ORIGINAL PAPER

The Mediating Role of Emotion Dysregulation in the Association Between Trait Mindfulness and PTSD Symptoms among Trauma-Exposed Adults

Abigail Powers[1] · Hayley Drew Dixon[1] · Alfonsina Guelfo[1] · Yara Mekawi[1] · Bekh Bradley[1] · Nadine Kaslow[1] · Negar Fani[1]

Abstract

Objectives Growing evidence of the effectiveness of mindfulness-based interventions for posttraumatic stress disorder (PTSD) warrants greater understanding of factors relevant to the relation between trait mindfulness and PTSD, such as emotion dysregulation (ED). The goal of this study was to examine associations between trait mindfulness, ED, and PTSD symptoms across two samples of trauma-exposed adults.

Methods Participants for Sample 1 ($n=39$, 90% women, 100% Black) and Sample 2 ($n=60$, 100% women, 87% Black) were recruited from an urban hospital in the South. Trait mindfulness, ED, and PTSD were assessed.

Results Across both samples, mindfulness and ED were significantly associated with overall PTSD severity ($r=-.49$ and $r=-.42$, $ps=.001$; $r=.53$ and $r=.51$, $ps<.001$, respectively) in the expected direction. In Sample 1, mindful nonjudgment and difficulty with emotion regulation strategies showed the strongest associations with overall PTSD severity as well as symptom clusters. In Sample 2, mindful acceptance and all ED dimensions (except non-awareness) showed strong associations with overall PTSD severity and particularly with negative cognitions and mood symptoms. In both samples, ED mediated the association between mindfulness and overall PTSD severity (Sample 1: $ab=-.15$, 95% CI $[-.35,-.02]$; Sample 2: $ab=-.11$, 95% CI $[-.22,-.04]$).

Conclusions These findings demonstrate the important role of ED in the relation between trait mindfulness and PTSD symptoms among trauma-exposed adults. They highlight the value of examining ED as a mechanism of change in mindfulness-based interventions for PTSD.

Clinical Trials Registration Sample 1: NCT03922581, April 22, 2019; NCT03938350, May 6, 2019; Sample 2: NCT02754557, April 28, 2016.

Keyword Emotion dysregulation · Trauma · Mindfulness · Posttraumatic stress disorder

Posttraumatic stress disorder (PTSD), a serious public health problem, affects 6–8% of the general population in their lifetime (Kilpatrick et al., 2013). PTSD is a heterogeneous disorder made up of four symptom clusters including intrusions, avoidance, negative cognitions and mood, and hyperarousal symptoms (American Psychiatric Association, 2013). While most individuals will be exposed to a traumatic event in their lifetime, certain groups are at greater risk for experiencing trauma, with higher rates found among women, individuals with low socioeconomic status, and racially marginalized individuals (Gillespie et al., 2009; Golin et al., 2016). Black, urban-dwelling adults with low socioeconomic resources report high levels of trauma exposure and experience various chronic stressors such as racial discrimination (Sibrava et al., 2019) and subsequently face higher risk of developing PTSD compared to white individuals (Gillespie et al., 2009). Identifying psychological factors related to PTSD risk and resilience in racially marginalized groups, like low-income urban-dwelling Black adults, is crucial in reducing the public health burden of trauma and PTSD and improving treatment and health outcomes in these communities.

✉ Abigail Powers
adpower@emory.edu

[1] Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, 69 Jesse Hill Jr Drive, Atlanta, GA 30303, USA

One factor relevant to understanding PTSD symptomology is mindfulness, the purposeful, nonjudgmental, and accepting awareness of present feelings, thoughts, and sensations (Kabat-Zinn, 2015). While most people experience transient mindfulness (state mindfulness), there is variability in the degree of dispositional or trait mindfulness across individuals (Brown & Ryan, 2003). Trait mindfulness has been associated with lower PTSD symptom severity among firefighters (Smith et al., 2011), veterans (Dahm et al., 2015), and individuals with substance dependence (Garland & Roberts-Lewis, 2013).

Given that there are different facets of mindfulness, some studies have tried to disentangle the unique associations between facets of mindfulness and PTSD symptoms. For example, Cheng et al. (2018) found interactive effects of overall PTSD severity and the observing, acting with awareness, and nonjudging Five Facet Mindfulness Questionnaire (FFMQ) facets on suicidality in psychiatric inpatients. In a sample of mostly White (92.1%), trauma-exposed individuals, the Kentucky Inventory of Mindfulness Skills (KIMS) accepting subscale was associated with overall PTSD severity after controlling for negative affectivity and trauma exposure severity (Vujanovic et al., 2009). Less has been done to examine unique effects across both mindfulness facets and specific PTSD symptom clusters. One study of active-duty police officers found that lower KIMS accepting scores were related to higher PTSD avoidance and intrusion symptoms, and lower nonjudgment and describing scores were related to higher hyperarousal symptoms (Chopko & Schwartz, 2013). Given the heterogeneity of PTSD symptom clusters and the value of identifying which symptoms may be most related to trait mindfulness, more research is needed to disentangle these associations in trauma-exposed adults.

The use of mindfulness interventions in trauma-exposed populations has gained attention in recent decades. Evidence supports the efficacy of such interventions in reducing PTSD symptoms (Banks et al., 2015; Hopwood & Schutte, 2017), although results are mixed when comparing mindfulness to other active interventions (e.g., Davis et al., 2019). Among studies examining changes in PTSD symptom clusters as a result of mindfulness training, avoidance and negative cognitions and mood symptoms demonstrated the greatest reductions (e.g., Kimbrough et al., 2010; King et al., 2013). Mindfulness is present-oriented and therefore may facilitate individuals' adoption of a nonjudgmental acceptance of traumatic experiences and awareness and acceptance of trauma-related emotions and cognitions without directly targeting those trauma memories through the treatment itself. Improved acceptance and reduced judgment may ameliorate painful emotions (e.g., shame and guilt) related to negative cognitive appraisals associated with PTSD (Wilson et al., 2011) and allow for emotional processing and regulation that ultimately reduces PTSD symptoms. However, a recent meta-analysis found that improvements in mindfulness do not explain the amelioration of PTSD symptoms as a result of mindfulness interventions, and thus, other potential-related mechanisms of change must also be considered (Hopwood & Schutte, 2017).

Emotion regulation, the ability to effectively modulate the intensity or duration of emotions or implement effective regulating strategies (Gross & Thompson, 2007), is a proposed mechanism of change in mindfulness interventions for PTSD, as many individuals with this disorder exhibit emotion dysregulation (ED) (Guendelman et al., 2017). ED, a transdiagnostic process relevant to many disorders (Aldao et al., 2010), is associated with increased risk of developing PTSD following trauma exposure (Pencea et al., 2020). ED includes difficulties identifying and understanding emotions, accepting painful emotions, using helpful emotion regulation techniques, and pursuing goal-directed behavior even in the context of unpleasant emotions (Gratz & Roemer, 2004). Several PTSD symptoms represent difficulties regulating emotions adaptively, such as persistent negative affect and irritability or avoidance symptoms. Intrusion symptoms and avoidance of environmental stimuli reflect difficulty responding to aversive stimuli, also indicative of ED.

