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Mindfulness-Based Acceptance and Posttraumatic Stress Symptoms among Trauma-Exposed Adults without Axis I Psychopathology

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Abstract

The present investigation examined the incremental predictive validity of mindfulness-based processes, indexed by the Kentucky Inventory of Mindfulness Skills, in relation to posttraumatic stress symptom severity among individuals without any axis I psychopathology. Participants included 239 adults who endorsed exposure to traumatic life events. Results indicated that the Accepting without Judgment subscale was significantly incrementally associated with posttraumatic stress symptoms; effects were above and beyond the variance accounted for by negative affectivity and number of trauma types experienced. The Acting with Awareness subscale was incrementally associated with only posttraumatic stress-relevant re-experiencing symptoms; and no other mindfulness factors were related to the dependent measures. Findings are discussed in relation to extant empirical and theoretical work relevant to mindfulness and posttraumatic stress.

Keywords

mindfulness; acceptance; trauma; posttraumatic stress

Recent proliferation of mindfulness and acceptance-based treatments has underscored importance of advancing more basic knowledge about the clinically-relevant mechanisms underlying associations between mindfulness and acceptance and various psychological symptoms (Eifert & Forsyth, 2005; Hayes, Strosahl, & Wilson, 1999; Kabat-Zinn, Lipworth, Burney, & Sellers, 1987; Linehan, 1993; Parks, Anderson & Marlatt, 2001; Segal, Williams, & Teasdale, 2002; Walser & Westrup, 2007). However, despite promise of mindfulness for improved psychological functioning, there is a lack of consensus on an overarching theoretical

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framework, and by extension, operationalization of the construct (Bishop et al., 2004; Zvolensky, Feldner, Leen-Feldner, & Yartz, 2005). Bishop et al. (2004) offer one promising two-component definition, whereby mindfulness is defined as (1) self-regulation of attention on the internal and external events in the present moment, and (2) maintenance of an acceptance-based stance toward one's present experience.

Without a universally accepted definition of the construct, each mindfulness-based treatment has defined and indexed the construct and corresponding approach to skills training slightly differently. Thus, numerous types of mindfulness skills have been targeted across relevant intervention programs for a relatively wide array of clinical conditions (Hayes et al., 1999; Kabat-Zinn et al., 1987; Linehan, 1993; Parks et al., 2001). In the case of posttraumatic stress disorder (PTSD), specifically, acceptance and commitment therapy (ACT; Hayes et al., 1999), a mindfulness-relevant intervention emphasizing experiential acceptance, has gained promise as a potentially effective treatment (Orsillo, Roemer, Block-Lerner, LeJeune, & Herbert, 2005; Varra & Follette, 2005; Walser & Hayes, 2006; Walser & Westrup, 2007). Emerging research suggests that mindfulness practice has the potential to be a clinically significant intervention strategy for posttraumatic stress; as increased levels of mindfulness facilitate a present-oriented stance, and may therefore, assist in the development of nonjudgmental acceptance of past traumatic life experiences as well as increased awareness and acceptance of ongoing trauma-relevant cognitive and affective experiences (Orsillo et al., 2005; Walser & Hayes, 2006; Walser & Westrup, 2007).

Some initial work has demonstrated that higher levels of mindfulness, as indexed by self-reported mindful attention and awareness, have been concurrently associated with both lower anxiety (Vujanovic, Zvolensky, Bernstein, Feldner, & McLeish, 2007) and depressive symptoms (Zvolensky, Solomon et al., 2006). Additionally, increased mindfulness skills, defined generally as purposeful, non-judgmental, present-centered attention (e.g., Segal, Williams, & Teasdale, 2002), have been associated with the prevention of major depressive disorder recurrence (Ma & Teasdale, 2004), lower rates of relapse for substance abuse (Breslin, Zack, & McMain, 2002), and improvements in chronic pain (McBee, 2003; Weissbecker et al., 2002). Controlled clinical trials also have demonstrated that psychosocial interventions targeting mindfulness processes are efficacious for the treatment of a variety of psychological symptoms, including, but not limited to, borderline personality disorder, substance dependence, stress and anxiety, and major depressive disorder (e.g., Bond & Bunce, 2000; Hayes et al., 1999; Linehan, 1993; Lynch, Trost, Salsman, & Linehan, 2007; Parks et al., 2001; Teasdale et al., 2002). Although extant work on mindfulness and psychopathology is indeed encouraging, there unfortunately remains little understanding as to how this construct relates to the experience of posttraumatic stress symptoms.

