

Relating Dispositional Mindfulness, Contemplative Practice, and Positive Reappraisal With Posttraumatic Cognitive Coping, Stress, and Growth

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Objective: A growing body of theoretical and empirical work suggests that mindfulness may support more positive posttraumatic outcomes by reducing posttraumatic stress (PTS) and encouraging posttraumatic growth (PTG). Positive reappraisal (PR), a cognitive coping correlate of dispositional mindfulness (DM) has also been linked with greater PTG. However, neither DM nor PR have been modeled in relation to core posttraumatic constructs such as core belief disruption, intrusive rumination, deliberate rumination, PTS and PTG. **Method:** This study explored associations between these constructs in a sample of college students ($N = 505$), also investigating the impact of contemplative practice involvement on the relationships between the constructs. **Results:** Results indicate that including DM and PR into established models of PTG increases the model's explanatory power, which distinct cognitive coping pathways connect DM and core belief disruption with PTS as well as PTG, and that contemplative practice involvement substantially alters relationships between the core PTG variables. **Conclusions:** The present study contributes to the growing reconceptualization of trauma as linked with both positive and pathogenic outcomes, emphasizing the need to better understand how posttraumatic cognitive coping strategies contribute to more positive outcomes.

Keywords: mindfulness, trauma, posttraumatic growth, coping, contemplative practice

Exposure to trauma is a common experience (Breslau, 2009). Yet, posttraumatic reactions vary greatly in their course and intensity (Norris, Tracy, & Galea, 2009). Posttraumatic stress (PTS) is characterized by distressing, event-related cognitive intrusions that often elicit efforts to avoid event-related reminders (Joseph & Williams, 2005). Furthermore, while the desire to relieve posttraumatic distress has traditionally oriented trauma researchers, PTS is only one possibility in a range of posttraumatic reactions. Indeed, some trauma exposed individuals report no demonstrable negative effects as a result of a traumatic exposure, while others report the navigation of trauma to be growth promoting (Calhoun & Tedeschi, 2004; Joseph & Williams, 2005). The process of realizing personal growth as a result of coping successfully with trauma is known as posttraumatic growth (PTG; Tedeschi & Calhoun, 1996).

Efforts to better understand PTG have identified several protective factors believed to positively influence posttraumatic reactions. For instance, external factors, such as social support or environmental characteristics, along with internal factors, such as personality characteristics and cognitive coping styles, are believed to be influential in the growth process (Joseph, Murphy, & Regel, 2012). While external factors are important, internal, cognitive coping processes are believed to be most central to posttraumatic reactions (Garland, Farb, Goldin, & Fredrickson, 2015; Joseph et al., 2012; Tedeschi & Calhoun, 2004). In fact, cognitive processes are frequently identified as fundamental to posttraumatic reactions given the theoretical proposition that PTS results largely from the disruption of fundamental beliefs about the world (Janoff-Bulman, 1992). Thus, reconstructing initial stress appraisals into adaptive cognitive schemas seems necessary for more positive posttraumatic outcomes.

Posttraumatic reactions are driven by idiosyncratic cognitive appraisals of the traumatic incident in relation to deeply held cognitive schemas. PTS is often characterized by cognitive disruptions, such as intrusive ruminations (IR), and indeed, the relationship between traumatic exposure, IR and PTS is well-documented (e.g., Cann et al., 2011; Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2012). However, IR is not necessarily pathological, and instead may signal initial attempts to reconstruct core beliefs disrupted by the traumatic event (Cann et al., 2011). More recently, a second form of rumination, deliberate rumination (DR), has been proposed as a complimentary posttraumatic cognitive coping process. DR is the intentional engagement with cognitions related to the traumatic event, often in an effort to make sense or derive meaning from the trauma (Cann et al., 2011). Cann et al. (2011) propose that DR emerges later in the posttraumatic re-

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sponse, and may represent a more salutary form of posttraumatic cognitive coping. Further, these two forms of rumination may not be orthogonal: though DR is associated with more positive posttraumatic outcomes than IR, evidence suggests that higher levels of IR predict greater DR (Triplett et al., 2012). Thus, a cognitive coping hierarchy is suggested in the PTG literature, with IR prompting DR, which in turn may encourage greater PTG. From a cognitive neuroscience perspective, such rumination may involve the processing of traumatic material in working memory to integrate this influx of novel situational information into the context of extant schemas embedded in long-term memory, thereby allowing for a recontextualization and reconsolidation of the traumatic memory (e.g., Schwabe, Nader, & Pruessner, 2014).

Triplett et al. (2012) investigated the relationships between traumatic impact, both ruminative processes and posttraumatic outcomes in a sample of college students. Their model, reflecting the most parsimonious modeling of posttraumatic cognitive coping, linked core belief disruption to PTS and PTG through both IR and DR, with IR emerging more closely related to PTS and DR more closely related to PTG. Path models derived from several other samples also support this framework (e.g., Nightingale, Sher, & Hansen, 2010; Wilson, Morris, & Chambers, 2014). As evidenced in these recent studies, extending the nomological net around core posttraumatic responses has proved useful in more accurately mapping the full scope of posttraumatic reactions, specifically PTG and DR. Continuing to refine the relationships between the posttraumatic reaction variables is valuable; and, continuing to investigate novel constructs in relation of the core PTG variables may prove theoretically and clinically beneficial.

DM, PR, and Posttraumatic Coping

DM, the tendency to experience mindful awareness in context of daily life by attending to the flow of internal and external experiences with an attitude of openness and nonjudgment (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), is believed to be a universal capacity (Brown & Ryan, 2003) that can be cultivated through intentional, contemplative practice (e.g., Carmody & Baer, 2008). Contemplative practice can take many forms, with prayer and meditation representing two of the most common approaches to practice. Regular contemplative practice is believed to encourage mindful qualities, such as self-awareness and self-regulation skills, that manifest in daily life and may be particularly salient in navigating times of adversity or trauma (Follette, Palm, & Pearson, 2006; Garland et al., 2015). Broadly, DM is associated with less PTS and greater PTG (Chopko & Schwartz, 2009; Hanley, Peterson, Canto, & Garland, 2015; Thompson, Arnkoff, & Glass, 2011). However, DM is a multidimensional construct, often operationalized with five dimensions: observing, describing, acting with awareness, nonreacting, and nonjudging (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006); and, previous investigations have found various domains of DM to be differentially related to PTG (Chopko & Schwartz, 2009; Hanley et al., 2015). The nonreacting and acting with awareness domains have been positively associated with PTG, while the nonjudging domain has been inversely associated with PTG, suggesting that DM plays a complex role with respect to PTG. Specifically, cognitive-evaluative coping processes appear necessary for PTG, a complexity lost when not

examining the relationship between DM and PTG at the subdomain level.

