

# Deconstructing Mindfulness and Constructing Mental Health: Understanding Mindfulness and its Mechanisms of Action

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**Abstract** Research on mindfulness indicates that it is associated with improved mental health, but the use of multiple different definitions of mindfulness prevents a clear understanding of the construct. In particular, the boundaries between different conceptualizations of mindfulness and emotion regulation are unclear. Furthermore, the mechanisms by which any of these conceptualizations of mindfulness might influence mental health are not well-understood. The two studies presented here addressed these questions using correlational, self-report data from a non-clinical sample of undergraduate students. The first study used a combination of exploratory and confirmatory factor analyses to better understand the factor structure of mindfulness and emotion regulation measures. Results indicated that these measures assess heterogeneous and overlapping constructs, and may be most accurately thought of as measuring four factors: present-centered attention, acceptance of experience, clarity about one's internal experience, and the ability to manage negative emotions. A path analysis supported the hypothesis that mindfulness (defined by a two-factor construct including present-centered attention and acceptance of experience) contributed to clarity about one's experience, which improved the ability to manage negative emotions. The second study developed these findings by exploring the mediating roles of clarity about one's internal life, the ability to manage negative

emotions, non-attachment (or the extent to which one's happiness is independent of specific outcomes and events), and rumination in the relationship between mindfulness and two aspects of mental health, psychological distress and flourishing mental health. Results confirmed the importance of these mediators in the relationship between mindfulness and mental health.

**Keywords** Mindfulness · Emotion regulation · Mental health · Factor analysis · Structural equation modeling

## Introduction

The past three decades have witnessed a surge of popular and academic interest in the psychological benefits of mindfulness. Mindfulness-based interventions have been found to reduce many forms of psychological distress, including generalized anxiety disorder (Kabat-Zinn et al. 1992), social anxiety disorder (Goldin and Gross 2010), depression (Kumar et al. 2008; Shapiro et al. 1998; Speca et al. 2000), depressive relapse (Ma and Teasdale 2004; Teasdale et al. 2000), anger (Speca et al. 2000), attention deficit hyperactivity disorder (Zylowska et al. 2008), and parasuicidal behavior (Linehan et al. 1991). A recent meta-analysis of the mindfulness research literature reported robust effect sizes for the impact of mindfulness training on anxiety and depression (Hofmann et al. 2010). Despite burgeoning interest in mindfulness and its applications, it is a new research field, and has yet to achieve a consensual definition of the core construct (Dimidjian and Linehan 2003). Furthermore, the mechanisms by which mindfulness might beneficially impact psychological adjustment are unclear.

One of the most widely cited conceptualizations of mindfulness was offered by an interdisciplinary team of

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researchers, and encompasses both an attentional and an acceptance-based component (Bishop et al. 2004). The attentional component pertains to the ability to intentionally regulate attention, which is honed by deliberate and sustained observation of thoughts, feelings, physical sensations, and other stimuli as they occur in the present moment. The acceptance-based component involves maintaining an attitude of openness and receptivity to these experiences, rather than judging, ignoring, or minimizing them, particularly when they are unpleasant. These two components are common to most definitions for mindfulness.

Other definitions for mindfulness include additional elements. For example, in dialectical behavior therapy (DBT; Linehan 1993), a mindfulness-based intervention, mindfulness encompasses four additional elements: describing experience with words, fully participating in experience, completing activities “one-mindfully,” and focusing on effective behavior (Linehan 1993). One definition for mindfulness that does not explicitly incorporate an acceptance-based component was offered by Brown and Ryan (2003). Brown and Ryan (2003) restrict their definition of mindfulness to attentional control and note that it involves being “attentive to and aware of what is taking place in the present.” Brown and Ryan (2004) report that an initial version of their mindfulness measure, the *Mindful Attention Awareness Scale* (MAAS; Brown and Ryan 2003) had an acceptance factor, in addition to an attention or “presence” factor. They found that the presence factor correlated with indicators of well-being more strongly than did the acceptance factor, and that the acceptance factor added no additional convergent, discriminant, or criterion validity. They concluded that present-centered attention subsumed an attitude of acceptance towards one’s experience.

