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Mindfulness' Effects on Stress, Coping, and Mood: A Daily Diary Goodness-of-Fit Study

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Dispositional mindfulness is often linked to higher positive affect and lower negative affect, and coping with stress has been hypothesized to mediate these links. However, few studies have explicitly tested the ways in which stress appraisals, coping strategies, or coping flexibility (i.e., fit of coping to controllability appraisals) uniquely relate to mindfulness and well-being. Drawing on a stress and coping framework, the present study tested the degree to which (a) lower stress appraisals mediate mindfulness' effects on daily positive and negative affect; (b) daily coping mediates mindfulness' impact on daily positive and negative affect, above and beyond the effects of stress appraisals; and (c) coping flexibility mediates mindfulness' impact on positive and negative affect, above and beyond the effects of stress appraisals and average daily coping. Participants were 157 undergraduate students (mean age = 17.81; 79% women), completing daily diary questionnaires regarding stress appraisals, coping, and affect for 1 week. Results demonstrate that lower average stress appraisals mediated 19% of mindfulness' effects on negative affect; further, average use of some "mindful" emotion-focused coping strategies (i.e., non-self-blame and acceptance) independently mediated 3%–13% of mindfulness' effects on positive and negative affect. Although mindfulness was associated with greater "fit" of problem-focused versus acceptance coping to high controllability appraisals, coping flexibility did not appear to mediate mindfulness' effects on either positive or negative affect. Thus, mindfulness-based stress management interventions may be most effective by promoting mindful coping to complement, rather than replace, problem-focused coping.

Keywords: mindfulness, coping, stress, goodness-of-fit, coping flexibility

Dispositional mindfulness confers benefits to psychological health, with ties to greater eudaemonic well-being and lower global distress (Brown, Ryan, & Creswell, 2007). In psychology, mindfulness has been conceptualized as an adaptive cognitive style focused on acceptance and nonjudgmental awareness of the present moment (Bishop et al., 2004). Past work has linked mindfulness to higher levels of positive mood and lower levels of negative mood, with mindfulness representing a popular component of third-wave cognitive–behavioral psychotherapies for a variety of presenting problems (Hofmann, Sawyer, Witt, & Oh, 2010; Keng, Smoski, & Robins, 2011).

To understand the ways in which mindfulness promotes well-being, some preliminary research has begun to examine links between mindfulness and daily coping in stressful situations. Stress and coping theory suggests that coping results from a series of overlapping cognitive processes that vary from situation to situation (Folkman & Lazarus, 1980; Folkman, Lazarus, Gruen, & DeLongis, 1986). These processes include making subjective appraisals about specific stressors and their need for coping responses and using these appraisals to select which types and how much of specific coping strategies to implement (Lazarus & Folkman, 1984). It is important to note that the effectiveness of different types of coping is also thought to vary depending on initial stress appraisals; this idea is often referred to as the *goodness-of-fit hypothesis* (Lazarus & Folkman, 1984; Terry & Hynes, 1998). Of note, this hypothesis has greater empirical support for some ways of coping than for others. For example, actively attempting to change one's stressor, or *problem-focused coping,* typically leads to positive outcomes in situations that offer opportunities for control over one's problem (Park, Sacco, & Edmondson, 2012; Roubinov, Turner, & Williams, 2015). In the case of less controllable events, such as receiving a cancer diagnosis, some research has also suggested that strategies directed at regulating one's emotional response to stress, or *emotion-focused coping,* may

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more effectively promote adjustment (Park, Folkman, & Bostrom, 2001; Sorgen & Manne, 2002), with other studies suggesting that emotion-focused strategies demonstrate consistent positive effects regardless of situational controllability (e.g., Park et al., 2012). This inconsistency in the literature may be due in large part to study-level differences in the specific lower order strategies (e.g., behavioral disengagement vs. acceptance) that make up the higher order category *emotion-focused coping* (see Skinner, Edge, Altman, & Sherwood, 2003).

In considering the distinct effects of mindfulness on stress and coping and affect–mood, research has suggested three different pathways through which benefits may arise: through lower stress appraisals, through greater use of adaptive coping, and through goodness-of-fit, or flexibility in matching coping to appraisals (see Figure 1).

First, a small number of studies have shown that individuals with greater levels of dispositional mindfulness typically appraise daily experience as less stressful, thus perceiving a reduced environmental demand on their resources for coping (Keng et al., 2011; Weinstein, Brown, & Ryan, 2009). Although little research has tested specific factors that might explain mindfulness' effects on subjective stress appraisals, prevailing theories of mindfulness have suggested that lower stress appraisals may result from a broad, nonjudgmental awareness of one's internal and external experiences, such that individuals higher in mindfulness attend to a wide scope of environmental cues rather than becoming attached to one particular aspect of a situation (Bishop et al., 2004; Brown et al., 2007). An emerging literature has also linked mindfulness to perceptions of personal control or autonomy, which may reduce the degree to which stressors are appraised as overwhelming one's personal resources for coping (Brown & Ryan, 2003; Fetterman, Robinson, Ode, & Gordon, 2010; Galla & Wood, 2015; Masicampo & Baumeister, 2007). In turn, reductions in perceived stressfulness may reduce the degree to which daily events lead to negative affect reactivity and facilitate increased engagement with positive experiences (Galla & Wood, 2015; Gu, Strauss, Bond, & Cavanagh, 2015; Weinstein et al., 2009; see Point 1 in Figure 1).

Second, at the point of actually implementing coping, research has suggested that higher levels of mindfulness are characterized by a greater tendency to use certain adaptive coping strategies for responding to distress. Mindfulness has been associated with increased distress tolerance and sustained behavioral engagement with distressing experiences (Bishop et al., 2004; Donald, Atkins, Parker, Christie, & Ryan, 2016), which likely allows individuals to persist with challenging tasks rather than quitting and ultimately enjoy greater accomplishment and perceived self-efficacy in relation to stress (Bishop et al., 2004; Coffey, Hartman, & Fredrickson, 2010). However, the degree to which distress tolerance is beneficial may be contextual; other pathways through which mindfulness has been linked to greater positive and less negative mood include increased acceptance of what one realistically cannot change and nonjudgment of self during stressful events (Bishop et al., 2004; Vago & Silbersweig, 2012). In addition, recent research has suggested that dispositional mindfulness is associated with active reframing of stressful events in a more positive light, reducing the degree to which events are perceived as threatening well-being and expanding the degree to which attention is devoted to other experiences (Garland, Farb, Goldin, & Fredrickson, 2015; Garland, Gaylord, & Fredrickson, 2011). In experimental research, facets of mindfulness comprising stress reactivity and emotional clarity have been shown to mediate the links between dispositional mindfulness and positive reframing, suggesting that initial cognitive appraisals of stress may lead to subsequent positive refocusing and reappraisal processes (Hanley & Garland, 2014).