DM has also been linked to adaptive coping responses in the face of stress and trauma. One cognitive coping strategy consistently associated with mindfulness is PR, the tendency to reframe stressful events as beneficial and/or meaningful (Lazarus & Folkman, 1984). Studies reflect a robust association between DM and PR (for a review, see Garland et al., 2015), with the largest cross-sectional analysis ($N = 819$) identifying a correlation of $r = .41$ between the constructs (Hanley & Garland, 2014). Evidence further suggests that contemplative practice is associated with tendency to positively reappraise (Hanley, Garland, & Black, 2014). The relationship between DM and PR is particularly relevant to discussions of trauma and PTG, as PR is strongly associated with positive outcomes in the wake of adversity (Prati & Pietrantonio, 2009). This body of evidence supports the recently proposed Mindfulness-to-Meaning Theory (MMT; Garland et al., 2015), which asserts that mindfulness facilitates decentering from stress appraisals and iterative reprocessing of the broader stressor context via a metacognitive state of awareness that accommodates a reappraisal of adverse life circumstances.

The MMT implicates iterative cognitive processing in adaptive coping, mirroring the constructs of IR and DR that are centrally situated in leading models of PTG (Joseph et al., 2012; Tedeschi & Calhoun, 2004). Though the transition from IR to DR is an important marker in posttraumatic coping not fully explicated in PTG models, the MMT provides insights into this transition, providing a detailed process model of how mindfully attending to intrusive stress responses may facilitate DR and ultimately PTG. Bringing the mindful attention cultivated in contemplative practice to posttraumatic thoughts, emotions, and memories is likely to adjust the experience of intrusions (Follette et al., 2006; Thompson et al., 2011), potentially by relaxing rigid, negative associations linked with the trauma so that broader, more adaptive interpretations may emerge. Posttraumatic intrusions often elicit emotional distress (Joseph et al., 2012; Tedeschi & Calhoun, 2004), which fosters negatively biased information processing (Mathews & MacLeod, 2005) and prompts conditioned, behavioral chains (Schwabe & Wolf, 2009). In this regard, distress arising from posttraumatic intrusions may narrow cognition and behavior around scripted and habitual defense or avoidance responses (Eastbrook, 1959; Garland et al., 2010). Conversely, mindfulness is theorized to broaden and build cognitive and behavioral flexibility (Garland et al., 2015). Indeed, Tedeschi and Blevins (2015) suggest that PR, central to the MMT and robustly associated with DM, is one specific form of DR germane to PTG.

The purpose of this study was to investigate the associations between DM, PR, and the core PTG model, including core belief disruption, IR, DR, PTS, and PTG. To this end, three analytic stages were performed: (a) previous models of PTG were expanded by including DM and PR to the core PTG model, *the Mindful-Reappraisal Model*, (b) associations between the five subdomains of DM, PR, and the core PTG model were investigated to unpack the multidimensional relations between DM and PTG, *the Mindful-Domains Model*, and (c) relationships between the primary variables of interest for respondents reporting involvement with a contemplative practice were compared with respondents reporting no contemplative practice. It was expected that DM and PR would be significantly associated with DR and PTG in

both the Mindful-Reappraisal and Mindful-Domains Models. Furthermore, given the link between contemplative practice and greater DM (Carmody & Baer, 2008) as well as evidence that contemplative practice impacts the relationships between DM and PTG (Hanley et al., 2015), it was expected that contemplative practitioners would evidence a stronger relationship between DM and PTG, potentially mediated by more positive cognitive coping strategies, PR and DR.

Method

Participants and Procedures

Participants were 505 college students recruited from a large, Southeastern public university's voluntary college of education (COE) subject pool. The COE subject pool draws from approximately 800 undergraduate students in the fall and spring semesters. Only those participants completing the entire survey, experiencing at least one traumatic exposure, and reporting posttraumatic distress greater than an established threshold (i.e., at or above a stress level of 4 on a 7-point scale; Lindstrom, Cann, Calhoun, & Tedeschi, 2013) were included in the final analysis. Participants completed the entire survey online during a single administration. The mean completion time was 23 min.

The majority of respondents identified as female (76%) and single (95%). The mean respondent age was 21.11 ($SD = 3.30$). Ethnically, respondents identified primarily as White (75%), Latino (15%), Black (8%), or Asian (2%).

As time since trauma has been identified as an important posttraumatic variable (e.g., Breslau, 2009), only those respondents able to provide a precise traumatic exposure date were included. The mean number of trauma exposures was 4, matching previous estimates (e.g., Vrana & Lauterbach, 1994), with the number of reported traumas ranging from 1 to 17 events. The average time since trauma exposure was 1,717 days ($SD = 1,767$). The types of trauma most frequently reported included receiving news of a serious injury, life threatening illness or unexpected death of someone close to you (40%), having a serious accident at work, in a car or somewhere else (10%), experiencing a natural disaster (e.g., tornado, hurricane, flood, or major earthquake) where you felt you or your loved ones were in danger of death or injury (7%), and being forced to have intercourse, oral or anal sex against your will (5%).

Nearly half of respondents reported involvement with a contemplative practice (47%). Prayer was the most commonly reported practice (44%), followed by yoga (32%) and mindfulness meditation (21%). The length of time respondents had been practicing was bimodal, with 35% of respondents reporting less than a year of contemplative practice and 34% reporting 10+ years of practice. Fewer respondents reported 1–3 years (18%) or 3–10 years (14%) of practice. Frequency of practice, measured in days per week, was also bimodal with respondents most commonly reporting 1 day (29%) or 7 days (23%), followed by 3 days (15%) and 2 days (14%) per week. The durations of practice most commonly reported were 0–15 min (45%), 15–30 min (21%), 30–45 min (13%), and 45–60 min (14%).