### Mindfulness Measures

As interest in understanding and using mindfulness in psychological interventions has grown, interest in inexpensive, self-report measures for the construct has grown as well. Because there is no one single conceptualization of the construct, however, different researchers understand the construct differently. As a result, early mindfulness measures encompassed as few as one (Brown and Ryan 2003) or as many as four (e.g., Baer et al. 2004) or more different facets. To explore the relationships among these different conceptualizations of the construct, Baer et al. (2006) factor analyzed five self-report trait-level mindfulness questionnaires: the MAAS (Brown and Ryan 2003), the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al. 2004), the Freiburg Mindfulness Inventory (Buchheld et al. 2001), the Cognitive and Affective Mindfulness Scale (Kumar et al. 2008), and the Mindfulness Questionnaire (Chadwick et

al. 2005). Baer et al. (2006) examined these measures in an undergraduate sample ( $n=613$ ), which largely had no formal mindfulness training. An exploratory factor analysis with oblique rotation revealed the presence of five factors: observation of experience, a non-judging or accepting orientation towards experience, acting with awareness versus functioning on automatic pilot, the ability to describe experience, and non-reactivity to inner experience. The last factor examined the respondent’s ability to tolerate internal distress without feeling overwhelmed by it, becoming stuck in it, or acting out in response to it. Baer et al. (2006) tested and confirmed this factor structure using a confirmatory factor analysis in an independent sample ( $n=268$ ). From this work, the Five Factor Mindfulness Questionnaire (FFMQ) was born (Baer et al. 2006).

Baer et al. (2006) found that the five mindfulness factors were generally significantly correlated with each other, except that, contrary to expectation, the tendency to observe one’s experience was not related to the ability to refrain from judging experience. Furthermore, all of the factors except observation of experience were significantly and negatively correlated with psychological distress. In contrast, observation of experience was positively correlated with psychological distress. This was also an unexpected finding, given the rich history of Buddhist thought on the psychological benefits of mindfulness (e.g., Goldstein 1976; Kyabgon 2001) and the beneficial impact of mindfulness-based interventions on mental health (e.g., Kabat-Zinn et al. 1992; Shapiro et al. 1998; Speca et al. 2000). Baer et al. (2006) suggest that the relationship between observation of experience and psychological distress may vary as a function of mindfulness training, as might the relationship between observation of experience and the ability to refrain from judging experience.

### Mechanisms of Action

Baer et al. (2006) also demonstrated that four of the five facets of mindfulness were significantly associated with psychological distress in the predicted direction. Thus, even in the absence of an intervention intended to manipulate mindfulness, naturally varying individual differences in the constructs identified by Baer et al. (2006) were associated with a meaningful mental health outcome, psychological distress. Despite this demonstrated relationship, the possible mechanism(s) by which any of these facets of mindfulness might impact mental health remained unclear.

There is theoretical and empirical support for at least three possible mechanisms to explain the relationship between mindfulness and psychological distress. The first is emotion regulation or the ability to manage (negative) affect, typically by altering thoughts or behavior to address the source of distress or better cope with it. Mindfulness is

hypothesized to improve the ability to manage negative affect by increasing familiarity with and reducing reactivity to one's internal life. Knowledge of one's inner life can then be used to cope with negative affect in effective ways (Shapiro et al. 2006). Buddhist psychology posits that mindfulness facilitates insight into one's emotional life, which enables one to liberate oneself from negative and destructive mental states (Ekman et al. 2005). In Buddhist psychology, cognition and emotion are considered to be inextricable aspects of mental states (Goleman 2003). Thus, the ability to liberate oneself from negative "mental states" is similar to the Western psychological concept of emotion regulation, in that the individual is better equipped to cope effectively with negative emotions.

A growing body of research links mindfulness and emotion, and reflects the fact that emotion is considered to be a key target of mindfulness practices (Davidson 2010). For instance, Way et al. (2010) found that while looking at faces displaying emotional expressions, participants' amygdala reactivity was positively correlated with self-reported depressive symptomatology and negatively correlated with self-reported dispositional mindfulness. Arch and Craske (2006) found that participants who engaged in a laboratory-based mindfulness breathing exercise reported less negative affect and a greater willingness to view highly negative pictures than did participants in other experimental conditions. Similarly, Farb et al. (2010) found that an 8-week mindfulness training program reduced neural reactivity to sadness-inducing stimuli.