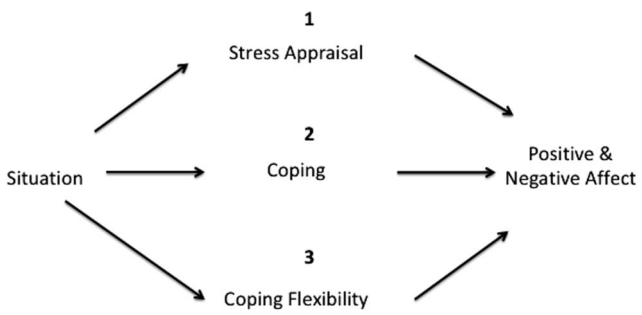

Figure 1. Proposed stress and coping pathways mediating mindfulness' effects on affect.

Per Lazarus and Folkman's (1984) dichotomy of problem- versus emotion-focused coping, all of these strategies represent managing one's emotional reaction to environmental experiences. For simplicity, we refer to these as *mindful emotion-focused* coping strategies for the remainder of this article. The potential association of mindfulness with use of four mindful emotion-focused coping strategies in response to stress (positive reappraisal, sustained behavioral engagement–distress tolerance, acceptance, and nonjudgment) is elaborated in Table 1 and is denoted by Point 2 in Figure 1.

Finally, the ability to "fit" one's coping to variation in situational appraisals represents a third aspect of the stress and coping process that dispositional mindfulness may influence (see Point 3 in Figure 1). Per the goodness-of-fit hypothesis (Lazarus & Folkman, 1984), individuals who are more skillful at modifying their typical coping to match the demands of their environment may enjoy the greatest benefit from their coping efforts. Preliminary work has also suggested that flexibility in interpreting and responding to stressful situations may lead to reductions in chronic mood dysregulation and symptoms of depression and anxiety (Kashdan & Rottenberg, 2010). At the personality level, one might consider these individuals as exhibiting greater levels of dispositional *coping flexibility* (Cheng, Lau, & Chan, 2014). Mindfulness has been conceptually linked to nonjudgmental flexibility in adapting to perceived environmental demands (Bishop et al., 2004; Brown et al., 2007; Shapiro, Carlson, Astin, & Freedman, 2006), but the degree to which individuals actually calibrate their use of mindful emotion-focused coping strategies to match appraisals of environmental controllability remains untested.

Research on the affective outcomes of coping flexibility has been scant and often inconsistent across studies. Prevailing theories suggest that metacognitive calibration of one's coping efforts in response to situational variability promotes positive and reduces negative markers of adjustment (Gu et al., 2015; Shapiro et al., 2006), but little empirical evidence has supported this hypothesis (Gu et al., 2015). Given the inconsistency in the literature testing the goodness-of-fit hypothesis with emotion-focused coping, there is also a great need for additional research of the ways that average

Table 1
Mindful Emotion-Focused Coping

Mindful quality	Coping construct	Item used in the present study[a]
Positive reappraisal	Positive reappraisal of stressful event	"I've been trying to see it in a different light, to make it seem more positive."
Acceptance	Acceptance of stressful event	"I've been accepting the reality of the fact that it has happened."
Distress tolerance	Behavioral disengagement from stressful event	"I've been giving up trying to deal with it."
Nonjudgment	(Non-)self-blame for stressful event	"I've been criticizing myself."[b]

[a] Coping items were selected from the Brief COPE (Carver, 1997). [b] Higher scores indicate less mindful coping.

versus situation-specific levels of emotion-focused strategies impact positive and negative affect, independent of stress appraisals.

At present, there is also some debate about the oversimplification of traditional Buddhist mindfulness practice in some interventions or lay beliefs and the extent to which contemporary interpretations of mindfulness are useful across all stressful situations (Harrington & Dunne, 2015; Monteiro, Musten, & Compson, 2015). Skeptics of some contemporary interpretations of mindfulness have argued that an overly nonjudgmental, accepting approach to stress management has the potential to be problematic when consistently substituted for problem-focused approaches to managing stressful situations (Monteiro et al., 2015). For example, replacing problem-focused coping with passive acceptance prevents individuals from engaging with problems that they might have realistic opportunities to change and thus leads to negative outcomes. However, it should be noted that little in vivo research outside of lab-based mindfulness inductions (e.g., Erisman & Roemer, 2010; Weinstein et al., 2009) has tested contextual variability in mindful coping as it predicts the effects of stress on well-being, despite evidence that both amount and effects of individuals' coping vary considerably from situation to situation (Lazarus & Folkman, 1984). The methodological shortcomings of existing studies can be addressed by daily assessment of coping and affect, which considerably reduces measurement error related to retrospective recall bias and additionally allows for examination of both between-subjects (personality-level) differences and within-subject variation (i.e., flexibility in adapting to situational demands; Bolger & Laurenceau, 2013).

The Present Study

Using intensive longitudinal methodology, the present study tests three distinct potential mediators of mindfulness' effects on well-being (conceptualized as positive and negative affect): stress appraisals, mindful emotion-focused coping, and flexibility in achieving good appraisal–coping fit. This study adds to the small body of research on mindfulness' impact on stress and coping by examining each of these mediated pathways individually, rather than examining the degree to which mindfulness is related to "adaptive" coping more broadly. Models predicting mindfulness' effects on coping include stress appraisals as a covariate to control for total coping expenditure (Park, Armeli, & Tennen, 2004) and models predicting affect control for other aspects of appraisals and coping incrementally to test the degree to which each potential component of adaptive coping makes a distinct contribution to positive and negative affect. In this way, we were able to test all three pathways shown in Figure 1.

