


Bracing Later and Coping Better: Benefits of Mindfulness During a Stressful Waiting Period

Personality and Social
Psychology Bulletin
2017, Vol. 43(10) 1399–1414
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DOI: 10.1177/0146167217713490
journals.sagepub.com/home/pspb


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Abstract

People frequently await uncertain news, yet research reveals that the strategies people naturally use to cope with uncertainty are largely ineffective. We tested the role of mindfulness for improving the experience of a stressful waiting period. Law graduates awaiting their bar exam results either reported their trait mindfulness (Study 1; $N = 150$) or were instructed to practice mindfulness meditation (Study 2; $N = 90$). As hypothesized, participants who were naturally more mindful or who practiced mindfulness managed their expectations more effectively by bracing for the worst later in the waiting period and perceived themselves as coping better. Additionally, participants who were low in dispositional optimism and high in intolerance of uncertainty benefited most from mindfulness (relative to control) meditation. These findings point to a simple and effective way to wait better, particularly for those most vulnerable to distress.

Keywords

waiting, mindfulness, meditation, bar exam, law school, bracing, expectations, coping

Received February 24, 2017; revision accepted May 12, 2017

Many of life's most significant events are preceded by a period of uncertain anticipation. Pursuing an exciting new career necessitates waiting to learn the outcome of a job interview, having a baby necessitates waiting to learn whether efforts to conceive or adopt were successful, and graduating from college necessitates waiting for countless exam and assignment grades. Unfortunately, people tend to be ineffective at managing their distress while waiting. When people reflect on times they received bad news, more than half recall the waiting period prior to learning bad news as being at least as difficult as the bad news itself (Sweeny & Falkenstein, 2015). In fact, recent research revealed that the many coping strategies people have at their disposal while waiting (e.g., managing expectations, distraction, taking preventive action; Sweeny & Cavanaugh, 2012) are ineffective for reducing distress and can even backfire and exacerbate the strain of waiting (Sweeny, Reynolds, Falkenstein, Andrews, & Dooley, 2016). The present study examined the role of mindfulness for improving people's coping skills during a significant waiting period. Specifically, we first examined associations between trait mindfulness and waiting experiences (Study 1) and then trained law graduates to engage in mindfulness meditation (or a comparison meditation activity) while they awaited their result on the bar exam in an effort to improve how they managed their expectations and coped with the wait (Study 2).

Mindfulness as an Antidote to Uncertainty-Related Distress

The particular curse of uncertain waiting periods is a persistent and distressing focus on the past (“Why did I say that in my interview?” “Why didn’t I study more for that exam?”) and future (“Will I get the job?” “Will I pass the test?”), which prompts sometimes paralyzing levels of anxiety and perseverative thinking (Poole et al., 1999; Sweeny & Falkenstein, 2015; Sweeny et al., 2016). As such, mindfulness may be particularly well-suited to reduce the distress of waiting. Mindfulness is characterized by active focus on the present moment, paired with awareness and acceptance of whatever thoughts and feelings might arise (Drake, Duncan, Sutherland, Abernethy, & Henry, 2008; Farb et al., 2007; Kabat-Zinn, 1994). In fact, trait mindfulness (i.e., the persistent tendency to be mindful across situations; Brown & Ryan, 2003) is associated with differential processing of emotional stimuli in the brain (Creswell, Way, Eisenberger,

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& Lieberman, 2007; Frewen et al., 2010), conferring well-being benefits including lowered depression vulnerability (Paul, Stanton, Greeson, Smoski, & Wang, 2013) and healthier physiological and psychological responses to stressful lab tasks (Brown, Weinstein, & Creswell, 2012; Bullis, Bøe, Asnaani, & Hofmann, 2014). Moreover, evidence supports the effectiveness of mindfulness meditation for reducing anxiety (Evans et al., 2008; Tacón, McComb, Caldera, & Randolph, 2003) and rumination (Kumar, Feldman, & Hayes, 2008; Ramel, Goldin, Carmona, & McQuaid, 2004) and for improving emotion regulation (Chambers, Gullone, & Allen, 2009), among numerous other benefits. These and related findings point to mindfulness as an antidote to many forms of stress. However, awaiting uncertain news is unique from other stressors in a number of ways (e.g., the relevance of specific coping strategies, Sweeny & Cavanaugh, 2012; its emotional profile, Sweeny & Falkenstein, 2015), and efforts to identify effective tactics for mitigating the distinctive stress of waiting have been unsuccessful (Sweeny et al., 2016). The current studies provide the first test of the effect of mindfulness in the context of waiting for uncertain news.

Although we anticipate that trait mindfulness will improve waiting experiences, we also recognize the possibility of “third variable” explanations for any effects we find. Trait mindfulness tends to co-occur with other characteristic adaptations to stress, including superior emotion regulation (Coffey & Hartman, 2008), low neuroticism (Giluk, 2009), low trait negative affect (Giluk, 2009), low esteem contingency (Coffey, Hartman, & Fredrickson, 2010), high emotional intelligence (Schutte & Malouff, 2011), and high self-esteem and self-acceptance (Thompson & Waltz, 2008). Thus, our strongest test of the effectiveness of mindfulness will come from the randomized meditation intervention in Study 2. We chose to use a conservative comparison activity for our control group, a version of loving-kindness meditation (LKM), which is designed to increase positive feelings toward oneself and others (Salzberg, 1995).

Although LKM has many benefits, including increases in positive emotions, social connectedness, life satisfaction, and physical health, and even reductions in perceived stress (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008; Hofmann, Grossman, & Hinton, 2011; Hutcherson, Seppala, & Gross, 2008; Kok et al., 2013), we suspected that it would be relatively ineffective for reducing the particular distress associated with awaiting uncertain news for three reasons. First, the worry associated with waiting is an intrapersonal form of distress, thus rendering the interpersonal focus and benefits of LKM ill-suited for the job. Second, although self-compassion is also emphasized in LKM, recent findings suggest that self-esteem is largely unrelated to distress and coping strategies during uncertain waiting periods (Sweeny & Andrews, 2014). Finally, a study directly comparing the effects of LKM and mindfulness meditation found that mindfulness was more effective for quieting emotional reactivity to

repetitive thoughts (Feldman, Greeson, & Seniville, 2010). In sum, we see waiting for uncertain news as a unique stressor that mindfulness meditation is uniquely suited to address. Moreover, we work to rule out the plausible alternative explanation that any form of meditation could be equally effective.

Improving Waiting Experiences

In the present study, we focus on the effects of mindfulness during a stressful waiting period. Our predictions focus primarily on two outcomes: one key uncertainty navigation strategy (bracing for the worst) and one key marker of successful waiting (self-reported coping).

Bracing for the Worst

Our first primary outcome is bracing for the worst: a coping strategy in which people adopt pessimistic expectations prior to receiving news (Shepperd, Grace, Cole, & Klein, 2005; Sweeny & Shepperd, 2010). Forming appropriate expectations is central to managing feelings of uncertainty, and research consistently finds that people use their expectations to manage current and anticipated emotions rather than simply and rationally evaluating their likely outcomes (Sweeny, Carroll, & Shepperd, 2006; Sweeny & Krizan, 2013). Most notably, when people brace for the worst, they adopt pessimistic expectations in an effort to manage rising anxiety and to mitigate disappointment if they receive bad news (Shepperd et al., 2005; Sweeny & Shepperd, 2010). Bracing can be an effective and relatively painless strategy at the moment of truth, just prior to feedback (Sweeny & Shepperd, 2010), but this pessimistic mindset can be quite distressing if deployed too early in a waiting period (Sweeny & Andrews, 2014; Sweeny et al., 2016). Thus, well-timed bracing (i.e., bracing only at the end of the waiting period) is key to successful waiting, and the present study examines whether mindfulness promotes a productive pattern of expectation management by delaying the use of pessimistic strategies. We also included a measure of attempting to maintain hope and optimism—the converse expectation management strategy to bracing—to determine the specificity of our effects.

Subjective Coping

Our second primary outcome is subjective coping. To evaluate the ultimate success of mindfulness for improving uncertain waiting periods, we focus on a simple, face-valid measure of success: how well people believe they are coping with the wait, hereafter referred to as subjective coping. Other studies have zeroed in on worry (a combination of anxiety and perseverative thinking; McCaul, Magnan, & Mead, in press) as a key indicator of distress in an effort to precisely describe the waiting experience (Sweeny &

Andrews, 2014; Sweeny et al., 2016). Here, we take a more holistic and subjective approach to defining “waiting well.” Although worry is undoubtedly unpleasant, some people find anxiety to be motivating rather than paralyzing (Norem, 2001), and others feel that rumination is necessary for gaining personal insights and self-understanding (Lyubomirsky & Nolen-Hoeksema, 1993; Papageorgiou & Wells, 2001). Furthermore, mindfulness prompts people to tune into their present experiences, including emotions (Kabat-Zinn, 2009). Thus, even if mindfulness reduces the distress associated with feelings of anxiety, awareness of those anxious feelings may be heightened during and following mindfulness meditation. In light of this variability in how people interpret specific markers of distress and the nature of mindfulness meditation, we define success in the context of our intervention as an improvement in people’s perception of how well they are coping with the wait for uncertain news rather than reductions in any particular affective or cognitive experience. Nonetheless, we also report results for worry as a point of comparison.