While mindfulness is associated with emotion regulation (Goodall et al., 2012), limited research has examined relations between mindfulness facets and PTSD symptom clusters, taking into account the contribution of ED. One study with trauma-exposed undergraduate students found that above and beyond ED, the nonjudging FFMQ facet was negatively associated with re-experiencing symptoms and negative cognitions and mood, and awareness and nonreactivity subscales were negatively associated with hyperarousal symptoms (Reffi et al., 2019). These results indicate that certain facets may be differentially related to PTSD symptoms, which could inform our understanding of unique relations and treatment targets. However, simply controlling for ED does not enable a comprehensive understanding of the links between these variables.

The aforementioned studies have elucidated associations between dispositional mindfulness and PTSD and demonstrated separately how mindfulness, ED, and PTSD symptoms relate. However, most studies summed PTSD symptom and mindfulness scores, limiting our understanding of the relations between specific facets of mindfulness and PTSD symptom clusters. The unique contribution of ED and its dimensions to the mindfulness–PTSD link, particularly its potential mediating effect, has yet to be investigated. Further, there is scant literature on any combination of these variables in Black samples, which is problematic given the prevalence of trauma exposure and PTSD in Black urban communities with high rates of violence and barriers to accessing behavioral health care (Cook et al., 2017). Determining how these psychological

processes relate to PTSD symptomology among Black adults could inform mindfulness-based interventions for these trauma-exposed communities, ultimately leading to more culturally responsive interventions (Becker et al., 2007).

The goal of the present study is to examine associations between trait mindfulness, facets of ED, and PTSD symptoms and determine if there is an indirect effect of mindfulness on PTSD symptoms through ED in trauma-exposed adults. We include data from two samples of similarly trauma-exposed populations of primarily low-income, Black adults in an urban hospital setting. Although both use the same measure of ED, the first sample includes a self-report measure of PTSD and the FFMQ and the second sample includes a clinician-administered measure of PTSD and the KIMS. Utilizing these samples together will provide a more comprehensive picture of how mindfulness, ED, and PTSD relate in chronically trauma-exposed individuals and how results may differ across measures of mindfulness and PTSD. We hypothesize that (1) mindfulness will be negatively related to overall PTSD severity and ED will be positively related to overall PTSD severity, and (2) there will be a full indirect effect of mindfulness on PTSD symptom severity through ED. Examinations of associations among different facets of mindfulness, ED dimensions, and PTSD symptom clusters are exploratory.

Method

Sample 1

Participants

Sample 1 consisted of 39 Black or African American adults (89.7% women; M age = 41.62). See Table 1 for all demographic characteristics.

Procedure

Participants were recruited through direct medical provider referrals or from the waiting rooms of medical clinics in a large publicly funded hospital as part of a larger project (see Gillespie et al., 2009, for full study details). Participants who were eligible for active treatment studies and completed the measures of interest were included in the present sample. Inclusion criteria included ability to complete informed consent, age 18–65, self-identification as Black or African American, positive PTSD screen (based on a score of ≥ 3 on the Primary Care PTSD Screen for DSM-5; Prins et al., 2016) and/or positive depression screen (based on a score of ≥ 10 on the Patient Health Questionnaire, 9-item version; Arroll et al., 2010), and exposure to trauma. Exclusion criteria included active mania, psychosis, cognitive impairment, or substance use disorder. Informed consent was approved by Emory University Institutional Review Board and the Grady

Table 1 Demographic details across Samples 1 and 2	Sample 1 N = 39	Sample 2 N = 60
	%	%
Gender (% women)	89.7	100.0
Race		
Black/African American	100.0	86.7
White	0.0	6.7
More than one race	0.0	3.3
Ethnicity (% Latinx)	0.0	1.7
Household monthly income (% < $2000)	79.5	67.8
Employed	33.3	40.0
Education		
Less than 12th grade	25.6	15.0
HS Graduate/GED	35.9	23.3
Some college or tech school graduate	28.2	30.0
College graduate	7.7	20.0
Graduate school	2.6	11.7
	Mean (SD, range)	**Mean (SD, range)**
Age	41.62 (14.39, 19–65)	43.57 (12.49, 18–65)
Trauma load	8.95 (3.56, 2–16)	7.72 (3.45, 1–16)

Note: Trauma load reflects total number of types of trauma experienced in lifetime

Research Oversight Committee and completed in accordance with the Declaration of Helsinki; consent was obtained prior to the start of research visits. Participants were compensated $15 for the assessment that included self-report measures of trauma history and psychological symptoms.

Measures

Traumatic Events Inventory (TEI; Gillespie et al., 2009) The TEI was used to assess lifetime exposure to traumatic events. For this study, all individuals had exposure to at least one traumatic event, which was determined based on a total score of total number of types of traumatic events witnessed or experienced ($M = 8.95$, $SD = 3.56$, range = 2–16).

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) The DERS is a 36-item well-validated self-report measure that assesses difficulties in emotion regulation across 6 dimensions: (1) nonacceptance of emotional responses (nonacceptance), (2) difficulties engaging in goal-directed behavior (goals), (3) impulse control difficulties in the presence of strong emotions (impulse), (4) lack of emotional awareness (awareness), (5) limited access to emotion regulation strategies (strategies), and (6) lack of emotional clarity (clarity). Participants responded to statements based on a Likert-type scale from 1 (*almost never*) to 5 (*almost always*). For the present study, we included a total score for ED (DERS total) and total scores for each of the six subscales, with higher scores suggesting higher levels of ED. See Table 2 for descriptive details. This measure has been

Table 2 Descriptive characteristics of variables of interest across Samples 1 and 2

	Sample 1 N = 39	Sample 2 N = 60
	Mean (SD, range)	Mean (SD, range)
KIMS total		122.90 (20.15, 76–173)
Observe		40.10 (7.84, 20–53)
Describe		27.07 (7.77, 8–40)
Act		23.65 (5.79, 14–40)
Accept		26.43 (8.35, 11–44)
FFMQ total	102.21 (23.14, 67–164)	
Observe	28.00 (4.83, 15–39)	
Describe	23.13 (7.38, 14–40)	
Aware	16.45 (9.94, 2–40)	
Nonjudgment	14.44 (8.04, 3–39)	
Nonreact	20.62 (4.59, 13–31)	
DERS total	96.60 (23.24, 43–154)	88.67 (25.79, 42–146)
Nonaccept	17.41 (6.93, 6–30)	14.68 (7.27, 5–30)
Goals	16.08 (5.13, 6–25)	14.95 (5.19, 5–25)
Impulse	14.59 (5.43, 6–29)	12.85 (5.56, 6–27)
Awareness	15.05 (5.57, 6–25)	14.71 (5.32, 6–26)
Strategies	20.92 (6.83, 8–38)	19.80 (8.02, 8–36)
Clarity	12.56 (4.83, 5–22)	11.67 (4.32, 5–24)
PCL total	47.56 (16.25, 17–73)	
Intrusions	11.69 (5.36, 1–20)	
Avoidance	4.82 (2.69, 0–8)	
Negative cognitions and mood	16.97 (6.18, 3–26)	
Hyperarousal	14.08 (5.20, 4–23)	
CAPS total		27.90 (9.05, 8–45)
Intrusions		6.05 (3.20, 0–13)
Avoidance		3.07 (2.05, 0–8)
Negative cognitions and mood		10.73 (4.92, 2–23)
Hyperarousal		8.05 (2.83, 3–14)
	% (N)	% (N)
Current PTSD	82.1 (32)	65.0 (39)

Note: *KIMS*, Kentucky Inventory of Mindfulness Skills; *FFMQ*, Five Facet Mindfulness Questionnaire; *DERS*, Difficulties in Emotion Regulation Scale; *PCL*, PTSD Symptom Scale for DSM-5; *CAPS*, Clinical Administered PTSD Scale

validated in a sample of low-income Black women (Mekawi et al., 2020a). Internal consistency of the DERS total scale in this sample was high (α = 0.93).

Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) The FFMQ is a 39-item well-validated self-report measure that assesses five facets of trait mindfulness: (1) observing, (2) describing, (3) acting with awareness, (4) nonjudgment, and (5) nonreacting (Pang & Ruch, 2019). Participants responded to statements based on a Likert-type scale from 1 (*never or very rarely true*) to 5 (*very often or always true*). FFMQ total score and total scores across the five subscale scores were calculated based on summation of scores, with higher scores suggesting higher levels of mindfulness. See Table 2 for descriptive details. The FFMQ has been validated in meditating and non-meditating samples (de Bruin et al., 2012) as well as in a demographically similar clinical sample of African Americans (Watson-Singleton et al., 2018). Internal consistency of the FFMQ total scale in this sample was high (α = 0.93).

PTSD Symptom Scale for DSM-5 (PCL-5; Blevins et al., 2015) The PCL-5 is a 20-item well-validated measure that assesses the severity of DSM-5 PTSD symptoms experienced within the past month. The symptoms cut across four symptom clusters including intrusions, avoidance, negative cognitions and mood, and hyperarousal. Participants responded based on a Likert-type scale from 0 (*not at all*) to 4 (*extremely*). Overall PTSD symptom severity (PCL total) and severity across the four PTSD clusters were summed, with higher scores suggesting higher levels of PTSD symptoms. See Table 2 for descriptive details. Probable PTSD diagnosis was determined based on a cutoff score of 31 (Bovin et al., 2016). Internal consistency of the PCL-5 total scale in this sample was high (α = 0.92).

Sample 2

Participants

Sample 2 consisted of 60 women (86.7% Black/African American; *M* age = 43.57). See Table 1 for full demographic details.

Procedure

Participants were initially recruited through the same procedures as described in Sample 1 for the Grady Trauma Project. Potential eligibility for a separate treatment study was assessed. If eligible, participants were given the opportunity to participate in a breath-focused mindfulness intervention for PTSD. Inclusion criteria included exposure to a criterion A traumatic event (assessed using the TEI) and the presence

of impairing PTSD symptoms in the past month (assessed using the Clinician Administered PTSD Scale, described below). Exclusion criteria included active mania, active psychosis, cognitive impairment, or a history of neurologic disorders. Participants were compensated $60 for their time for a diagnostic assessment and $160 for completion of additional study measures including the mindfulness measure used.

Measures

DERS (Gratz & Roemer, 2004) The DERS was also used as the measure of ED in this sample. Internal consistency of the DERS total scale in this sample was high (α = 0.93).

Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004) The KIMS is 39-item well-validated self-report measure that assesses mindfulness skills across four facets of trait mindfulness including (1) observing, (2) describing, (3) acting with awareness, and (4) accepting without judgment. Participants responded to statements based on a Likert-type scale from 1 (*never or very rarely true*) to 5 (*very often or always true*). KIMS total score and the 4 subscale scores were calculated based on a summation across the participant scores, with higher scores suggesting the presence of more mindfulness skills. See Table 2 for descriptive details. Internal consistency of the KIMS total scale in this sample was high (α = 0.87).

Clinician-Administered PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2018) The CAPS-5 is a semi-structured assessment for current PTSD based on DSM-5 diagnostic criteria. Interviewers rated severity of symptoms from 0 (absent) to 4 (extreme/incapacitating) and scores were summed to create an overall PTSD severity score (CAPS total) as well as totaled across the four clusters. Interrater reliability (IRR) within a similar sample has been examined previously and showed good IRR for current diagnosis of PTSD (*k* = 0.83) (Powers et al., 2017). Additionally, reliability of presence/absence of all PTSD symptoms on CAPS-5 was examined with 25 randomly chosen videos and results showed good IRR across all items (κ = 0.77).

Data analyses

Analyses were conducted using SPSS version 26 and PROCESS version 3.4. The same analytic approach was used in both samples. Descriptive statistics of the variables of interest were run and evaluated for skewness and kurtosis. Skewness and kurtosis levels fell within the acceptable parameters for the sample size on all variables (Tabachnick & Fidell, 2001). Then, correlation analyses were conducted. Finally, mediation analyses were run using PROCESS model

4. Mediation analyses coefficients were considered statistically significant if the 95% confidence intervals did not contain 0 or if alpha < .05 for *p*-values. Confidence intervals for the mediation models were generated from 5,000 bootstrap resamples. Previously conducted power calculations using a simulation approach suggest that our sample sizes were sufficient to find medium to large effect sizes with the mediation analyses (Fritz & MacKinnon, 2007).

Results

Sample 1

To determine the magnitude of associations between mindfulness and ED with PTSD symptom severity, we first calculated Pearson's correlation coefficients. As shown in Table 3, FFMQ total was significantly negatively associated with overall PTSD severity (PCL total) ($r = -0.49$) and severity scores across all four PTSD symptom clusters (r's = -0.37 to -0.49). Of the five FFMQ subscales, *Awareness* ($r = -0.47$) and *Nonjudgment* ($r = -0.51$) demonstrated the only significant negative correlations with overall PTSD symptom severity. *Mindful Nonjudgment* was significantly negatively associated with all four PTSD symptom clusters, while *Mindful Awareness* was only significantly negative associated with Negative Cognitions and Mood and Hyperarousal clusters. Regarding ED, DERS total was significantly positively related to overall PTSD severity ($r = 0.53$) and all four symptom clusters (r's = 0.32–0.58). Of the six dimensions of ED measured, only *Nonacceptance* and *Strategies* were significantly positively related to overall PTSD severity and all symptom clusters (with the exception of a non-significant association between DERS *Nonacceptance* and