We define *appraisal–coping fit* as calibrating one's average use of coping to use (a) relatively more problem-focused coping in situations appraised as more controllable and (b) relatively more mindful emotion-focused coping in situations appraised as less controllable. Individuals who achieve greater appraisal–coping fit on average are defined as exhibiting greater dispositional coping flexibility. Because the majority of studies testing the goodness-of-fit hypothesis have relied on cross-sectional, retrospective designs and trait coping measures (e.g., Roubinov et al., 2015), the present study is notable for its use of intensive longitudinal design, and specifically daily diary methodology, comprising multiple quantitative brief surveys that enhance one's ability to understand daily experiences (Bolger & Laurenceau, 2013). The focus on specifically *mindful* emotion-focused coping in the present study further allowed us to examine whether (a) flexibility in balancing mindful emotion-focused coping with problem-focused coping based on controllability appraisals matters for promoting higher levels of positive and lower levels of negative affect during stressful experiences and (b) mindful coping is beneficial across situations.

Our specific research questions and hypotheses were as follows:

Research Question 1: Do lower stress appraisals mediate mindfulness' effects on well-being?

Hypothesis 1: Mindfulness will, on average, be associated with lower stress appraisals, which will partially mediate mindfulness' effects on increasing positive and decreasing negative affect.

Research Question 2: Does greater use of mindful emotion-focused coping (i.e., more positive reappraisal and acceptance, less behavioral disengagement and self-blame) mediate mindfulness' effects on well-being?

Hypothesis 2: Above and beyond the effects of stress appraisals, greater average use of mindful emotion-focused coping will mediate mindfulness' effects on more positive and less negative affect.

Research Question 3: Does good appraisal–coping fit ability (i.e., coping flexibility) mediate mindfulness' effects on well-being?

Hypothesis 3: Independent of mindfulness' relation to average stress appraisals and coping, mindfulness will also be associated with higher appraisal–coping fit, as calculated through a person-centered index score (i.e., [Problem-Focused–Mindful Emotion-Focused Coping] × [Control Appraisal]; Park et al., 2001), averaged across days to represent one's dispositional fit ability. This relationship will be demonstrated such that more mindful individuals demonstrate greater relative use of

problem-focused coping on days when coping with more controllable stressors and greater relative use of mindful emotion-focused coping on days when coping with less controllable stressors. Further, we anticipated that dispositional coping flexibility (i.e., fit across days) in using relatively less mindful emotion-focused coping in high-controllability situations will mediate the effects of mindfulness on daily mood, above and beyond the effects of stress appraisals and average use of coping.

Method

Participants

Participants in this study were 157 first-year undergraduate students at the University of Connecticut (UCONN). The majority were White (84%), non-Hispanic (99%), and female (79%), with an average age of 17.81 years (SD = .44).

Procedure

All study procedures were approved by the UCONN Institutional Review Board. Study participants were recruited via the UCONN Psychology Department Participant Pool and completed online surveys in exchange for participation credit. All participants provided informed consent. Participants completed a 30-min online survey at the beginning of their first semester (September), as well shorter surveys every evening for 7 days during the second month of the semester (October).

Measures

Mindfulness. Participants completed the Cognitive and Affective Mindfulness Scale—Revised (CAMS–R; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007). The CAMS–R measures a single, second-order construct of mindfulness comprising attention, present focus, awareness, and acceptance and is designed for use by populations who are inexperienced with mindfulness and meditation. The CAMS–R consists of 12 items, rated on a 4-point scale from 1 (*Rarely/Not at all*) to 4 (*Almost always*), with the total score taken as the average of these items (possible range = 1–4). The CAMS–R has demonstrated good reliability as well as convergent and discriminant validity in a college student sample (Feldman et al., 2007). Cronbach's alpha in the present sample was .70 (acceptable).

Daily stressors. At the end of each day (8 p.m. to 2 a.m.) for a period of 7 days, participants were presented with a list of 17 stressors (Dasch, Cohen, Sahl, & Gunthert, 2008) and prompted to select all event types that they had experienced that day. After selecting all events that applied, participants were then prompted to indicate which of these was the "worst or most bothersome."

Daily appraisals. At the end of each day, participants were asked to appraise the (a) stressfulness and (b) controllability of their "worst or most bothersome" daily stressor on a Likert scale ranging from 1 (*not at all stressful/controllable*) to 7 (*extremely stressful/controllable*). These items have been used in previous research (e.g., Park et al., 2004) and provide a clear summary of within-subject appraisals as they vary day-to-day.

Daily coping. At the end of each day, participants were also presented with a list of 14 types of coping and asked to rate their degree of use of each type of coping that they had used to deal with their "worst or most bothersome" stressor on a scale of 0 (*not at all*) to 7 (*extremely*). Each item represented a subscale of the Brief COPE (Carver, 1997). Items selected for the present analyses included active coping ("I've been concentrating my efforts on doing something about the situation I'm in"), positive reappraisal ("I've been trying to see it in a different light, to make it seem more positive"), acceptance ("I've been accepting the reality of the fact that it has happened"), behavioral disengagement ("I've been giving up trying to deal with it"), and self-blame ("I've been criticizing myself").

The last four of these five coping factors were selected for their relevance to mindfulness, a trait that is thought to increase attention to the present moment and allow individuals to accept emotions in a way that does not interfere with daily functioning (Bishop et al., 2004), and the first factor was selected to represent problem-focused coping, as described in transactional models of stress and coping (Lazarus & Folkman, 1984). This selection of individual mindful coping strategies from the larger Brief COPE (Carver, 1997) measure is consistent with others' treatment of these items in relation to mindfulness (e.g., Donald et al., 2016) and is intended to capture specific aspects of mindful coping that are often included in models of mindfulness' effects on affect. Each of these items and its relationship to hypothesized aspects of mindfulness is outlined in Table 1.

Daily positive and negative affect. At the end of each day, participants were shown a list of nine emotions from the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) and asked to rate the extent to which they felt each emotion on a scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). The nine emotions shown were categorized as positive (determined, attentive, alert, inspired, active) and negative (afraid, nervous, upset, ashamed). The PANAS has demonstrated good psychometric properties in a variety of samples (Watson et al., 1988). For the purposes of the present analyses, total scores of positive and negative emotions endorsed were treated as separate continuous outcomes, varying by day; total subscale scores were taken as the average of positive and negative items (possible range = 1–5). Because of within-subject clustering in the present sample, reliability for affect was calculated with responses to the first of the nightly surveys; Cronbach's alpha was .85 for positive affect and .80 for negative affect.