Overview and Hypotheses

We examined the effect of trait (Study 1) and induced mindfulness (Study 2) on expectation management, subjective coping, and worry among law graduates awaiting their result on the bar exam, a stressful waiting period that stretches over four months. In Study 2, we provide a conservative test of the effect of mindfulness meditation by comparing it to the effect of a distinct but similar activity: a version of LKM. Like mindfulness meditation, LKM involves stillness, typically with eyes closed in a seated posture, and a focus on one’s own breath (Salzberg, 1995). However, where mindfulness meditation focuses on remaining in the present moment and allowing thoughts to pass in and out of awareness without fixation or judgment, LKM focuses on cultivating warm and positive feelings toward others (Fredrickson et al., 2008). Thus, this control group was optimal in that all participants engaged in meditation, but only participants assigned to the mindfulness intervention engaged in the mental practices that we propose to be particularly well-suited for improving experiences of uncertainty.

Two hypotheses guided the current investigation: (a) People higher in mindfulness (either via trait-like tendencies or intervention) will brace more effectively (i.e., later in the waiting period) compared to people lower in mindfulness, and (b) people higher in mindfulness will report better subjective coping while awaiting uncertain news. We did not anticipate a strong effect of mindfulness on participants’ efforts to maintain hope and optimism, nor their reports of worrying.

We present the studies in their present order for conceptual clarity and logical flow. However, in the interest of transparency, we note that Study 1 was run after Study 2.

Study 1

Method

Participants. One hundred fifty law graduates taking the California bar exam (61% women; $M_{age} = 27.71$, $SD_{age} = 4.93$; 61% White/Caucasian, 19% Asian or Pacific Islander, 7% Latino/a, 2% Black or African American, 11% multiple or other) were recruited via law school alumni offices, student bar associations, and bar exam listservs approximately 1 month prior to taking the exam. Due to the significant challenges associated with recruiting such a specific sample for a lengthy study during a particularly stressful time in their lives, we did not set a target sample size; rather, we simply recruited as many participants as possible in the month prior to the bar exam.

Nearly all participants (95%) were taking the bar exam in California for the first time. A minority of participants were already employed in the legal field at the time they took the exam (34%). Participants received their law degrees from 19 law schools, with the greatest number receiving degrees from the University of California, Los Angeles (UCLA) School of Law ($n = 57$; pass rate in relevant year = 82%), Chapman University Fowler School of Law ($n = 20$; pass rate = 57%), University of California, Irvine (UCI) School of Law ($n = 17$; pass rate = 81%), and Pepperdine University ($n = 11$; pass rate = 70%). Out of eight total questionnaires across approximately 6 months, 77% of participants completed at least six of the questionnaires.

Procedure. Questionnaires relevant to the present study were completed during the 4-month waiting period between the bar exam and the day when exam results are posted online. We used a planned-missingness design to best examine temporal fluctuations in our variables of interest. Specifically, we randomly assigned participants to one of five arbitrary response groups. All response groups completed the first waiting questionnaire 3 days after completion of the bar exam (a 3-day process). For the subsequent four questionnaires, the timing was staggered such that each response group completed a questionnaire every 5 weeks, and questionnaires were completed by one group each week. In other words, some participants completed questionnaires each week throughout the waiting period, but each participant completed the measures only every 5 weeks. All participants completed a final waiting questionnaire no more than 24 hr prior to checking their exam result online. Participants also completed questionnaires prior to the bar exam and two following receipt of their results, but these questionnaires are not relevant to the current inquiry. All study measures are publicly available on the Open Science Framework, <https://osf.io/mpnqt/>, and full data will be available via the same link 1 year after completion of the study (available December 2017). This study was reviewed, approved, and monitored by the IRB at the University of California, Riverside.

Measures

Trait mindfulness. Trait mindfulness was assessed with the 14-item Freiburg Mindfulness Inventory (FMI; Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006; e.g., “I am open to the experience of the present moment,” “I see my mistakes and difficulties without judging them”; 1 = *not true at all of me*, 5 = *very true of me*; $M = 3.31$, $SD = 0.58$, Cronbach’s $\alpha = .82$). We assessed trait mindfulness in the fourth waiting questionnaire.

Expectation management. Participants indicated the extent to which they were *bracing* for the worst on two items: “I’m bracing for the worst when it comes to my bar exam results,” “I want to make sure to keep my expectations low when it comes to my bar exam results” (1 = *strongly disagree*, 7 = *strongly agree*; $M = 4.30$, $SD = 1.50$, all $as > .77$). Participants indicated the extent to which they were maintaining hope and optimism (hereafter referred to as *positive expectation* management) on two items: “I’m hoping for the best when it comes to my bar exam result,” “I’m trying to be optimistic about my bar exam result” (1 = *strongly disagree*, 7 = *strongly agree*; $M = 5.97$, $SD = 0.92$, all $as > .68$). These measures have been validated in past studies of law graduates awaiting bar exam results (Sweeny & Andrews, 2014; Sweeny et al., 2016). Participants completed these measures in all five waiting questionnaires.

Subjective coping. Participants indicated how well they believed they were *coping* with the wait for their bar exam results with a single item: “How well do you feel like you’re coping with the wait for your bar exam results?” (1 = *not very well*, 7 = *very well*; $M = 5.21$, $SD = 1.14$). Although this item has not undergone formal validation, it is highly face valid and is negatively associated with a measure of negative affect, $r(132) = -.49$, $p < .0001$ (see <https://osf.io/mpnqt/> for details about the negative affect measure). Participants completed this subjective coping measure in all five waiting questionnaires.

Worry. We assessed participants’ *worry* with a combination of measures tapping anxiety and perseverative thinking about future outcomes. Two items assessed participants’ anxiety about their bar exam results (“I feel anxious every time I think about the bar exam,” “I am worried about my bar exam results”), and one item assessed perseverative thinking about the bar exam (“I can’t seem to stop thinking about the bar exam”; for all, 1 = *strongly disagree*, 7 = *strongly agree*). We averaged responses on these three items to create a measure of worry ($M = 4.43$, $SD = 1.25$, all $as > .77$). Participants completed this measure in all five waiting questionnaires.

Results

In their own words. Although not pertinent to our focal analyses, participants in both studies provided open-ended

comments about their experience awaiting their result on the bar exam. For readers unfamiliar with this particular waiting experience, we provide several representative responses that vividly illustrate the stressful nature of the wait for bar exam results:

I had a nightmare where I couldn’t determine whether I had passed or failed the bar exam and I spent the entire dream trying to find out my results. I have these sort of bar exam nightmares once every couple weeks.

I am starting to feel mounting anxiety and dread over getting my bar results back. The feeling is similar to when the actual bar exam was approaching.

I got sick, like fever flu sick, and I think it’s because my anxiety levels have slowly been building up to today!! I was constantly thinking and thinking about the results.

I’M STARTING TO FREAK OUT NOW.

Temporal trends. To test our hypotheses, we first conducted longitudinal growth curve modeling to identify temporal trends in bracing, positive expectation management, coping, and worry via the SAS 9.4 PROC MIXED procedure. Time was coded as the day a given survey was completed, from the first day surveys were distributed (several days after participants completed the exam; assigned a 1 for the time variable) to the day exam results were released online (110 days later). All longitudinal analyses center time at the middle of the waiting period (day 55). We first examined the role of linear time. Next, when appropriate based on model-fit comparisons, we added quadratic time to the model. Finally, we added trait mindfulness as a continuous predictor and moderator of the linear and, if relevant, quadratic trends. When we entered quadratic time (ranging from 0 to 3,025) into the model, we encountered model convergence problems that are typical when the scale of two variables differs considerably (Kiernan, Tao, & Gibbs, 2012). As such, for the purpose of analyses, we divided time by 7 (i.e., so each unit represented 7 days) and used that variable to create linear and quadratic time. Thus, in our reports, a 1-unit change in linear time represents a 1-week change.

Table 1 provides model comparison tests between linear-only and linear-plus-quadratic growth models (first row under each outcome) and then between quadratic growth models and a growth model including trait mindfulness (second row under each outcome)—with the exception of positive expectation management, for which a linear model fit best. Table 1 also provides model fit statistics for the relevant models. We added trait mindfulness as a continuous predictor of the linear and, if relevant, quadratic trends in conditional growth models. See Figure 1 for fitted growth curves with trait mindfulness centered at high (+1SD) and low (−1SD) levels. Table 2 provides the correlations among all study variables, averaged across time.

Table 1. Study 1 Longitudinal Growth Curve Modeling Parameters.