One recently developed and promising measure of mindfulness is the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004). The KIMS is designed to index the tendency to be mindful in daily life from a multidimensional perspective (Baer et al., 2004). Informed largely by the theoretical basis of dialectical behavior therapy (DBT; Linehan, 1993), and thus by definition not completely consistent with other relevant treatment approaches (e.g., ACT, mindfulness-based cognitive therapy), the KIMS indexes four theoretically distinct, yet interrelated, factors (Baer et al., 2004): (1) the ability to observe cognitions, emotions and sensations, and external phenomena such as sounds and smells (Observing factor); (2) the ability to apply words to observed phenomena (Describing factor); (3) the ability to limit attention to the current activity or present moment (Acting with Awareness factor); and (4) the ability to experience the present state without evaluating or judging its content (Accepting without Judgment factor). These four mindfulness skills domains have demonstrated adequate levels of internal consistency and construct validity across clinical and nonclinical populations (Baer et al., 2004; McKee, Zvolensky, Solomon,

Bernstein, & Leen-Feldner, 2007). Thus, mindfulness skills, as indexed by the KIMS, can be assessed from a multidimensional framework and employed to inform the nature of psychopathological states.

Several scholars have recently extrapolated upon the clinical utility of mindfulness, generally, and acceptance (one component of mindfulness), in particular, in the treatment of traumatic stress (Orsillo et al., 2005; Walser & Hayes, 2006; Walser & Westrup, 2007). Here, the psychological benefits of engaging in an active process of experiencing emotions and related internal events (e.g., memories) are cited as explanatory mechanisms by which to lessen dysfunctional psychological states (Hayes et al., 1999). From this perspective, and consistent with the Bishop et al. (2004) definition of the mindfulness construct, acceptance, and perhaps to a lesser extent, acting with awareness, are posited to play a role in the experience of posttraumatic stress symptoms (Walser & Westrup, 2007). Overall, this viewpoint is indirectly supported by a diverse body of empirical work that has suggested that a relative inability to accept aversive emotional experiences and concurrent (active) attempts to avoid such experiences may exacerbate traumatic stress symptoms (Hayes, Wilson, Gifford, Follette & Strosahl, 1996; Purdon, 1999).

Contemporary models of PTSD postulate that emotional self-regulation aimed at avoiding or limiting contact with trauma-related thoughts and memories contributes to risk for and maintenance of more intense and problematic symptoms (Polusny & Follette, 1995; Orsillo & Batten, 2005). Empirical work supports this conceptualization, in that experiential avoidance is related to the severity of posttraumatic stress symptoms after accounting for the severity of traumatic event exposure (Plumb, Orsillo, Luterek, 2004; see also Lynch, Robins, Morse, & MorKrause, 2001; Marx & Sloan, 2002). Although the idea that efforts to (rigidly) avoid trauma-related sequelae is certainly not new to models of stress and anxiety (Barlow, 1988; Mineka, 1985), and many psychosocial treatments are purposively designed to counteract such regulatory behavior through a willingness and acceptance of experience (Walser & Westrup, 2007), there is a current absence of empirical data pertaining to the association between mindfulness processes and the experience of posttraumatic stress symptoms. Therefore, it remains clinically and theoretically important to clarify the empirical association between multidimensional mindfulness processes and posttraumatic stress symptoms. Moreover, to the extent that mindfulness offers unique explanatory relevance to posttraumatic stress symptoms, its effects would need to be evident after the variance explained by generalized emotional vulnerability (negative affectivity/neuroticism) and traumatic event exposure are considered. That is, such effects should not be better accounted for by other co-occurring risk factors relevant to the experience of posttraumatic stress symptoms.