Analyses

A priori power analysis suggested that a sample of approximately 150 would provide sufficient power to detect small to medium effect sizes using a multilevel, repeated-measures design, while allowing for missing data. Preliminary data cleaning, examination for completeness, and descriptive and reliability analyses were conducted in SPSS. All subsequent analyses were conducted using R, utilizing the lme4 package for multilevel modeling (Bates, Mächler, Bolker, & Walker, 2015) and the mediation package for bootstrapped tests of indirect effects with 95% confidence intervals (Tingley, Yamamoto, Hirose, Keele, & Imai, 2014). Individual participants completed multiple surveys over time, and so multilevel models were used to best account for the

clustering of daily data points within individuals (Bolger & Laurenceau, 2013). Because the present study focused on the degree to which individuals vary in their appraisals, coping, and appraisal–coping fit across a 1-week period, rather than how these variables fluctuate at the daily level, we utilized grand-mean centering for predictors in these analyses (including fit indices, which were created using within-subject components of appraisals and coping before grand-mean centering). Thus, mediated effect sizes reported here can be interpreted in the context of between-subjects differences (i.e., comparing individuals' typical daily experiences and general fitting ability, based on dispositional mindfulness). These procedures follow the guidelines elaborated on by Krull and MacKinnon (2001) for "2−1−1" multilevel models testing effects of a Level 2 independent variable (i.e., mindfulness) on a Level 1 dependent variable (i.e., affect) as mediated by a Level 1 variable (i.e., appraisals, coping, and coping flexibility).

Data were examined for any outliers or apparent errors in participant response; none were identified. Individuals with missing data did not differ significantly from individuals with complete data sets on any demographic variables or on mindfulness, with 19% of measured observations missing apparently at random. Given the patterns of missing data observed, linear mixed-effects models were used to provide unbiased maximum likelihood parameter estimates by including all available information, as is preferred for longitudinal data analysis (Gibbons, Hedeker, & DuToit, 2010). The average person was missing .40 complete daily surveys; thus, adherence rates were fairly high. Intraclass correlations (ICCs) were calculated from unconditional models for each of the two appraisal and five coping variables to determine the degree to which the grouping variable (in this case, person ID) accounts for variation in the variables of interest. High ICCs (close to 1) indicate that a larger proportion of the variance is accounted for by clustering, and low ICCs (close to 0) indicate that there is little clustering effect in the data. In daily diary studies, when measures vary on a daily basis and cluster within-subject, it is usual to have ICCs in the .2–.4 range, and this level of nonindependence, if ignored, causes tests of significance to be incorrect and biased in the direction of concluding that effects exist when they do not (Bolger & Laurenceau, 2013; Kenny, Kashy, & Bolger, 1998). In addition to accounting for within-subject clustering (i.e., random intercepts for person ID), most models included both a fixed and a random effect for time to control for possible intervention effects (random effect not used where noted, to improve model fit; Bolger & Laurenceau, 2013).

For Hypotheses 1 and 2, our primary interest was in person-level differences in stress appraisals and use of mindful emotion-focused coping as they relate to dispositional levels of mindfulness; thus, grand-mean-centered predictors were utilized in all models. To test Hypothesis 3, regarding *relative* use of problem-focused versus mindful emotion-focused coping, we calculated a (within-subject) situational fit index for each daily response, similar to what has been used in our previous research (Park et al., 2001). Our use of a relative fit index, rather than testing the strength of the multiplicative effect of coping and control (i.e., moderation), allowed us to test whether (a) dispositional mindfulness is associated with calibrating one's coping to situational appraisals across stressful situations (i.e., mediation path a) and (b) calibrating these coping types to situational appraisals is actually associated with well-being at the daily level (i.e., mediation path b). This demonstrates an advantage over traditional moderated mediation models by allowing us to treat fit as an individual and within-subject difference variable (Park et al., 2001).

To create the fit index, we first calculated person-centered deviation scores for controllability appraisals and each of the coping items by subtracting an individual's average score across days from raw daily scores and creating a standardized variable (z score) from the resulting within-subject component of appraisals and coping. For example, a negative z score on a given day can be interpreted as a person's having lower controllability appraisals than was typical for the person across the 7-day study period. Next, an index score was calculated by taking the difference score between the z score for problem-focused coping and the z score for each mindful emotion-focused coping strategy and multiplying this by the z score of a participant's within-subject daily appraisal of controllability (i.e., $[z_{\text{problem-focused coping}} - z_{\text{emotion-focused coping}}] * [z_{\text{controllability}}]$). Thus, higher (positive) fit scores can be interpreted as increasing one's use of problem-focused coping in a subjectively more controllable situations and increasing use of emotion-focused coping in subjectively less controllable situations. In contrast, lower (negative) fit scores indicate a mismatch of coping strategy to control appraisal. Because self-blame is an emotion-focused strategy that leads to worse outcomes in low-controllability situations, in contrast to positive reappraisal and acceptance, standardized scores on this item were multiplied by −1 before a calculating a fit index. Thus, the fit index comparing use of problem-focused and self-blame coping can be understood as relative use of problem-focused coping and non-self-blame. Although behavioral disengagement is also considered to be a less mindful coping strategy indicative of low distress tolerance (Bishop et al., 2004; Donald et al., 2016), we chose not to reverse-code this variable in order to compare mindfulness' effects on average coping scores (i.e., Hypothesis 2) and person-centered flexibility (i.e., Hypothesis 3), which may suggest a mindful, metacognitive acceptance of what one cannot change (Shapiro et al., 2006; Vago & Silbersweig, 2012). In models predicting affect from fit indices, grand-mean-centered stress appraisals and coping scores were entered as covariates.

Table 2
Descriptive Information on Study Variables

Variable	*M* (*SD*)	ICC[a]	Possible range
Mindfulness	2.56 (.47)		1–4
Stress appraisals	3.64 (2.06)	.33	0–7
Control appraisals	3.11 (2.26)	.21	0–7
Problem-focused coping	3.28 (2.13)	.26	0–7
Reappraisal coping	2.64 (2.04)	.27	0–7
Acceptance coping	3.85 (2.12)	.24	0–7
Behavioral disengagement coping	1.18 (1.74)	.25	0–7
Self-blame coping	1.93 (2.23)	.38	0–7
Positive affect	2.98 (1.01)	.58	1–5
Negative affect	2.06 (.94)	.47	1–5

Note. ICC = intraclass correlation.
[a] High ICCs (close to 1) indicate that a larger proportion of variance is accounted for by within-subject clustering, and low ICCs (close to 0) indicate that there is little clustering effect in the data.