Measures

Trauma history. The Trauma History Questionnaire (THQ; Green, 1996) is a 23-item checklist of potentially traumatic events. Respondents indicate their trauma exposure history (answering “yes” or “no”), their frequency of exposure, as well as their approximate age during exposure on the THQ. Respondents are also provided the opportunity to write in an unlisted traumatic event should they believe the provided 23-item list was incomplete.

Two additional items were used to further assess trauma history. First, respondents were prompted to identify their most stressful trauma to center participants' recollections on a particular traumatic event. Second, all participants completed an item rating the stressfulness of their identified trauma: “How stressful was this event?” (Lindstrom et al., 2013). This item was scored on a 7-point Likert scale (1 = *not at all stressful* to 7 = *extremely stressful*) and used as a fidelity check to ensure that participants believed the event exposure was stressful. Those participants not endorsing a stress level of 4 or above were excluded from statistical analysis ($n = 179$). Participants were instructed to answer the remainder of the questions with this particular event in mind.

Core beliefs inventory. Disruption of an individual's core beliefs resulting from traumatic exposure was measured with the Core Beliefs Inventory (CBI; Cann et al., 2010), a 9-item measure using a 6-point Likert scale (1 = *not at all* to 6 = *a very great degree*). Respondents are instructed to reflect on a single, traumatic event when completing the CBI.

Rumination. The Event Related Rumination Inventory (ERRI; Cann et al., 2011) is a 20-item, two factor scale that was used to measure two posttraumatic cognitive processes: IR (“I thought about the event when I did not mean to”) and DR (“I forced myself to think about my feelings about my experience”). Both subscales consist of 10-items measured on a 4-point Likert scale (0 = *not at all* to 3 = *often*) yielding two separate total scores, one for IR and one for DR.

Posttraumatic stress. The Impact of the Events Scale-Revised (IES-R) is a 22-item measure used to assess PTS (Weiss & Marmar, 1997), on a 5-point Likert scale (0 = *not at all* to 4 = *extremely*). While the IES-R measures three symptom subscales, *intrusion*, *avoidance*, and *hyperarousal*, only the total score was used in this study.

Posttraumatic growth. The 21-item Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) measures PTG across five domains (*relating to others*, *new possibilities*, *personal strength*, *spiritual change*, and *appreciation of life*) using a 6-point Likert scale (0 = “*I did not experience this change as a result of my trauma*” to 5 = “*I experienced this change a great deal as a result of my trauma*”; Tedeschi & Calhoun, 1996). While the PTGI yields a total score and subscale scores for each of the five domains, only the total score was used in this study.

DM and Contemplative Practice Involvement. The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) is a 39-item, 5-point Likert type measure designed to capture mindful behavior in everyday life across five domains: *observing*, *describing*, *acting with awareness*, *nonjudging*, and *nonreacting* (Baer et al., 2006). The FFMQs factor structure has been supported across time, with the scale demonstrating sound psychometric properties

(Baer et al., 2006; Christopher, Neuser, Michael, & Baitman-galkar, 2012; Neuser, 2010).

Contemplative practice was measured with six items. The first was a simple dichotomous item assessing contemplative practice involvement ["Do you currently have a mindfulness practice (e.g., meditation, yoga, centering . . .)"]. Respondents denying practice involvement were routed to the next section of the survey. Respondents reporting practice involvement were prompted with the remaining five items assessing their style of practice (e.g., centering prayer, mindfulness mediation, yoga, or other), their practice involvement history (ranging from less than 6 months to 10+ years), their practice frequency (measured in days per week), and their typical practice duration (measured in 15 min increments). Roughly equivalent numbers of contemplative practitioners ($N = 236$) and nonpractitioners ($N = 269$) were observed in this sample. No significant relationships were observed between DM and respondents' history, frequency or duration of contemplative practice.

Positive reappraisal. The Cognitive Emotion Regulation Questionnaire's (CERQ; Garnefski, Kraaij, & Spinhoven, 2001) 4-item Positive Reappraisal subscale measured respondents' tendencies to reappraise adverse situations using a 5-point Likert scale (1 = *almost never* and 5 = *almost always*). Higher, summed scores reflect an increased tendency to positively reappraise adversity (Example Item: "I think that the [adverse] situation also has its positive sides").

Results

Descriptive Statistics and MANCOVA

A multivariate analysis of variance (MANCOVA) was used to investigate between group differences in the primary variables of interest with respect to contemplative practice involvement, controlling for gender, age, race, and time since trauma. Gender, age, race, and time since trauma were controlled for as each has evidenced associations with PTS (e.g., Breslau, 2009). Results (see Table 1) indicated a significant between group difference, $F(11, 489) = 2.20, p = .013, \eta^2 = .05$. Specifically, significant between group differences were observed for DM ($F(1, 500) =$

$28.12, p = .005$) as well as three of the DM facets: observing, $F(1, 500) = 19.43, p < .001$; describing, $F(1, 500) = 4.34, p = .038$ and; nonreacting, $F(1, 500) = 2.20, p = .004$. No significant differences emerged between groups for the remaining two DM facets or for any of the core PTG variables. A second, MANCOVA was nonsignificant, assessing between group differences in DM and the DM facets with respect to the type of contemplative practice (prayer, yoga, or meditation), $F(4, 228) = 0.82, p = .69$.

The Mindful-Reappraisal Model

A data driven model respecification process was used to derive the Mindful-Reappraisal Model (see Figure 1). The resulting model evidenced good fit across five indices ($\chi^2 = 2.12, df = 5, p = .83$; comparative fit index (CFI) = 1.00; Tucker-Lewis index (TLI) = 1.02; root mean square error of approximation (RMSEA) <.001; standardized root mean square residual (SRMR) = .005) and accounted for significant portions of variance in PTS ($R^2 = .33$) and PTG ($R^2 = .55$). Total, direct, and indirect effects for the Mindful-Reappraisal Model are provided in Table 2.

Core belief disruption demonstrated significant, positive total effects on all endogenous variables. IR evidenced significant, positive direct effects on DR and PTS as well as a significant, positive indirect effect on PTG through DR. DR had significant, positive effects on PTS and PTG. However, when examined comparatively, IR evidenced a stronger relationship with PTS, and DR was more closely linked with PTG.