	Intercept	Mindfulness	Time	Mindfulness × Time	Time ²	Mindfulness × Time ²	$\Delta\chi^2$
Bracing							
Unconditional (quadratic)	4.01 [3.73, 4.30] (<.0001)	N/A	.02 [0.001, 0.03] (.029)	N/A	.01 [0.01, 0.01] (<.0001)	N/A	32.7 (<.0001)
Moderated by mindfulness	3.96 [3.66, 4.25] (<.0001)	-.94 [-1.45, -.043] (.017)	.01 [0.0003, 0.03] (.045)	-.01 [-0.03, 0.02] (.584)	.01 [0.01, 0.01] (<.0001)	.01 [0.001, 0.01] (.017)	204.8 (<.0001)
Positive expectation management							
Unconditional (linear)	5.95 [5.78, 6.11] (<.0001)	N/A	-.02 [-0.03, -.0004] (.007)	N/A	N/A	N/A	42.2 (<.0001)
Moderated by mindfulness	5.94 [5.77, 6.12] (<.0001)	.49 [0.19, 0.79] (.002)	-.02 [-0.03, -.0005] (.007)	.009 [-0.01, 0.03] (.431)	N/A	N/A	139.2 (<.0001)
Subjective coping							
Unconditional (quadratic)	5.45 [5.22, 5.67] (<.0001)	N/A	-.05 [-0.06, -.003] (<.0001)	N/A	-.01 [-0.01, -.0004] (<.0001)	N/A	23.7 (<.0001)
Moderated by mindfulness	5.44 [5.20, 5.68] (<.0001)	.51 [0.10, 0.93] (.017)	-.05 [-0.07, -.003] (<.0001)	.001 [-0.03, 0.03] (.921)	-.01 [-0.01, -.0004] (<.0001)	-.0008 [-0.01, 0.004] (.772)	183.3 (<.0001)
Worry							
Unconditional (quadratic)	3.69 [3.42, 3.95] (<.0001)	N/A	.07 [0.06, 0.08] (<.0001)	N/A	.02 [0.02, 0.02] (<.0001)	N/A	203.7 (<.0001)
Moderated by mindfulness	3.69 [3.41, 3.97] (<.0001)	-.63 [-1.10, -.015] (.011)	.07 [0.06, 0.09] (<.0001)	.02 [-0.001, 0.05] (.061)	.02 [0.02, 0.03] (<.0001)	.003 [-0.003, 0.008] (.353)	186.0 (<.0001)

Note. 95% confidence intervals are in brackets and p values in parentheses below each parameter. 1 unit of time = 1 week. Only best-fitting models are presented; chi-square tests indicate improvement in fit over previous, simpler model.

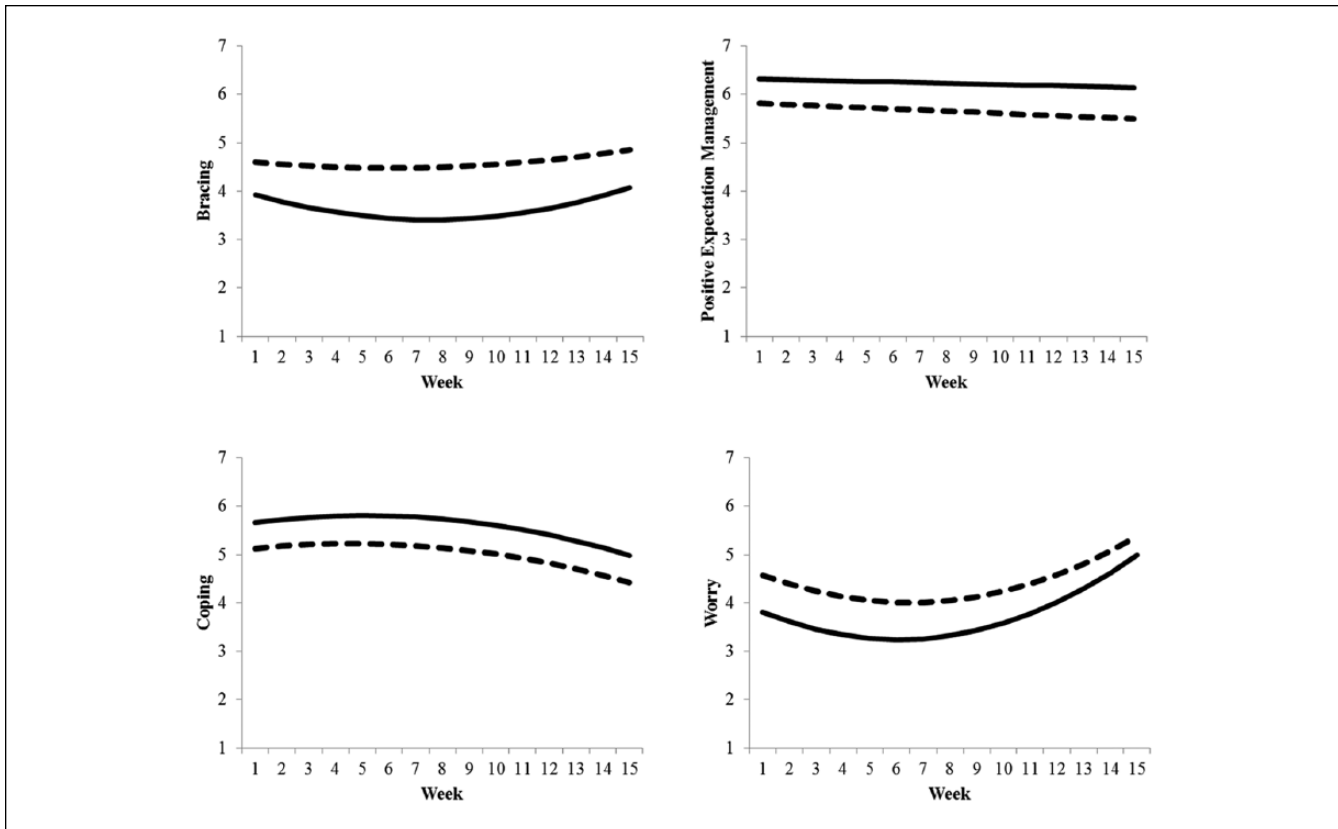


Figure 1. Study 1 fitted growth curves, moderated by trait mindfulness.

Note. Solid lines are at +1SD for trait mindfulness; dashed lines are at -1SD. Higher scores indicate greater self-reported bracing, greater positive expectation management, better subjective coping, and more worry.

Table 2. Intercorrelations Among Study Variables, Averaged Across Time Points.

	Positive expectation management		Subjective coping		Worry	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Study 1						
Bracing	-.41	<.0001	-.35	<.0001	.48	<.0001
Positive expectation management			.25	.003	-.09	.33
Subjective coping					-.68	<.0001
Study 2						
Bracing	-.44	<.0001	-.48	<.0001	.48	<.0001
Positive expectation management			.49	<.0001	-.32	.002
Subjective coping					-.78	<.0001

As Table 1 shows, adding quadratic time to linear time significantly improved model fit for bracing, subjective coping, and worry. In contrast, adding a linear but not a quadratic term improved model fit for positive expectation management. An examination of the coefficients for the linear effect of time suggest that bracing and worry increased over time, whereas positive expectation management and subjective coping decreased over time. Moreover, an examination of the quadratic effects suggests that bracing and

worry were highest at the beginning and ends of the waiting period and subjective coping was poorest at the beginning and end of the waiting period. Next, we turn to analyses involving mindfulness.

Expectation management. Adding trait mindfulness as a moderator of bracing’s temporal trend improved model fit. An examination of the second row of coefficients in Table 1 shows that trait mindfulness significantly moderated

bracing's positive quadratic trend. Thus, we re-centered mindfulness at high (+1SD) and low (-1SD) levels and examined the simple main effect of quadratic time. The results suggested that participants high in trait mindfulness showed steeper curvilinear trends in bracing, $t(104) = 5.66$, $p < .0001$, than did those low in trait mindfulness, $t(107) = 2.18$, $p = .032$. That is, those highest in mindfulness showed a psychologically healthier pattern of bracing, engaging in this strategy to ready themselves for possible failure just as their results approached. Consistent with the idea that those high in mindfulness brace only at the appropriate time (i.e., at the end of the wait) rather than throughout the waiting period, a main effect of trait mindfulness also emerged, suggesting that greater mindfulness was related to lower levels of bracing overall. Trait mindfulness did not interact with linear time.

Adding trait mindfulness as a moderator of the negative linear trend in positive expectation management similarly improved model fit. As Table 1 shows, a main effect of mindfulness emerged, indicating that those high in mindfulness were more likely to embrace a hopeful and optimistic outlook overall. Mindfulness did not moderate the effect of linear time. In sum, those high in mindfulness had lower levels of bracing generally, as they appropriately waited until the end to brace, and higher levels of positive expectation management generally.

Subjective coping. Adding trait mindfulness as a moderator of the temporal trends in subjective coping improved model fit. As Table 1 shows, a main effect of trait mindfulness emerged such that those high in trait mindfulness reported better subjective coping overall. Mindfulness did not moderate the temporal trends in subjective coping.

Worry. As with our other outcomes, adding trait mindfulness as a moderator of the temporal trends worry improved model fit. As the final row of estimates in Table 1 shows, there was a positive association between mindfulness and worry such that those who were high in mindfulness also worried less. Mindfulness did not moderate temporal trends in worry.