Results

Descriptives of all independent and dependent variables are reported in Table 2. On average, participants reported a mindfulness score of 2.56 ($SD = .47$) on a scale of 1–4. Across all days, participants also reported average event stressfulness of 3.64 ($SD = 2.06$) and controllability of 3.11 ($SD = 2.26$). Acceptance coping ($M = 3.85$, $SD = 2.12$) and problem-focused coping ($M = 3.28$, $SD = 2.13$) were used the most, with participants reporting the least amount of behavioral disengagement ($M = 1.18$, $SD = 1.74$). All time-varying items demonstrated appropriate ICCs for multilevel modeling, ranging from .21 (control appraisals) to .58 (positive affect).

To test Hypothesis 1, we first examined the degree to which mindfulness was associated with daily appraisals of stress, controlling for the effects of time. Results demonstrated that dispositional mindfulness significantly accounted for individual variance in rating events as less stressful ($\beta = -.12$, $p = .03$). When tested as separate paths predicting affect, mindfulness and stress appraisals were significantly associated with negative affect (mindfulness $\beta = -.24$, $p < .001$; stress appraisal $\beta = .39$, $p < .001$), but only mindfulness demonstrated significant associations with positive affect (mindfulness $\beta = .31$, $p < .001$; stress appraisal $\beta = -.03$, $p = .30$). In examining a full mediated model, stress appraisals mediated 19% of mindfulness' effects on reducing average negative affect (see Figure 2) but did not significantly mediate mindfulness' effects on increasing average positive affect. Results of these mediation models, including direct and indirect pathways, are reported in full in Table 3.

To test Hypothesis 2, we first examined the degree to which mindfulness predicted average use of positive reappraisal, acceptance, behavioral disengagement, and self-blame coping. Controlling for the effects of stress appraisals and time, dispositional mindfulness was also associated with greater use of acceptance ($\beta = .13$, $p = .01$) and less use of self-blame ($\beta = -.11$, $p = .03$), with no significant difference in use of positive reappraisal ($\beta = .04$, $p = .45$) or behavioral disengagement ($\beta = -.07$, $p = .14$). Results of models predicting person-level effects of mindfulness on average coping are displayed in Table 4.

Next, we examined the degree to which coping strategies that were significantly associated with mindfulness (i.e., acceptance and non-self-blame) accounted for mindfulness' effects on average positive and negative affect, above and beyond the effects of lower stress appraisals. Above and beyond the effects of time and stress appraisals, acceptance was associated with greater positive ($\beta = .07$, $p = .01$) but not significantly different negative ($\beta = .02$, $p = .47$) affect; further, results of bootstrapped mediation models indicated that average use of acceptance to cope with stress significantly mediated the effects of mindfulness on increasing positive but not decreasing negative affect. Self-blame was associated with significantly less positive ($\beta = -.07$, $p = .02$) and greater negative ($\beta = .28$, $p < .001$) affect, and mediation models indicated that less use of self-blame coping significantly mediated the effects of mindfulness on reducing negative affect with marginal effects on increasing positive affect. Overall, these effects were such that greater acceptance significantly accounted for 3% of mindfulness' effects on daily positive affect (see Figure 3), and reductions in self-blame significantly accounted for 12% of mindfulness' effects on negative affect (see Figure 4) and marginally accounted for 2% of mindfulness' effects on positive affect. Results of between-subjects mediation models are reported in full in Table 5.

To test Hypothesis 3, we first calculated goodness-of-fit values for daily person-centered problem-focused coping and each of our

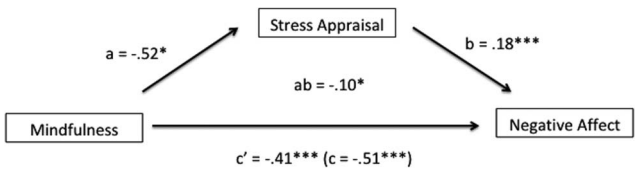

Figure 2. Significant mediation model linking mindfulness, stress appraisal, and negative affect. Path values represent unstandardized coefficients. The value in parentheses represents the total effect of mindfulness on negative affect, whereas the value outside parentheses represents the direct effect; both were extracted from bootstrapped mediation analyses. * $p < .05$. *** $p < .001$.

Table 3
Mediation Models Linking Mindfulness, Stress Appraisal, and Affect

Variable	Estimate	95% CI	*p*
Positive affect			
Indirect effect (ab)	.01	[−.01, .03]	.26
Direct effect (c′)	.71	[.38, .95]	<.001
Total effect (c)	.72	[.39, .95]	<.001
Proportion mediated	.01	[−.01, .04]	.26
Negative affect			
Indirect effect (ab)	−.10	[−.19, −.01]	.02
Direct effect (c′)	−.41	[−.57, −.21]	<.001
Total effect (c)	−.51	[−.72, −.32]	<.001
Proportion mediated	.19	[.02, .42]	.02

Note. Predictors are grand-mean-centered. CI = confidence interval.

Table 4
Mindfulness Predicting Daily Coping Styles

Variable	Estimate	95% CI	β	*t*	*p*
Reappraisal coping on					
Intercept	4.16	[3.84, 4.48]		25.41	<.001
Mindfulness	.17	[−.28, .63]	.04	.76	.45
Stress	.13	[.06, .20]	.13	3.86	<.001
Time	−.14	[−.20, −.07]	−.13	−4.19	<.001
Acceptance coping on					
Intercept	5.40	[5.11, 5.69]		37.02	<.001
Mindfulness	.59	[.16, 1.03]	.13	2.75	.01
Stress	.19	[.12, .26]	.18	5.27	<.001
Time	−.13	[−.20, −.06]	−.12	−3.70	<.001
Behavioral disengagement coping on					
Intercept	2.38	[2.09, 2.67]		16.28	<.001
Mindfulness	−.29	[−.68, .10]	−.08	−1.49	.14
Stress	.09	[.03, .15]	.10	2.90	.004
Time	−.04	[−.10, .01]	−.05	−1.47	.14
Self-blame coping on					
Intercept	3.15	[2.81, 3.49]		18.33	<.001
Mindfulness	−.52	[−.98, −.06]	−.11	−2.23	.03
Stress	.40	[.34, .47]	.38	12.24	<.001
Time	−.05	[−.12, .02]	−.04	−1.49	.14

Note. Predictors are grand-mean-centered. CI = confidence interval.

