait mindfulness. Research shows that levels of mindfulness are negatively correlated with reported depression, state and trait anxiety, social anxiety, angry hostility, and impulsiveness. Mindfulness is positively correlated with reported self-esteem, positive affect, autonomy, relatedness, and feelings of competence (Brown & Ryan). Similar results have also been obtained when using other measures of mindfulness, such as the Kentucky Mindfulness Scale (Baer, Smith, & Allen, 2004).

Modes of Processing

Teasdale (1999) speculates that there are three ways or modes through which individuals process information:

- 1) Mindless emoting occurs when individuals are almost completely immersed in and identified with their emotional experiences, with little or no reflection or self-exploration. Individuals in this mode often report that they feel overwhelmed or even controlled by their emotions, and that they have little if any ability to regulate such emotions. This mode is consistent with the concept of *emotion mind* in DBT (Linehan, 1993a).
- 2) Conceptualizing/doing occurs when awareness consists primarily of the following: intellectualized thoughts about self or emotions as objects, strategies to understand or cope with emotion-related problems, and discrepancies between the present self/situation and the ideal. Thoughts will often pertain to the past or future and will be characterized by ruminative thinking about negative emotions, causes of those emotions, and the self in general. Information will be processed almost entirely on an intellectual level, with little or no emotional processing involved. This mode is consistent with the concept of *reasonable mind* in DBT (Linehan, 1993a).
- 3) Mindful experiencing/being occurs when awareness consists of a combined cognitive-affective inner process, in which feelings, sensations, and thoughts are directly sensed as aspects of subjective experience, rather than being the objects of conceptual thought to be evaluated or changed. As opposed to the emotional immersion of mindless emoting, this mode

involves a subjective awareness of experience from one moment to the next, with the awareness that one's emotions and thoughts reflect one's reaction to an event as opposed to always being an accurate indicator of the ultimate meaning of the event. This mode is consistent with the concept of *wise mind* in DBT (Linehan, 1993a).

The third mode, mindful experiencing, is the mode that includes both cognitive and emotional experiences, a combination that is hypothesized to be necessary for true emotional processing to occur (Hayes et al., 2005; Segal et al., 2002; Teasdale, 1999). Processing is believed to be a principal component of change by therapists across theoretical orientations, and experiential-based interventions have been shown to be effective methods in facilitating change in perspectives and emotional reactions (Brewin, Dalgleish, & Joseph, 1996; Foa & Kozak, 1986; Greenberg, 2002; Hayes & Feldman, 2004; Samoilov & Goldfried, 2000; Teasdale, 1999; Whelton, 2004).

Process Vs. Content: A Lesson From Depression Research

Cognitive theory has long asserted that vulnerability to depression is caused by dysfunctional beliefs and assumptions, or the *content* of thoughts (Kovacs & Beck, 1978). Consistently, depressed persons tend to score higher on Dysfunction Attitude Scale than do controls (DAS; Weissman & Beck, 1978). However, as formerly depressed persons are known to have heightened vulnerability for future depressive episodes, these persons should also display a stronger endorsement of dysfunctional attitudes than do those who have never been depressed (Haaga, Dyck, & Ernst, 1991). Contrary to expectations, research shows that formerly depressed persons do not endorse significantly greater dysfunctional attitudes than do never-depressed

persons (Haaga, et al., 1991). However, when researchers invoked a dysphoric mood, formerly depressed persons reported significantly higher dysfunctional attitudes than did controls (Teasdale, 1988; Ingram, Miranda, & Segal, 1998), and scores on the DAS during these dysphoric inductions were predictive of future depressive episodes (see Segal et al., 2002 for review). Thus, it is apparently not simply the content of beliefs that lead to depression, but it is also the process by which dysphoric moods appear to automatically activate the retrieval of former maladaptive beliefs, even in individuals with low endorsement of these beliefs in euthymic states. Furthermore, less environmental stress is needed to invoke this pattern as the number of depressive episodes increases (Segal, Teasdale, & Williams, 2004), indicating that these patterns become more autonomous with each depressive episode. Therefore, mindfulness-based interventions target these beliefs not by attempting to prove that they are irrational or distortions, but instead by targeting the entire process through which these emotions and beliefs occur, hence allowing individuals to be aware of negative cognitions and emotions without becoming consumed by them.

Mindfulness and Avoidance

Findings of mindfulness' relationship to psychological functioning suggest that mindfulness serves to decrease the tendency toward experiential avoidance through a number of means (Brown & Ryan, 2003; Hayes et al., 1996; Hayes et al., 2005; Baer, 2004; Segal et al., 2002; Teasdale, 1999). First, mindfulness appears to be a way to decenter from automatic categorizations of internal and external events as good or bad, which lessens the need to avoid unpleasant events. Second, mindfulness can preempt the cycle of rumination, avoidance, and intrusive thoughts. Third,

mindfulness can foster habituation to formerly aversive stimuli, therefore lessening (and, in some cases, even eliminating) the unpleasant emotions and experiences association with those stimuli.

Mindfulness: Decentering from Inflexible Categorizations

Mindfulness appears to be a way to decenter from maladaptive automatic thoughts and behaviors that often have their roots in previous experience. Mindful decentering facilitates viewing thoughts from a wider perspective, thus allowing thoughts and emotions to be seen as “thoughts” and “reactions” as opposed to the only true reflections of reality (Hayes et al., 2004). Thus, the thoughts that certain emotions are *bad* or *wrong* can be seen as interpretations instead of actuality. For example, instead of viewing anxiety as being *bad*, and thus something to avoid at all costs, an individual can view anxiety as simply *being* – an emotion that exists in certain (or possibly most) situations. Thus, instead of thinking, “I get anxious when I got to parties, so I will stay home,” the person may decide, “I get anxious when I go to parties, so I will go to the party and accept the fact that I will feel anxious at least of some of the time I’m there.”

Similarly, decentering means becoming aware of formerly automatic reactions (such as thought suppression, chronic passivity, or maladaptive impulsivity) and viewing them as *one* possible way of responding to an event, as opposed to *the only* possible way of responding. For example, although an individual may continue to experience urges to engage in self-harm or seek revenge when a partner offers criticism, the individual can first be aware of those urges, instead of acting on them automatically, and then see the urges for what they are – *urges*, as opposed to

necessary courses of action. Therefore, instead of attempting to solve a problem by reflexively utilizing habitual schemas and behaviors, a person can learn to process actual aspects of the current situation, possible alternative behaviors, and means for the best possible results. Thus, mindful decentering appears to foster change in the *processing* of reactions, as opposed to just the content of reactions.

Mindfulness: Preempting the Rumination Spiral

Activation of dysphoric moods and negative beliefs often leads to ruminatory focus on discrepancies between the present and the ideal, as well as the resulting negative feelings and their possible causes (Nolen-Hoeksema, 1991). The increased negative affect resulting from rumination can amplify efforts to suppress unpleasant thoughts and emotions, which in turn can produce additional intrusive thoughts and rumination (Hayes et al, 2004; Miller et al., 1995; Schwartz, & Koenig, 1996; Teasdale, 1999). In contrast, mindful processing may preempt the establishment of these self-perpetuating and intensifying patterns. Through the process of awareness, attention, and acceptance, mindfulness fosters awareness and acceptance of ruminatory thoughts simply as mental processes, thus facilitating more openness to alternative perceptions and more self-control of the ruminatory process (Hayes et al., 1999; Linehan, 1993a; Segal et al., 2002; Teasdale, 1999). Furthermore, the ongoing internal awareness and attention allows responding to the resulting increases in negative emotions in a more intentional way, as opposed to the patterns of increased rumination about the causes of the emotions interspersed with periodic attempts to suppress the thoughts and emotions (Segal et al., 2002; Teasdale, 1999). Finally, the intentional deployment of attention and awareness involved in mindfulness utilizes limited attentional resources (Teasdale et al., 1995). Thus, although

rumination is automatic in that it can be a habitual and standard reaction, it also requires controlled attentional resources to sustain itself (Norman & Shallace, 1986; Teasdale et al.; Wallace & Newman, 1997; Wallace & Newman, 1998). Therefore, mindfulness also interferes with rumination by making limited attentional resources less available for rumination's establishment and maintenance (Segal et al., 2004). Consistently, research shows that rumination is negatively related to trait levels of mindfulness (Brown & Ryan, 2003).

Mindfulness: Habituation to Experience

Chronic avoidant behavior can impede or even preclude the development of tolerance for both internal and external events. This low tolerance can then bring about further increased avoidant behavior (Foa & Kozak, 1996; Hayes et al., 1999; Linehan, 1993a), thus creating a self-perpetuating cycle and potentially leading to recurring maladaptive coping, increased distress, and reduced feelings of mastery and self-efficacy (Hayes et al., 1996; Linehan, 1993a; Polusny & Follette; 1995; Teasdale et al., 2002).

In contrast, the increased levels of the emotional attention, awareness, and acceptance involved in mindfulness can help facilitate emotional processing and habituation to the emotion or experience, thus leading the experiences to become less intense and more bearable (Foa & Kozak, 1996; Hayes et al., 2004; Hunt, 1998; Linehan, 1993a; Teasdale, 1999; Whelton, 2004). Individuals may then feel they have less need to resort to avoidant or maladaptive behavior when faced with problems that invoke such experiences. Hence, through mindful experiencing, the distress accompanying such avoidance progressively decreases (Hayes et al., 1999; Hayes, & Feldman, 2004). Additionally, by gradually engaging in experiences that once seemed too dangerous or painful, one can build an

increased sense of mastery and self-efficacy when dealing with one's emotions, thoughts, and general life - thus further decreasing the need for avoidant behavior (Hayes et al., 1996; Teasdale et al., 1999). Notably, the accompanying reduction in destructive avoidant behaviors such as self-harm, suicide attempts, impulsive aggression, and substance abuse can have a positive effect on mood, interpersonal relationships, and general life functioning (Linehan, 1993).