Together, the present investigation sought to examine the incremental predictive validity of specific mindfulness skills in relation to posttraumatic stress symptom severity and the severity of each posttraumatic stress symptom cluster in a sample of trauma-exposed individuals without axis I psychopathology. Hypotheses were partially informed by the Bishop et al. (2004) model of mindfulness, whereby attention/awareness and acceptance are theorized as the principle components of the construct. First, it was hypothesized that the KIMS – Accepting without Judgment subscale would incrementally (concurrently) predict posttraumatic stress symptom severity and severity of re-experiencing, avoidance, and hyperarousal symptoms, above and beyond variance accounted for by negative affectivity and number of trauma types experienced. It also was expected that the effect for the KIMS – Accepting without Judgment subscale in predicting posttraumatic stress symptoms would not be accounted for by shared variance with other mindfulness components (i.e., Observing, Describing, Acting with Awareness). These hypotheses were driven by theoretical models and indirect empirical data that suggest that the process of accepting without judgment is a central explanatory mechanism in the experience of the severity of posttraumatic stress symptoms (Bishop et al., 2004; Walser

& Westrup, 2007). Second, in regard to the other mindfulness components, it was hypothesized that only the KIMS - Acting with Awareness subscale would be related to posttraumatic stress symptoms above and beyond the covariates of negative affectivity and number of trauma types. This hypothesis was informed by theoretical models of mindfulness that posit acting with awareness also is a unique explanatory component relevant to psychological health (Bishop et al., 2004; Hayes et al., 1996; Linehan, 1993).

Method

Participants

A total of 239 participants (129 women; M_{age} = 23.0 years, *SD* = 9.6), ranging in age from 18 to 65 years, who endorsed exposure to traumatic life events,[1] was recruited via flyer and newspaper advertisements for participation in studies on "emotion." On average, participants reported experiencing 2.3 different types of traumatic life events. Types of traumatic events reported, as per responses on the Posttraumatic Diagnostic Scale (PDS; Foa, 1995), included: serious accident, fire, or explosion (48.5%), natural disaster (25.9%), sexual contact when younger than 18 years with someone five or more years older (23.0%), non-sexual assault by a family member or someone known (22.6%), non-sexual assault by a stranger (20.5%), sexual assault by a family member or someone known (14.2%), sexual assault by a stranger (11.3%), imprisonment (10.5%), military combat or a war zone (3.3%), torture (2.1%), and "other" trauma type (33.5%). Of the 33.5% of participants who endorsed an "other trauma type," the most commonly endorsed traumas included the death of a family member or friend (*n* = 24), a self-relevant serious illness or injury (*n* = 15), serious illness or injury of a family member or friend (*n* = 12), September 11th terrorist attacks (*n* = 4), and witnessing a sexual or physical assault (*n* = 3).

The ethnic/racial background of participants was generally consistent with that of the state of Vermont population (State of Vermont Department of Health, 2007): 92.1% of participants identified as White/Caucasian; 1.3% identified as Black/African-American; 1.3% identified as Hispanic/Latino; 0.8% identified as Asian; 0.8% identified as biracial; and 3.7% of participants endorsed the 'other' race/ethnicity category. Exclusionary criteria for the present study included: (1) current axis I psychopathology; (2) limited mental competency or the inability to provide informed, written consent; (3) current suicidal or homicidal ideation; (4) current or past history of psychotic-spectrum symptoms; and (5) pregnancy (women only).

Measures

Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders – 4th Edition (DSM-IV) Axis I Diagnoses/Non-Patient Version (SCID-I/NP)—Diagnostic exclusion for current axis I diagnoses was determined using the SCID-I/NP (First, Spitzer, Gibbon, & Williams, 1995). The non-patient version was used since participants were not identified as a clinical sample. The *DSM-IV* version of the SCID-I/NP has been shown to have good reliability (inter-rater Kappa = .63 – 1.0, Zanarini et al., 2000; test-retest Kappa = .44 – .78, Zanarini et al., 2000) and good to excellent validity (Basco et al., 2000). The SCID was administered by trained graduate-level raters. Inter-rater reliability in prior investigations by our team has been excellent for axis I diagnoses (e.g., Zvolensky, et al., 2005).

[1]A traumatic event was defined, broadly, as endorsement of at least one of the events delineated in Part I of the Posttraumatic Diagnostic Scale. When a traumatic event was more conservatively defined according to *DSM-IV-TR* PTSD Criterion A, results of analyses were consistent with those reported in this investigation. According to Criterion A, a traumatic event is defined as one in which an individual "experienced, witnessed, or was confronted with an event…that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others" and the individual's response "involved intense fear, helplessness, or horror," as defined by the *DSM-IV-TR* Posttraumatic Stress Disorder diagnosis criteria (APA, 2000, p. 467).