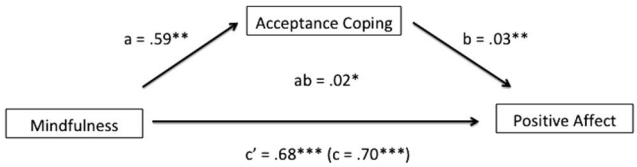

Figure 3. Significant mediation model linking mindfulness, acceptance coping, and positive affect. Path values represent unstandardized coefficients. The value in parentheses represents the total effect of mindfulness on positive affect, whereas the value outside parentheses represents the direct effect; both were extracted from bootstrapped mediation analyses. * $p < .05$. ** $p < .01$. *** $p < .001$.

four mindful emotion-focused coping strategies, with higher (positive) values indicating better fit of problem-focused coping to more controllable days and mindful emotion-focused coping to less controllable days; lower (negative) values indicate worse fit. Across all days, person-centered goodness-of-fit values for problem-focused versus reappraisal coping spanned from −8.79 to 8.81, with a mean of .11 (*SD* = 1.42; ICC = .09). Goodness-of-fit values for problem-focused versus acceptance coping ranged from −9.90 to 9.81, with a mean of .04 (*SD* = 1.49; ICC = .09). Goodness-of-fit values for problem-focused versus behavioral disengagement ranged from −5.51 to 12.31, with a mean of .23 (*SD* = 1.63; ICC = .08). Goodness-of-fit values for problem-focused versus self-blame coping (reverse-coded to indicate non-self-blame) ranged from −5.89 to 12.86, with a mean of .50 (*SD* = 1.85; ICC = .08). The low ICCs observed for these fit indices can be interpreted as suggesting that the majority of variance in daily calibration of coping to appraisal is accounted for by contextual factors, rather than individual differences; for all fit indices, less than 10% of variance may be attributed to personal characteristics (e.g., mindfulness) that make someone a "flexible coper" by nature.

Next, we tested models of mindfulness' effects on participants' situational appraisal–coping fit index, controlling for the effects of time. Results of these models are reported in Table 6. When examining its effects on a mindful versus problem-focused coping index depending on daily controllability, mindfulness was not significantly associated with conditional "fitting" of positive reappraisal ($\beta = -.04$, $p = .36$), behavioral disengagement ($\beta = .06$, $p = .12$), or (non-)self-blame ($\beta = .02$, $p = .60$), on average, as opposed to problem-focused coping. However, mindfulness was associated with greater fitting of acceptance coping to low controllability days, with greater increases in problem-focused coping, relative to increases in acceptance coping, on days that were more controllable ($\beta = .10$, $p = .02$). Because these coefficients refer to between-subjects averages of a within-subject "fit score," these results can be interpreted as suggesting that higher levels of mindfulness are associated with greater reliance on acceptance coping (relative to use of problem-focused coping) with low controllability stressors, with greater use of problem-focused coping on days appraised as providing greater opportunities for control.

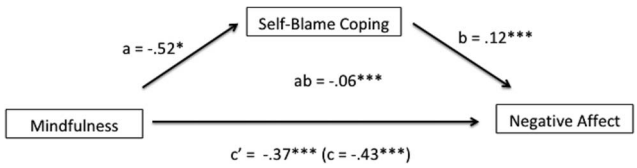

Figure 4. Significant mediation model linking mindfulness, self-blame coping, and negative affect. Path values represent unstandardized coefficients. The value in parentheses represents the total effect of mindfulness on negative affect, whereas the value outside parentheses represents the direct effect; both were extracted from bootstrapped mediation analyses. * $p < .05$. *** $p < .001$.

Finally, to determine the degree to which daily flexibility in use of mindful emotion-focused coping might be associated with variation in positive and negative affect above and beyond the effects of stress appraisals and coping, we tested the effects of individuals' grand-mean-centered, problem-focused versus mindful-emotion-focused coping fit indices on positive and negative affect. Full results of these models are reported in Table 7. Effects of fit indices on positive and negative affect were largely nonsignificant, with small effects observed only in the two models testing the effects of (non-)self-blame ($\beta = -.05$, $p = .04$) and behavioral disengagement ($\beta = -.04$, $p = .07$) coping fit indices on negative affect. These small effects can be interpreted as suggesting that increasing relative use of non-self-blame and behavioral disengagement versus problem-focused coping in less controllable situations is associated with lower levels of negative affect. Because the fit index for problem-focused versus acceptance coping (the only index associated with mindfulness) was unrelated to either positive or negative affect, mediation models were not tested for coping flexibility.

Discussion

The results of the present study make several important contributions to the understanding of the effects of mindfulness on daily

Table 5
Mediation Models Linking Mindfulness, Coping, and Affect

Variable	Estimate	95% CI	*p*
Acceptance and positive affect			
Indirect effect (ab)	.02	[.00, .05]	.02
Direct effect (c′)	.68	[.46, .95]	<.001
Total effect (c)	.70	[.47, .97]	<.001
Proportion mediated	.03	[.00, .09]	.02
Acceptance and negative affect			
Indirect effect (ab)	.02	[−.01, .02]	.52
Direct effect (c′)	−.43	[−.62, −.23]	<.001
Total effect (c)	−.42	[−.61, −.22]	<.001
Proportion mediated	−.01	[−.05, .02]	.52
Self-blame and positive affect			
Indirect effect (ab)	.01	[.00, .03]	.06
Direct effect (c′)	.66	[.43, .91]	<.001
Total effect (c)	.68	[.44, .92]	<.001
Proportion mediated	.02	[.00, .05]	.06
Self-blame and negative affect[a]			
Indirect effect (ab)	−.06	[−.10, −.01]	<.001
Direct effect (c′)	−.37	[−.51, −.20]	<.001
Total effect (c)	−.43	[−.57, −.27]	<.001
Proportion mediated	.13	[.04, .27]	<.001

Note. Predictors are grand-mean-centered. CI = confidence interval.
[a] To improve model fit, this model was run without a random effect of time.