DM had a significant, total effect on each endogenous variable, evidencing negative associations with IR, DR and PTS as well as positive associations with PR and PTG. DM was directly associated with all endogenous variables except for DR, but evidenced a negative, indirect relationship with DR through IR. DM demonstrated the strongest relationships with PR, PTS, and IR. PR only evidenced a positive, direct effect on PTG, but was also affected directly or indirectly by core belief disruption, IR, DR, and DM. Both DR and DM demonstrated direct effects on PR, while core belief disruption and IR demonstrated indirect relationships with PR through DR.

Table 1
Between Group Comparisons for Contemplative Practitioners and Nonpractitioners

Variable	Total sample ($N = 505$)		Contemplative practitioners ($N = 236$)	Nonpractitioners ($N = 269$)	F	p	Effect size
	Mean (SD)	α	Mean (SD)	Mean (SD)			
1. Dispositional mindfulness	126.19 (14.81)	.87	128.12 (14.58)	124.61 (14.829)	8.03	.005	.02
1a. Observing	26.59 (4.88)	.78	27.61 (4.90)	25.71 (4.70)	19.40	<.001	.04
1b. Describing	27.40 (5.22)	.87	27.90 (4.89)	26.98 (5.50)	4.35	.037	.01
1c. Acting with awareness	25.21 (5.38)	.88	25.37 (5.33)	25.11 (5.34)	.33	.565	.00
1d. Nonreacting	25.46 (6.08)	.90	21.86 (3.82)	21.24 (4.14)	4.20	.041	.01
1e. Nonjudging	21.53 (3.40)	.78	25.38 (6.12)	25.57 (6.09)	.08	.777	.00
2. Traumatic impact	33.07 (11.50)	.91	34.08 (11.56)	32.25 (11.42)	2.64	.105	.01
3. Intrusive rumination	22.25 (8.47)	.96	22.40 (8.46)	22.13 (8.56)	.01	.906	.00
4. Deliberate rumination	22.23 (8.26)	.94	22.76 (8.35)	21.74 (8.19)	1.63	.203	.00
5. Positive reappraisal	11.12 (3.24)	.87	11.40 (3.18)	10.90 (3.27)	2.91	.089	.01
6. Posttraumatic stress	39.89 (19.46)	.97	40.65 (19.47)	39.02 (19.50)	.87	.353	.00
7. Posttraumatic growth	67.82 (27.29)	.96	70.04 (28.32)	64.90 (26.39)	2.24	.135	.00

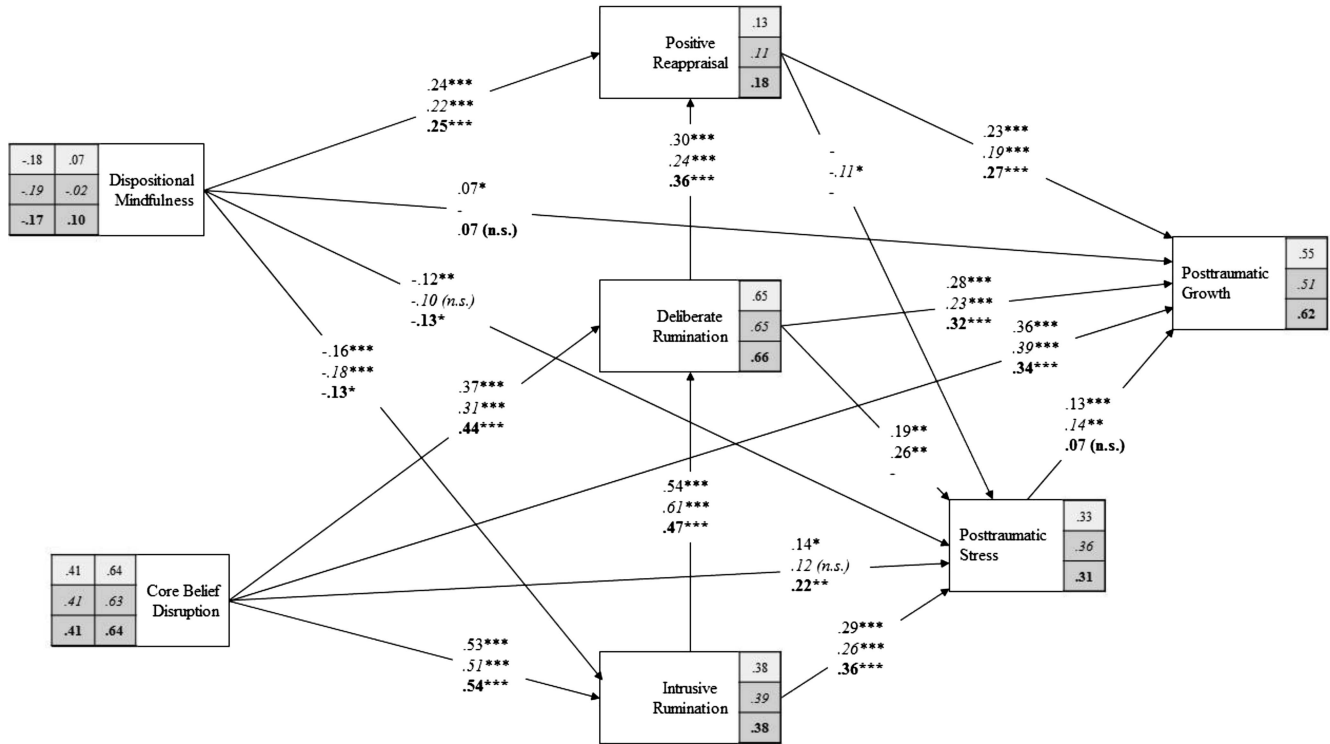


Figure 1. Mindful Reappraisal Model. Standardized relationships for all three groups are reported in this figure. The top numbers reflect the path weights for the total sample. The middle, *italicized* numbers reflect the path weights for nonpractitioners and the bottom, **bold** numbers reflect the path weights for contemplative practitioners. Gray boxes on the left sides of the two exogenous variables indicate total effects, with the left box providing the posttraumatic stress (PTS) total effect and the right box the posttraumatic growth (PTG) total effect. The gray boxes on the right sides of the endogenous variables indicate the percentage of variance accounted for in that variable by this model. * $p < .05$. ** $p < .01$. *** $p < .001$.