Thus, increases in mindfulness may lead to reductions in borderline pathology by reducing the need for ineffective coping strategies and decreasing difficulties with interpersonal effectiveness, emotion regulation, and impulsivity. However, although mindfulness has been a core component of DBT for more than a decade, research has only recently begun to examine the relationship of mindfulness to BPD features.

Empirical Research On Mindfulness And BPD Features

Preliminary research has found that individuals diagnosed with BPD in a clinical sample reported lower levels of mindfulness than did non-diagnosed individuals in a nonclinical, university sample (Baer et al., 2004). However, individuals in clinical samples tend to display high diagnostic comorbidity and levels of neuroticism (Sher & Trull, 1996), both of which may explain the lower levels of mindfulness (Brown & Ryan, 2003). Thus, the specific relationship of mindfulness to BPD features requires further examination.

Emotion Regulation

Based on the negative association of mindfulness and emotion-related symptoms such as depression, depressive relapses, anxiety, negative affect, trauma symptoms, and hostile anger, it appears that mindfulness has a positive effect on emotion-regulation skills (Brown & Ryan, 2003). This assertion is strengthened by the positive effects of mindfulness on

pleasant affect and well-being (Brown & Ryan). However, some findings relate even more directly to emotion-regulation skills. Mindfulness is positively associated with aspects of emotion regulation such as attention to emotion, clarity of emotional experiences, and feelings of confidence about ability to maintain positive mood and reduce negative mood (Brown & Ryan). In addition, findings from experimental studies indicate that directions to engage in non-judgmental awareness of internal reactions to biological challenges results in less anxiety and panic-related symptoms than do directions to engage in cognitive-behavioral treatments such as relaxation or cognitive reframing (e.g., Eifert & Heffner, 2003; Levitt, Brown, Orsillo, & Barlow, 2004). Treatments developed to address the reluctance to accept certain internal states have had encouraging results for a number of psychological conditions (e.g., Bach & Hayes, 2002; Bohus et al., 2004).

Impulsivity

Research also shows promising indications of mindfulness' effects on maladaptive impulsive behaviors, and trait mindfulness is negatively related to self-reported measures of impulsivity (Brown & Ryan, 2003). An EEG study (Takahashi, et al., 2004) showed that internalized attention in mindfulness meditation was positively correlated with fast theta band power in the frontal area of the brain. Both mindfulness meditation and theta band power were also associated with self-report scores of harm avoidance (Takahashi, et al., 2004), which is the ability to consider long-term negative consequences of actions and respond accordingly. Deficits in harm avoidance appear to be related to the maladaptive impulsive behavior demonstrated by individuals with BPD (Hochhausen et al., 2002). Therefore, the increased internalized attention of mindfulness may activate the fast theta band power in the frontal area of the brain, which may facilitate reductions in maladaptive

impulsive behaviors through increased capacity to behave in accordance with possible negative consequences.

Related to these findings, some researchers suggest that the impulsive behavior of emotionally dysregulated individuals demonstrates difficulty in activating and focusing sufficient attentional resources to inhibit dominant responses (e.g., immediate rewards) or decide upon conflict in response (e.g., immediate rewards versus negative consequences; Wallace and Newman, 1998; MacCoon et al., 2001). Hence, mindfulness may reduce maladaptive impulsive behavior by helping focus attentional resources on inhibiting responses that lead to negative consequences. Consistently, a review of attention studies concluded that the use of conscious attention appears to reduce unwanted emotional, cognitive, and impulsive/behavioral responses (Baumeister, Heatherton, & Tice, 1994).

Interpersonal Effectiveness

Trait mindfulness is also related to several aspects of interpersonal functioning, with significant negative relationships to hostility, anger, and social anxiety, as well as positive relationships to autonomous regulation and satisfaction with one's behavior (Brown & Ryan, 2003). Mindfulness is also associated with less introjection (i.e., behaviors focused on avoiding the loss of regard from self and others, as opposed to intrinsic motivation or consistency with personal values; Brown & Ryan, 2003; Ryan & Connell, 1989). Low levels of mindfulness predict increases in actions motivated by need for approval and decreases in effective decision-making. The above relationships continued in both between-group and within-group analyses. Furthermore, in a study of mindfulness training in medical students, students who underwent training displayed significant quantitative increases in empathy along with decreases in anxiety. Qualitative data also indicated an

influence on an intrapersonal and interpersonal level of functioning (Shapiro, Schwartz, & Bonner, 1998).

BPD Features

However, the above discussion is not to imply that mindfulness affects emotion regulation, impulsivity, interpersonal functioning, or overall BPD features as discrete entities. Instead, DBT and other theories of BPD suggest a transactional relationship among variables. For example, emotion dysregulation can result in intense anger, which can lead to problems in interpersonal relationship. Interpersonal problems may further activate negative affect such as dysphoria, rage, or shame, which may then activate reflexive thoughts or schemas about interpersonal relationships and one's ability to regulate accompanying emotions. These schemas may then lead to rumination, which then exacerbates the original mood and thoughts and ultimately disrupts the ability to engage in adaptive interpersonal problem-solving or modulation of distressing emotions. Consequently, a person may attempt to solve the problem by reflexively utilizing habitual schemas and behaviors (e.g., increased passivity, angry hostility, self-harm, or dissociation) as opposed to processing actual aspects of the current situation, possible alternative behaviors, and means for the most desired consequences.

Additionally, this relationship between maladaptive avoidance and problem-solving may be even more intense in persons with borderline features, as individuals with BPD tend to endorse schemas that the world is malevolent and that they are bad and incompetent (Arntz et al., 1999; Beck et al., 2004). Thus, problems in interpersonal situations -- especially those involving abandonment, rejection, hostility, or other borderline-specific situations -- may invoke feelings and thoughts that lead to automatic

and impulsive reactions of anger, aggression, avoidance, self-blame, impulsivity, shame, or other reactions that may impair effective problem-solving abilities. This increase in unpleasant emotions, especially in individuals who are already emotionally deregulated and have low distress tolerance, can then lead to further avoidance, instability, and distress, as well as deep rifts in relationships with others who do not understand the reasons behind the individuals' aggression, self-harm, sudden passivity, or intense distress.

However, mindfulness has the potential to disrupt this destructive pattern at several points in the cycle. Mindfulness may foster interpersonal, emotional, and distress-tolerance skills by preempting the detrimental patterns of mood-activated automatic thoughts and rumination, while also facilitating habituation and decentered/nonjudgmental emotional processing that lessens the perceived need for avoidant or destructive behaviors. The relationship between mindfulness and problem-solving may be especially important in individuals with BPD, who have a history of classifying emotions as *bad* (and thus important to avoid), engaging in unstable interpersonal relationships, and alleviating distressing experiences through maladaptive impulsivity.

Furthermore, by fostering attention, awareness, and acceptance of one's internal experiences, mindfulness may also address the emptiness and identity disturbances experienced by individuals with BPD, which is consistent with the DBT conceptualization (Linehan, 1993a; Linehan, 1993b). In contrast, chronic experiential avoidance may exacerbate feelings of emptiness. Although emptiness and identity disturbance are not considered core BPD features by many researchers (Skodol et al., 2002a; Skodol et al., 2002b), these symptoms are included in BPD diagnostic criteria (APA, 2004), and they can

be distressing and resistant problems for individuals who experience them (Linehan, 1993a).

Finally, it is important to note that effects of mindfulness are not limited only to decreases in unpleasant emotions or destructive behaviors. Mindfulness is also related to increased self-esteem, positive affect, pleasant emotions, overall health, behavior in accordance with intrinsic values, and reported empathy (Baer, 2002; Brown & Ryan, 2003). Mindfulness has been embraced by the field of positive psychology, and mindfulness researchers assert that mindfulness can enhance joy, hope, capacity for love, the sensual pleasures, interpersonal relatedness, aesthetic appreciation, forgiveness, creativity, talent, compassion, moderation, wisdom, and general life satisfaction (Hayes et al., 1999; Hayes & Feldman, 2004; Kabat-Zinn, 2003; Langer, 2002; Linehan, 1993a). By facilitating full attention and awareness of pleasurable experiences such as joy, love, or creativity, mindfulness has the potential to increase the amount of pleasure and satisfaction derived from these experiences. Considering the low intensity and frequency of pleasure experienced by many persons with BPD, increases in positive experience appears to be an important step toward a life that feels worth living, which is the ultimate goal of DBT (Linehan, 1993a).

Thus, mindfulness may be a necessary and core component of any treatment aimed at improving coping deficits, overall symptoms, and quality of life in persons with BPD (Linehan, 1993a; Linehan, 1993b). More specifically, high levels of mindfulness may predict less severity in overall borderline features, as well as improvements in interpersonal problem-solving, impulsivity, and emotion-regulation strategies.

Neuroticism, Mindfulness, and BPD Features

Mindfulness is also negatively correlated with neuroticism, or general negative affect and reactivity (Eysenk & Eysenk, 1985; Brown & Ryan, 2003), and neuroticism has been widely reported to be the underlying characteristic of BPD features (e.g., Ball, Tennen, Poling, Dranzler, & Rounsaville, 1997; Clarkin et al, 1993; Trull, 1992, 2001).

Furthermore, neuroticism is highly correlated with rumination and depressive symptoms (Duggan, Lee, and Murray, 1990; Jorm, 1987; Roberts, Gilboa, & Gotlib, 1998; Wallace & Neuman, 1997; Wupperman & Neumann, 2006). In fact, one longitudinal study utilized structural equation modeling to examine the relationship between BPD features and depressive symptoms and found that the relationship could be explained by one common underlying factor, which was hypothesized to be neuroticism (Klein & Schwartz, 2000). Thus, neuroticism may reflect the underlying biological temperament of individuals with BPD. Alternatively, neuroticism may reflect the trait of emotion dysregulation, which is theorized to be a combination of temperament and invalidating environment (Linehan, 1993).