Table 6
Mindfulness Predicting Within-Subject Coping Goodness-of-Fit Index

Variable	Estimate	95% CI	β	*t*	*p*
Reappraisal index on					
Intercept	−.08	[−.29, .12]		−.81	.42
Mindfulness	−.12	[−.37, .14]	−.04	−.91	.36
Time	.02	[−.03, .07]	.03	.75	.45
Acceptance index on					
Intercept	−.04	[−.29, .19]		−.40	.69
Mindfulness	.31	[.05, .57]	.10	2.34	.02
Time	.01	[−.04, .06]	.02	.55	.58
Behavioral disengagement index on					
Intercept	.02	[−.26, .30]		.16	.87
Mindfulness	.22	[−.06, .50]	.06	1.54	.12
Time	−.00	[−.07, .06]	−.00	−.13	.89
Self-blame index on					
Intercept	−.10	[−.37, .17]		−.73	.47
Mindfulness	.08	[−.22, .39]	.02	.53	.60
Time	.02	[−.03, .08]	.03	.81	.42

Note. Predictors are grand-mean-centered. For parsimony, we did not control for stress levels in these final models, because use of a within-subject coping "index" effectively controls for amount of coping; however, when including grand-mean-centered stress as a covariate, results are effectively unchanged. CI = confidence interval.

stress and coping processes. We found that mindfulness was related to better daily affect, in accordance with results of previous literature (Brown et al., 2007; Donald et al., 2016; Weinstein et al., 2009) and tested three pathways that may account for this association based on stress and coping theory. Our first hypothesis, regarding the effects of mindfulness on positive and negative affect as accounted for by variation in stress appraisals, was partially supported; individuals with higher levels of dispositional mindfulness reported lower stress appraisals on average, which mediated 19% of mindfulness' effects on lower negative affect but was not significantly associated with positive affect. Our second hypothesis was also partially supported; greater average use of acceptance mediated mindfulness' effects on positive (but not negative) affect, and less use of self-blame mediated mindfulness' effects on negative (but not positive) affect. Contrary to our hypothesis, mindfulness was not significantly associated with average use of positive reappraisal or behavioral disengagement above and beyond the effects of stress appraisal. Finally, our third hypothesis was not supported; mindfulness' effects on coping flexibility were minimal, with a significant association demonstrated between only mindfulness and a problem-focused versus acceptance fit index. Further, flexibility in use of problem-focused versus acceptance coping was not significantly associated with daily affect and thus did not mediate any of mindfulness' effects on daily well-being.

Although our hypothesis that lower stress appraisals would mediate mindfulness' effects on increasing positive affect was not confirmed, the results of this study do suggest that stress appraisals are linked to negative affect (i.e., feelings of being afraid, nervous, ashamed, or upset). Further, the effects of self-blame coping on positive affect were marginal and much smaller than were effects on negative affect. Thus, it may be the case that mindfulness' effects on positive emotional experiences (i.e., feeling determined, attentive, alert, inspired, or active) are accounted for by other factors, such as acceptance of stressful experiences. These results may also be interpreted in the context of contemporary theories of positive emotion as a distinct outcome from negative emotion, suggesting that positive experiences may actually minimize concurrent experiences of negative affect and vice versa (Folkman & Moskowitz, 2000; Fredrickson, 2004). Considering the two-factor structure of affect described by Watson and colleagues (1988), future longitudinal studies should find it interesting to examine positive affect as a moderator or mediator of the effects of acceptance coping on negative affect (e.g., Ong, Bergeman, Bisconti, & Wallace, 2006) or even test negative affect as a moderator or mediator of the effects of self-blame or behavioral disengagement coping on positive affect.

Although recent theories suggest that mindfulness promotes greater metacognitive flexibility, which in turn leads to greater well-being (Bishop et al., 2004; Brown et al., 2007; Kashdan & Rottenberg, 2010; Shapiro et al., 2006), the present results indicate that mindfulness may be associated with more mindful emotion-focused coping across situations (i.e., greater acceptance and lower self-blame) as well as relative flexibility specifically in accepting what one can and cannot change. Thus, mindfulness predisposes individuals to increase their use of acceptance coping versus problem-focused coping in relatively uncontrollable situations, with greater increases in problem-focused approaches when a stressor is appraised as more controllable. However, this flexibility was not significantly linked to affect; acceptance coping was associated with greater positive affect across situations, with effects not varying based on fit of coping to situational controllability. In agreement with authors who have suggested that mindfulness is best used as a complement to active, problem-focused strategies for coping with stress (Monteiro et al., 2015), we interpreted these results as supporting the idea that acceptance of stressful experiences should co-occur with problem-focused coping as it increases and decreases according to situational controllability, with discrepant use of problem-focused and acceptance coping not making a major difference for affective outcomes.

It is interesting that this study found a small, trend-level significant ($\beta = -.04$, $p = .07$) association of our behavioral disengagement fit index with lower levels of negative affect; however, the association of mindfulness with this index did not reach statistical significance ($\beta = .06$, $p = .12$) Toward a better understanding of the different aspects of mindful emotion-focused coping that demonstrate conditional effects on well-being, future studies may wish to test these mediated pathways with larger sample sizes. Further, results suggested that less average use of self-blame coping and greater flexibility in reducing one's typical levels of self-blame in relatively low-controllability situations were both significantly associated with lower negative affect. These findings indicate that a misfitting of self-blame coping to uncontrollable stressors is associated with higher levels of daily negative affect; although we did not find mindfulness to be associated with situational self-blame coping fit, it may be important for future research to examine this process further.

In connecting our results with the apparent efficacy of mindfulness-based treatments for depression and anxiety (Hofmann et al., 2010), a focus on exercising a more mindful approach appears to be important across stressful situations. To this point, some researchers have suggested that incorporating mindfulness