Differences emerged in comparing the contemplative practitioner’s Mindful-Reappraisal Model ($\chi^2 = 7.75, df = 6, p = .26; CFI = 1.00; TLI = .98; RMSEA = .035; SRMR = .019$) with the nonpractitioner’s Mindful-Reappraisal Model ($\chi^2 = 8.25, df = 6, p = .14; CFI = 1.00; TLI = .95; RMSEA = .052; SRMR = .014$). The most notable difference between the two models was the role of DR (see Table 3). DR was associated with greater PR and PTG for the practitioners. Furthermore, the positive association with DR and PTS observed in the nonpractitioner model was absent in the practitioner model. CBI had a stronger direct and total effect on DR in the practitioner model, while IR had a stronger effect on DR in the nonpractitioner model. CBI also had a stronger total effect on PR among practitioners. Differences in DM and PR were most pronounced with respect to PTG, with greater DM and PR associated with greater PTG in practitioners when compared with nonpractitioners. The two models predicted approximately equivalent amounts of variance in IR, DR and PTS, but the practitioner model predicted noticeably larger percentages of variance in PR and PTG.

The Mindful-Domains Model

The Mindful-Domains Model (see Figure 2) was found to demonstrate good fit after respecification, $\chi^2 = 20.73, df = 20, p = .41; CFI = 1.00; TLI = 1.00; RMSEA = .008; SRMR = .015$. Associ-

ations among the variables in the core PTG variables and PR remained largely unchanged by deconstructing the composite DM variable into its five domains. In comparison with the Mindful-Reappraisal Model, the Mindful-Domains Model accounted for similar proportions of variance in PTS ($R^2 = .35$) and PTG ($R^2 = .55$). Total, direct, and indirect effects for the Mindful-Domains Model are provided in Table 2.

Examination of the five DM domains revealed three of the DM domains (nonjudging, observing, and acting with awareness) were primarily, negatively associated with the core PTG variables, while the remaining two DM domains (nonreacting and describing) were primarily, positively associated with PR and PTG. The nonjudging domain was the most strongly associated with the core PTG model variables, having significant negative associations with IR, DR, and PTS. The observing domain also demonstrated negative associations with all variables in the core PTG model, but was most strongly related to IR. Acting with awareness was found to only be related to PTS. With respect to PTG and PR, the nonreacting domain was the most strongly associated with both, while the describing domain was primarily associated with PR.

Similar patterns of association emerged in comparing the contemplative practitioner’s Mindful-Domains Model ($\chi^2 = 25.81, df = 24, p = .36; CFI = 1.00; TLI = .99; RMSEA = .018; SRMR = .021$)

Table 2
Summary of the Standardized Effects for Each Total Sample Path Model

Variable	Mindful-Reappraisal Model						Mindfulness Facets Model					
	IR	DR	PR	PTS	PTG	r^2	IR	DR	PR	PTS	PTG	r^2
Core belief disruption												
Total effect	.53	.65	.19	.41	.64		.53	.63	.17	.38	.61	
Direct effect	.53	.37	—	.14	.36		.53	.35	—	.11	.36	
Indirect effect	—	.29	.19	.28	.28		—	.29	.17	.27	.26	
Intrusive rumination						.38						.38
Total effect		.54	.16	.39	.24			.54	.14	.39	.23	
Direct effect		.54	—	.29	—			.54	—	.30	—	
Indirect effect		—	.16	.10	.24			—	.14	.09	.23	
Deliberate rumination						.65						.66
Total effect			.30	.19	.37				.27	.17	.36	
Direct effect			.30	.19	.28				.27	.17	.28	
Indirect effect			—	—	.09				—	—	.08	
Posttraumatic stress						.33						.35
Total effect					.13						.11	
Direct effect					.13						.11	
Indirect effect					—						—	
Posttraumatic growth						.55						.55
Positive reappraisal						.13						.16
Total effect				—	.23					—	.23	
Direct effect				—	.23					—	.23	
Indirect effect				—	—					—	—	
Dispositional mindfulness												
Total effect	-.16	-.09	.21	-.18	.07							
Direct effect	-.16	—	.24	-.12	.07							
Indirect effect	—	-.09	-.03	-.06	—							
Observing (<i>mindfulness facet</i>)												
Total effect							-.10	-.05	-.01	-.04	-.02	
Direct effect							-.10	—	—	—	—	
Indirect effect							—	-.05	-.01	-.04	-.02	
Describing (<i>mindfulness facet</i>)												
Total effect							—	—	.15	—	.03	
Direct effect							—	—	.15	—	—	
Indirect effect							—	—	—	—	.03	
Acting with awareness (<i>mindfulness facet</i>)												
Total effect							—	—	—	-.11	-.01	
Direct effect							—	—	—	-.11	—	
Indirect effect							—	—	—	—	-.01	
Nonreacting (<i>mindfulness facet</i>)												
Total effect							—	.07	.23	.01	.14	
Direct effect							—	.07	.21	—	.07	
Indirect effect							—	—	.02	.01	.07	
Nonjudging (<i>mindfulness facet</i>)												
Total effect							-.13	-.13	-.03	-.17	-.06	
Direct effect							-.13	-.06	—	-.11	—	
Indirect effect							—	-.07	-.03	-.06	-.06	

Note. IR = intrusive rumination; DR = deliberate rumination; PTS = posttraumatic stress; PTG = posttraumatic growth; PR = positive reappraisal.

with the nonpractitioner's Mindful-Domain Model ($\chi^2 = 16.71$, $df = 22$, $p = .78$; CFI = 1.00; TLI = 1.03; RMSEA < .001; SRMR = .015) as observed in the Mindful-Reappraisal Model (see Table 4). One exception was the direct association between IR and PR, which was significant and negative for nonpractitioners while remaining nonsignificant for mindfulness practitioners. The DM facets were differentially associated for contemplative practitioners and nonpractitioners across the two models. While each of the DM facets contributed to the nonpractitioner model, only the nonreacting and nonjudging DM facets contributed to the practitioner model. Similar to the full model, for nonpractitioners the nonreacting and describing DM facets were associated with more positive posttraumatic reactions (i.e., PR and

PTG), while the nonjudging, acting with awareness and observing DM facets were associated with less severe PTS reactions (i.e., IR and PTS). Comparatively, for practitioners, nonreacting was positively associated with PR and PTG as well as DR and PTS to a lesser degree, while nonjudging was negatively associated with all endogenous variables, most principally PTS. The observing DM facet was also unique in that observing was negatively associated with each endogenous variable for the nonpractitioners, but entirely unrelated to the practitioner's model. Similar to the Mindful-Reappraisal Model, both Mindful-Domain Models accounted for similar percentages of variance in IR, DR and PTS, but the Mindful-Practitioner Model explained more of the variance in both PR and PTG.