PTSD Avoidance symptoms). See Table 3 for all correlation results. FFMQ total was significantly negatively correlated with DERS total ($r = -0.60$, $p < 0.001$) and *Impulse*, *Awareness*, *Strategies*, and *Clarity* dimensions (r's = -0.40 to -0.56, $ps < 0.05$). FFMQ *Observe*, *Describe*, *Aware*, and *Nonjudgment* were also all significantly negatively correlated with DERS total (r's = -0.32 to -0.52, $ps < 0.05$). See Supplemental Table 1 for all correlations between FFMQ facets and DERS dimensions.
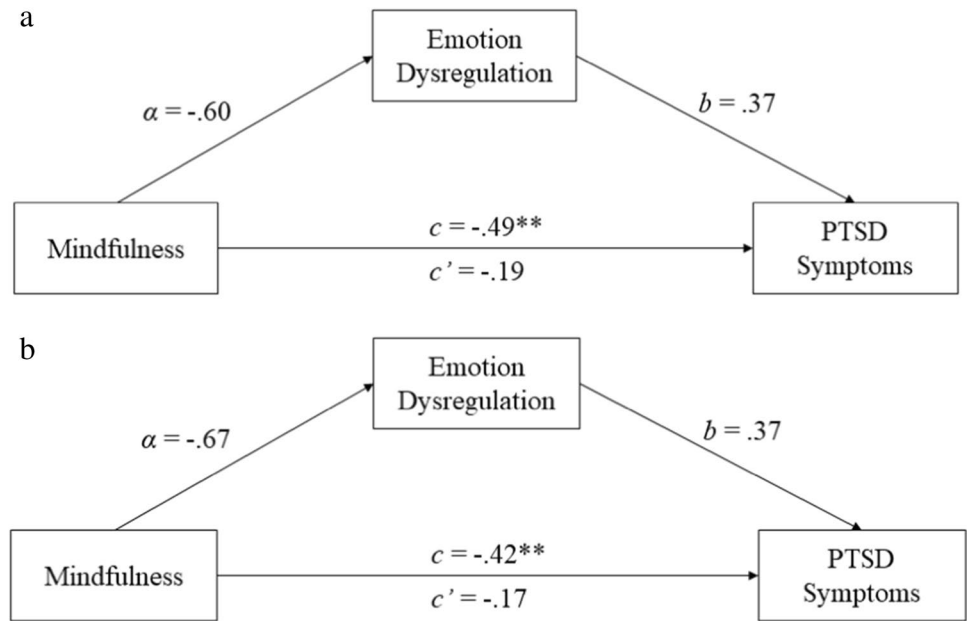
Next, we tested the indirect effect of mindfulness (FFMQ total) on overall PTSD severity (PCL total) through ED (DERS total) using a mediation model. As shown in Fig. 1a, this model was significant, $F(2,36) = 8.92$, $p = 0.007$, $R^2 = 0.33$. The indirect effect of FFMQ total on PCL total through DERS total was significant, $\beta = 0.26$, $SE = 0.12$, 95% CI [0.02, 0.50]; as such, the direct effect of FFMQ total on PCL total was no longer significant, $\beta = -0.19$, $SE = 0.12$, 95% CI [0.02.50]. See Supplemental Table 3 for full results. We conducted four additional exploratory mediation analyses to evaluate unique effects on the four PTSD symptom clusters. The overall model of the indirect effect of FFMQ total on intrusion symptoms through DERS total was significant, $F(2,36) = 4.27$, $p = 0.02$, $R^2 = 0.19$. However, neither the direct or indirect effect of FFMQ total on Intrusions was significant ($\beta = -0.06$, $SE = 0.04$, 95% CI [-0.15, 0.02] and $\beta = 0.05$, $SE = 0.04$, 95% CI [-0.04, 0.14], respectively). The overall model of the indirect effect of FFMQ total on Avoidance through DERS total was not significant, $F(2,36) = 3.20$, $p = 0.06$, $R^2 = 0.15$. The overall model testing the indirect effect of FFMQ total on Negative Cognitions and Mood through DERS total was significant, $F(2,36) = 9.31$, $p < 0.001$, $R^2 = 0.34$. The indirect effect of FFMQ total on Negative Cognitions

Table 3 Bivariate Pearson's correlations (r) between variables of interest with PTSD symptoms in Sample 1

	PTSD total	Intrusions	Avoidance	Negative Cognitions/Mood	Hyperarousal
FFMQ total	−.49**	−.40*	−.37*	−.38*	−.49**
Observe	−.04	.07	−.13	−.15	.04
Describe	−.22	−.20	−.06	−.07	−.37*
Aware	−.47**	−.31	−.31	−.43**	−.49**
Nonjudgment	−.51**	−.46**	−.40*	−.40*	−.42**
Nonreact	−.27	−.24	−.19	−.21	−.23
DERS total	.53***	.38*	.32*	.58***	.41**
Nonaccept	.50**	.35*	.27	.57***	.36*
Goals	.18	.05	.08	.17	.27
Impulse	.32	.20	.16	.30	.34*
Awareness	.18	.11	.19	.28	.02
Strategies	.60***	.57***	.47**	.57**	.35*
Clarity	.26	.11	.01	.34*	.28

$^*p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$; N = 39

Fig. 1 a Indirect effect of trait mindfulness on overall PTSD symptoms through ED in Sample 1 **$p<.01$; standardized coefficients shown. **b** Indirect effect of trait mindfulness on overall PTSD symptoms through ED in Sample 2 **$p<.01$; standardized coefficients shown

a

Emotion Dysregulation

$\alpha = -.60$

$b = .37$

Mindfulness

$c = -.49$**

$c' = -.19$

PTSD Symptoms

b

Emotion Dysregulation

$\alpha = -.67$

$b = .37$

Mindfulness

$c = -.42$**

$c' = -.17$

PTSD Symptoms

and Mood through DERS total was significant, $\beta = 0.15$, $SE = 0.05$, 95% CI [0.06, 0.24]; after accounting for these effects, the direct effect of FFMQ total on Negative Cognitions and Mood was no longer significant, $\beta = -0.01$, $SE = 0.05$, 95% CI [−0.11, 0.08]. Finally, the model testing the effect of FFMQ total on Hyperarousal through DERS total was significant, $F(2,36) = 6.34$, $p = 0.004$, $R^2 = 0.26$. The direct effect of FFMQ on Hyperarousal was significant in this model, $\beta = -0.08$, $SE = 0.04$, 95% CI [−0.17, −0.003]. The indirect effect of FFMQ total on Hyperarousal was not significant, $\beta = 0.04$, $SE = 0.04$, 95% CI [−0.04, 0.12].