Positive Affect Negative Affect Scale (PANAS)—The PANAS is a 20-item measure in which respondents indicate, on a 5-point Likert-type scale (1 = *very slightly or not at a*ll to 5 = e*xtremely*), the extent to which they generally experience emotions (e.g., "*Hostile*"). The PANAS is a well-established affective measure (Watson, Clark, & Tellegen, 1988). Factor analysis indicates that it assesses two global dimensions of affect: negative and positive. Both subscales of the PANAS have demonstrated good convergent and discriminate validity. Additionally, both the negative affect as well as the positive affect scales of the PANAS have demonstrated high levels of internal consistency (range of alpha coefficients: .83 to .90 and . 85 to .93, respectively). A large body of literature supports the psychometric properties of the PANAS (see Watson, 2000). For the purposes of this study, only the negative affectivity subscale (PANAS – NA) was used to assess the trait-like tendency to experience negative affect states.

Posttraumatic Diagnostic Scale (PDS)—The PDS (Foa, 1995) is a 49-item self-report instrument designed to assess the presence of posttraumatic stress symptoms, based on *DSM-IV* criteria (American Psychiatric Association [APA], 1994, 2000). Respondents report if they have experienced any of 12 traumatic events, including an "other" category, and then indicate which event was most disturbing. Respondents also rate the frequency (0 = *not at all* or *only one time* to 3 = *five or more times a week/almost always*) of 17 PTSD symptoms experienced in the past month in relation to the most-disturbing event endorsed (total score range of 0 to 51). The PDS is a measure of trauma-related symptoms with generally excellent psychometric properties (Foa, Cashman, Jaycox, & Perry, 1997). The PDS has demonstrated high internal consistency (alpha = .92) and high test-retest reliability (kappa = .74). In terms of convergent validity, when PDS scores were compared to those of the SCID-PTSD module, the PDS correctly identified the PTSD status of 86% of participants; with positive predictive power of 100% and negative predictive power of 82% (Foa, Riggs, Dancu, & Rothbaum, 1993). In this study, the PDS was utilized to index traumatic event exposure and to assess posttraumatic stress symptom severity, and the severity of each posttraumatic stress symptom cluster (i.e., re-experiencing symptoms, avoidance symptoms, and hyperarousal symptoms).

Kentucky Inventory of Mindfulness Skills (KIMS).[2]—The KIMS is a 39-item questionnaire on which respondents indicate, on a 5 point Likert-type scale (1 = *never or very rarely true* to 5 = *almost always or always true*), the general tendency to be mindful in daily life (Baer et al., 2004). It was purposely designed for use among individuals without any particular experience in practices presumably related to mindfulness skills (e.g., meditation experience), and therefore, can be employed among unselected community samples. Factor analysis of the measure indicates that it has a hierarchical structure, with four first-order factors entitled Observing (e.g.,*"I pay attention to how my emotions affect my thoughts and behavior"*), Describing (e.g., *"I'm good at finding the words to describe my feelings"*), Acting With Awareness (e.g., *"When I'm doing something, I'm only focused on what I'm doing, nothing else"*), and Accepting Without Judgment (e.g., *"I criticize myself for having irrational or inappropriate emotions"- reverse scored*). A summed score is calculated for each factor, with some items reverse scored, where higher scores indicate greater use of mindfulness skills. The KIMS appears to have good internal consistency, with alpha coefficients calculated from an undergraduate sample for Observing, Describing, Acting With Awareness, and Accepting Without Judgment of .91, .84, .83, and .87, respectively (Baer et al., 2004). Each of the mindfulness first-order factors identified by the KIMS is only moderately correlated with one

[2]Baer, Smith, Hopkins, Krietemeyer, and Toney (2006) recently developed another self-report measure of mindfulness skills entitled the Five Facet Mindfulness Questionnaire (FFMQ). The FFMQ consists of the four mindfulness factors indexed by the KIMS in addition to a fifth factor entitled Nonreactivity to Inner Experience. Baer et al. (2006) continue to promote the utility of the KIMS in measuring four of the five identified mindfulness facets at the present stage of research. At the time of the conduct of the present study, only the original four-factor KIMS was available.

another, suggesting that they tap related, but distinct, processes (Baer et al., 2004; McKee et al., 2007). Convergent and discriminate validity for the KIMS also has been established with the five factor model of personality (NEO Five; Costa & McCrae, 1992), a broad range of psychopathology symptoms, and other theoretically-relevant constructs (e.g., alexithymia, absorption, satisfaction with life; see Table 3 listed in Baer et al., 2004). Test-retest reliability data over a 14–17 day time period suggest mindfulness skills are stable (Baer et al., 2004).