Table 3
 Summary of the Standardized Effects for Contemplative Practitioner's and Nonpractitioner's Mindful-Reappraisal Model

Variable	Nonpractitioners Mindful-Reappraisal Model						Practitioners Mindful-Reappraisal Model					
	IR	DR	PR	PTS	PTG	r^2	IR	DR	PR	PTS	PTG	r^2
Dispositional mindfulness												
Total effect	-.18	-.11	.19	-.19	-.02		-.13	-.06	.23	-.17	.10	
Direct effect	-.18	—	.22	-.10	—		-.13	—	.25	-.13	.07	
Indirect effect	—	-.11	-.03	-.10	-.02		—	-.06	-.02	-.05	.03	
Core belief disruption												
Total effect	.51	.61	.14	.40	.62		.54	.69	.25	.42	.66	
Direct effect	.51	.31	—	.12	.39		.54	.44	—	.22	.34	
Indirect effect	—	.31	.14	.28	.23		—	.26	.25	.20	.32	
Intrusive rumination						.39						.38
Total effect	—	.61	.14	.41	.23		—	.47	.17	.36	.22	
Direct effect	—	.61	—	.26	—		—	.47	—	.36	—	
Indirect effect	—	—	.14	.14	.23		—	—	.17	—	.22	
Deliberate rumination						.65						.66
Total effect	—	—	.24	.24	.31		—	—	.36	—	.42	
Direct effect	—	—	.24	.26	.23		—	—	.36	—	.33	
Indirect effect	—	—	—	-.03	.08		—	—	—	—	.10	
Positive reappraisal						.11						.18
Total effect	—	—	—	-.11	.18		—	—	—	—	.27	
Direct effect	—	—	—	-.11	.19		—	—	—	—	.27	
Indirect effect	—	—	—	—	-.02		—	—	—	—	—	
Posttraumatic stress						.36						.31
Total effect	—	—	—	—	.14		—	—	—	—	.07	
Direct effect	—	—	—	—	.14		—	—	—	—	.07	
Indirect effect	—	—	—	—	—		—	—	—	—	—	
Posttraumatic growth						.50						.62

Note. IR = intrusive rumination; DR = deliberate rumination; PTS = posttraumatic stress; PTG = posttraumatic growth; PR = positive reappraisal.

Discussion

This study investigated associations among the core PTG variables, DM, and PR in an attempt to integrate prevailing models of PTG with recent theorizing on the role of mindfulness in coping with adversity. Results generally support previous investigations of cognitive coping and PTG, findings that core belief disruption functions as a catalyst for both IR and DR, with IR primarily related with PTS and DR primarily related with PTG (e.g., Nightingale et al., 2010; Triplett et al., 2012; Wilson et al., 2014). Results further suggest that including DM and PR into established models of PTG increases the model's explanatory power and that contemplative practice substantially alters relationships between the core PTG variables.

Generally, greater DM appears associated with less PTS and greater PTG. Specifically, the mindful tendencies to be nonjudgmental and observant while acting with awareness may be related to lower levels of PTS. Furthermore, the mindful tendencies to be nonreactive and descriptive of experience may be related to greater PTG. Looking at these findings conjointly suggests two routes by which DM appears to be simultaneously related to greater PTG and reduced PTS. First, the nonreacting and describing domains both evidenced positive indirect relationships with PTG, primarily through PR. Second, the remaining DM domains evidenced negative indirect relationships with PTG, primarily through the two types of ruminations. The division of the DM domains with respect to the core PTG model variables provides insight into the lack of relationship between DM and PTG. Taken together, these findings suggest that mindful individuals are more likely to report more positive posttraumatic outcomes; yet, the degree to which an

individual may experience PTG is relative to the intensity of schematic disruption experienced as a result of trauma. As the degree of schematic disruption associated with the traumatic exposure increases, the potential for greater PTG also appears to increase—at least up until a point (Cann et al., 2010). Mindfully approaching schematic disruptions occasioned by trauma may direct the psychic potential nested in the traumatic disruption toward psychological growth, potentially by promoting engagement with more adaptive cognitive coping strategies (i.e., PR) while limiting engagement with less adaptive cognitive coping strategies (i.e., IR).

With respect to cognitive coping strategies, results support the centrality of cognitive coping in posttraumatic recovery efforts. Results also extend efforts to more fully map posttraumatic cognitive coping strategies, adding PR to the previously addressed ruminative styles. Collectively, the current findings suggest a cognitive coping hierarchy in this data, with IR providing a foundation for DR, which in turn may support PR. The intentional processing of trauma, either through DR or with the aim of extracting benefit from the event, appears to encourage greater PTG. Drilling down into this model, three cognitive coping pathways emerged. The first path, linking core belief disruption to PTS through IR can be conceptualized as the “intrusive path,” an association previously documented in college students (Triplett et al., 2012), HIV/AIDS patients (Nightingale et al., 2010), and cancer patients (Wilson et al., 2014).