Additionally, rumination and depressive symptoms have frequently been found to predict less-effective interpersonal problem solving (Goddard, Dritschel, & Burton, 1996; Lyubomirsky et al., 1999; Marx, Williams, & Claridge, 1992). Hence, neuroticism's strong relationship with rumination and depressive symptoms suggests that neuroticism is at least indirectly related to problem-solving skills.

Thus, considering neuroticism's negative relationship with mindfulness and its positive relationship with BPD features and other factors that predict poor problem-solving, the effects of neuroticism should be taken into account when exploring the

relationships of mindfulness, interpersonal problem-solving, impulsivity, emotion-regulation, and BPD features. Previous research has found that mindfulness continues to predict rumination and depression when neuroticism is controlled (Brown & Ryan, 2003). Similarly, although neuroticism may explain some of the effects of mindfulness on coping strategies and BPD features, mindfulness is predicted to continue to have effects on these factors even when controlling for neuroticism. However, it is also possible that neuroticism would completely mediate the relationship of mindfulness with coping strategies and/or BPD features. Hence, the present study is designed to explore these issues.

Current Study

The purpose of the current study is to examine the proposed relationships of mindfulness with BPD features and the underlying constructs of interpersonal problem-solving effectiveness, impulsive and passive emotion-regulation strategies, and trait neuroticism in a large college sample. The models shown in Figures 1 and 2 are predicted conceptual models of these relationships. The first model is an Structural Equation Model (SEM) that predicted the latent-variable effects of mindfulness on the core constructs of interpersonal problem-solving and impulsive/passive emotion-regulation strategies, as well as the predictive effects of mindfulness on BPD features when these core constructs were controlled. The second model examined whether mindfulness, interpersonal problem-solving, and impulsive/passive emotion-regulation strategies predicted the BPD factor directly or instead predicted it indirectly through their effects on neuroticism. A limitation of some of the previous research on coping strategies and BPD features concerns the statistical approach used to examine the associations between constructs. To the extent that previous studies relied upon analysis of observed data without accounting for error

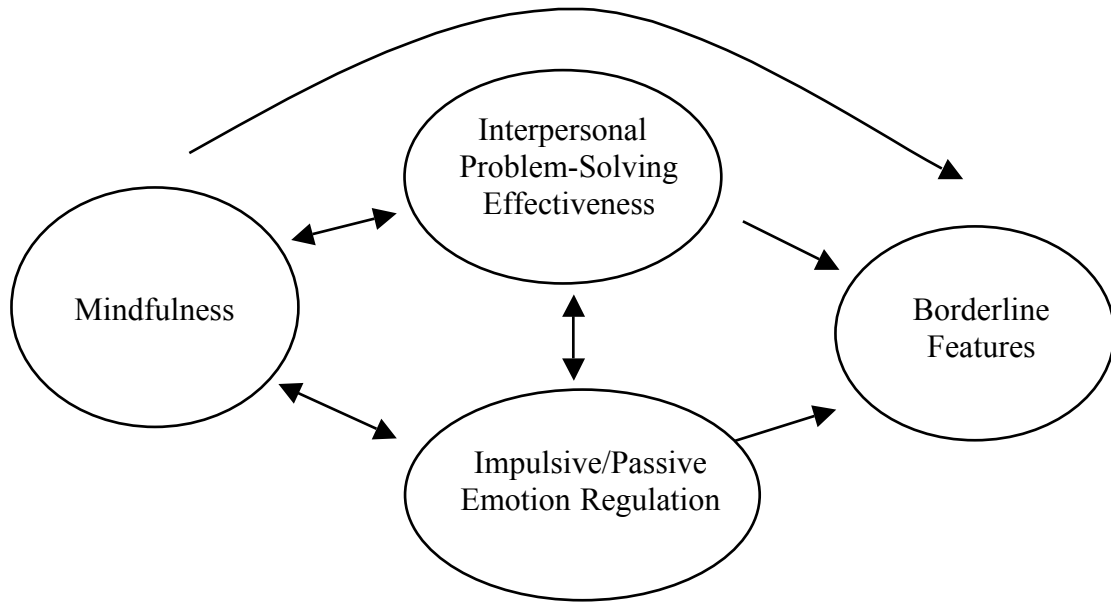


Figure 1. Proposed inter-relations between mindfulness, interpersonal problem-solving effectiveness, impulsive/passive emotion-regulation strategies, and BPD features.

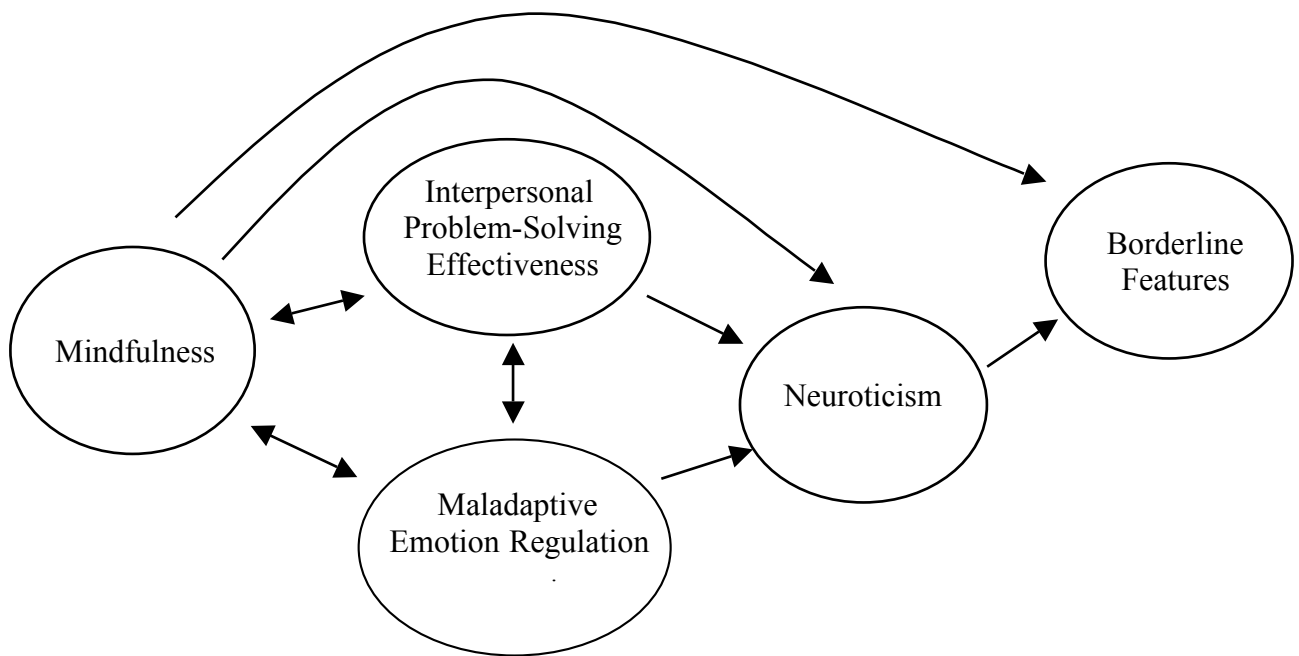


Figure 2. Proposed inter-relationships between mindfulness, interpersonal problem-solving effectiveness, impulsive/passive emotion-regulation strategies, and BPD features.

measurements, the results of such studies are at best biased estimates of any detected associations. As such, a more sophisticated data analytic approach may help in elucidating the relationships among these constructs.

Confirmatory factor analysis (CFA) has been shown to be one of the most accurate statistical methods for modeling theoretical constructs (e.g., mindfulness and/or BPD features) and the relations among such constructs (Bentler, 1995; Dunn, Everett, & Pickels, 1993; Hershberger, 1999). This multivariate approach allows investigators to examine whether a set of observed or manifest variables (MVs) are valid indicators of specific hypothetical constructs or latent variables (LVs). A specific LV (e.g., mindfulness) is hypothesized to be responsible for generating the correlations among a set of MVs (e.g., MAAS items). The value of LV models is that they represent the common factor variance in a set of MVs separately from their unique error variance (Bentler, 1980). In contrast, MV models are not as reliable because their theoretical effects are estimated in a more biased manner. Specifically, the absolute size of a correlation coefficient is strongly influenced by the level of measurement error for each MV. Since LV models represent the common variance among two or more MVs, they can evaluate the inter-correlations between factors (e.g., mindfulness and interpersonal problem-solving) in a less-biased manner because the factor correlations have been freed from the unique (plus error) variance. As such, CFA provides precise parameter estimates adjusted for measurement error (Bentler, 1980, 1995). Of course, it is important to note that some form of "thingness" cannot definitively be attributed to a particular LV, since an LV is a mathematical and theoretical construct (Bentler, 1980). Nonetheless, LVs are often quite useful for representing the supposed theoretical system in a set of correlated MVs.

Another advantage of an SEM approach is that hypothesized omnibus models can be directly tested for their goodness of fit to the observed data. In conducting SEM, investigators must explicitly specify the number of factors, the variable-to-factor relationships, and the factor-to-factor relationships within a model (along with other variance and covariance parameters). Then one must statistically test the adequacy of the model in terms of strict model fit criteria (Bentler, 1995). Two kinds of fit indices are regularly recommended, absolute and relative fit indices (Hu & Bentler, 1999). An absolute index gauges how well the model reproduces the observed data, and thus smaller values are better; while relative indices gauge the fit of the hypothesized model with respect to a less sophisticated null model, and larger values indicate better fit of the hypothesized model. Extensive research by Hu and Bentler (1999) has shown that the standardized root mean square (SRMR) index and the comparative fit index (CFI), respectively, are preferred indices for assessing absolute and relative model fit. Good fit is evident when the CFI value is approximately .90 or above and the SRMR value is .08 or below and/or the RMR value is .05 or below.