Procedure

Upon arrival to the laboratory, participants (1) provided verbal and written informed consent, (2) completed a medical screen (to assess for self-reported medical conditions and/or pregnancy), (3) underwent a diagnostic evaluation (SCID-I/NP) in order to determine if any exclusionary criteria were met, and (4) completed a battery of self-report assessments, including those used in the present investigation. Participants were compensated an average of $25 for their efforts.

Data Analytic Plan

A series of four hierarchical regression analyses was performed. Criterion variables included: (1) PDS – Total score, (2) PDS – Re-Experiencing Symptoms subscale score, (3) PDS – Avoidance Symptoms subscale score, and (4) PDS – Hyperarousal Symptoms subscale score. At step one of each of the models, the PANAS – NA score and PDS - Number of Trauma Types variable were entered as covariates. At step two of each of the models, the four KIMS subscales, KIMS – Observing, KIMS – Describing, KIMS – Acting with Awareness, and KIMS-Accepting without Judgment were entered concurrently. This analytic approach provides a test of incremental validity and ensures that any observed effects at step two of the models are separable from the variance accounted for by the other theoretically-relevant factors at step one of the equations (Cohen & Cohen, 1983).

Results

Zero-Order Associations among Theoretically-Relevant Variables

Please see Table 1 for a summary of descriptive data and zero-order correlations among the studied variables. The PANAS – NA subscale was significantly associated (p's < .05) with all PDS-relevant variables (range of r's: .29 to .38) as well as with each of the KIMS subscales (range of r's: −.15 to −.33); all correlations were in the expected directions except for the positive association between the PANAS – NA and KIMS – Observing subscales (see Table 1). The PDS – Number of Trauma Types variable was significantly associated with each of the PDS variables (p's < .01; range of r's:.36 to .50), but none of the KIMS subscales.

The KIMS – Observing subscale was not significantly associated with the PDS - Total or subscale scores. The KIMS – Describing subscale was only significantly associated with PDS hyperarousal symptoms ($r = -.15$, $p < .01$). The KIMS – Acting with Awareness subscale was significantly associated with each of the PDS variables (p's < .01; range of r's: −.21 to −.25). The KIMS – Accepting without Judgment subscale also was significantly associated with the PDS - Total and subscale scores (p's < .01; range of r's: −.29 to −.37).

Hierarchical Regression Analyses

Please see Table 2 for a summary of all hierarchical regression analyses. In terms of the PDS – Total score, step one of the model accounted for a significant 32% of variance ($p < .001$), and PANAS – NA ($p < .001$) and PDS - Number of Trauma Types ($p < .001$) were both significant predictors. Step two of the model accounted for 6% of unique variance ($p < .001$);

and only the KIMS – Accepting without Judgment subscale was a significant incremental predictor ($p = .001$).

In terms of the PDS – Re-Experiencing Symptoms subscale, step one of the model accounted for a significant 19% of variance ($p < .001$), and both PANAS – NA ($p < .001$) and PDS - Number of Trauma Types were significant predictors ($p < .001$). Step two of the model explained 6% of unique variance. The KIMS – Acting with Awareness and KIMS – Accepting without Judgment were both significant incremental predictors ($p < .05$).

In terms of the PDS – Avoidance Symptoms subscale, step one of the model explained a significant 32% of variance ($p < .001$), and both PANAS – NA ($p < .001$) and PDS - Number of Trauma Types ($p < .001$) were significant predictors. Step two of the model accounted for 6% of unique variance ($p < .001$); and only the KIMS – Accepting without Judgment subscale was a significant incremental predictor ($p = .001$).

In terms of the PDS – Hyperarousal Symptoms Total, step one of the model accounted for a significant 32% of variance ($p < .001$), and both PANAS – NA ($p < .001$) and PDS - Number of Trauma Types ($p < .001$) were significant predictors. Step two of the model explained 6% of unique variance ($p < .001$), and only the KIMS – Accepting without Judgment subscale was a significant incremental predictor ($p = .001$).