The second path, linking core belief disruption to both posttraumatic outcomes, primarily through DR, can be conceptualized as the “deliberate path.” The association between DR and PTG is

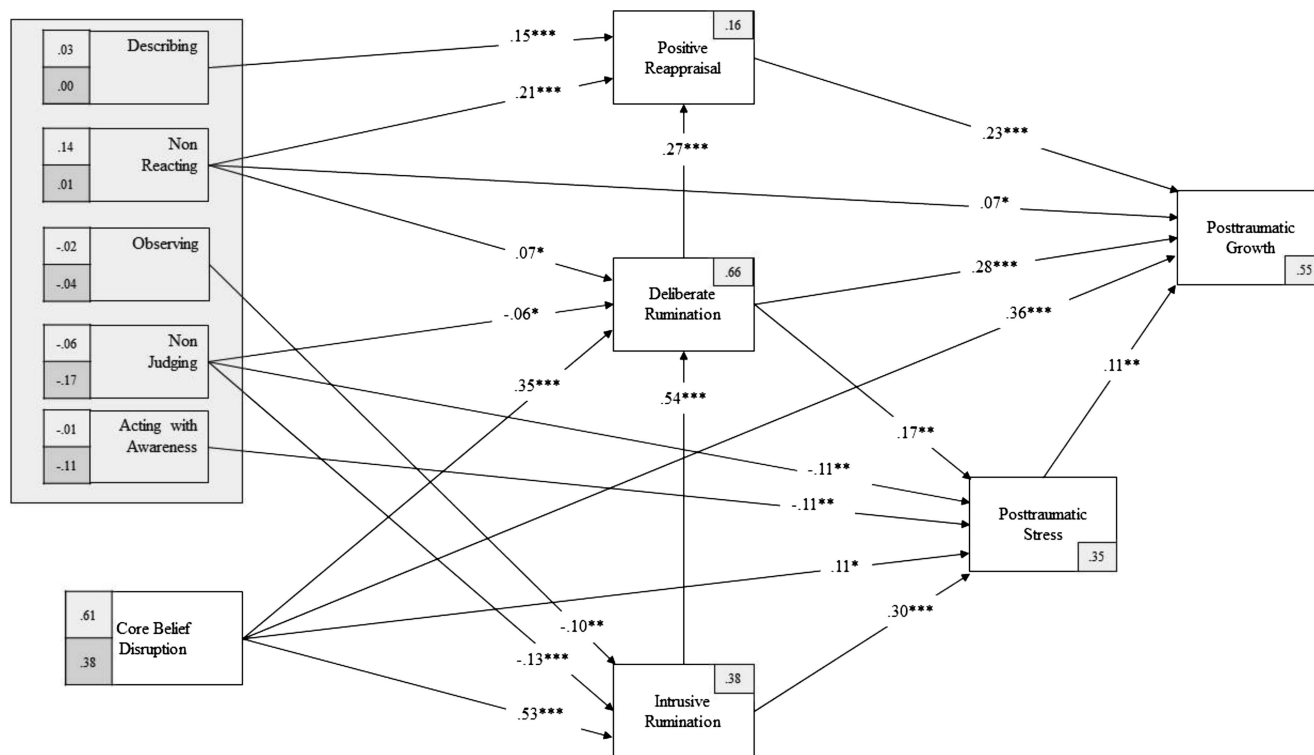


Figure 2. *Mindful Domains Model*. Standardized relationships for the total sample are reported in this figure. The gray boxes on the left side of each exogenous variable indicate total effects, with the top box providing the posttraumatic growth (PTG) total effect and the bottom box the posttraumatic stress (PTS) total effect. The gray box on the right side of each endogenous variables indicates the percentage of variance accounted for in that variable by this model. * $p < .05$. ** $p < .01$. *** $p < .001$.

consistent with previous findings (e.g., Triplett et al., 2012) and theoretical proposals (e.g., Cann et al., 2011). DR is distinct from the avoidant coping strategies often associated with PTS: by recurrently processing traumatic mental contents, DR may transform intrusive posttraumatic cognitive experiences into opportunities for meaningful reflection. In turn, such reflection may allow for adaptive posttraumatic interpretations to emerge—potentially through the recruitment of PR mechanisms.

The third path, linking DM to both PTS and PTG through rumination and reappraisal can be conceptualized as the “mindful-reappraisal” path. Like the deliberate path, the mindful-reappraisal path was related to greater PTG; unlike the deliberate path, the mindful-reappraisal path was also related to lower levels of PTS. The indirect, inverse association between DM and PTS was principally mediated by IR, suggesting that more mindful individuals report lower PTS by virtue of having fewer posttraumatic, cognitive intrusions. It may be that more mindful individuals are more skilled at recognizing and regulating intrusions; thus, diminishing their distressing nature. The direct relationship between DM and PTS also suggests that mindfulness may play additional salutogenic roles in attenuating stress responses beyond the cognitive domain.

The modest relationship between DM and PTG observed in the present study was unexpected given prior evidence of relatively strong associations between these two constructs (e.g., Chopko & Schwartz, 2009; Hanley et al., 2015). Such a modest relationship

may be the result of DM exhibiting conflicting associations in the Mindful-Reappraisal Model. DM appears to be inversely related with both ruminative coping strategies, while also being positively related with PR; however, all three cognitive coping strategies have a positive total effect on PTG. Thus, it may be that by reducing PTS, DM may also be reducing PTG by limiting the positive influence of the ruminative coping strategies on PTG. In short, less cognitive disruption translates into less growth; and, decreased IR may reduce instances of DR. However, causal conclusions cannot be drawn from this correlational data, rendering these interpretations tentative. Given this conflict, an effort was made to clarify the complex role DM plays in the Mindful-Reappraisal Model by examining DM at the subdomain level in relation to the core PTG model and PR.

Examining relationships in the Mindful-Domains Model suggests that the DM domains could be categorized by their respective associations with the two posttraumatic outcomes. The first group, comprised of the observing, acting with awareness, and nonjudging DM domain, is inversely associated with the core PTG model, ultimately linked with lower levels of PTS. As such, these DM domains are also associated with lower levels of PTG and only minimally associated with PR. Thus, individuals who are more observant of internal experiences, who act with greater awareness, and who tend to be nonjudgmental are likely to experience less PTS. In comparison, the remaining two DM domains, nonreacting and describing, appear to be primarily associated with PTG by

Table 4

Summary of the Standardized Effects for Contemplative Practitioner's and Nonpractitioner's Mindful Facet Model