Study 2

The results of Study 1 provide initial evidence that mindfulness improves expectation management and buffers well-being during stressful waiting periods. As hypothesized, participants higher in trait mindfulness also tended to report bracing a bit later (after coming down from initially high levels of bracing following the bar exam) and tended to see themselves as coping better than did participants lower in trait mindfulness. More mindful participants also tended to report bracing less overall, engaging in more positive expectation management, and worrying less than their less mindful counterparts. Given that we could not randomly assign trait levels of mindfulness, it is possible that third variables (e.g.,

emotion regulation differences, Coffey & Hartman, 2008; personality differences, Giluk, 2009) were at least partly responsible for our effects. Thus, in Study 2, we employed an experimental design in which we randomly assigned participants to practice either mindfulness meditation or a control meditation activity (similar to LKM) to examine whether mindfulness played a causal role in improving the waiting period.

As an exploratory aim, we also examined whether two waiting-related individual differences moderated the effectiveness of the mindfulness intervention (dispositional optimism and intolerance of uncertainty; see Sweeny & Andrews, 2014; Sweeny et al., 2015). People high in dispositional optimism and low in intolerance of uncertainty naturally cope better during stressful waiting periods, which could either boost or hinder their ability to benefit from an intervention designed to improve coping. That is, people who naturally find themselves in an adaptive mindset in the face of uncertainty may be particularly well-positioned to benefit from an intervention designed to promote adaptive responding. On the other hand, perhaps people who naturally cope well with uncertainty do not require intervention to shore up their coping capacity, and thus will experience less benefit from mindfulness meditation than will those who lack natural coping skills. We explored these competing possibilities in Study 2.

Method

Participants. Ninety law graduates taking the California bar exam (56% women; $M_{\text{age}} = 28.21$, $SD_{\text{age}} = 4.00$; 61% White/Caucasian, 12% Asian or Pacific Islander, 6% Black or African American, 5% Latino/a, 16% multiple or other) were recruited via the same methods described in Study 1, approximately 1 month prior to taking the exam. As in Study 1, we did not set a target sample size and instead recruited as many participants as possible prior to the bar exam.

All participants were taking the bar exam in California for the first time. A significant minority of participants were already employed in the legal field at the time they took the exam (28%). Participants received their law degrees from 20 law schools, with the greatest number receiving degrees from the University of California Hastings College of the Law ($n = 23$; pass rate in relevant year = 68%), Stanford University ($n = 14$; pass rate = 88%), George Washington University Law School ($n = 12$; pass rate = 77%), San Joaquin College of Law ($n = 9$; pass rate = 54%), and American University ($n = 5$; pass rate = 51%). Out of eight total questionnaires across approximately 4 months, 80% of participants completed at least six of the questionnaires.

Procedure. Participants completed a baseline questionnaire approximately 1 week prior to taking the bar exam, which included the individual difference measures (see Measures for details). The day following the final day of the bar exam,

participants were randomly assigned to receive a link to one of two training videos via email. The videos described the activity as a “positive activity” (no explicit reference to meditation) and instructed participants to practice their activity twice a week throughout the study. The video also provided a chance for participants to engage in their first session of the activity by following along with an audio recording (either mindfulness meditation or LKM). This recording was provided to participants in an audio file for later practice. To reduce the likelihood of contamination across conditions, participants were instructed not to discuss the nature of their activity or share their recording with other participants in the study.

The guided meditation recording in the *mindfulness condition* was a 15-min recording by Dr. David Boles, an ordained monk and acupuncturist in Gainesville, Florida (recording used with Dr. Boles’ permission). The recording begins with basic instructions to find a comfortable seated position and focus attention on one’s breath, then proceeds with encouragement to practice mindfulness. For example, the recording repeatedly encourages listeners to observe with detachment any thoughts or feelings that arise and then return attention to the breath.

The guided meditation recording in the *LKM condition* was a 15-min recording by Barbara Fredrickson, a leading positive psychologist (available at www.positivityresonance.com/meditations.html). This recording also begins with basic instructions to find a comfortable seated position and to focus attention on one’s breath but then diverges from the mindfulness recording. Listeners are instructed to think first of specific loved ones and then ultimately all people with whom the listener shares a connection, fostering warm and positive feelings toward those people (as well as oneself) and wishing them well. Although neither guided recording has been used extensively in empirical research, we selected these recordings because they are nearly identical to each other in length, brief, and free for use.

In addition to practicing either mindfulness meditation or LKM throughout the waiting period for bar exam results, participants also completed six questionnaires during the waiting period (spaced 3 weeks apart, starting after the initial meditation training) and one within 24 hr following receipt of their bar exam results. For the purpose of this paper, we focus on a subset of measures relevant to our hypotheses and for testing potential confounds (i.e., frequency of practice, enjoyment of the activity). Full data and measures are publicly available on the Open Science Framework, <https://osf.io/6a7sx/>. This study was reviewed, approved, and monitored by the IRB at the University of California, Riverside.

Measures

Potential moderators. Participants completed measures of dispositional optimism and intolerance of uncertainty in the baseline questionnaire, prior to the bar exam. Dispositional optimism was assessed with the Life Orientation Task–

Revised (LOT-R), minus the filler items (six items total, Scheier, Carver, & Bridges, 1994; e.g., “In uncertain times, I usually expect the best,” “I’m always optimistic about my future”; 1 = *strongly disagree*, 5 = *strongly agree*; $M = 3.63$, $SD = 0.67$, $\alpha = .80$). Intolerance of uncertainty was assessed with the 12-item Intolerance of Uncertainty Scale–Short Form (IUS-12, Carleton, Norton, & Asmundson, 2007; e.g., “Unforeseen events upset me greatly,” “Uncertainty keeps me from living a full life”; 1 = *strongly disagree*, 5 = *strongly agree*; $M = 2.69$, $SD = 0.64$, Cronbach’s $\alpha = .86$).

Expectation management. Participants completed the same measures of bracing ($M = 3.02$, $SD = 1.08$, all $as > .64$) and positive expectation management ($M = 4.25$, $SD = 0.59$, all $as > .56$) completed in Study 1, except in this study, the measures were on 5-point scales instead of 7-point scales (1 = *strongly disagree*, 5 = *strongly agree*). Participants completed this measure in all six waiting questionnaires.

Subjective coping. Participants completed the same single-item measure of subjective coping as in Study 1, but on a 5-point scale instead of a 7-point scale (1 = *not very well*, 5 = *very well*; $M = 3.71$, $SD = 0.81$). Participants completed this measure in all six waiting questionnaires.

Worry. Participants completed the same measure of worry as in Study 1, but on a 5-point scale instead of a 7-point scale (1 = *strongly disagree*, 5 = *strongly agree*; $M = 2.73$, $SD = 0.98$, all $as > .81$). Participants completed this measure in all six waiting questionnaires.

Effort toward activity practice. We asked participants to report how much time and effort they put toward their activity in the past week with three items: “In the past week, I’ve put effort into my positive activity” (1 = *strongly disagree*, 5 = *strongly agree*; $M = 2.81$, $SD = 0.91$); “In the past week, I practiced my positive activity at least twice” (*yes/no*; average % responding yes = 41%); and “How many times during the past week did you practice your positive activity?” ($M = 1.20$, $SD = 1.10$). Participants completed this measure in all six waiting questionnaires.

Activity evaluation. Participants provided an evaluation of their experience with the activity in the final questionnaire, after they learned whether they passed the exam, on seven items (“I didn’t find much point to the positive activity,” “I found the positive activity to be useful,” “I found the positive activity to be enjoyable,” “I found the positive activity to be boring,” “I found that my mind wandered during the activity,” “The positive activity got easier over the course of the study,” “The positive activity became more enjoyable over the course of the study”; 1 = *strongly disagree*, 5 = *strongly agree*, after reverse-scoring negatively worded items, $M = 2.82$, $SD = 0.75$, Cronbach’s $\alpha = .87$). Although this

Table 3. Effort Toward and Enjoyment of Meditation by Condition (Study 2).

	Mindfulness M [95% CI]	LKM M [95% CI]	t	d	p
Effort (averaged)	2.78 [2.52, 3.03]	2.84 [2.55, 3.13]	0.32 (88)	.07	.749
Frequency (averaged)	1.04 [0.78, 1.31]	1.36 [0.98, 1.73]	1.36 (88)	.29	.179
Practiced at least twice (averaged)	2.02 [1.44, 2.61]	2.00 [1.44, 2.56]	-0.06 (88)	-.01	.956
Post-feedback evaluation	2.83 [2.61, 3.06]	2.80 [2.53, 3.06]	-0.22 (74)	.05	.828

Note. CI = confidence interval; LKM = loving-kindness meditation.

measure was collected after participants learned their outcome on the exam, responses did not differ between participants who passed ($M = 2.82$, $SD = 0.72$) versus failed ($M = 2.80$, $SD = 0.83$), $t(74) = 0.14$, $p = .89$, $d = .03$.

Results

Effort and enjoyment. We first sought to ensure that effects of the meditation condition were not due to differences in participants' enjoyment of or effort toward one activity over the other. Independent samples t -tests confirmed that participants' reports of the time and effort they put toward their activity were not significantly different on average or at any point during the waiting period, nor did their post-feedback evaluation of the activities differ significantly (see Table 3 for overall comparisons).