Table 7
Goodness-of-Fit Indices Predicting Affect

Variable	Estimate	95% CI	β	*t*	*p*
Positive affect on					
Intercept	3.22	[3.08, 3.37]		43.84	<.001
Reappraisal index	−.01	[−.04, .03]	−.01	−.33	.74
Stress appraisal	−.04	[−.06, −.01]	−.07	−2.55	.01
Problem-focused coping	.04	[.02, .07]	.09	3.24	.001
Reappraisal coping	.05	[.02, .07]	.09	3.43	<.001
Time	−.06	[−.09, −.04]	−.13	−4.80	<.001
Negative affect on					
Intercept	2.27	[2.14, 2.40]		34.09	<.001
Reappraisal index	−.02	[−.05, .01]	−.02	−1.05	.30
Stress appraisal	.17	[.14, .20]	.37	12.61	<.001
Problem-focused coping	.02	[−.01, .04]	.04	1.38	.17
Reappraisal coping	.00	[−.03, .03]	.00	.03	.98
Time	−.05	[−.07, −.03]	−.10	−4.09	<.001
Positive affect on					
Intercept	3.22	[3.08, 3.37]		43.40	<.001
Acceptance index	.01	[−.02, .04]	.01	.52	.60
Stress appraisal	−.04	[−.07, −.01]	−.08	−2.64	.01
Problem-focused coping	.05	[.03, .08]	.23	4.12	<.001
Acceptance coping	.03	[.00, .05]	.02	2.23	.03
Time	−.07	[−.09, −.04]	−.14	−4.98	<.001
Negative affect on					
Intercept	2.26	[2.13, 2.40]		33.97	<.001
Acceptance index	−.01	[−.04, .02]	−.02	−.89	.37
Stress appraisal	.17	[.14, .20]	.37	12.66	<.001
Problem-focused coping	.02	[−.01, .04]	.04	1.31	.19
Acceptance coping	.01	[−.04, .02]	.02	.75	.45
Time	−.04	[−.07, −.02]	−.09	−4.01	<.001
Positive affect on					
Intercept	3.23	[3.09, 3.38]		43.28	<.001
Behavioral disengagement index	−.01	[−.03, .02]	−.01	−.42	.68
Stress appraisal	−.03	[−.06, −.00]	−.07	−2.33	.02
Problem-focused coping	.06	[.03, .08]	.12	4.29	<.001
Behavioral disengagement coping	−.01	[−.03, .02]	−.01	−.45	.66
Time	−.07	[−.10, −.04]	−.14	−5.22	<.001
Negative affect on					
Intercept	2.26	[2.13, 2.38]		34.97	<.001
Behavioral disengagement index	−.03	[−.05, .00]	−.04	−1.83	.07
Stress appraisal	.17	[.14, .20]	.37	12.62	<.001
Problem-focused coping	.02	[−.01, .04]	.04	1.46	.14
Behavioral disengagement coping	.05	[.02, .08]	.09	3.63	<.001
Time	−.04	[−.07, −.02]	−.09	−4.01	<.001
Positive affect on					
Intercept	3.24	[3.10, 3.39]		43.79	<.001
Self-blame index	−.01	[−.03, .01]	−.02	−.79	.42
Stress appraisal	−.02	[−.05, .01]	−.05	−1.62	.11
Problem-focused coping	.06	[.04, .09]	.13	4.69	<.001
Self-blame coping	−.04	[−.06, −.01]	−.08	−2.73	.01
Time	−.07	[−.10, −.05]	−.14	−5.35	<.001
Negative affect on					
Intercept	2.24	[2.13, 2.36]		38.79	<.001
Self-blame index	−.02	[−.05, −.00]	−.05	−2.08	.04
Stress appraisal	.14	[.11, .17]	.30	10.40	<.001
Problem-focused coping	.00	[−.02, .03]	.01	.20	.84
Self-blame coping	.12	[.10, .15]	.28	10.04	<.001
Time	−.04	[−.06, −.02]	−.08	−3.75	<.001

Note. Predictors are grand-mean-centered. CI = confidence interval.

into interventions may help individuals to better engage with their stressful experiences and reduce avoidance, which may facilitate adaptive use of problem-focused coping (Donald & Atkins, 2016; Donald et al., 2016). Based on the results of the present study, higher levels of acceptance and non-self-blame coping may have helped individuals to be better primed to respond to stressful events as they arise and thus facilitate use of active, problem-focused coping; however, our use of single daily assessments makes it impossible to parse apart causal relationships between different types of coping. As a next step, future studies may benefit

from using multiple daily measurements of coping and affect to better understand temporality and infer causality.

Limitations

Despite the present study's making several contributions to understanding the effects of mindfulness on daily stress and coping processes, limitations should be noted. First, our failure to replicate previous research demonstrating significant associations between mindfulness and positive reappraisal coping (e.g., Garland et al., 2015, 2011) may be due in part to the observational design of the present study; because we did not use an experimental mindfulness or stress induction to prompt participants' coping, it may be the case that positive reappraisal had already occurred and the new meaning of a stressful event had been internalized prior to the time when participants were completing their daily diary entries. In addition, our use of a largely White, female college student sample may limit the generalizability of these results both in terms of stressor types experienced and the efficacy of specific ways of coping, especially given participants' young age. Some literature has suggested that patterns of cognitive control and coping develop with age (McRae et al., 2012; Skinner & Zimmer-Gembeck, 2007), with midlife adults typically demonstrating more adaptive regulation abilities than do young adults (Zimmermann & Iwanski, 2014). Thus, it would be interesting to know whether a similar study conducted with an older group of participants might demonstrate greater variability in appraisal–coping fit at the person (rather than event) level.

It should also be noted that we used a relatively short measure of dispositional mindfulness, the CAMS–R (Feldman et al., 2007), rather than a longer measure such as the Five Factor Mindfulness Questionnaire (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). We selected this measure to reduce participant burden, but it precludes our ability to assess the specific components of mindfulness that may influence daily coping. In addition, the present study had low statistical power to detect significant within-subject mediated effects; future studies could improve upon this limitation by using larger samples or recruiting samples in which daily variation in coping and affect is expected to be greater. Given the low ICCs demonstrated for our appraisal–coping fit indices in particular, a larger sample would have provided greater power to detect small person-level variation in fit ability. Finally, despite our use of an intensive longitudinal study design, it should be noted that our measures of appraisals, coping, and affect were measured concurrently, and thus true temporality—let alone causality—between these variables cannot be inferred.

Conclusions

These results make several notable contributions to the literature on mindfulness' effects on stress and coping. Although a few other studies have demonstrated that mindfulness is associated with trait coping styles (e.g., Coffey et al., 2010; Donald et al., 2016; Weinstein et al., 2009), none has examined the degree to which mindfulness predicts individuals' ability to fit coping to the demands of their situation. Recent literature testing the goodness-of-fit hypothesis has been largely inconclusive, especially for emotion-focused coping strategies that involve varying levels of engagement with stressors; thus, this study makes an important contribution to this literature by testing fit flexibility in the use of multiple types of emotion-focused coping. Further, the present study suggests that the relative effects of acceptance coping, as opposed to problem-focused coping, may not be as strongly linked to well-being as is the total amount of coping used. In other words, exercising acceptance of stressful experiences may be uniformly associated with positive affect regardless of situational controllability and independent of concurrent use of problem-focused coping. Future studies should continue to examine these questions at the state and trait level to better understand how mindfulness impacts daily coping with stress.

Taken together, the results of the present study suggest that trait mindfulness manifests at the daily level through promoting use of coping strategies such as acceptance and non-self-blame in response to stressful experiences. Rather than being an alternative to problem-focused coping, mindful emotion-focused coping may have additive effects along with other types of coping and be associated with positive outcomes across stressful situations. In addition, mindfulness may be linked to appraising daily hassles as less stressful, resulting in lower negative affect and less expenditure of coping resources overall.

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