Variable	Nonpractitioners Mindfulness Facet Model					r^2	Practitioners Mindfulness Facet Model					r^2
	IR	DR	PR	PTS	PTG		IR	DR	PR	PTS	PTG	
Nonreacting												
Total effect	—	—	.14	-.01	.03		—	.12	.36	.11	.23	
Direct effect	—	—	.14	—	—		—	.12	.33	.11	.09	
Indirect effect	—	—	—	-.01	.03		—	—	.04	—	.14	
Describing												
Total effect	—	—	.21	-.02	.04		—	—	—	—	—	
Direct effect	—	—	.21	—	—		—	—	—	—	—	
Indirect effect	—	—	—	-.02	.04		—	—	—	—	—	
Nonjudging												
Total effect	-.15	-.09	.00	-.07	-.03		-.10	-.16	-.05	-.30	-.07	
Direct effect	-.15	—	—	—	—		-.10	-.12	—	-.27	—	
Indirect effect	—	-.09	.00	-.07	-.03		—	-.05	-.05	-.04	-.07	
Acting with awareness												
Total effect	—	—	—	-.14	-.02		—	—	—	—	—	
Direct effect	—	—	—	-.14	—		—	—	—	—	—	
Indirect effect	—	—	—	—	-.02		—	—	—	—	—	
Observing												
Total effect	-.13	-.08	-.14	-.05	-.05		—	—	—	—	—	
Direct effect	-.13	—	-.14	—	—		—	—	—	—	—	
Indirect effect	—	-.08	.00	-.05	.05		—	—	—	—	—	
Core belief disruption												
Total effect	.53	.62	.13	.34	.62		.53	.65	.19	.35	.61	
Direct effect	.53	.31	—	—	.40		.53	.40	—	.17	.35	
Indirect effect	—	.32	.13	.34	.22		—	.24	.19	.18	.26	
Intrusive rumination						.39						.37
Total effect	—	.61	.01	.48	.21		—	.46	.13	.35	.18	
Direct effect	—	.61	-.25	.28	—		—	.46	—	.35	—	
Indirect effect	—	—	.26	.20	.21		—	—	.13	—	.18	
Deliberate rumination						.65						.68
Total effect	—	—	.42	.28	.36		—	—	.29	—	.40	
Direct effect	—	—	.42	.32	.23		—	—	.29	—	.32	
Indirect effect	—	—	—	-.4	.12		—	—	—	—	.08	
Positive reappraisal						.17						.23
Total effect	—	—	—	-.11	.18		—	—	—	—	.27	
Direct effect	—	—	—	-.11	.19		—	—	—	—	.27	
Indirect effect	—	—	—	—	-.02		—	—	—	—	—	
Posttraumatic stress						.36						.37
Total effect	—	—	—	—	.14		—	—	—	—	—	
Direct effect	—	—	—	—	.14		—	—	—	—	—	
Indirect effect	—	—	—	—	—		—	—	—	—	—	
Posttraumatic growth						.51						.62

Note. IR = intrusive rumination; DR = deliberate rumination; PTS = posttraumatic stress; PTG = posttraumatic growth; PR = positive reappraisal.

virtue of their links with PR. Thus, the indirect relationship between DM and PTG absent in the Mindfulness-Reappraisal Model is present at the domain level. The nonreactivity DM domain appears to tap the propensity toward adopting a metacognitive, decentered stance toward experience, whereas the describing domain seems to assess the ability to discriminate and differentiate emotional experience. According to the MMT, the synergy of metacognition and heightened emotional awareness may facilitate effective processing of posttraumatic mental contents and thereby facilitate PTG (Garland et al., 2015).

It is also worthy of note that examining the relationship between DM and DR at the domain level may provide some clarity concerning the lack of relationship between global measures of these constructs. Nonreactivity was the only DM domain to be positively associated with DR and nonjudging had the strongest negative relationship. Taken together, these results suggest that being non-

reactive to internal experiences is likely to be helpful in the intentional processing of emotionally valenced content. Furthermore, judgment also appears to help facilitate DR—a finding that is resonant with previous studies suggesting that evaluative processing is necessary for personal narrative reconstruction following an adverse event (Cann et al., 2010; Triplett et al., 2012). Understanding the relation between DM and DR may require further study at the domain level to reveal the subtleties involved.

These results further indicate that involvement with a contemplative practice has a nontrivial impact on the relationships between DM and PR with respect to the core PTG variables, substantially shifting relationships between the core trauma variables toward greater PTG. The most notable difference between the contemplative practitioner's and nonpractitioner's models was observed in the function of DR. For practitioners, DR was only associated with PR and PTG, suggesting that DR for practitioners

takes the form of salutary reappraisals of the traumatic event and its larger context. In contrast, DR was similarly associated with both PTS and PTG for nonpractitioners, indicating that nonpractitioners experience DR as equally distressing and growth promoting. Examination at the DM domain level indicates that contemplative practitioners use two distinct mindfulness domains in the service of posttraumatic coping while nonpractitioners appear to have a more diffuse approach. For practitioners remaining nonreactive appears most closely linked with the tendency to cognitively reconstruct adversity and find value in navigating trauma. Furthermore, remaining nonjudgmental appears associated with less PTS for practitioners. Comparatively, all of the DM domains were recruited for nonpractitioners, suggestive of a less skillful application of DM akin to the colloquial shotgun approach. It may be that practitioners are able to apply the mindfulness skills more precisely as a result of contemplative practice familiarizing them with behavioral and cognitive regulation strategies. However, such distinct differences in the utilization of the DM domains for each group were unexpected and further investigation is needed to better understand the function of the respective DM domains in posttraumatic coping for contemplative practitioners and nonpractitioners. Future studies could also attend to the relationship between the duration and frequency of contemplative practice and DM as this nonsignificant association was unexpected.

While results from this study provide preliminary insights into the relationships between DM, PR and previous models of PTG, results should be interpreted with caution given methodological limitations. Principally, though our model's directional assumptions were theoretically and empirically grounded, causal relations could not be tested formally because of this data cross-sectional nature. Future studies could address this limitation using longitudinal and experimental designs. A second limitation arises from this sample being disproportionately college educated White women, potentially limiting the generalizability of results. Future studies are encouraged to explore these relationships in more diverse populations. Third, future studies are also encouraged to attend to respondents' religious affiliations given variability in the emphasis of contemplative practice, broadly, and mindfulness, specifically, across religious traditions. In summary, the present study contributes to the growing reconceptualization of trauma as being linked with both positive and pathogenic outcomes, by identifying a potential role for mindfulness and PR as well as providing evidence of the impact of contemplative practice on posttraumatic reactions. Understanding how positive outcomes arise from trauma may require careful consideration of the cognitive coping strategies that emerge in the wake of traumatic life incidents.

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