Sample 2

To determine the extent of the association between mindfulness and ED with PTSD symptom severity, we first calculated Pearson's correlation coefficients. As shown in Table 4, KIMS total was significantly negatively associated with overall PTSD severity (CAPS total) ($r = -0.42$) and Avoidance ($r = -0.29$), Negative Alterations in Cognitions and Mood ($r = -0.37$), and Hyperarousal symptom clusters ($r = -0.27$). Of the four mindfulness facets, KIMS *Describe*, *Act*, and *Accept* were significantly negatively associated with CAPS total (r's $= -0.37$ to -0.40). Similarly, KIMS *Describe* was significantly negatively associated with Avoidance, Negative Alterations in Cognitions and Mood, and

Table 4 Bivariate Pearson's correlations (r) between variables of interest with PTSD symptoms in Sample 2

	PTSD total	Intrusions	Avoidance	Negative Cognitions/Mood	Hyperarousal
KIMS total	− .42**	− .19	− .29*	− .37**	− .27*
Observe	− .01	− .03	− .01	− .02	.07
Describe	− .37	− .19	− .33*	− .27*	− .27*
Act	− .40**	− .21	− .18	− .31*	− .38*
Accept	− .38**	− .12	− .28*	− .40**	− .17
DERS total	.51***	.22	.23	.57***	.22
Nonaccept	.49***	.23	.29*	.58***	.08
Goals	.41**	.20	.18	38**	.28*
Impulse	.39**	.20	.18	.35**	.29*
Awareness	.19	.05	.03	.25	.11
Strategies	.38**	.15	.13	.49**	.11
Clarity	.30*	14	14	.29*	.18

$^*p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$; N$=60$

Hyperarousal symptom clusters. KIMS *Act* was associated with avoidance and hyperarousal symptom clusters. KIMS *Accept* was associated with avoidance and negative alterations in cognition/mood PTSD symptom clusters. Regarding ED, DERS total was significantly positively related to CAPS severity ($r = 0.51$) and CAPS Negative Alterations in Cognitions and Mood ($r = 0.57$). Of the six dimensions of ED measured, all dimensions (except *Awareness*) were significantly positively related to overall PTSD severity (r's = 0.30–0.49) and Negative Alterations in Cognitions and Mood ($r = 0.29$–0.58). *Nonacceptance* was also associated with PTSD Avoidance symptoms ($r = 0.29$). *Goals* and *Impulses* were associated with PTSD Hyperarousal symptoms ($r = 0.28$ and $r = 0.29$, respectively). See Table 3 for all correlation results. KIMS total was highly significantly negatively correlated with DERS total ($r = -0.63$, $p < 0.001$) and its dimensions (r's = -0.35–0.52, $ps < 0.05$). All KIMS facets were significantly negatively associated with DERS total and dimensions except for KIMS *Observe* and DERS *Awareness* (see Supplemental Table 2 for all correlations between KIMS and DERS).

Next, we tested the indirect effect of mindfulness (KIMS total) on overall PTSD severity (CAPS total) through ED (DERS total) using a mediation model. As shown in Fig. 1b, this model was significant, $F(2,57)$ 9.58, $p < 0.001$, $R^2 = 0.25$. The indirect effect of KIMS total on CAPS total through DERS total was significant, $\beta = 0.13$, $SE = 0.05$, 95% CI [0.02, 0.23]; as such, the direct effect of KIMS total on CAPS total was no longer significant, $\beta = -0.07$, $SE = 0.07$, 95% CI [-0.22, 0.06]. See Supplemental Table 3 for full results. We conducted an additional exploratory mediation analysis with Negative Alterations in Cognitions and Mood based on significant correlational results. This model was significant, $F(2,57)$ 12.87, $p < 0.001$, $R^2 = 0.31$. The indirect effect of mindfulness on Negative Alterations in Cognitions and Mood through DERS total was significant, $\beta = 0.10$, $SE = 0.03$, 95% CI [0.04, 0.15]; as such, the direct effect of KIMS total on Negative Cognitions and Mood was no longer significant, $\beta = -0.01$, $SE = 0.03$, 95% CI [-0.08, 0.07].

Discussion

This study utilized two clinical samples to evaluate how mindfulness, ED, and PTSD relate in chronically trauma-exposed individuals from a primarily low-income, urban-dwelling Black community. Main results were consistent across both samples and supported our hypothesis, showing that trait mindfulness was negatively associated with overall PTSD severity and ED was positively associated with overall PTSD severity. In support of our second hypothesis, we found an indirect effect of mindfulness on PTSD severity through ED. These findings were robust, replicating across

different samples using two different measures of mindfulness and separate self-report and diagnostic measures of PTSD. The data from this study highlight ED as a valuable psychological process to consider as a mechanism of change in mindfulness-based interventions for PTSD.

Although overall trait mindfulness was significantly associated with PTSD severity in both samples, relations between the mindfulness and PTSD subscales revealed a more nuanced pattern of results. In the first sample, we found that *nonjudgment* was the only mindfulness facet that was associated with all PTSD symptom clusters. The *describe* and *aware* facets were inconsistently associated with the specific PTSD clusters such that both demonstrated associations with hyperarousal, but only *aware* was associated with negative cognitions and mood. The *observe* and *nonreact* facets were not associated with any PTSD symptom clusters. In the second sample, slightly different patterns emerged. *Describe* was associated with avoidance, negative cognitions/mood, and hyperarousal; *act* was associated with negative cognitions/mood and hyperarousal and *accept* was associated with avoidance and negative cognitions/mood. The *observe* facet was not associated with any specific PTSD symptom clusters. In considering patterns that emerged across both samples, mindful nonjudgment and acceptance were associated with avoidance and negative cognitions and mood and mindful describing was associated with hyperarousal. Rejecting one's emotions and pushing them away is counterproductive and often results in greater intensity and duration of emotions (Gross & Thompson, 2007). While causality cannot be determined through this cross-sectional study, a lack of acceptance and nonjudgment of one's experience could lead to more negative cognitions and emotions and a greater desire to engage in avoidance behaviors when emotions arise. In turn, greater avoidance and negative cognitions and mood symptoms could lead to greater difficulty with nonjudgment and acceptance. Attentional biases toward threat, which are common in PTSD (Lazarov et al., 2019) and have been linked to hyperarousal symptoms in particular, may reduce available resources for describing and attending to varied emotions, body sensations, or thoughts as they arise. Notably, mindful observing was not associated with any PTSD symptoms. It is possible that mindful observing is more removed from PTSD symptoms because it includes more elements of day-to-day experience and is less directly tied to emotions.

Consistent with prior research (Seligowski et al., 2015), overall ED was related to overall PTSD severity. Patterns of associations between ED dimensions and PTSD symptom clusters were largely consistent across both samples. It is notable that there was a particularly strong association between difficulty with emotion regulation strategies and avoidance in the first sample that was not replicated in the second sample. In the absence of perceived access to

adaptive emotion regulation strategies, avoidance is one way to reduce exposure to strong emotions or quickly bring down emotional reactions in the short term, ultimately leading to the perpetuation of symptoms and the inability to recover in the long term (Seligowski et al., 2015). It is unclear why the relations between overall ED and lack of strategies with PTSD avoidance symptoms were not significant across both samples. Emotional awareness was not associated with PTSD in either sample and emotional clarity was only associated with negative cognitions and mood symptoms, suggesting that these deficits in emotion regulation may not be as relevant to PTSD as other dimensions of ED (Mekawi et al., 2020b). It is possible that the etiology of PTSD symptom clusters varies and that mindfulness and ED play a bigger etiological role in negative cognitions and mood while other factors play a greater role in the development or maintenance of other symptoms. However, prospective studies are needed to further clarify causal models and etiological factors and it is possible that this study did not have sufficient statistical power to find all effects at the level of subscales.