A second potential mechanism by which mindfulness might beneficially impact mental health is by decreasing rumination, which is associated with depression (Nolen-Hoeksema 2000). Rumination refers to repetitive, negative, and self-focused thoughts about the past or future (Trapnell and Campbell 1999). Mindful attention to the present moment, and the ability to control the focus of attention more broadly, are hypothesized to prevent one from becoming mired in ruminative thoughts (Baer 2003; Teasdale et al. 1995). Mindfulness-based cognitive therapy (MBCT; Segal et al. 2002), an intervention for depression, uses this hypothesized relationship to prevent transient dysphoric affect from activating ruminative, depressogenic thought patterns, and subsequent depressive episodes. For patients who have experienced three or more major depressive episodes, MBCT has been found to significantly reduce the risk of relapse over a 60-week period, relative to treatment as usual (Teasdale et al. 2000). Consistent with the hypothesized mechanisms of action in MBCT, Jain et al. (2007) found that although mindfulness meditation and somatic relaxation were both associated with decreased self-reported psychological distress, only mindfulness meditation reduced rumination. Furthermore, reductions in rumination mediated the impact of mindfulness meditation on psychological distress. Similarly, Kumar et al. (2008)

found that a cognitive-based treatment for depression, which included a mindfulness component, increased mindfulness and increases in mindfulness were associated with decreases in rumination and depression symptoms.

A third mechanism to explain how mindfulness influences psychological distress is via its relationship with non-attachment. Attachments are objects or outcomes that people believe they must have to be happy (McIntosh 1997), such as positive experiences or avoidance of negative emotions (Dalai Lama and Cutler 1998; Hanh 1998). Attachments are thought to cause suffering because they represent important goals, in the form of desired experiences or objects (McIntosh 1997). People are most likely to ruminate when important goals are blocked (Martin and Tesser 1989); thus, when people are attached to these goals and cannot attain them, they may ruminate (McIntosh and Martin 1992). Mindfulness has been hypothesized to be associated with greater non-attachment (Brown et al. 2007), which research suggests decreases rumination (McIntosh and Martin 1992), and which is in turn associated with lower levels of psychological distress (Jain et al. 2007). Thus, mindfulness may impact psychological distress through non-attachment, which then reduces rumination and psychological distress.

Thus, there is a theoretical basis, with limited empirical support, for the possibility that mindfulness influences psychological distress by increasing emotion regulation (which decreases psychological distress), increasing non-attachment (which decreases psychological distress by decreasing rumination), and decreasing rumination (which decreases psychological distress). Coffey and Hartman (2008) used structural equation modeling to test all three possible mechanisms of action together in the relationship between mindfulness and psychological distress. We tested a model in which MAAS-measured mindfulness predicted emotion regulation, non-attachment, and rumination. Emotion regulation and rumination then predicted psychological distress, whereas non-attachment predicted rumination, which in turn predicted psychological distress. Consistent with our hypotheses, we found that MAAS-measured mindfulness was positively associated with emotion regulation and with non-attachment, and negatively associated with rumination. Greater emotion regulation and less rumination in turn predicted decreased psychological distress. Non-attachment indirectly influenced psychological distress through its impact on rumination. Emotion regulation, non-attachment, and rumination were also inter-related, such that an increased ability to manage negative affect was associated both with a greater tendency to view happiness as independent of external circumstances and with less rumination.

Although useful as a preliminary model of the mechanisms by which mindfulness might impact psychological distress, the Coffey and Hartman (2008) model utilized only the MAAS in measuring mindfulness. Thus, it

considers only one of five mindfulness factors of Baer et al.: specifically, the factor concerned with the degree to which one acts with awareness vs. functions on automatic pilot (Baer et al. 2006). The discovery that current mindfulness measures encompass five correlated constructs raises the possibility that different aspects of what is considered “mindfulness” may influence each other and psychological distress in different ways. For example, some facets of mindfulness identified by Baer et al. (2006), such as observation of experience, may precede other aspects of mindfulness, such as the ability to describe one’s experience. Furthermore, some of the components of mindfulness may influence psychological distress only indirectly, through their influence on other variables such as emotion regulation or rumination, while others may exert both direct and indirect influences on psychological distress. Thus, at present, the term mindfulness appears to encompass a set of related constructs whose relationships with each other and with psychological distress are not fully known. For these reasons, a revised model for mindfulness’ mechanisms of action that accounts for the multi-faceted nature of the construct is needed.