Discussion

The purpose of the present investigation was to examine the incremental associations between mindfulness, as indexed by the KIMS, and posttraumatic stress symptoms in a sample of trauma-exposed adults without axis I psychopathology. As hypothesized, there was consistent evidence that the KIMS - Accepting without Judgment subscale was significantly and uniquely associated with posttraumatic stress symptoms (global and specific symptom clusters). The size of the observed effects was consistently 6% of unique variance across all posttraumatic stress-relevant outcomes, with lower levels of Accepting without Judgment incrementally associated with greater levels of posttraumatic stress symptoms. These findings are consistent with conceptual models that suggest mindfulness-based acceptance may be a unique explanatory process related to the concurrent experience of global and specific posttraumatic stress symptom clusters (Bishop et al., 2004; Walser & Westrup, 2007). The observed results also are noteworthy for at least two reasons. First, the effects for the Accepting without Judgment subscale were apparent over and above the significant variance accounted for by negative affectivity and number of types of trauma exposure (range of variance explained by negative affectivity and trauma exposure: 19% to 32%). Thus, results cannot be attributed to these two co-occurring risk factors for posttraumatic stress symptoms. Second, the effects for the KIMS - Accepting without Judgment subscale were independent of shared variance with other mindfulness dimensions. In fact, there was little empirical evidence that any other mindfulness dimension, with the exception of the incremental association between the KIMS – Acting with Awareness subscale and PDS - re-experiencing symptoms (see below for a discussion), was incrementally related to posttraumatic stress symptoms. Such data, considered in light of the unique contribution made by the KIMS – Accepting without Judgment effect, suggest that the other studied mindfulness variables indexed by the KIMS are not likely part of the explanatory mechanism linking mindfulness to posttraumatic stress symptoms among a nonclinical trauma-exposed population.

Partially consistent with prediction, the KIMS – Acting with Awareness subscale was significantly and incrementally related to posttraumatic stress-relevant re-experiencing symptoms. There was, however, no evidence that the KIMS – Acting with Awareness subscale was incrementally related to other posttraumatic stress symptoms. Examination of effect sizes

indicated that the effect for KIMS - Acting with Awareness was approximately equivalent to that observed for the KIMS – Accepting without Judgment effect in terms of re-experiencing symptoms (see Table 2). Thus, consistent with the Bishop et al. (2004) conceptualization of mindfulness, both the capacity to be aware of the present context and to be willing to experience it without judgment may play a role in the concurrent experience of posttraumatic stress symptoms. This pattern of findings is consistent with theoretical models positing unique explanatory roles for acceptance and acting with awareness in the experience of posttraumatic stress symptoms (Walser & Westrup, 2007). Future work is needed to explicate how these mindfulness dimensions affect re-experiencing symptoms among traumatized individuals. Prospective work that can isolate the direction of the observed relations would be particularly helpful in informing models of the onset and maintenance of posttraumatic stress psychopathology.

Although not a primary focus of the present investigation, the current study also provided novel data on the interrelation between mindfulness dimensions and their associations with posttraumatic stress-relevant outcomes among traumatized young adults without current axis I psychopathology. At the zero-order level, all of the four KIMS subscales were significantly correlated (range of *r*'s = .23 – .34, $p < .01$) with each other, with the exception of the non-significant association between the KIMS – Observing and KIMS – Acting with Awareness subscales. These findings replicate and extend past work to a novel sample (Baer et al., 2004; McKee et al., 2007). Additionally, as described above, the KIMS – Acting with Awareness and KIMS – Accepting without Judgment subscales were both significantly (negatively) correlated with each of the posttraumatic stress outcomes (range of absolute *r* values = .21 – .25; .29 – .37, respectively), indicating that higher levels of these mindfulness dimensions were related to lower levels of posttraumatic stress symptoms. Yet, the magnitude of these correlations was small to moderate, potentially due to the nonclinical nature of the sample. However, neither the KIMS – Observing nor the KIMS – Describing subscales was significantly associated with global posttraumatic stress symptoms or relevant re-experiencing or avoidance symptom clusters. In terms of hyperarousal symptoms, the KIMS – Describing subscale demonstrated a significant association ($r = -.15$, $p < .01$), although KIMS – Observing did not. These findings generally underscore the potential clinical significance of acceptance and awareness-based processes, specifically, in terms of posttraumatic stress symptoms. Further work is necessary to replicate and extend these findings with more diverse nonclinical and clinical populations.