Temporal trends. As in Study 1, we used longitudinal growth curve modeling to identify temporal trends in bracing, positive expectation management, coping, and worry via the SAS 9.4 PROC MIXED procedure, centering on the third waiting period questionnaire. We coded meditation condition as +0.5 for mindfulness and -0.5 for LKM in all relevant analyses. Table 2 provides the correlations among study variables, averaged across time points, and Table 4 provides model comparison tests and fit statistics.

As in Study 1, and shown in Table 4, adding quadratic time to linear time significantly improved model fit for bracing, coping, and worry. In contrast to Study 1, adding quadratic time also improved model fit for positive expectation management. Thus, we examine quadratic time for all measures. Figure 2 shows the model trends in each of our outcomes, separated by meditation condition. An examination of the coefficients for the linear effect of time suggests that once again bracing and worry increased over time, whereas positive expectation management and subjective coping decreased over time. Moreover, an examination of the quadratic effects suggests that bracing and worry were highest at the beginning and ends of the waiting period, and subjective coping and positive expectation management were lowest at the beginning and end of the waiting period. Next, we examined whether the meditation condition predicted each outcome overall and whether it moderated temporal trends.

Expectation management. Consistent with Study 1, adding meditation condition as a moderator of bracing's temporal trend improved model fit. As the second row of coefficients in Table 4 shows, meditation condition moderated bracing's positive linear trend. Participants in the LKM condition showed a marginal linear increase in bracing over time, $t(77) = 1.77$, $p = .08$, whereas those in the mindfulness meditation condition showed no significant linear change over time, $t(80) = -1.37$, $p = .17$. Unlike Study 1, neither the main effect of condition nor the interaction between quadratic time and condition were significant, indicating that the level of bracing did not differ overall between the mindfulness and LKM conditions.

Unlike Study 1, adding meditation condition as a moderator of the temporal trend in positive expectation management did not improve model fit. Consistently, mindfulness condition did not have any effects on general levels or temporal trends in positive expectation management.

Subjective coping. Adding meditation condition as a moderator of the temporal trend in subjective coping improved model fit. An examination of Table 4 shows that, consistent with Study 1, participants in the mindfulness condition coped better than did those in the LKM condition. As in Study 1, condition did not moderate temporal trends in subjective coping.

Worry. As with positive expectation management, adding meditation condition as a moderator of the temporal trend in worry did not significantly improve model fit. As such, mindfulness condition showed no effects on levels of or temporal trends in worry, although the main effect of condition was in the same direction as Study 1 (i.e., mindfulness reducing worry, in this case relative to LKM).

Moderators of the intervention effects. Prior to testing moderation, we first ensured that participants did not differ by condition on any individual difference measure. In no case did the groups differ, $t_s < .80$, $p_s > .40$, $d_s < .18$. Next, we grand-mean centered each moderator variable and used them in separate models. In these models, we included the main effects of time (linear and quadratic), condition, and the moderator; two-way interactions between time (linear and quadratic) and condition; two-way interactions between time (linear and quadratic) and the moderator; a two-way interaction between condition

Table 4. Study 2 Longitudinal Growth Curve Modeling Parameters.

	Intercept	Condition	Time	Condition × Time	Time ²	Condition × Time ²	$\Delta\chi^2$
Bracing							
Unconditional (quadratic)	2.93 [2.70, 3.16] (<.0001)	N/A	.01 [-0.04, 0.05] (.750)	N/A	.02 [0.001, 0.05] (.043)	N/A	6.5 (.011)
Moderated by condition	2.93 [2.70, 3.15] (<.0001)	-.24 [-0.69, 0.21] (.290)	.005 [-0.04, 0.05] (.077)	-.09 [-0.18, -0.01] (.028)	.03 [0.001, 0.05] (.040)	.03 [-0.02, 0.08] (.260)	5.1 (.024)
Positive expectation management							
Unconditional (quadratic)	4.23 [4.08, 4.37] (<.0001)	N/A	-.04 [-0.07, -0.005] (.024)	N/A	.01 [-0.01, 0.03] (.357)	N/A	22.7 (<.0001)
Moderated by condition	4.23 [4.09, 4.37] (<.0001)	.18 [-0.10, 0.47] (.203)	-.04 [-0.07, -0.004] (.026)	.01 [-0.05, 0.08] (.706)	.01 [-0.01, 0.03] (.368)	-.02 [-0.07, 0.02] (.366)	2.2 (.138)
Subjective coping							
Unconditional (quadratic)	3.85 [3.67, 4.04] (<.0001)	N/A	-.09 [-.13, -.04] (.0002)	N/A	-.04 [-0.06, -0.01] (.009)	N/A	24.6 (<.0001)
Moderated by condition	3.85 [3.67, 4.03] (<.0001)	.41 [0.05, 0.77] (.026)	-.09 [-0.13, -0.04] (.0004)	.05 [-0.05, 0.14] (.317)	-.04 [-0.06, -0.009] (.010)	.004 [-0.05, 0.06] (.892)	31.4 (<.0001)
Worry							
Unconditional (quadratic)	2.35 [2.13, 2.57] (<.0001)	N/A	.10 [0.05, 0.14] (<.0001)	N/A	.10 [0.08, 0.13] (<.0001)	N/A	84.4 (<.0001)
Moderated by condition	2.35 [2.14, 2.56] (<.0001)	-.34 [-0.77, 0.09] (.117)	.10 [0.05, 0.14] (<.0001)	-.03 [-0.13, 0.06] (.470)	.10 [0.08, 0.13] (<.0001)	.03 [-0.02, 0.08] (.185)	3.1 (.078)

Note. 95% confidence intervals are in brackets and *p* values in parentheses below each parameter. Only best-fitting models are presented; chi-square test indicates improvement in fit over previous, simpler models.

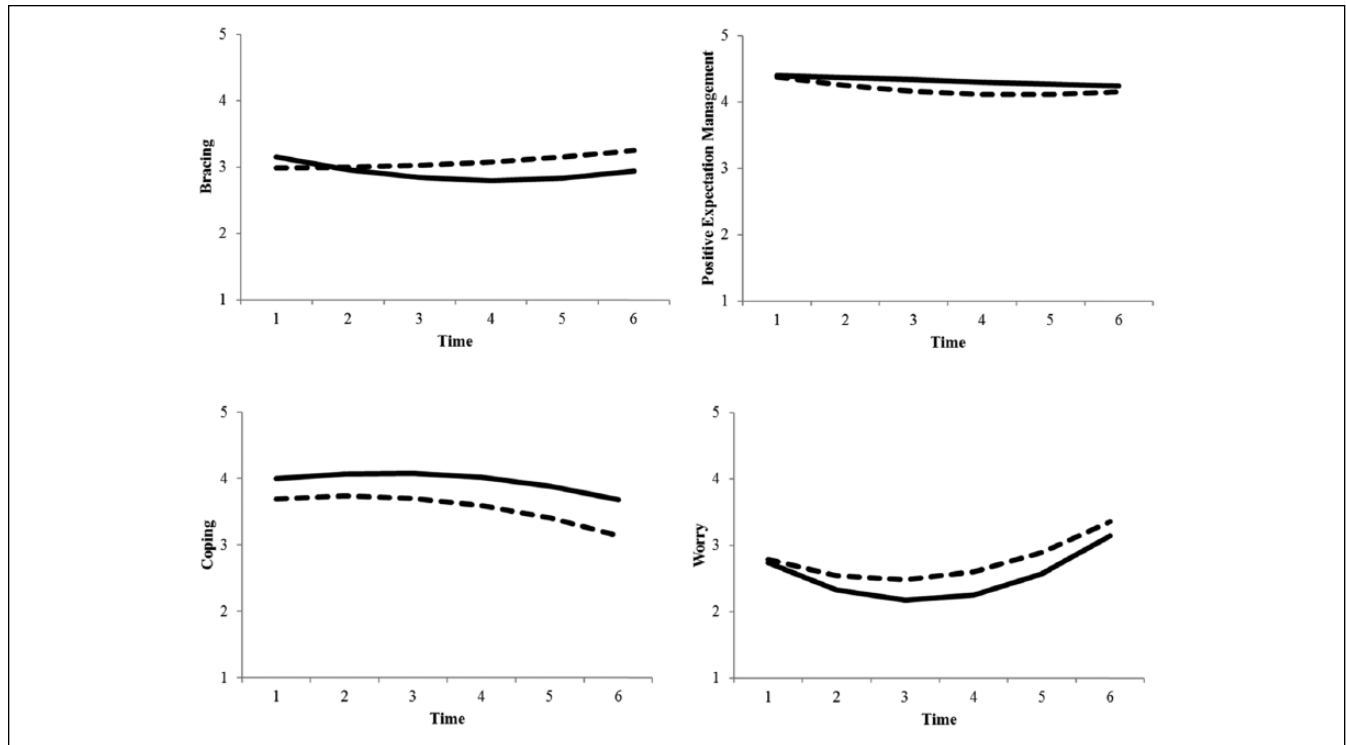


Figure 2. Study 2 fitted growth curves, on average and separated by condition. Note. Solid lines are the mindfulness meditation condition (MM); dashed lines are the loving-kindness meditation condition (LKM). Higher scores indicate greater self-reported bracing, greater positive expectation management, better subjective coping, and more worry.