The Coffey and Hartman (2008) model may also oversimplify the process of emotion regulation. Their model relied on only a single measure for emotion regulation, the Repair subscale from the Trait Meta-Mood Scale (TMMS; Salovey et al. 1995). This measure examines the ability to repair negative moods using cognitively oriented techniques such as thinking positive thoughts. Other researchers have suggested that emotion regulation may reflect six different abilities (Gratz and Roemer 2004), including acceptance of emotional experience, clarity about one’s feelings, awareness of one’s emotions, ability to engage in goal-directed behavior, impulse control, and access to emotion regulation strategies. Difficulties with emotion regulation may reflect disruptions in any or all of these six abilities. The Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer 2004) measures this more comprehensive and integrative set of abilities related to emotion regulation.

The task of constructing a model that incorporates the multi-faceted nature of emotion regulation is complicated by the unknown relationships among the different aspects of mindfulness, as identified by Baer et al. (2006), and the different aspects of emotion regulation, as measured by the DERS and TMMS. Certain aspects of emotion dysregulation, such as non-acceptance of emotional response, appear intimately related to aspects of mindfulness, such as non-judging of one’s experience. Furthermore, both the mindfulness and the emotion regulation research literatures draw heavily on the work on treatment of borderline personality disorder by Marsha Linehan (1993). In identifying the importance of attending to, accepting, and recognizing emotional responses in effective emotion regulation, Gratz

and Roemer (2004) reference Linehan (1993). Baer et al. (2004) also reference Linehan (1993) when assembling items for mindfulness subscales on the KIMS. If, as Linehan (1993) suggests, mindfulness is important in facilitating emotion regulation, and if these two constructs are also composed of multiple smaller processes, it is possible that the boundary between them has become blurred in the attempt to model both constructs as comprehensively as possible. Thus, as part of determining how aspects of mindfulness impact more proximal variables, which then influence psychological distress, it is also necessary to explore the overlap among these constructs.

### The Current Studies

The present sequence of two studies explores how different facets of dispositional, naturally varying mindfulness influence each other and also mental health. The first study examined the relationship between current conceptualizations of mindfulness and emotion regulation. A series of exploratory and confirmatory factor analyses and a path analysis tested the hypotheses that (1) multiple distinct processes are subsumed under the terms “mindfulness” and “emotion regulation;” (2) some of the same processes are simultaneously considered “mindfulness” and “emotion regulation;” and (3) some of these processes may assist or improve others, suggesting that they are not simply co-occurring but may be causally related.

The second study tested a model of how mindfulness and emotion regulation, as identified in study 1, might influence each other, the mediators proposed by Coffey and Hartman (2008), and mental health. Two aspects of mental health were included: psychological distress and “flourishing” mental health, or a sense that one is living a rich and satisfying life. Psychological distress and flourishing mental health are conceptualized as separate dimensions of complete mental health (Keyes 2005). This study tested the hypothesis that mindfulness influences mental health by improving the ability to regulate negative affect, decreasing reliance on external circumstances for one’s happiness, and decreasing rumination. Furthermore, this study tested the possibility that mindfulness might beneficially impact two different dimensions of mental health—psychological distress and flourishing—via the same mechanisms.

### Study 1

#### Methods

##### *Participants*

A total of 399 undergraduate students (60% female) participated in this study in exchange for credit towards a course requirement. The sample ranged in age from 18 to

24 years ( $M=19.2$  years,  $SD=1.11$  years). Approximately 91.7% of the sample ( $n=366$ ) indicated no or limited experience with meditation: 35.8% reported that they had never meditated ( $n=143$ ), 34.8% reported that they had not meditated in the past 6 months ( $n=139$ ), 14.5% reported that they had done so less than once/month during the previous 6 months ( $n=58$ ), and 6.5% reported that they had meditated one to three times/month during the previous 6 months ( $n=26$ ). Approximately 8.3% of participants reported that they had meditated at least once a week during the previous 6 months ( $n=33$ ).