Our exploratory mediation analyses looking at the specific effects across PTSD symptom clusters revealed that ED may be particularly relevant to the relation between mindfulness and negative cognitions and mood, in comparison to other symptoms. Mindfulness interventions have been shown to be particularly helpful for negative cognition and mood symptoms (Kimbrough et al., 2010; King et al., 2013). This cluster contains features of PTSD that are most relevant to emotion regulation (e.g., persistent negative emotions, inability to experience positive emotions) which may help to explain the strong association with ED. Additionally, avoidance and negative cognition and mood symptoms reflect many of the maladaptive emotion regulation strategies previously found to be associated with PTSD, like experiential avoidance, rumination, and suppression (Seligowski et al., 2015). The negative cognitions and mood cluster, which include symptoms related to deficits in reward processing, or anhedonia, also show the greatest overlap with major depression symptoms and comorbidity between these disorders is high. One mindfulness-based intervention, Mindfulness-based Cognitive Therapy (MBCT) (Segal et al., 2018), was developed to aid with depression symptoms and risk of relapse and has been shown to be effective at treating active depression symptoms (Schroevers et al., 2016). Individuals with comorbid PTSD and major depression show greater functional impairment, report higher levels of distress, and have a poorer prognosis for treatment (Flory & Yehuda, 2015). Thus, treatments that directly target these negative mood and anhedonic symptoms, which cut across both disorders, may be particularly helpful in improving treatment outcomes.

It is important to consider cultural and social context with regard to the relation between ED and trait mindfulness. Black adults experience racial stress and marginalization that can impact the ways in which they may experience and express their emotions (Mekawi et al., 2020b). Certain emotion regulation strategies that have been labeled as "maladaptive," like emotional restriction and inhibition, may be encouraged by culturally relevant coping processes in Black adults, such as John Henryism (Hudson et al., 2016) and the Strong Black Woman Schema (Abrams et al., 2019). John Henryism is a form of active coping often employed by Black adults with limited resources that promotes determination in response to stressful situations and systematic discrimination (James, 1994). The Strong Black Woman Schema represents how many Black women are socialized to cope with general and racial stress by suppressing emotions, forgoing emotional support from others and postponing one's own self-care and taking on multiple demanding roles and responsibilities (Abrams et al., 2019). These culturally based coping strategies can have implications for how Black adults regulate their emotions and the ways in which interventions designed to improve emotion regulation abilities may work within these communities. Mindfulness-based approaches could be particularly helpful in both addressing ED and augmenting cultural coping strategies that have developed in response to chronic race-related stress. This may aid in reducing the long term health effects of chronic stress and trauma (Watson-Singleton et al., 2019). Yet mindfulness studies have largely included nonminority samples and access to culturally informed mindfulness-based interventions in Black and other ethnoracial minority communities remains limited. Promising initial evidence, however, supports the use of mindfulness interventions in Black communities (Woods-Giscombé & Black, 2010), including trauma-exposed Black women (Dutton et al., 2013), although cultural considerations are needed for mindfulness-based interventions to be effective in marginalized groups (Watson et al., 2016).

Limitations and Future Research

Despite its strengths, this study has several limitations. ED was only measured using self-report. It would be beneficial in future research to add in psychophysiological measures of ED, such as respiratory sinus arrhythmia (RSA), which measures vagal tone and is seen as a biological marker of ED (Beauchaine, 2015). Both samples also included only cross-sectional data and thus, causal relationships between the variables of interest could not be determined. It will be valuable for future research to examine patterns of change in mindfulness, ED, and PTSD symptoms in mindfulness-based interventions to better understand if in fact ED serves as a mechanism of change in mindfulness

interventions. Surprisingly, despite strong theoretical justification that ED may serve as a mechanisms of change in mindfulness-based interventions (Gratz & Tull, 2010), this has not yet been tested with mindfulness-based PTSD treatment. Both clinical samples used in the present study will be able to test those effects when active interventions are completed. Finally, the majority of our participants across the samples were Black women; the specificity of these samples could limit generalizability of the findings. However, Black women from urban low-income communities are underrepresented in research even though they are at high risk for trauma exposure and negative health outcomes, and thus, studying these variables in this population is crucial.

Although mindfulness-based interventions appear to be efficacious in treating PTSD (Hopwood & Schutte, 2017), as well as treating other psychological conditions (Hofmann et al., 2010; Khoury et al., 2013) and reducing stress (Chiesa & Serretti, 2009), their use has so far been largely overlooked in low-income urban racially marginalized communities where exposure to trauma and other life stressors (including racial stress and discrimination) are common. Our findings delineate the important role of ED in the link between mindfulness and PTSD symptoms among Black adults and the need to address both mindfulness and ED in these groups.

Declarations

Ethics Approval and Consent All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Emory University Institutional Review Board and the Grady Research Oversight Committee.

Consent to Participate Informed consent was obtained from all individual participants included in the study.

Competing Interests The authors declare no competing interests.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Abrams, J. A., Hill, A., & Maxwell, M. (2019). Underneath the mask of the strong Black woman schema: Disentangling influences of strength and self-silencing on depressive symptoms among US Black women. *Sex Roles, 80*(9–10), 517–526. https://doi.org/10.1007/s11199-018-0956-y

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*, 217–237. https://doi.org/10.1016/j.cpr.2009.11.004

Arroll, B., Goodyear-Smith, F., Crengle, S., Gunn, J., Kerse, N., Fishman, T., Falloon, K., & Hatcher, S. (2010). Validation of PHQ-2 and PHQ-9 to screen for major depression in the primary care population. *The Annals of Family Medicine, 8*(4), 348–353. https://doi.org/10.1370/afm.1139

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11*(3), 191–206. https://doi.org/10.1177/1073191104268029

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27–45. https://doi.org/10.1177/1073191105283504

Banks, K., Newman, E., & Saleem, J. (2015). An overview of the research on mindfulness-based interventions for treating symptoms of posttraumatic stress disorder: A systematic review. *Journal of Clinical Psychology, 71*(10), 935–963. https://doi.org/10.1002/jclp.22200

Beauchaine, T. P. (2015). Respiratory sinus arrhythmia: A transdiagnostic biomarker of emotion dysregulation and psychopathology. *Current Opinion in Psychology, 3*, 43–47. https://doi.org/10.1016/j.copsyc.2015.01.017

Becker, C. B., Darius, E., & Schaumberg, K. (2007). An analog study of patient preferences for exposure versus alternative treatments for posttraumatic stress disorder. *Behaviour Research and Therapy, 45*(12), 2861–2873. https://doi.org/10.1016/j.brat.2007.05.006

Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The posttraumatic stress disorder checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. *Journal of Traumatic Stress, 28*(6), 489–498. https://doi.org/10.1002/jts.22059

Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2016). Psychometric properties of the PTSD checklist for diagnostic and statistical manual of mental disorders–fifth edition (PCL-5) in veterans. *Psychological Assessment, 28*(11), 1379. https://doi.org/10.1037/pas0000254

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822. https://doi.org/10.1037/0022-3514.84.4.822