Table 5. Condition Effects on Longitudinal Trends, Moderated by Individual Differences (IDs; Study 2).

	Bracing		Coping	
	Dispositional optimism	Intolerance of uncertainty	Dispositional optimism	Intolerance of uncertainty
Intercept	2.93 [2.72, 3.15] (<.0001)	2.95 [2.71, 3.14] (<.0001)	3.87 [3.71, 4.03] (<.0001)	3.84 [3.68, 4.01] (<.0001)
Condition	-.20 [-0.62, 0.23] (.356)	-.29 [-0.72, 0.14] (.179)	.36 [0.03, 0.68] (.033)	.45 [0.12, 0.78] (.009)
Time	.006 [-0.04, 0.05] (.782)	.003 [-0.04, 0.05] (.872)	-.08 [-0.13, -0.04] (.0008)	-.09 [-0.13, -0.04] (.0004)
Time ²	.02 [0.001, 0.05] (.045)	.03 [0.004, 0.05] (.020)	-.04 [-0.06, -0.01] (.012)	-.03 [-0.06, -0.01] (.010)
ID	-.58 [-0.91, -0.25] (.0007)	.50 [0.17, 0.84] (.004)	.44 [0.19, 0.69] (.0008)	-.44 [-0.70, -0.17] (.001)
Condition × Time	-.11 [-0.18, -0.02] (.016)	-.09 [-0.17, -0.01] (.038)	.04 [-0.05, 0.14] (.371)	.05 [-0.04, 0.14] (.302)
Condition × Time ²	.03 [-0.01, 0.08] (.170)	.02 [-0.02, 0.07] (.288)	.007 [-0.05, 0.06] (.801)	.006 [-0.05, 0.06] (.830)
Condition × ID	.0001 [-0.65, 0.65] (.999)	.33 [-0.35, 1.00] (.337)	-.53 [-1.03, -0.03] (.040)	.51 [-0.01, 1.03] (.055)
Time × ID	.06 [-0.01, 0.12] (.088)	-.03 [-0.09, 0.04] (.398)	.02 [-0.05, 0.09] (.558)	-.02 [-0.09, 0.05] (.546)
Time ² × ID	-.03 [-0.07, 0.001] (.055)	.04 [0.003, 0.07] (.031)	-.0006 [-0.04, 0.04] (.979)	-.02 [-0.07, 0.02] (.266)
Condition × Time × ID	-.02 [-0.15, 0.11] (.718)	.06 [-0.07, 0.19] (.390)	-.02 [-0.17, 0.12] (.779)	.05 [-0.09, 0.19] (.503)
Condition × Time ² × ID	.05 [-0.02, 0.12] (.145)	-.08 [-0.15, -0.01] (.021)	-.03 [-0.12, 0.06] (.498)	-.04 [-0.13, 0.04] (.261)
$\Delta\chi^2$	29.8 (<.0001)	23.8 (<.0001)	26.2 (<.0001)	23.2 (<.0001)

Note. 95% confidence intervals are in brackets and *p* values in parentheses below each parameter. Full models are presented; chi-square test indicates improvement in fit over quadratic model, moderated only by condition.

and the moderator; and three-way interactions between time (linear and quadratic), condition, and the moderator.

We are interested in three primary outcomes: the interaction between condition and the moderators, and the three-way interactions between condition, time (linear and quadratic), and the moderators. All three of these model terms directly inform the question of whether mindfulness

meditation is useful in changing average levels of and temporal trends in strategy use and well-being during a waiting period more among some people (e.g., those lower in optimism, those higher in intolerance of uncertainty) than others. We present the full results of each model in Table 5 but focus only on these three terms in our discussion. We focus here only on moderation of the intervention’s effects on bracing

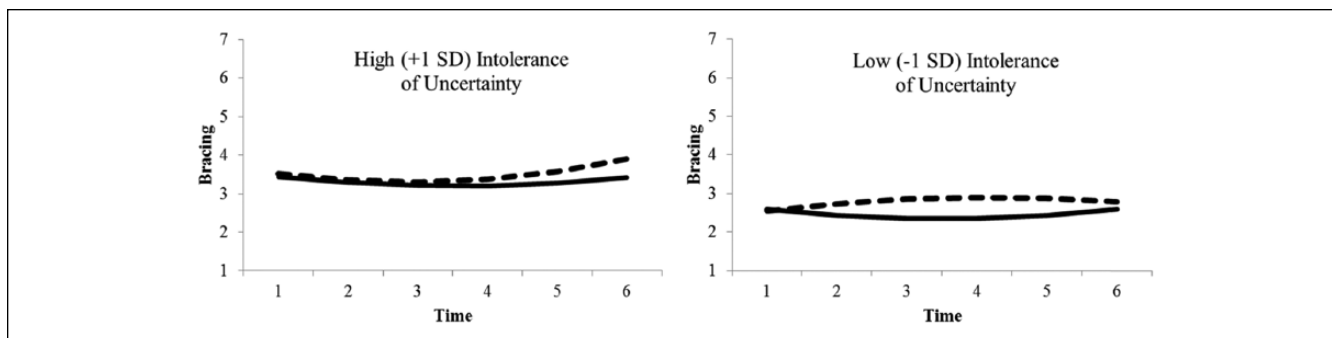


Figure 3. Study 2 fitted growth curves for bracing, separated by condition and presented at high (+1SD) and low levels (−1SD) of intolerance of uncertainty.

Note. Solid lines are the mindfulness meditation condition (MM); dashed lines are the loving-kindness meditation condition (LKM). Higher scores indicate greater self-reported bracing.

and subjective coping, given the non-significant effects of the intervention on positive expectation management and worry (consistent with our hypotheses).

Bracing. A three-way interaction between condition, quadratic time, and intolerance of uncertainty emerged, qualifying all other effects, $t(75) = -2.37, p = .02$. Among those high in intolerance of uncertainty (+1SD), there was no interaction between condition and quadratic time, $t(76) = -0.88, p = .38$, suggesting that condition did not influence the general tendency to brace most at the beginning and end of the waiting period. In contrast, among those low in intolerance of uncertainty, there was a significant interaction between condition and quadratic time, $t(74) = 2.45, p = .02$, such that participants in the mindfulness condition showed a marginal positive quadratic trend, $t(73) = 1.79, p = .077$, whereas participants in the LKM condition showed a marginal negative quadratic trend, $t(75) = -1.67, p = .099$. Figure 3 shows the temporal pattern of bracing in each condition at high (+1SD) and low (−1SD) levels of intolerance of uncertainty. Dispositional optimism did not moderate any of the effects of time or condition on bracing.

Subjective coping. Both individual difference measures qualified the main effect of condition on subjective coping. As such, we investigated the effect of condition on subjective coping among those high (+1SD) and low (−1SD) in each trait. Among those high in optimism, $t(84) = 0.01, p = .99$, and low in intolerance of uncertainty, $t(82) = 0.52, p = .60$, there was no effect of condition on subjective coping, suggesting they did not benefit from mindfulness meditation. Among those low in optimism, $t(82) = 3.00, p = .004$, or high in intolerance of uncertainty, $t(82) = 3.26, p = .002$, a main effect of condition emerged such that participants in the mindfulness condition coped better overall compared to participants in the LKM condition. Figure 4 shows the temporal pattern of subjective coping in each condition at high (+1SD) and low (−1SD) levels of dispositional optimism and intolerance of uncertainty. No other interactions were significant.

General Discussion

The goal of the present study was to test whether mindfulness could enhance people's typically inadequate strategies for managing their expectations and ultimately allow them to cope more effectively with waiting for uncertain news. We were primarily interested in two outcomes: bracing for the worst and subjective coping. Although results differed somewhat between trait mindfulness and a mindfulness meditation intervention, on the whole, our hypotheses were supported. People who were more mindful (Study 1) or who engaged in mindfulness meditation (Study 2) braced later (i.e., had a bracing "curve" that turned upward later in the waiting period) and reported coping better on average than did people who were less mindful or engaged in a different, less relevant type of meditation. The intervention was particularly successful in improving subjective coping among participants with traits that would otherwise set them up to cope poorly.

As a secondary inquiry, we investigated how mindfulness influenced worry and efforts to remain hopeful and optimistic. Trait mindfulness seemed to buffer people from worry during their wait for bar exam results, a mindfulness intervention less so (but in the same direction). Finally, trait mindfulness was associated with greater efforts to remain hopeful and optimistic (i.e., positive expectation management), but the mindfulness intervention did not influence this coping strategy. Given the correlational nature of Study 1, we suspect that trait mindfulness's relationships with worry and positive expectation management reflect the influence of third variables such as general tendencies toward positivity or other positively oriented traits.