Besides the use of a sophisticated data analytic approach, this study also addresses some important methodological concerns. First, many previous studies of BPD have used participants from clinical samples, most or all of whom met criteria for a BPD diagnosis. However, clinical samples are not likely to be representative of all persons experiencing BPD because the most severe cases are likely to be found in clinical settings (Cohen & Cohen, 1984; Sher & Trull, 1996, Trull 2001). Second, participants from clinical samples have an increased likelihood of comorbid diagnoses (Berkson, 1946); however, unless the

sample size is large enough to control for comorbidity, comorbid diagnoses make the results more difficult to interpret (Sher & Trull, 1996; Trull, 1995).

Finally, most previous research has utilized a categorical perspective and neglected to consider the continuous nature of borderline features. By portraying BPD as either present or absent, this research fails to take into account the dimensionality of personality disorders (Widiger, 1992), including the fact that young adults with subsyndromal borderline features exhibit clinically significant degrees of impairment across a number of realms (Cheavens et al., 2005; Trull, Ueda, Conforti, & Doan, 1997).

Thus, the current study explored the relationship of mindfulness to ineffective interpersonal problem-solving, passivity/impulsive emotion-regulation strategies, and borderline features in a university sample. In addition to the use of SEM, traditional hierarchical multiple regression was also utilized to assess whether 1) mindfulness continued to predict interpersonal problem-solving and impulsive/passive emotion-regulation strategies when neuroticism was controlled, 2) mindfulness continued to predict BPD features when interpersonal strategies were controlled, 3) mindfulness continued to predict BPD features when impulsive/passive emotion strategies were controlled, and 4) mindfulness continued to predict BPD features when neuroticism were controlled. Finally, CFA and SEM were utilized to test omnibus models of 1) the inter-relations between mindfulness, interpersonal strategies, impulsive/passive emotion-regulation strategies, and borderline features, and 2) the predictive effects of mindfulness, interpersonal strategies, and impulsive/passive emotion-regulation strategies on BPD features when controlling for neuroticism (see figures 1 & 2 for proposed models).

METHODS

Participants

The current study recruited 342 undergraduate students from introductory psychology courses at the University of North Texas (UNT) in Denton, Texas. Thus, a sufficient subject-to-variable ratio (20:1) existed for conducting multiple regression and structural equation modeling. The sample consisted of 90 male participants (27%) and 250 female participants (73%), with 2 participants failing to report gender. Of the participants, 12% were African American, 5% were Asian American, 63% were European-American, 12% were Hispanic, and 8% endorsed “other.”

Participants were recruited by fliers placed on bulletin boards, presentations made in psychology courses, and announcements placed on a UNT website for research sign-up. Each participant earned extra-credit points toward their course grades in exchange for participation. This study was approved by the UNT IRB. Participants were treated in accordance with the ethical principles of the American Psychological Association (APA).

Measures

Mindfulness

The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) was utilized to assess levels of dispositional mindfulness. The MAAS consists of 15 items that assess general attention to and awareness of emotions, thoughts, actions, external circumstances, and physical sensations. Respondents indicate how frequently they have the experiences described in each statement utilizing a 6-point Likert-type scale ranging from 1 (almost never) to 6 (almost always). Examples of items include: “I could be experiencing some emotion and not be conscious of it until sometime later,” “I find it difficult to stay focused

on what's happening in the present,” and “I do jobs or tasks automatically, without being aware of what I'm doing.”

The MAAS has been shown to have high reliability (Cronbach's alpha = .82-.87), convergent validity, and discriminant validity in college and community populations based on established measures of emotional well-being, self-awareness, attention, and psychopathology (Brown & Ryan, 2003). Confirmatory factor analysis revealed that all items on the MAAS were good measures of a unidimensional latent factor.

Interpersonal Problem-Solving Effectiveness

Complex interpersonal problem-solving skills were assessed with an adaptation of the Means-End Problem-Solving Test (MEPS; Platt & Spivack, 1975a) that has been utilized in several previous studies (Lyubomirsky et al., 1999; Marx et al., 1992; Goddard et al., 1996). The MEPS-Int consists of 10 vignettes, each that describes a problematic interpersonal situation and the resolution to that situation. As in previous research, participants were asked to imagine themselves in each situation and then describe what they would do to bring about the specified resolution. In the original version, participants are asked to make up a story connecting the beginning to the end, a method criticized for not triggering a clear interpersonal problem-solving set (D'Zurilla & Nezu, 1982). Thus, the current study follows the lead of several more-recent studies in instructing participants to write *how they would respond* to achieve the stated solution (e.g., Marx et al., 1992; Goddard et al., 1996). An example of a situation is as follows:

You love your partner and are happy in the relationship, but you've noticed you've been having more arguments recently. One day, your partner says, “I can't take this anymore!” and leaves you. You want things to be different. The

story ends with everything fine between you and your partner. You begin the story with your partner leaving you after an argument.

The MEPS has good internal consistency in a variety of populations (Cronbach's alpha = .80-.84; see Marx et al., 1999, for review). Research has also demonstrated good convergent and discriminant validity in college, community, and psychiatric samples based on other measures of problem-solving ability and interpersonal functioning, as well as measures of constructs theorized to be related to interpersonal problem-solving skills (Lyubomirsky et al., 1999; Goddard et al., 1996; Platt & Spivack, 1972; Platt & Spivack, 1975a; Siegal, Platt, & Peizer, 1976).

Platt and Spivack (1975b) demonstrated that it is not necessary to administer all ten of the interpersonal problem situations, and many studies have utilized a shortened form. This study followed the lead of Kehrer & Linehan (1996) and utilized the following four situations: partner leaving, friends avoiding you, problems with the boss and coworkers, and making friends in a new neighborhood.

MEPS solutions can be scored for a variety of aspects. The original version suggests scoring the number of relevant means, or instrumental acts that allow respondents to move toward the desired solution. However, other researchers have pointed out that relevant means tell little about level of effectiveness and thus have suggested that a qualitative measure of responses is necessary (Butler & Meichenbaum, 1981). Many studies have since scored responses for levels of effectiveness. The current study scored for effectiveness according to the widely-utilized ratings developed by Marx and colleagues (1992). As defined by Marx and colleagues and based on criteria by D'Zurilla and Goldfried (1971), a strategy is judged effective if it maximizes positive and minimizes

negative short- and long-term consequences, both personally and socially. The effectiveness measure was marked on a Likert-type scale ranging from 1 (not at all effective) to 7 (very effective) for each problem. Scores were summed across problems to give each participant a total effectiveness score.

Previous studies have reported interrater correlation coefficients ranging from .82 to 1.0 for the above domain (Lyubomirsky et al., 1999; Goddard et al., 1996; Kehrer & Linehan, 1996; Marx et al.). For the current study, two psychology doctoral students were trained in rating the effectiveness of problem-solving responses based on an established scoring system (Lyubomirsky, et al., 1999). Both raters scored 10% of the responses, and interrater reliability was computed. Pearson correlation coefficients were .86, which was above the standard of .80 set by previous research (Kerhrer & Linehan, 1996). Thus, the remaining responses were scored by a single rater as planned. Raters were blind to participants' scores on other measures at the time of rating.

As research questions, the current study also utilized two additional scoring systems developed by Linehan and colleagues (Linehan, et al., 1987; Kehrer & Linehan, 1996). Each response was scored for number of passive vs. active means, as well as number of maladaptive impulsive means, which include any maladaptive impulsive behaviors performed by the protagonist, such as instances of substance abuse, aggression toward others, binge eating, and self harm. One psychology doctoral students and two senior-level psychology undergraduates were trained to code the responses based on the rating system utilized by Linehan and colleagues (Kehrer & Linehan, 1996). All three raters scored 15% of the responses, and interrater reliability was computed. Pearson correlation coefficients were .91, which was above the standard of .80 set by previous research (Kerhrer &

Linehan, 1996). Thus, the remaining responses were scored by a single rater as planned. Raters were blind to participants' scores on other measures at the time of rating.

Emotional Problem-Solving: Passivity/Impulsivity In Response In Emotion-Regulation

Impulsivity and passivity in emotion regulation were each assessed with an adaptation of the Means-End Problem-Solving Test (MEPS; Platt & Spivack, 1975a) that has been utilized in two previous studies (Linehan, et al., 1987; Kehrer & Linehan, 1996). The MEPS-Emo consists of 4 vignettes, each that describe an emotionally distressing problem and a solution to that problem that involves a reduction in distress. Participants were asked to imagine themselves in each situation and then describe what they would do to bring about the specified resolution. Situations include the following: overwhelmed at work, aversive driving experience, partner leaving, and job and relationship difficulties. Although some overlap exists in content between interpersonal and emotional stories, they are distinguished by their focus and outcome. Interpersonal situations focus on relationship difficulties and outcomes in which the protagonist resolves difficulties with other individuals. Emotional situations focus on negative emotional states and outcomes in which the protagonist modulates aversive affect. An example of a situation is as follows:

The place where you work was short of staff that day and you had more responsibilities than you are used to. Everyone is telling you to do different things and being critical and impatient -- which makes you feel very frustrated, angry, and out of control. This had been happening a lot lately. You think that you wish you could just numb your feelings to relieve some of the tension. The story ends with you leaving the office at the end of the day, feeling less frustrated. You begin the story where you first feel frustrated and angry.

Each response was scored based on number of active means (or steps toward a solution), number of passive means, and number of maladaptive impulsive means, such as self harm, substance abuse, inappropriate aggression, and skipping class. Scores were summed across problems to give each participant a total active score, total passive score, and total maladaptive-impulsivity score. Previous studies have reported interrater correlation coefficients ranging from .85 to 1.0 for the above domains (Kehrer & Linehan, 1996; Linehan et al., 1987). Although the MEPS-Emo has been used in two previous studies (Kehrer & Linehan, 1996; Linehan et al., 1987), additional psychometric properties have not been published.