Cheng, S., Banks, K., Bartlett, B. A., San Miguel, G., & Vujanovic, A. A. (2018). Posttraumatic stress and mindfulness facets in relation to suicidal ideation severity among psychiatric inpatients. *Mindfulness, 9*(3), 761–772. https://doi.org/10.1007/s12671-017-0814-y

Chiesa, A., & Serretti, A. (2009). Mindfulness-based stress reduction for stress management in healthy people: A review and meta-analysis. *The Journal of Alternative and Complementary Medicine, 15*(5), 593–600. https://doi.org/10.1089/acm.2008.0495

Chopko, B. A., & Schwartz, R. C. (2013). The relation between mindfulness and posttraumatic stress symptoms among police officers. *Journal of Loss and Trauma, 18*(1), 1–9. https://doi.org/10.1080/15325024.2012.674442

Cook, B. L., Trinh, N.-H., Li, Z., Hou, S.S.-Y., & Progovac, A. M. (2017). Trends in racial-ethnic disparities in access to mental health care, 2004–2012. *Psychiatric Services, 68*(1), 9–16. https://doi.org/10.1176/appi.ps.201500453

Dahm, K. A., Meyer, E. C., Neff, K. D., Kimbrel, N. A., Gulliver, S. B., & Morissette, S. B. (2015). Mindfulness, self-compassion, posttraumatic stress disorder symptoms, and functional disability in US Iraq and Afghanistan war veterans. *Journal of Traumatic Stress, 28*(5), 460–464. https://doi.org/10.1002/jts.22045

Davis, L. L., Whetsell, C., Hamner, M. B., Carmody, J., Rothbaum, B. O., Allen, R. S., & Bremner, J. D. (2019). A multisite randomized controlled trial of mindfulness-based stress reduction in the treatment of posttraumatic stress disorder. *Psychiatric Research and Clinical Practice, 1*(2), 39–48. https://doi.org/10.1176/appi.prcp.20180002

de Bruin, E. I., Topper, M., Muskens, J. G., Bögels, S. M., & Kamphuis, J. H. (2012). Psychometric properties of the Five Facets Mindfulness Questionnaire (FFMQ) in a meditating and a non-meditating sample. *Assessment, 19*(2), 187–197. https://doi.org/10.1177/1073191112446654

Dutton, M. A., Bermudez, D., Matas, A., Majid, H., & Myers, N. L. (2013). Mindfulness-based stress reduction for low-income, predominantly African American women with PTSD and a history of intimate partner violence. *Cognitive and Behavioral Practice, 20*(1), 23–32. https://doi.org/10.1016/j.cbpra.2011.08.003

Flory, J. D., & Yehuda, R. (2015). Comorbidity between post-traumatic stress disorder and major depressive disorder: Alternative explanations and treatment considerations. *Dialogues in Clinical Neuroscience, 17*(2), 141. https://doi.org/10.3188/dcns.2015.17.2/jflory

Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science, 18*(3), 233–239. https://doi.org/10.1111/j.1467-9280.2007.01882.x

Garland, E. L., & Roberts-Lewis, A. (2013). Differential roles of thought suppression and dispositional mindfulness in posttraumatic stress symptoms and craving. *Addictive Behaviors, 38*(2), 1555–1562. https://doi.org/10.1016/j.addbeh.2012.02.004

Gillespie, C., Bradley, B., Mercer, K., Smith, A., Conneely, K., Gapen, M., & Ressler, K. (2009). Trauma exposure and stress-related disorders in inner city primary care patients. *General Hospital Psychiatry, 31*, 505–514. https://doi.org/10.1016/j.genhosppsych.2009.05.003

Golin, C. E., Haley, D. F., Wang, J., Hughes, J. P., Kuo, I., Justman, J., Adimora, A. A., Soto-Torres, L., O'Leary, A., & Hodder, S. (2016). Post-traumatic stress disorder symptoms and mental health over time among low-income women at increased risk of HIV in the US. *Journal of Health Care for the Poor and Underserved, 27*(2), 891. https://doi.org/10.1353/hpu.2016.0093

Goodall, K., Trejnowska, A., & Darling, S. (2012). The relationship between dispositional mindfulness, attachment security and emotion regulation. *Personality and Individual Differences, 52*(5), 622–626. https://doi.org/10.1016/j.paid.2011.12.008

Gratz, K., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment, 26*(1), 41–54. https://doi.org/10.1023/b:joba.0000007455.08539.94

Gratz, K. L., & Tull, M. T. (2010). Emotion regulation as a mechanism of change in acceptance-and mindfulness-based treatments. In R. A. Baer (Ed.), *Assessing mindfulness and acceptance processes in clients: Illuminating the theory and practice of change* (pp. 107–133). New Harbinger Publications. https://doi.org/10.1111/j.1465-3362.2010.00284_2.x

Gross, J. J., & Thompson, R. A. (2007). *Emotion regulation: Conceptual foundations*. Guilford Press.

Guendelman, S., Medeiros, S., & Rampes, H. (2017). Mindfulness and emotion regulation: Insights from neurobiological, psychological, and clinical studies. *Frontiers in Psychology, 8*, 220. https://doi.org/10.3389/fpsyg.2017.00220

Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*(2), 169. https://doi.org/10.1037/a0018555

Hopwood, T. L., & Schutte, N. S. (2017). A meta-analytic investigation of the impact of mindfulness-based interventions on post traumatic stress. *Clinical Psychology Review, 57*, 12–20. https://doi.org/10.1016/j.cpr.2017.08.002

Hudson, D. L., Neighbors, H. W., Geronimus, A. T., & Jackson, J. S. (2016). Racial discrimination, John Henryism, and depression among African Americans. *Journal of Black Psychology, 42*(3), 221–243. https://doi.org/10.1177/0095798414567757

James, S. A. (1994). John Henryism and the health of African-Americans. *Culture, Medicine, and Psychiatry, 18,* 163–182.

Kabat-Zinn, J. (2015). Mindfulness. *Mindfulness, 6*(6), 1481–1483. https://doi.org/10.1007/s12671-015-0456-x

Khoury, B., Lecomte, T., Fortin, G., Masse, M., Therien, P., Bouchard, V., Chapleau, M.-A., Paquin, K., & Hofmann, S. G. (2013). Mindfulness-based therapy: A comprehensive meta-analysis. *Clinical Psychology Review, 33*(6), 763–771. https://doi.org/10.1016/j.cpr.2013.05.005

Kilpatrick, D. G., Resnick, H. S., Milanak, M. E., Miller, M. W., Keyes, K. M., & Friedman, M. J. (2013). National estimates of exposure to traumatic events and PTSD prevalence using DSM-IV and DSM-5 criteria. *Journal of Traumatic Stress, 26*(5), 537–547. https://doi.org/10.1002/jts.21848

Kimbrough, E., Magyari, T., Langenberg, P., Chesney, M., & Berman, B. (2010). Mindfulness intervention for child abuse survivors. *Journal of Clinical Psychology, 66*(1), 17–33. https://doi.org/10.1037/e517292011-413