Well-Timed Pessimism

Although trait mindfulness was associated with less bracing overall, the meditation intervention did not influence the extent to which people managed their expectations by bracing for the worst, just as hypothesized. Bracing is a strategy that can be effective for mitigating distress both in anticipation of

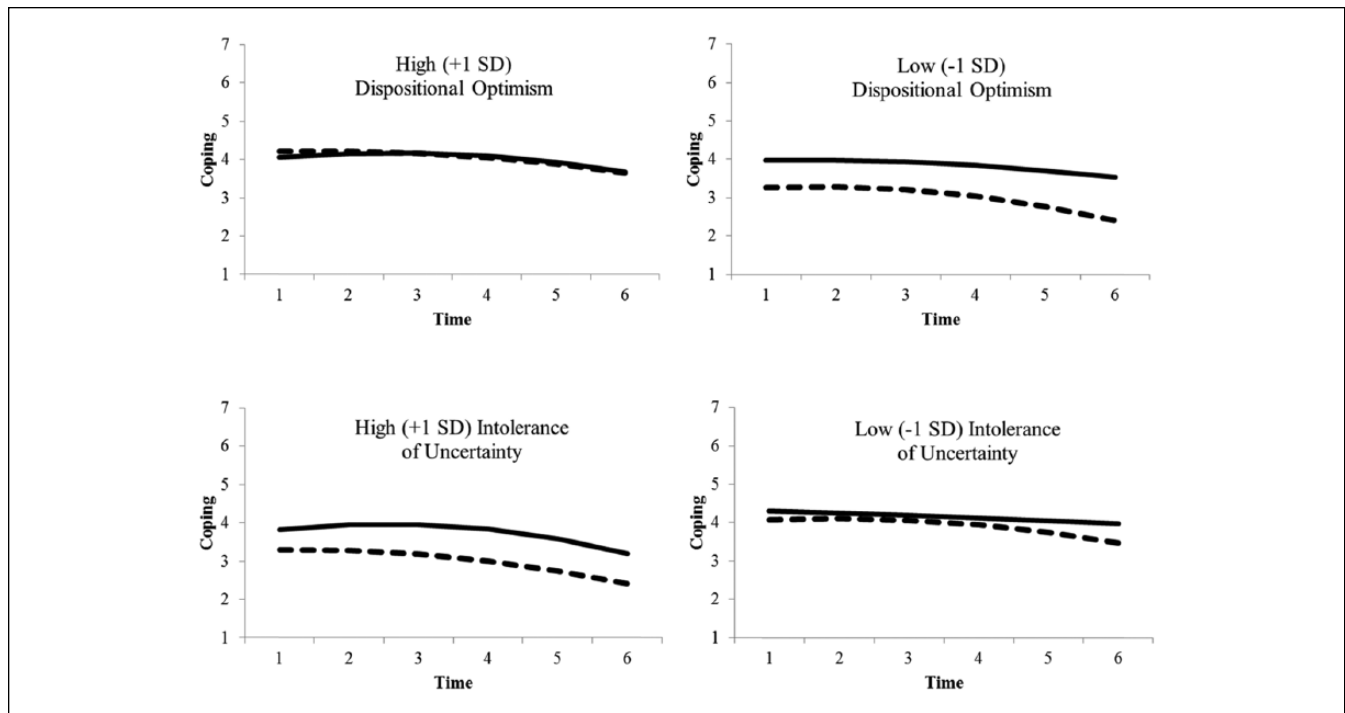


Figure 4. Study 2 fitted growth curves for subjective coping, separated by condition and presented at high (+1 SD) and low levels (-1 SD) of dispositional optimism and intolerance of uncertainty.

Note. Solid lines are the mindfulness meditation condition (MM); dashed lines are the loving-kindness meditation condition (LKM). Higher scores indicate better subjective coping.

and following bad news (Shepperd et al., 2005; Sweeny et al., 2016; Sweeny & Shepperd, 2010), and the mindfulness intervention seemed to promote an economical approach to expectation management in which people resisted the tendency to brace until the final days of a lengthy waiting period. Previous work suggests that bracing for the worst serves a protective function without increasing distress when deployed just prior to feedback (Sweeny & Shepperd, 2010) but is quite distressing when it arises earlier in a waiting period (Sweeny & Andrews, 2014; Sweeny et al., 2016). Thus, it seems that mindfulness meditation acts on people's coping strategies with precision, leaving successful strategies untouched at the moments when they are most needed, while undermining destructive tendencies to embrace pessimism too early. Trait mindfulness showed a similar pattern, in which more mindful people showed a more extreme acceleration in their reports of bracing for the worst in the final days and weeks of the wait after maintaining relatively low levels of bracing during the middle of the waiting period. Resisting the temptation to brace until the moment of truth draws near is not the only marker of waiting well, but we suggest that bracing later is beneficial in comparison to bracing early and often.

Improved Subjective Coping

Although effective expectation management is key to a tolerable waiting period, it would be of little use if people did

not perceive an improvement in their experience. Fortunately, mindfulness did more than optimize bracing; it also improved coping as perceived by those who were waiting for personally significant news. As anticipated, the intervention had a weaker effect on worry, albeit an effect consistent in direction with the effect on subjective coping. Mindfulness, and specifically the guided meditation used in the present study, does not aim to suppress or reduce one's experience of unpleasant emotions or physical sensations. Instead, practitioners of mindfulness meditation rehearse a state of non-judgment, observing their thoughts and emotions, acknowledging them, and then returning to focus on their breath (Kabat-Zinn, 1994). Perhaps the law graduates in our study were equally aware of their inevitable anxiety in both meditation conditions, but those in the mindfulness condition were less judgmental of their subjective coping during anxious moments. On the other hand, trait mindfulness was strongly associated with reduced worry during the wait, somewhat unsurprisingly given well-established associations between mindfulness and well-being (e.g., Evans et al., 2008; Kumar et al., 2008; Ramel et al., 2004; Tacón et al., 2003).

Helping Those Who Need It Most

We also explored moderators of the benefits of mindfulness meditation in the intervention study, targeting dispositional

optimism and intolerance of uncertainty given the context of an uncertain waiting period. These individual differences did not consistently moderate the effects of mindfulness meditation on the trajectory of bracing, but they showed a consistent pattern with regard to subjective coping. Participants most vulnerable to distress showed the strongest benefits of mindfulness relative to LKM.

Specifically, relative optimists reported near-equivalent subjective coping regardless of their meditation condition. Dispositional optimists naturally maintain a positive outlook and thus report less distress and better subjective coping as they await uncertain news (Sweeny & Andrews, 2014; Sweeny et al., 2015). It seems that people who have effective built-in coping resources can thrive even when engaging in a relatively ineffective coping activity. Similarly, people who are dispositionally comfortable with uncertainty reported no effect of the mindfulness intervention compared to the control activity when it came to subjective coping, whereas people who found uncertainty particularly unnerving benefitted notably from practicing mindfulness. These moderating effects paint a picture of the type of person who is likely to benefit most from a mindfulness intervention as they await uncertain news: those who are unlikely to cope effectively without intervention.

Conclusion and Future Directions

Our findings offer one approach to easing the strain of awaiting uncertain news, which is particularly encouraging in light of recent evidence that people's "natural" coping strategies are ineffective or worse (Sweeny et al., 2016). Better yet, the mindfulness intervention tested in Study 2 requires no training, no financial cost, and minimal time and effort. In fact, inspection of the means in Table 3 reveals that participants reported practicing meditation only once a week on average. Thus, even brief and infrequent doses of mindfulness meditation helped people to see themselves as coping more effectively with uncertainty. The similar pattern of associations with trait mindfulness in Study 1 provide further support for the benefits of focusing on the present moment and maintaining an attitude of non-judgment during stressful waiting periods.

Of course, these findings warrant replication with people other than law graduates, who differ from the general public in a number of ways, as well as with waiting periods varying in their length, predictability, and significance. The wait for bar exam results in California is relatively long, predictably structured with clear start and end points, and of great consequence to those who endure it—albeit of lesser consequence than, for example, a dire medical diagnosis. Although speculative, we suspect that the benefits of mindfulness would be heightened when waiting for news of even greater importance and reduced when waiting for relatively trivial news. Regarding the length of the wait, meditation may be effective for calming the body and mind even during short waiting

periods, but the full cognitive and physiological benefits of mindfulness may require sustained practice.

Further studies can also dive deeper into the effects reported here to uncover specific mechanisms by which mindfulness improves subjective coping and expectation management. We additionally recognize the limitations of our measure of subjective coping, which is both novel and assessed with a single item. The face validity of the measure and its strong and inverse association with negative affect provides reassurance that we measured the intended construct, but a validated multi-item scale to assess subjective coping will be useful in future studies.

Finally, participants in Study 2 practiced meditation with guided audio recordings that differ in both duration and depth from more typical mindfulness (e.g., mindfulness-based stress reduction; Kabat-Zinn, 2013) and LKM training regimen (Fredrickson et al., 2008). Although demand characteristics are an unlikely explanation for our findings, given participants' equivalent evaluations of each guided meditation, future studies can examine the generalizability of our effects with different meditation procedures. In sum, our findings offer an important first step in identifying a potentially effective and practical tactic for improving waiting periods.