There are two key clinically-relevant implications of the present investigation. First, the present results cannot be attributed to current psychopathology among the sample and therefore suggest that mindfulness-based acceptance and awareness may be viable skills to target in prevention efforts related to posttraumatic stress among trauma-exposed populations. Second, participants were not assessed for past history of psychopathology, and therefore, the extent to which these findings may be generalized to those with or without past PTSD is unclear. Third, incremental associations between mindfulness-based acceptance—and to a lesser extent, mindfulness-based acting with awareness—and posttraumatic stress-relevant symptoms indicate that these dimensions of mindfulness also may be clinically useful in alleviating posttraumatic stress-relevant symptoms in the context of treatment. It is therefore important for future work to extend this line of research to clinical populations.

The present study has a number of limitations that warrant comment. First, this sample consisted of relatively homogeneous participants in terms of age and ethnicity. Future work might strive to replicate and extend the current findings among more heterogeneous populations. Second, due to the cross-sectional and correlational nature of the present research design, it is not possible to make causal statements concerning the relations between the studied variables. It therefore would be important to examine associations between mindfulness and

posttraumatic stress symptoms during the course of a relevant treatment, such as ACT (Walser & Westrup, 2007), to index the interplay of acceptance-based processes and posttraumatic stress symptoms over time. This approach may yield more conclusive evidence relevant to the facets of mindfulness that may be most pertinent to clinical intervention efforts. Third, the present investigation utilized established self-report instruments as the principal assessment strategy. Though this approach was prudent at this stage of research development, future work might build upon the present findings and incorporate multi-method approaches to indexing the variables of interest. Fourth, although the KIMS, an established assessment tool for mindfulness skills (Baer et al., 2004), offers only one operationalization of mindfulness. Future work might replicate and extent these findings using other self-report and behavioral indices of mindfulness to more comprehensively determine associations with posttraumatic stress and related clinical outcomes. Finally, this study examined individuals who suffered a variety of traumatic life experiences. Future research might extend this line of inquiry by comparing the associations between mindfulness and posttraumatic stress symptoms following different types of trauma.

Overall, the present investigation found preliminary evidence for the incremental associations between mindfulness-based acceptance and posttraumatic stress symptoms, broadly, and posttraumatic stress-relevant symptoms of re-experiencing, avoidance, and hyperarousal, specifically; while acting with awareness was only (concurrently) incrementally predictive of posttraumatic-stress-related re-experiencing symptoms. These results extended past work in the area of mindfulness and posttraumatic stress by showing support for specificity of associations between certain facets of mindfulness and posttraumatic stress symptoms.

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Table 1

Descriptive Data and Zero-Order Correlations among Theoretically-Relevant Variables

Variable	1	2	3	4	5	6	7	8	9	10	M (SD)	Norm[a] M (SD)	Range[b]
1. PANAS – Negative Affectivity[1]	-	.14*	.18**	−.15*	−.22**	−.33**	.38**	.29**	.38**	.38**	18.84 (6.04)	18.1[c] (5.9)	10–50
2. PDS – Number of Trauma Types[2]	-	-	.00	.04	−.02	−.10	.48**	.36**	.49**	.50**	2.34 (1.64)	-	0–12
3. KIMS – Observing[3]	-	-	-	.28**	−.01	−.26**	.10	.07	.10	.08	36.95 (8.44)	38.63[d] (7.80)	12–60
4. KIMS – Describing[4]	-	-	-	-	.23**	.25**	−.10	−.09	−.11	−.15*	28.24 (6.24)	28.21[d] (5.48)	8–40
5. KIMS – Acting with Awareness[5]	-	-	-	-	-	.34**	−.25**	−.25**	−.23**	−.21**	29.09 (5.74)	29.22[d] (5.37)	10–50
6. KIMS – Accepting without Judgment[6]	-	-	-	-	-	-	−.36**	−.29**	−.37**	−.37**	33.01 (7.40)	29.61[d] (6.50)	9–45
7. PDS – Total[7]	-	-	-	-	-	-	-	.87**	.98**	.90**	7.56 (9.05)	12.54[e] (10.54)	0–51
8. PDS – Re-Experiencing[8]	-	-	-	-	-	-	-	-	.75**	.67**	2.18 (2.73)	NA[f]	0–15
9. PDS – Avoidance[9]	-	-	-	-	-	-	-	-	-	.92**	5.36 (6.78)	NA[f]	0–21
10. PDS – Hyperarousal[10]	-	-	-	-	-	-	-	-	-	-	2.40 (3.21)	NA[f]	0–15

N = 239;

* $p < .05$;

** $p < .01$

[1] Positive Affect Negative Affect Scale – Negative Affectivity subscale;