For the current study, one psychology doctoral students and two senior-level psychology undergraduates coded the responses. All three raters scored 15% of the responses, and interrater reliability was computed. Pearson correlation coefficients were .87, which was above the standard of .80 set by previous research (Kehrer & Linehan, 1996). Thus, the remaining responses were scored by a single rater as planned. Raters were blind to participants' scores on other measures at the time of rating.

Borderline Features

Borderline features were assessed with the Personality Assessment Inventory™ (PAI®; Morey, 1991). The PAI-BOR consists of 24 items that assess features of personality psychopathology related to borderline and other personality disorders, such as unstable affect, identity problems, self-harm, and negative relationships. Respondents indicated their level of endorsement of each item on a 4-point Likert-type scale (e.g., False, not at all true; Sometimes True; Mainly True; or Very True). Items used to measure borderline features include: “My mood is very steady,” and “I’m too impulsive for my own good.”

The PAQ-BOR has been shown to have high reliability (.86-.92), as well as good convergent and discriminant validity in undergraduate college students (Morey, 1991; Trull, 1995, 2001) when compared to established measures of psychopathology and personality traits.

Neuroticism

Neuroticism was assessed with the neuroticism subscale of the Eysenck Personality Questionnaire Revised Abbreviated (EPQR-A; Francis, Brown, & Philipchalk, 1992). The subscale consists of 6 items, with questions such as, “Are you a worrier?” and “Do you often feel “fed up?” Participants indicated their responses on a 4-point Likert-type scale (eg., no, never; sometimes; often; very much). A total score for neuroticism is computed by summing subjects’ responses to the 6 items on the subscale.

The EPQR-A is widely used in personality research. In studies of 685 college students in England, Canada, and Australia, the concurrent validity of the EPQR-A was assessed by investigating the association of the EPQR-A subscales with the corresponding subscales on the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975). Correlations between the two forms ranged between .84 and .90. Reliability of the EPQR-A was demonstrated by computing internal consistency, which was $\alpha = .70 - .77$ for the neuroticism subscale. Lewis and Maltby (1995, 1996) have found comparable levels of internal consistency for the neuroticism subscale among United States college students ($\alpha = .77$) and adults ($\alpha = .76$). Furthermore, confirmatory factor analyses have revealed that all items on the EPQR-A were good measures of their latent factors (Forest, Lewis, & Shevlin, 2000; Wupperman & Neumann, 2006).

Procedures

Participants were recruited from introductory psychology courses at the University of North Texas. Participants completed a packet of questionnaires that consist of the following measures: (a) the PAI-BOR, (b) the MAAS, (c) the MEPS-Int, (d) MEPS-Emo, and (e) the EPQR-A. Average time to complete all measures was 1 hour.

Hypotheses And Statistical Analysis

1. Mindfulness would be significantly correlated with the following:
 - a. BPD features (PAI-BOR), negative correlation.
 - b. interpersonal problem-solving effectiveness (MEPS-Int).
 - c. emotional problem-solving strategies (MEPS-Emo) -- number of maladaptive-impulsive and passive means, negative correlation.
 - d. neuroticism (EPQR-A) -- negative correlation.

The above hypothesis was tested by examining correlations of total scores from the MAAS, PAI-BOR, MEPS-Int, MEPS-Emo (impulsive/passive), and the EPQR-A.

2. Borderline features would be:
 - a. negatively correlated with interpersonal problem-solving effectiveness.
 - b. positively correlated with neuroticism.
 - c. positively correlated with impulsive and passive emotion-regulation strategies.

Hypothesis 2 was tested by assessing the correlation coefficients between the PAI-BOR, the MEPS-Int, the MEPS-Emo (impulsive/passive), and the EPQR-A.

3. Mindfulness would continue to predict effective interpersonal problem-solving even when neuroticism was controlled.

Two hierarchical multiple regression analyses were performed, each with the MEPS-Int as the dependent variable. In the first regression analysis, the EPQR-A was entered in step 1 to control for neuroticism, and the MAAS was entered in step 2.

Additionally, the above analysis was conducted again with the MAAS entered first and the EPQR-A entered second, thus assessing whether neuroticism continued to predict interpersonal skills when mindfulness was controlled.

4. Mindfulness would continue to predict impulsive/passive emotional-regulation strategies even when neuroticism was controlled.

Two hierarchical multiple regression analyses were conducted, each with the MEPS-Emo (Impulsive/passive) as the criterion. In the first regression analysis, the EPQR-A was entered in step 1 to control for neuroticism. The MAAS was entered in step 2.

Additionally, the above analyses were conducted again with the MAAS entered first and the EPQR-A entered second, thus assessing whether neuroticism continued to predict maladaptive emotion-regulation strategies when mindfulness was controlled.

5. Mindfulness would continue to predict borderline features when interpersonal problem-solving effectiveness was controlled.

A hierarchical multiple regression analysis was conducted with PAI-BOR as the criterion. In step 1, scores from the MEPS-Int were entered. In step 2, the MAAS was entered.

Additionally, the above analysis was conducted again with the MAAS entered first and the MEPS-Int entered second, thus assessing whether interpersonal problem-solving continued to predict borderline features when mindfulness in controlled

6. Mindfulness would continue to predict borderline features when impulsive/passive emotion-regulation strategies were controlled.

A hierarchical multiple regression analysis was conducted with PAI-BOR as the criterion. In step 1, scores from the MEPS-Emo (impulsive/passive) were entered. In step 2, the MAAS was entered.

Additionally, the above analysis was conducted again with the MAAS entered first and the MEPS-Emo entered second, thus assessing whether impulsive/passive emotion-regulation strategies continued to predict borderline features when mindfulness was controlled.

7. Mindfulness would continue to predict borderline features when neuroticism was controlled.

A hierarchical multiple regression analysis was conducted with PAI-BOR as the criterion. In step 1, scores from the EPQR-A were entered. In step 2, the MAAS was entered.

Additionally, the above analysis was conducted again with the MAAS entered first and the EPQR-A entered second, thus assessing whether neuroticism continued to predict borderline features when mindfulness was controlled

8. Finally, the entire set of proposed relationships as discussed above and depicted in Figures 1 and 2 were tested via structural equation modeling (SEM).

An approach advocated by investigators (Little, Cunningham, Shahar, & Widaman, 2002; West et al., 1995) for dealing with ordinal variables in CFAs and SEMS is to re-express the items to form item composites (i.e., parcels). To most effectively model the number of parameters that could be estimated for each structural equation, this study followed the lead of previous SEM studies (Bagozzi & Heatherton, 1994; Greenbaum & Dedrick, 1998; Little et al., 2002; Marsh, 1994; Marsh & O'Neill, 1984; West et al., 1995), and relied upon item or scale composites, sometimes referred to as parcels, rather than all single items/scales as indicators for our latent variables (LVs). This approach involves summing or taking the mean of several items that measure the same construct (or dimension) to obtain variables that more closely approximate a normal distribution than do the original items (Bagozzi & Heatherton, 1994; Little et al., 2002; West et al., 1995). The use of parcels (instead of items) as indicators for the LVs (latent variables) is also advantageous because parcels: (a) are more reliable and valid indicators of LVs, (b) have higher communalities, (c) provide more efficient (low variability) parameter estimates, (d) are less skewed than individual items, and (e) reduce the number of parameters that have to be estimated, thus improving the ratio of the number of estimated parameters to the number of subjects (Bagozzi & Heatherton, 1994; Marsh; Little et al., 2002; West et al., 1995). Although not all investigators have advocated for the parceling approach (see Little

et al., 2002, for a review and reply to criticisms of parcels), parceling has consistently been shown to be a legitimate method for testing LV models (Bandalos, 2002; West et al.).

For the current study, preliminary CFAs provided good support for treating each scale as a uni-dimensional construct. Thus, parcels could be computed by using sub-sets of items within each scale. Parcels were then created by averaging subsets of the items for each factor of each measure so that there were at least two parcels (indicators) per measure. Consistent with previous research, the items from the PAI-Borderline were combined into five parcels, reflecting impulsivity/dysregulation, mood instability, negative relationships, separation concerns, and emptiness/identity confusion (Jackson & Trull, 2001).

RESULTS

Descriptive Statistics

Table 1 presents the mean, standard deviation, minimum, maximum, skew, kurtosis, and Cronbach's alpha for each primary measure. Correlations were conducted to assess the effects of gender on responding (see table 2). Correlations between gender and other manifest variables were insignificant to small ($r < .18$); thus, gender was not included as a separate variable in the subsequent regressions or structural equation models (SEMs).

While only minor research questions in this study, the MEPS-Emo (emotion regulation) active responses and MEPS-Int (interpersonal effectiveness) active and impulsive responses displayed unsatisfactory internal consistency (Cronbach's alpha $< .40$),

Table 1

Descriptive Statistics

Measure	M	SD	Min	Max	Skew	Kurtosis	
MAAS (n = 339)	56.43	11.74	24.00	88.00	-0.11	0.15	0.88
PAI-B (n = 336)	24.55	9.68	5.00	50.00	0.31	-0.48	0.86
MEP-Int (n = 334)	6.87	2.00	2.00	13.00	-0.22	0.07	0.70
MEP-Emo (n = 328)	5.50	2.66	0.00	14.00	0.60	0.39	0.68
EPQR-A (n = 343)	13.55	4.23	6.00	24.00	0.49	-0.50	0.85

Note: MAAS = Mindful Attention Awareness Scale; PAI-BOR = Personality Assessment Inventory-Borderline; MEPS-Int = Means End Problem-Solving Test-Interpersonal Effectiveness; MEPS-Emo = Passivity/Impulsivity in Emotion Regulation; EPQRA = Eysenk Personality Questionnaire Revised Abbreviated-Neuroticism.

high kurtosis, and insignificant-to-minimal correlations with the other primary measures of the study. It is unclear whether these results were due to the non-clinical sample or to the psychometric properties of the coding system itself, as the previous studies that included the system utilized clinical samples but did not report psychometric properties (Linehan, Camper, Chiles, Strosahl, & Shearin, 1987; Kehrer & Linehan, 1996). Clearly, further research is necessary to determine the utility of the measure. However, due to the results of the exploratory analyses, the MEPS-Emo active responses and the MEPS-Int active and impulsive response were not considered further in this study.