Acknowledgment

The authors wish to thank Angelica Falkenstein and Sara E. Andrews for their assistance with data collection, Chandra Reynolds for her data analytic guidance (and endless patience), and Megan Robbins for her insightful feedback on the manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This paper is based upon work supported by the National Science Foundation under Grant BCS1251672.

Supplemental Material

Supplementary material is available online with this article.

References

- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822-848.
- Brown, K. W., Weinstein, N., & Creswell, J. D. (2012). Trait mindfulness modulates neuroendocrine and affective responses to social evaluative threat. *Psychoneuroendocrinology, 37*, 2037-2041.
- Bullis, J. R., Bøe, H. J., Asnaani, A., & Hofmann, S. G. (2014). The benefits of being mindful: Trait mindfulness predicts less

- stress reactivity to suppression. *Journal of Behavior Therapy and Experimental Psychiatry*, 45, 57-66.
- Carleton, R. N., Norton, M. A., & Asmundson, G. J. G. (2007). Fearing the unknown: A short version of the Intolerance of Uncertainty Scale. *Journal of Anxiety Disorders*, 21, 105-117. doi:10.1016/j.janxdis.2006.03.014
- Chambers, R., Gullone, E., & Allen, N. B. (2009). Mindful emotion regulation: An integrative review. *Clinical Psychology Review*, 29, 560-572.
- Coffey, K. A., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complementary Health Practice Review*, 13, 79-91.
- Coffey, K. A., Hartman, M., & Fredrickson, B. L. (2010). Deconstructing mindfulness and constructing mental health: Understanding mindfulness and its mechanisms of action. *Mindfulness*, 1, 235-253.
- Creswell, J. D., Way, B. M., Eisenberger, N. I., & Lieberman, M. D. (2007). Neural correlates of dispositional mindfulness during affect labeling. *Psychosomatic Medicine*, 69, 560-565.
- Drake, L., Duncan, E., Sutherland, F., Abernethy, C., & Henry, C. (2008). Time perspective and correlates of wellbeing. *Time & Society*, 17, 47-61.
- Evans, S., Ferrando, S., Findler, M., Stowell, C., Smart, C., & Haglin, D. (2008). Mindfulness based cognitive therapy for generalized anxiety disorder. *Journal of Anxiety Disorders*, 22, 716-721.
- Farb, N. A., Segal, Z. V., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., & Anderson, A. K. (2007). Attending to the present: Mindfulness meditation reveals distinct neural modes of self-reference. *Social Cognitive and Affective Neuroscience*, 2, 313-322.
- Feldman, G., Greeson, J., & Seniville, J. (2010). Differential effects of mindful breathing, progressive muscle relaxation, and loving-kindness meditation on decentering and negative reactions to repetitive thoughts. *Behaviour Research and Therapy*, 48, 1002-1011.
- Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., & Finkel, S. M. (2008). Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential personal resources. *Journal of Personality and Social Psychology*, 95, 1045-1062.
- Frewen, P. A., Dozois, D. J., Neufeld, R. W., Lane, R. D., Densmore, M., Stevens, T. K., & Lanius, R. A. (2010). Individual differences in trait mindfulness predict dorsomedial prefrontal and amygdala response during emotional imagery: An fMRI Study. *Personality and Individual Differences*, 49, 479-484.
- Giluk, T. L. (2009). Mindfulness, Big Five personality, and affect: A meta-analysis. *Personality and Individual Differences*, 47, 805-811.
- Hofmann, S. G., Grossman, P., & Hinton, D. E. (2011). Loving-kindness and compassion meditation: Potential for psychological interventions. *Clinical Psychology Review*, 31, 1126-1132.
- Hutcherson, C. A., Seppala, E. M., & Gross, J. J. (2008). Loving-kindness meditation increases social connectedness. *Emotion*, 8, 720-724.
- Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. New York, NY: Hyperion.
- Kabat-Zinn, J. (2009). *Wherever you go, there you are: Mindfulness meditation in everyday life*. London: Hachette UK.
- Kabat-Zinn, J. (2013). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness* (2nd ed.). New York: Bantam/Random House.
- Kiernan, K., Tao, J., & Gibbs, P. (2012). Tips and strategies for mixed modeling with SAS/STAT procedures. In *SAS Global Forum* (Vol. 2012, Paper 332-2012). Retrieved from <http://support.sas.com/resources/papers/proceedings12/332-2012.pdf>
- Kok, B. E., Coffey, K. A., Cohn, M. A., Catalino, L. I., Vacharkulksemsuk, T., Algor, S. B., . . . Fredrickson, B. L. (2013). How positive emotions build physical health: Perceived positive social connections account for the upward spiral between positive emotions and vagal tone. *Psychological Science*, 24, 1123-1132.
- Kumar, S., Feldman, G., & Hayes, A. (2008). Changes in mindfulness and emotion regulation in an exposure-based cognitive therapy for depression. *Cognitive Therapy and Research*, 32, 734-744.
- Lyubomirsky, S., & Nolen-Hoeksema, S. (1993). Self-perpetuating properties of dysphoric rumination. *Journal of Personality and Social Psychology*, 65, 339-349.
- McCaul, K. D., Magnan, R. E., & Mead, P. M. (in press). Disease-specific worry. In K. Sweeny & M. L. Robbins (Eds.), *The Wiley encyclopedia of health psychology: The social bases of health behavior* (Vol. 2).
- Norem, J. K. (2001). Defensive pessimism, optimism, and pessimism. In E. C. Chang (Ed.), *Optimism and pessimism: Implications for theory, research, and practice* (pp. 77-100). Washington, DC: American Psychological Association.
- Papageorgiou, C., & Wells, A. (2001). Metacognitive beliefs about rumination in recurrent major depression. *Cognitive and Behavioral Practice*, 8, 160-164.
- Paul, N. A., Stanton, S. J., Greeson, J. M., Smoski, M. J., & Wang, L. (2013). Psychological and neural mechanisms of trait mindfulness in reducing depression vulnerability. *Social Cognitive and Affective Neuroscience*, 8, 56-64.
- Poole, K., Hood, K., Davis, B. D., Monypenny, I. J., Sweetland, H., Webster, D. J. T., . . . Mansel, R. E. (1999). Psychological distress associated with waiting for results of diagnostic investigations for breast disease. *The Breast*, 8, 334-338.
- Ramel, W., Goldin, P. R., Carmona, P. E., & McQuaid, J. R. (2004). The effects of mindfulness meditation on cognitive processes and affect in patients with past depression. *Cognitive Therapy and Research*, 28, 433-455.
- Salzberg, S. (1995). *Loving-kindness: The revolutionary art of happiness*. Boston, MA: Shambhala.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*, 67, 1063-1078.
- Schutte, N. S., & Malouff, J. M. (2011). Emotional intelligence mediates the relationship between mindfulness and subjective wellbeing. *Personality and Individual Differences*, 50, 1116-1119.
- Shepperd, J. A., Grace, J., Cole, L. J., & Klein, C. (2005). Anxiety and outcome predictions. *Personality and Social Psychology Bulletin*, 31, 267-275.
- Sweeny, K., & Andrews, S. E. (2014). Mapping individual differences in the experience of a waiting period. *Journal of Personality and Social Psychology*, 106, 1015-1030.

- Sweeny, K., Andrews, S. E., Nelson, S. K., & Robbins, M. L. (2015). Waiting for a baby: Navigating uncertainty while trying to conceive. *Social Science & Medicine, 141*, 123-132.
- Sweeny, K., Carroll, P. J., & Shepperd, J. A. (2006). Thinking about the future: Is optimism always best? *Current Directions in Psychological Science, 15*, 302-306.
- Sweeny, K., & Cavanaugh, A. G. (2012). Waiting is the hardest part: A model of uncertainty navigation in the context of health. *Health Psychology Review, 6*, 147-164.
- Sweeny, K., & Falkenstein, A. (2015). Is waiting really the hardest part? Comparing the emotional experiences of awaiting and receiving bad news. *Personality and Social Psychology Bulletin, 41*, 1551-1559.
- Sweeny, K., & Krizan, Z. (2013). Sobering up: A quantitative review of temporal declines in expectations. *Psychological Bulletin, 139*, 702-724.
- Sweeny, K., Reynolds, C., Falkenstein, A., Andrews, S. E., & Dooley, M. D. (2016). Two definitions of waiting well. *Emotion, 16*, 129-143.
- Sweeny, K., & Shepperd, J. A. (2010). The costs of optimism and the benefits of pessimism. *Emotion, 10*, 750-753.
- Tacón, A. M., McComb, J., Caldera, Y., & Randolph, P. (2003). Mindfulness meditation, anxiety reduction, and heart disease: A pilot study. *Family & Community Health, 26*, 25-33.
- Thompson, B. L., & Waltz, J. A. (2008). Mindfulness, self-esteem, and unconditional self-acceptance. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 26*, 119-126.
- Walach, H., Buchheld, N., Buttenmuller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness: The Freiburg Mindfulness Inventory (FMI). *Personality and Individual Differences, 40*, 1543-1555.