King, A. P., Erickson, T. M., Giardino, N. D., Favorite, T., Rauch, S. A., Robinson, E., Kulkarni, M., & Liberzon, I. (2013). A pilot study of group mindfulness-based cognitive therapy (MBCT) for combat veterans with posttraumatic stress disorder (PTSD). *Depression and Anxiety, 30*(7), 638–645. https://doi.org/10.1002/da.22104

Lazarov, A., Suarez-Jimenez, B., Tamman, A., Falzon, L., Zhu, X., Edmondson, D. E., & Neria, Y. (2019). Attention to threat in posttraumatic stress disorder as indexed by eye-tracking indices: A systematic review. *Psychological Medicine, 49*(5), 705–726. https://doi.org/10.1017/s0033291718002313

Mekawi, Y., Watson-Singleton, N. N., Dixon, H. D., Fani, N., Michopoulos, V., & Powers, A. (2020a). Validation of the difficulties with emotion regulation scale in a sample of trauma-exposed Black women. *Journal of Clinical Psychology, 77*(3), 587–606. https://doi.org/10.1002/jclp.23036

Mekawi, Y., Watson-Singleton, N. N., Kuzyk, E., Dixon, H. D., Carter, S., Bradley, B., Fani, N., Michopoulos, V., & Powers, A. (2020b). Racial discrimination and posttraumatic stress: Examining emotion dysregulation as a mediator in an African American community sample. *European Journal of Psychotraumatology, 11*(1), 1824398. https://doi.org/10.1080/20008198.2020.1824398

Pang, D., & Ruch, W. (2019). Scrutinizing the components of mindfulness: Insights from current, past, and non-meditators. *Mindfulness, 10*(3), 492–505. https://doi.org/10.1007/s12671-018-0990-4

Pencea, I., Munoz, A. P., Maples-Keller, J., Fiorillo, D., Schulte-braucks, K., Galatzer-Levy, I., Rothbaum, B. O., Ressler, K. J., Stevens, J., Michopoulos, V., & Powers, A. (2020). Emotion dysregulation is associated with increased prospective risk for chronic PTSD development. *Journal of Psychiatric Research, 121*, 222–228. https://doi.org/10.1016/j.jpsychires.2019.12.008

Powers, A., Fani, N., Carter, S., Cross, D., & Bradley, B. (2017). Differential predictors of DSM-5 PTSD and ICD-11 complex PTSD among African American women. *European Journal of Psychotraumatology, 8*(1), 1338914. https://doi.org/10.1016/j.jpsychires.2019.12.008

Prins, A., Bovin, M. J., Smolenski, D. J., Marx, B. P., Kimerling, R., Jenkins-Guarnieri, M. A., Kaloupek, D. G., Schnurr, P. P., Kaiser, A. P., & Leyva, Y. E. (2016). The primary care PTSD screen for DSM-5 (PC-PTSD-5): Development and evaluation within a veteran primary care sample. *Journal of General Internal Medicine, 31*(10), 1206–1211. https://doi.org/10.1007/s11606-016-3703-5

Reffi, A. N., Pinciotti, C. M., Darnell, B. C., & Orcutt, H. K. (2019). Trait mindfulness and PTSD symptom clusters: Considering the influence of emotion dysregulation. *Personality and Individual Differences, 137*, 62–70. https://doi.org/10.1016/j.paid.2018.08.010

Schroevers, M. J., Tovote, K. A., Snippe, E., & Fleer, J. (2016). Group and individual mindfulness-based cognitive therapy (MBCT) are both effective: A pilot randomized controlled trial in depressed people with a somatic disease. *Mindfulness, 7*(6), 1339–1346. https://doi.org/10.1007/s12671-016-0575-z

Segal, Z. V., Williams, M., & Teasdale, J. (2018). *Mindfulness-based cognitive therapy for depression*. Guilford Publications.

Seligowski, A. V., Lee, D. J., Bardeen, J. R., & Orcutt, H. K. (2015). Emotion regulation and posttraumatic stress symptoms: A meta-analysis. *Cognitive Behaviour Therapy, 44*(2), 87–102. https://doi.org/10.1080/16506073.2014.980753

Sibrava, N. J., Bjornsson, A. S., Pérez Benítez, A. C. I., Moitra, E., Weisberg, R. B., & Keller, M. B. (2019). Posttraumatic stress disorder in African American and Latinx adults: Clinical course and the role of racial and ethnic discrimination. *American Psychologist, 74*(1), 101. https://doi.org/10.1037/amp0000339

Smith, B. W., Ortiz, J. A., Steffen, L. E., Tooley, E. M., Wiggins, K. T., Yeater, E. A., Montoya, J. D., & Bernard, M. L. (2011). Mindfulness is associated with fewer PTSD symptoms, depressive symptoms, physical symptoms, and alcohol problems in urban firefighters. *Journal of Consulting and Clinical Psychology, 79*(5), 613. https://doi.org/10.1037/a0025189

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Allyn & Bacon.

Vujanovic, A. A., Youngwirth, N. E., Johnson, K. A., & Zvolensky, M. J. (2009). Mindfulness-based acceptance and posttraumatic stress symptoms among trauma-exposed adults without axis I psychopathology. *Journal of Anxiety Disorders, 23*(2), 297–303. https://doi.org/10.1016/j.janxdis.2008.08.005

Watson-Singleton, N. N., Hill, L. K., & Case, A. D. (2019). Past discrimination, race-related vigilance, and depressive symptoms: The moderating role of mindfulness. *Mindfulness, 10*(9), 1768–1778. https://doi.org/10.1007/s12671-019-01143-5

Watson-Singleton, N. N., Walker, J. H., LoParo, D., Mack, S. A., & Kaslow, N. J. (2018). Psychometric evaluation of the five facet mindfulness questionnaire in a clinical sample of African Americans. *Mindfulness, 9*(1), 312–324. https://doi.org/10.1007/s12671-017-0776-0

Watson, N. N., Black, A. R., & Hunter, C. D. (2016). African American women's perceptions of mindfulness meditation training and gendered race-related stress. *Mindfulness, 7*(5), 1034–1043. https://doi.org/10.1007/s12671-016-0539-3

Weathers, F. W., Bovin, M. J., Lee, D. J., Sloan, D. M., Schnurr, P. P., Kaloupek, D. G., Keane, T. M., & Marx, B. P. (2018). The Clinician-Administered PTSD Scale for DSM-5 (CAPS-5): Development and initial psychometric evaluation in military veterans. *Psychological Assessment, 30*(3), 383–395. https://doi.org/10.1037/pas0000486

Wilson, J. S., West, M. J. F., Messing, J. T., Brown, M. S., Patchell, M. B., & Campbell, J. C. (2011). Factors related to posttraumatic stress symptomatology in women experiencing police-involved intimate partner violence. *Advances in Nursing Science, 34*(3). https://doi.org/10.1097/ans.0b013e318227241d

Woods-Giscombé, C. L., & Black, A. R. (2010). Mind-body interventions to reduce risk for health disparities related to stress and strength among African American women: The potential of mindfulness-based stress reduction, loving-kindness, and the NTU therapeutic framework. *Complementary Health Practice Review, 15*(3), 115–131. https://doi.org/10.1177/1533210110386776