Exploratory analyses suggested that the impulsive and passive-emotion measures could be combined to each form a composite for a higher-order LV of maladaptive emotion-regulation strategies. This is consistent with the theory that both maladaptive impulsivity and chronic passivity are utilized by individuals with BPD as strategies for regulating distressing emotions (Chan, 2005; Chapman, et al., 2005; Linehan, 1993a). Therefore, given the theoretical link and significant correlation, the impulsive and passive-emotion variables were utilized as indicators of a single latent variable representing maladaptive emotion-regulation strategies—which was labeled *impulsive/passive emotion-regulation*. Factor loadings were .71 for the impulsive composite and .56 for the passive emotion-regulation composite.

Hypotheses 1 Through 5

Correlations

Table 2 presents the results of the correlation analyses. Consistent with the first hypothesis, mindfulness was positively correlated with interpersonal problem-solving

Table 2

Correlations Between Measures

Measures	PAI-B	MAAS	MEPS-Int	MEPS-MalEm	EPQR-A	Gender
PAI-B	1.00	-0.58**	-0.30**	0.26**	0.67**	0.06
MAAS	--	1.00	0.39**	-0.27**	-0.54**	-0.09*
MEPS-Int	--	--	1.00	-0.28**	-0.26**	0.12*
MEPS-Emo	--	--	--	1.00	0.28	0.12*
EPQR-A	--	--	--	--	1.00	0.17**
Gender	--	--	--	--	--	1.00

Note: ** $p < .001$, * $p < .05$. MAAS = Mindful Attention Awareness Scale; PAI-BOR = Personality Assessment Inventory-Borderline; MEPS-Int = Means End Problem-Solving Test–Interpersonal Effectiveness; MEPS-Em0 = Passivity/Impulsivity in Emotion Regulation; EPQRA = Eysenk Personality Questionnaire Revised Abbreviated-Neuroticism.

effectiveness ($r = .39, p < .001$), and negatively correlated with borderline features ($r = -.58, p < .001$), impulsive/passive emotion-regulation strategies ($r = -.27, p < .001$), and neuroticism ($r = -.54, p < .001$). In support of the second hypothesis, borderline features were negatively correlated with interpersonal problem-solving effectiveness ($r = -.30, p < .001$) and positively correlated with impulsive/passive emotion regulation ($r = .26, p < .001$) and neuroticism ($r = .67, p < .001$).

Regression Analyses

Table 3 presents the results of the regression analyses. Results also supported the third hypothesis, as mindfulness continued to predict interpersonal problem-solving effectiveness even when neuroticism was controlled ($r^2 = .09, p < .001$). In an alternative

model, neuroticism no longer had a significant effect on interpersonal problem-solving effectiveness once mindfulness was controlled. This finding is consistent with Baron and Kenny's (1996) definition of mediation, as mindfulness is related to interpersonal problem-solving, neuroticism is related to both mindfulness and interpersonal problem-solving, and neuroticism no longer has a significant relationship with interpersonal problem-solving once mindfulness is controlled. Thus, mindfulness appears to mediate the effects of neuroticism on interpersonal problem-solving effectiveness

Results were also consistent with the fourth hypothesis. When controlling for neuroticism, mindfulness continued to have a small predictive effect on impulsive/passive emotion-regulation strategies ($r^2 = .02, p < .01$). Alternatively, neuroticism also continued to have a small predictive effect on impulsive/passive emotion-regulation when controlling for mindfulness ($r^2 = .03, p < .01$).

Consistent with the fifth hypothesis, mindfulness continued to predict borderline features when interpersonal problem-solving was controlled ($r^2 = .26, p < .001$). In contrast, interpersonal problem-solving no longer had significant effects on borderline features when mindfulness was controlled. In support of the sixth hypothesis, mindfulness continued to predict borderline features when controlling for impulsive/passive emotion-regulation strategies ($r^2 = -.28, p < .001$). However, when controlling for mindfulness, maladaptive emotion-regulation had only a small effect on borderline features ($r^2 = .01, p < .01$). Furthermore, as mindfulness skills are thought to address BPD constructs of chronic emptiness and identity confusion (Linehan, 1993a), additional analyses were conducted to assess whether the effects of mindfulness on BPD features were explained entirely by its effects on the emptiness/identity factor of the BPD measure. Thus, the above

Table 3

Regression Analyses

Criterion	Predictor	Beta	Adjust. R2	F Change
MEPS-Int (Step 1)	EPQR-A	-0.24**	0.06	21.24
(Step 2)	MAAS	0.37**	0.15	37.57
MEPS (Step 1)	MAAS	0.39**	0.15	60.64
(Step 2)	EPQR-A	0.04 ^{ns}	0.15	0.55
MEPS-Emo (Step1)	EPQR-A	0.29**	0.08	28.74
(Step 2)	MAAS	-0.16 *	0.10	6.64
MEPS-MalEm (Step1)	MAAS	-0.27**	0.07	25.10
(Step 2)	EPQR-A	0.20*	0.10	10.10
PAI-Bor (Step 1)	MEPS-Emo	0.27**	0.07	30.55
(Step 2)	MAAS	-0.55**	0.34	134.26
PAI-Bor (Step 1)	MAAS	-0.58**	0.33	160.00
(Step 2)	MEPS-Emo	0.12*	0.34	6.80
PAI-Bor (Step 1)	MEPS-Int	-0.29**	0.08	30.55
(Step 2)	MAAS	0.55**	0.34	132.31
PAI-Bor (Step 1)	MAAS	-0.08**	0.34	171.65
(Step 2)	MEPS-Int	0.34 ^{ns}	0.34	2.33
PAI-Bor (Step 1)	EPQR-A	0.67**	0.44	272.76
(Step 2)	MAAS	-0.31**	0.51	47.48
PAI-Bor (Step 1)	MAAS	-0.58**	0.33	173.23
(Step 2)	EPQR-A	0.50**	0.51	121.84

Note: * $p < .01$. ** $p < .001$. MAAS = Mindful Attention Awareness Scale; PAI-BOR = Personality Assessment Inventory-Borderline; MEPS-Int = Means End Problem-Solving Test-Interpersonal Effectiveness; MEPS-Em0 = Passivity/Impulsivity in Emotion Regulation; EPQRA = Eysenk Personality Questionnaire Revised Abbreviated-Neuroticism.

regressions were repeated with the Personality Assessment Inventory™ (PAI®) Borderline Scale (PAI-BOR) minus the emptiness/identity factor. However, even when controlling for interpersonal and impulsive/passive emotion strategies, the effects of mindfulness on the emptiness/identity factor ($r^2 = .20, p < .001$) was similar to those of mindfulness on overall BPD features ($r^2 = .23, p < .001$). Hence, emptiness and identity confusion cannot entirely explain the continued relationship of mindfulness to BPD features when controlling for interpersonal and impulsive/passive emotion strategies.

Finally, findings supported the seventh hypothesis; mindfulness had significant effects on borderline features even when neuroticism was controlled ($r^2 = .07, p < .001$). Additionally, neuroticism also continued to predict borderline features when controlling for mindfulness ($r^2 = .18, p < .001$).

Modeling Latent Variables

Structural equation modeling was utilized to test the relationships among variables. Consistent with recommendations by Hu and Bentler (1999), the comparative fit index (CFI; Bentler, 1995) was utilized. The CFI avoids underestimation of fit from sampling variability associated with other fit indices. Fit values close to .90 are indicative of good fit (Hu & Bentler, 1999). Hu and Bentler (1999) also recommend use of at least one of the following: (a) the root mean square error of approximation (RMSEA; Steiger, 1990) or (b) a standardized version of the root mean squared residual (SRMR; Joreskog & Sorbom, 1981). Model fit is good when RMSEA value is approximately .05 or less and/or the SRMR value is .08 or less (Hu & Bentler, 1999). The maximum likelihood procedure was used for CFA/SEM analyses using EQS (version 5.7b; Bentler, 1998) for Windows. Two models were tested to assess the proposed relationship of mindfulness with borderline

features and core constructs of interpersonal problem-solving effectiveness and impulsive/passive emotion regulation. Although the models allow mindfulness, interpersonal effectiveness and impulsive/passive emotion-regulation to covary, they are statistically identical to models in which mindfulness predicts borderline features, interpersonal effectiveness, and impulsive/passive emotion regulation strategies.

The first SEM assessed the predictive effects of mindfulness on borderline features when controlling for interpersonal effectiveness and impulsive/passive emotion regulation. Figure 3 depicts this SEM, along with standardized coefficients for each path. Results of this SEM indicate excellent fit to the data, $RCFI = .97$, $SRMR = .04$, $RMSEA = .04$. Furthermore, this model accounted for 58% of the variance in the borderline-features factor. All factor loadings were significant.

As shown in Figure 3, mindfulness continued to have a strong negative predictive effect on borderline features even when interpersonal and impulsive/passive emotion-regulation strategies were included in the model. Furthermore, mindfulness had significant positive effects on effective interpersonal problem-solving and negative effects on impulsive/passive emotion regulation. Additionally, impulsive/passive emotion regulation had had a strong negative correlation with interpersonal problem-solving and a moderate positive effect on borderline features. However, interpersonal problem-solving had no significant effect on borderline features, thus replicating the regression results of mindfulness mediating the relationship between interpersonal effectiveness and borderline symptoms.