[2] Posttraumatic Diagnostic Scale – Number of Trauma Types endorsed;

[3] Kentucky Inventory of Mindfulness Skills – Observing subscale;

[4] Kentucky Inventory of Mindfulness Skills – Describing subscale;

[5] Kentucky Inventory of Mindfulness Skills – Acting with Awareness subscale;

[6] Kentucky Inventory of Mindfulness Skills – Accepting without Judgment subscale;

[7] Postraumatic Diagnostic Scale – Total score;

[8] Postraumatic Diagnostic Scale – Re-Experiencing Symptoms subscale;

[9] Postraumatic Diagnostic Scale- Avoidance Symptoms subscale;

[10] Postraumatic Diagnostic Scale-Hyperarousal Symptoms subscale;

[a] normative data for comparison;

[b] Range of possible scores;

[c] *N* = 663, general time-frame, undergraduate student sample (Watson et al., 1988);

[d] *N*= 215, undergraduate student sample (Baer et al., 2004);

[e] *N* = 120, non-PTSD sample (Foa, 1995);

[f] not available (Foa, 1995)

Table 2

Mindfulness Facets Predict Post-Traumatic Stress Symptoms

	ΔR^2	*t* (each predictor)	β	sr^2	*p*
		Criterion Variable: PDS- Total[1]			
Step 1	.32				$p < .001$
PANAS-Negative Affectivity[5]		5.51	.31	.12	$p < .001$
PDS-Number of Trauma Types[6]		7.39	.42	.20	$p < .001$
Step 2	.06				$p < .001$
KIMS-Observing[7]		.08	.00	.00	ns
KIMS-Describing[8]		−.08	−.00	.00	ns
KIMS-Acting with Awareness[9]		−1.86	−.11	.01	ns
KIMS- Accepting without Judgment[10]		−3.35	−.21	.05	$p = .001$
		Criterion Variable: PDS – Re-Experiencing Symptoms Total[2]			
Step 1	.19				$p < .001$
PANAS-Negative Affectivity		4.12	.25	.07	$p < .001$
PDS-Number of Trauma Types		5.21	.32	.11	$p < .001$
Step 2	.06				$p = .002$
KIMS-Observing		.20	.01	.00	ns
KIMS-Describing		−.13	−.00	.00	ns
KIMS-Acting with Awareness		−2.27	−.14	.02	$p < .05$
KIMS-Accepting without Judgment		−2.38	−.16	.02	$p < .05$
		Criterion Variable: PDS - Avoidance Symptoms Total[3]			
Step 1	.32				$p < .001$
PANAS-Negative Affectivity		5.55	.31	.12	$p < .001$
PDS-Number of Trauma Types		7.62	.43	.21	$p < .001$
Step 2	.06				$p < .001$
KIMS-Observing		.09	.00	.00	ns
KIMS-Describing		−.15	−.00	.00	ns
KIMS-Acting with Awareness		−1.55	−.09	.01	ns
KIMS-Accepting without Judgment		−3.50	−.22	.05	$p = .001$
		Criterion Variable: PDS – Hyperarousal Symptoms Total[4]			
Step 1	.32				$p < .001$

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	ΔR^2	*t* (each predictor)	β	sr^2	*p*
PANAS-Negative Affectivity		5.36	.30	.11	$p < .001$
PDS-Number of Trauma Types		7.63	.43	.09	$p < .001$
Step 2	.06				$p < .001$
KIMS-Observing		.19	.01	.00	ns
KIMS-Describing		−1.08	−.06	.00	ns
KIMS-Acting with Awareness		−1.09	−.06	.00	ns
KIMS-Accepting without Judgment		−3.51	−.22	.05	$p = .001$

Note: β= standardized beta weight; sr^2 = Squared semi-partial correlation;

[1]PDS – Total score;

[2]PDS – Re-Experiencing Symptoms subscale;

[3]PDS – Avoidance Symptoms subscale;

[4]PDS – Hyperarousal Symptoms subscale;

[5]PANAS-Negative Affectivity subscale

[6]PDS – Number of Trauma Types endorsed;

[7]Kentucky Inventory of Mindfulness Skills – Observing subscale;

[8]Kentucky Inventory of Mindfulness Skills – Describing subscale;

[9]Kentucky Inventory of Mindfulness Skills – Acting with Awareness subscale;

[10]Kentucky Inventory of Mindfulness Skills – Accepting without Judgment subscale