The second SEM included the above factors while also adding neuroticism as a criterion variable, thus controlling for the effects of neuroticism on borderline features. The

higher-order factor of impulsive/passive emotion regulation was once again utilized as the emotional problem-solving LV. Figure 4 depicts this model, along with standardized coefficients for each path. This model also had good fit with the data, $RCFI = .92$, $SRMR = .05$, $RMSEA = .07$. Additionally, it accounted for 48% of the neuroticism variance and 82% of the borderline-features variance. All factor loadings were significant.

As expected, neuroticism had a very strong predictive effect on borderline features; however, mindfulness continued to predict borderline features even when neuroticism, interpersonal problem-solving, and impulsive/passive emotion regulation were controlled. Mindfulness also had a strong negative effect on neuroticism, a moderate negative effect on impulsive/passive emotion regulation, and a strong positive effect on effective interpersonal problem-solving. Impulsive/passive emotion regulation was significantly related to neuroticism but had no significant effect on borderline features when controlling for the other latent variables. Interpersonal effectiveness had no significant effect on either neuroticism or borderline features when the other latent variables were controlled. Finally, it is important to note that supplementary modeling analyses indicated that the neuroticism and BPD latent variables were best represented as two correlated factors rather than indicators of a single factor. Thus, while the factors of BPD and neuroticism are strongly associated, they appear to be separable constructs.

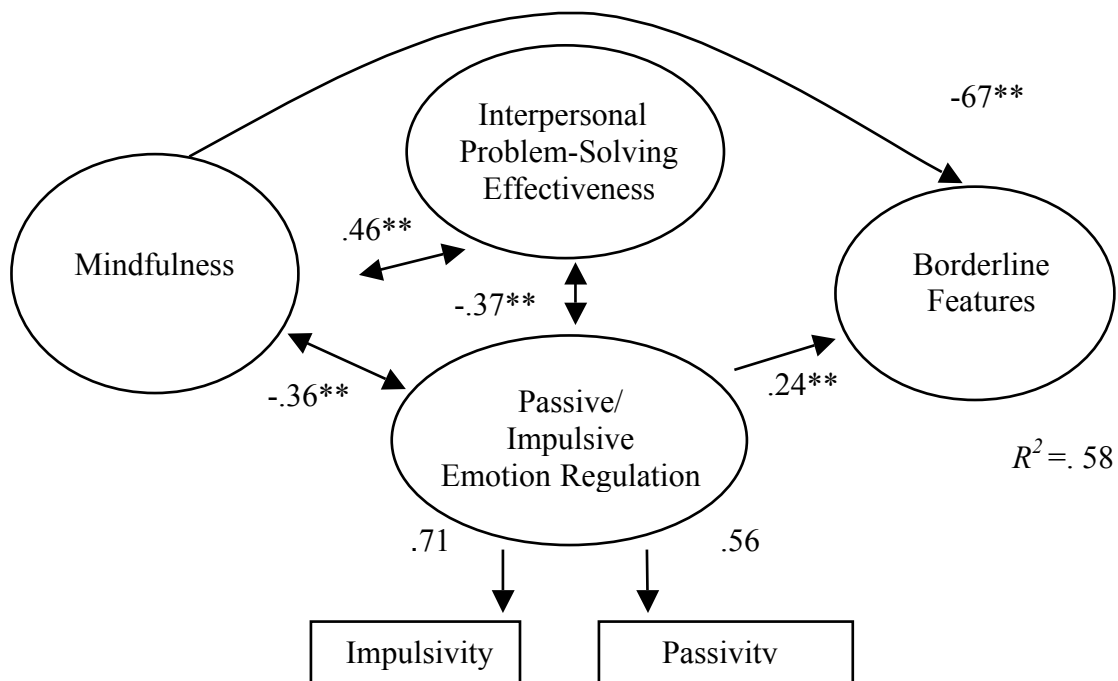


Figure 3. Inter-relationships between mindfulness, interpersonal problem-solving, impulsive/passive emotional-regulation strategies, and BPD features. Note: $^{**} p. < .001$; only significant paths are shown.

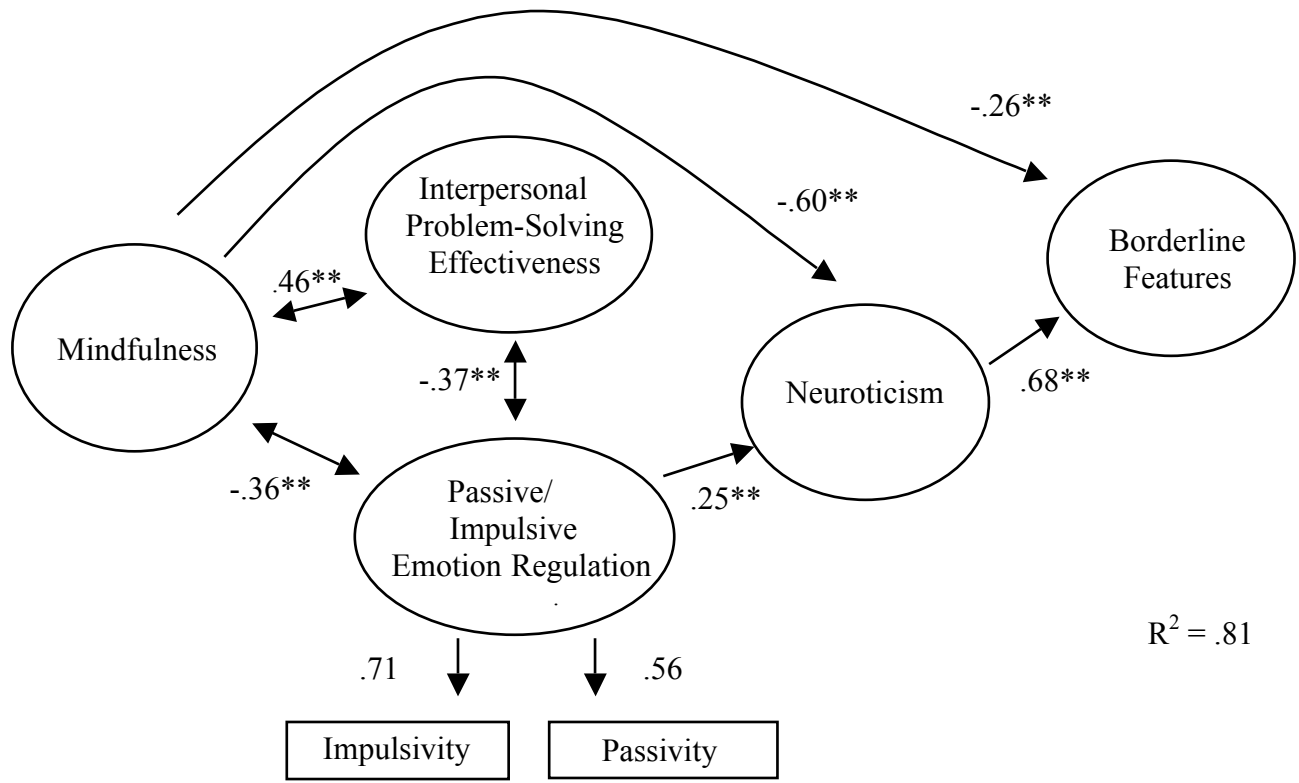


Figure 4. Inter-relations between mindfulness, interpersonal problem-solving, impulsive/passive emotional-regulation strategies, neuroticism, and BPD features. Note: ** $p < .001$; only significant paths are shown.

DISCUSSION

This purpose of this study was to examine the relationship of mindfulness with BPD features and the underlying constructs of interpersonal problem-solving effectiveness, impulsivity and passivity in emotion-regulation, and neuroticism. Mindfulness is a core component of the dialectical behavioral conceptualization and treatment of BPD, and many believe mindfulness to be an integral deficit in individuals with symptoms of BPD (Cheavens et al., 2005; Hayes et al., 1996; Linhen 1993a). However, little previous research has examined the relations of mindfulness to BPD features. Additionally, although aspects of mindfulness are currently being utilized in a number of interventions aimed at improving interpersonal functioning, emotion regulation, and behavioral control in a variety of populations (Fruzzetti & Iverson, 2004; Marlatt et al., 2004; Linehan, 1993b; Williams & Swales, 2004), little research has examined the actual associations between mindfulness and interpersonal, emotional, and behavioral functioning.

Results of this study provide evidence that (decreased) mindfulness is an important construct for understanding BPD symptoms. Results of both regression analyses and SEM revealed mindfulness to be inversely related to BPD features, and this relationship continued even when controlling for interpersonal problem-solving, passivity and impulsivity in emotion-regulation, and neuroticism—widely believed to be critical underlying traits of BPD. As expected, mindfulness also predicted less-effective interpersonal problem-solving and more impulsive/passive emotion regulation.

Mindfulness also continued to predict interpersonal problem-solving and impulsive/passive emotion regulation even when neuroticism was controlled. However, neuroticism no longer predicted interpersonal problem-solving when controlling for

mindfulness. Thus, mindfulness mediated the relationship between neuroticism and interpersonal problem-solving effectiveness. This finding suggests that mindfulness is a fundamental component of effective interpersonal problem-solving. Additionally, any effects of neuroticism on interpersonal problem-solving appear to be explained by neuroticism's relationship with mindfulness. These results provide further evidence for the importance of including a mindfulness focus in social-skills training.

Additionally, although neuroticism explained a considerable portion of the variance between mindfulness and impulsive/passive emotion regulation, the same was true of the reverse; mindfulness also explained a considerable portion of the variance between neuroticism and impulsive/passive emotion regulation. Thus, it would be premature to credit either mindfulness or neuroticism with explaining the majority of the emotion-regulation variance. At this point, the definitive finding is that mindfulness continues to have a significant relationship with emotion regulation even when controlling for neuroticism. Additional research is needed to elucidate the relationships of these constructs in more detail.

Neuroticism

The results of this study have several important clinical and research implications. Neuroticism is widely believed to be the underlying trait of BPD (Sher & Trull, 1996; Trull, 2001). Thus, the continued relationship of mindfulness to BPD features when controlling for neuroticism provides support for the unique contribution of mindfulness to BPD features, as well as related strategies of interpersonal problem-solving and impulsivity/passivity in emotion regulation. Although the effects of mindfulness on BPD features and strategies were substantially reduced when neuroticism was controlled, this

finding is not surprising considering neuroticism's significant relationships with both mindfulness and BPD features. Nevertheless, it is important to note that mindfulness and neuroticism were forced to compete for variance in this study. The inverse relationship between the two variables requires further investigation before a definitive statement can be made about either's direct effects on borderline features. For example, neuroticism, which includes worry, self-consciousness, and other forms of negative affect, may circumvent mindful processing, which can thus increase BPD features and harmful coping strategies. In contrast, increases in mindfulness, along with the resulting increases in awareness of emotions, self, and others, may lead to decreases in neurotic tendencies, which can then decrease BPD features and the need for avoidant and/or harmful coping strategies. Alternatively, if neuroticism is biologically based, then mindfulness can promote an awareness of one's negative affectivity and facilitate more adaptive coping responses.

Although many consider neuroticism to be a stable personality trait (Eysenck & Eysenck, 1985; Schrader, 1994), other research has suggested that neuroticism may be more state dependent, with levels changing significantly as a result of life events or counseling (Barnett & Gotlib, 1988; Coyne & Gotlib, 1983). Support for this view of neuroticism comes from numerous studies showing that scores on neuroticism scales are either no different or significantly lower in remitted depressed patients than they are in nondepressed controls (for review, see Barnett & Gotlib, 1988; Segal & Ingram, 1995). Still other research suggests that neuroticism levels may be somewhat stable, while also fluctuating over a lifetime (Santor, Bagby, & Joffe, 1997). Thus, neuroticism may reflect the underlying biological component of the biosocial model of BPD, or it may reflect the

trait of emotion dysregulation, which is theorized to be a combination of temperament and invalidating environment (Linehan, 1993; Trull, 2001). If the first case is true, increases in mindfulness may foster decreases in BPD features by improving patients' ability to adaptively cope with their underlying neurotic temperament, without actually affecting the level of neuroticism. If the second is true, then increases in mindfulness may actually lower levels of neuroticism, which then contributes to reductions in BPD features. Finally, some combination of the above may be true, with mindfulness serving to both reduce levels of neuroticism while also facilitating more adaptive coping methods for existing neurotic tendencies. Though important, the resolution of this issue is beyond the scope of this study. Longitudinal research is needed to investigate the interactions between mindfulness, neuroticism, and BPD features over time.

Finally, it is important to note that supplementary modeling analyses indicated that the neuroticism and BPD latent variables were best represented as two correlated factors rather than indicators of a single factor. Thus, while the factors of BPD and neuroticism are strongly associated, they appear to be separable constructs.

Conceptualization of BPD

Results of the current study also provide support for the DBT conceptualization of mindfulness and BPD (Linehan, 1993a). The inverse relation between mindfulness and BPD features offers evidence that individuals high in BPD features have less awareness and willingness to experience their internal events. This is consistent with the DBT theory that BPD features are a result of the interaction between emotional vulnerability and invalidating childhood environments. The combination of intense emotions routinely followed by invalidating responses may lead individuals to doubt and judge their own

emotions, perceptions, and experiences, thus leading to decreased awareness or mindfulness of the emotions and interpretations they experience. Additionally, the intensity of emotions experienced by individuals with BPD appears to further increase the perceived need to avoid any experience that has even the potential of being unpleasant or uncomfortable, which may then lead to the chronic avoidant coping displayed by individuals with BPD features. Therefore, the inverse relationship of mindfulness to ineffective interpersonal problem-solving and impulsive/passive emotion regulation suggests that mindfulness can alleviate the need for maladaptive coping strategies, thus – ultimately – helping to alleviate overall BPD features.

Additionally, mindfulness may also reduce BPD features by addressing the chronic feelings of emptiness and identity confusion experienced by individuals with BPD (Linehan, 1993a; Linehan, 1993b). However, emptiness and identity confusion cannot entirely explain the continued relationship of mindfulness to BPD features when controlling for interpersonal and impulsive/passive emotion strategies, as the relationship of mindfulness to the “empty/identity” factor of the BPD measure is not significantly different than the relationship of mindfulness to the other factors of the BPD measure. This result is true even when the effects of the coping strategies are controlled.

Additional Implications

Although the focus of this study was mindfulness and BPD features, it is important to reiterate that the sample consisted of a nonclinical sample of university students. Thus, the predictive effects of mindfulness on effective interpersonal problem-solving and impulsive/passive emotion regulation are not limited to individuals with BPD, and can be generalized to those in non-clinical populations. Of note is that approximately 4% of

individuals in the current sample reported clinically significant levels of BPD symptoms, which is in accordance with prevalence estimates of BPD symptoms in the general population. Thus the current results provide support for the use of mindfulness-based interventions focused on improving interpersonal functioning, impulsivity, and passivity in individuals who are not necessarily in treatment for BPD.

Directions for Further Research

The current study generates a number of directions for future research. First, the use of university students as participants limits the generalizeability of the results to clinical populations. Future research is needed in clinical samples to confirm low mindfulness as a core feature in BPD. However, it is important to note that the current sample demonstrated a broad range of BPD features, including features often targeted in treatment. Thus, although replication in a clinical sample is important, the focus on BPD symptoms in a sub-clinical sample provides clinically meaningful information that may be particularly useful for assessing vulnerability to the disorder.

A second limitation relates to assessment procedures. In order to thoroughly assess factors of interest and have a sufficient subject-to-variable ratio for conducting multiple regressions and structural equation modeling, it was necessary to collect data from a large number of participants. Therefore, written, self-report data was utilized. It is recommended that future research expand the methodology used to investigate BPD, mindfulness, interpersonal problem-solving, impulsivity and passivity utilizing multiple modes and methods.

Finally, as correlational statistics were utilized, no definitive statements can be made about cause and effect, and all speculated directionality is theorized based on the relevant

previous research. Thus longitudinal studies should examine the relationship of mindfulness and borderline features to investigate whether relations observed in this study vary over time and whether low mindfulness predicts the development of additional BPD features or maladaptive coping strategies. Additionally, research should explore whether increases in mindfulness predict decreases in BPD features, impulsive/passive emotion regulation, ineffective interpersonal problem-solving, and neuroticism. In contrast, decreases in BPD features, maladaptive coping strategies, and neuroticism may also facilitate increases in mindfulness, as internal and external events may seem less aversive due to the mastery and exposure inherent in more adaptive coping. Longitudinal studies are needed to further explain these relationships.

Finally, longitudinal clinical studies are needed to assess the effects of mindfulness on treatment outcome. If difficulties with mindfulness are truly central to BPD pathology, then a focus on mindfulness may be an essential element in the treatment effectiveness of DBT and other mindfulness-based interventions. Further studies are needed to clarify the involved components.

However, the current study does have clinical relevance. Although biological temperament and invalidating environments may be difficult-to-impossible to modify, research shows that levels of mindfulness can change through mindfulness training (Brown & Ryan, 2003). The results of this study provide evidence to suggest that therapeutic interventions to increase mindfulness may reduce overall BPD symptoms, as well core BPD constructs of ineffective interpersonal problem-solving and passivity/impulsivity in emotion-regulation. Thus, the current findings are one additional step toward understanding the key components necessary for effective treatment. Thus, mindfulness

appears to represent a core feature of BPD, and improvements in mindfulness may be a vital component of DBT's efficacy at treating BPD.

Conclusion

Mindfulness was supported as a central construct for understanding BPD pathology. Compared to individuals high in mindfulness, individuals low in mindfulness had less effective interpersonal problem-solving, more passivity and impulsivity in emotion-regulation strategies, and more-severe borderline features. Furthermore, low mindfulness predicted borderline features even when controlling for interpersonal effectiveness, impulsive and passive emotion-regulation, and neuroticism, widely believed to be the underlying traits of BPD. Thus, deficits in mindfulness appear integral to BPD, predicting variability in features even after accounting for characteristic behaviors, coping patterns, and traits. Therefore, an emphasis on mindfulness may be an integral component in effective treatment of BPD. It is strongly recommended that the unique contribution of mindfulness be examined in longitudinal treatment-outcome research.

APPENDIX

DSM-IV DIAGNOSTIC CRITERIA FOR BORDERLINE PERSONALITY DISORDER

Borderline Personality Disorder

A pervasive pattern of instability of interpersonal relationships, self-image, and affects, and marked impulsivity beginning by early childhood and present in a variety of contexts, as indicated by five or more of the following:

- 1) frantic efforts to avoid real or imagined abandonment. Note: Do not include suicidal or self-mutilating behavior covered in Criterion 5.
- 2) a pattern of unstable and intense interpersonal relationships characterized by alternative between extremes of idealization and devaluation.
- 3) identity disturbance: markedly and persistently unstable self-image or sense of self.
- 4) impulsivity in at least two areas that are potentially self-damaging (e.g., spending, sex, substance abuse, reckless driving, binge eating). Note: Do not include suicidal or self-mutilating behavior covered in Criterion 5.
- 5) recurrent suicidal behavior, gestures, or threats, or self-mutilating behavior
- 6) affective instability due to a marked reactivity of mood (e.g., intense episodic dysphoria, irritability, or anxiety usually lasting a few hours and only rarely more than a few days)
- 7) chronic feelings of emptiness
- 8) inappropriate, intense anger or difficulty controlling anger (e.g., frequent displays of temper, constant anger, recurrent physical fights)
- 9) transient, stress-related paranoid ideation or severe Dissociative symptoms

Note: APA, 2000, p. 701.

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