### Measures

**Five-Factor Mindfulness Questionnaire** (Baer et al. 2006). The FFMQ is a 39-item self-report measure that examines five components of mindfulness: observation of one's internal experience and sensations (FFMQ observe); non-judging of experience (FFMQ nonjudging); the ability to describe one's experience (FFMQ describe); nonreactivity to inner experience (FFMQ nonreactivity), and acting with awareness versus on automatic pilot (FFMQ acting with awareness). In this study, the acting with awareness vs. on automatic pilot subscale was scored so that acting with awareness responses produced higher scores. Internal consistency reliability coefficients (Cronbach's  $\alpha$ ) in this sample were: FFMQ nonreactivity=0.72; FFMQ observe=0.74; FFMQ acting with awareness=0.85, FFMQ describe=0.86, and FFMQ nonjudging=0.87.

**Difficulties in Emotion Regulation Scale** (Gratz and Roemer 2004). The DERS is a 36-item self-report questionnaire designed to assess six aspects of emotional dysregulation. To facilitate data analysis and interpretation, all DERS subscales were reverse-scored to reflect an *absence* of emotion regulation difficulties, or the presence of emotion regulation ability. Subscales include emotional awareness (DERS awareness), acceptance of emotional responses (DERS acceptance), emotional clarity (DERS clarity), ability to engage in goal-directed behaviors (DERS goals), impulse control (DERS impulse control), and access to emotion regulation strategies (DERS strategies). Internal consistency reliability coefficients (Cronbach's  $\alpha$ ) in this sample were: DERS acceptance=0.90, DERS goals=0.87, DERS impulse control=0.87, DERS awareness=0.76, DERS strategies=0.87, and DERS clarity=0.81.

**Trait Meta-Mood Scale** (Salovey et al. 1995). The TMMS contains subscales that measure the ability to discriminate among moods (TMMS clarity) and regulate moods (TMMS repair). Internal consistency reliabilities (Cronbach's  $\alpha$  coefficient) in this sample were 0.80 for the Repair subscale and 0.85 for the Clarity subscale.

## Results

### Overview of Data Analytic Strategy

**Data analyses entailed four steps** The first step used a confirmatory factor analysis to test the appropriateness of treating mindfulness and emotion regulation measures as distinct constructs. The second step consisted of a series of exploratory factor analyses to investigate the presence of common factors among these measures. The third step subjected the common factors identified in the exploratory factor analyses to a more rigorous test in a confirmatory factor analysis. The last step tested a theory-driven model for the potential relationships among the common factors.

The confirmatory factor analysis and path analysis models were tested using LISREL 8.51 (Jöreskog and Sörbom 2001) and Full Information Maximum Likelihood (FIML) estimation. We selected FIML estimation because this estimation approach uses all available data when there are missing data. Approximately 0.04% of data was missing due to isolated missed items. FIML estimation assumes that all indicators are normally distributed; thus, the data were first examined for normality. To reduce the effects of negative skew, the DERS acceptance, DERS impulse control, DERS strategies, DERS clarity, and the TMMS repair subscales were transformed by squaring them, resulting in the following distributions: DERS Acceptance (skewness=-0.30, kurtosis=-0.54); DERS clarity (skewness=0.01, kurtosis=-0.53); TMMS Repair (skewness=0.02, kurtosis=-0.47); DERS impulse control (skewness=-0.59, kurtosis=-0.60); and DERS strategies (skewness=-0.26, kurtosis=-0.87).

After transformation, scatterplots representing the relationship between each set of indicators were examined to identify potential outliers. Because no participant produced consistently unusual patterns of scores, all participants were retained.

Indicator descriptive statistics and inter-correlations are presented in Table 1.

**Step 1:** Confirmatory factor analysis for original mindfulness and emotion regulation scales.

The first step in study 1 consisted of a confirmatory factor analysis, which examined whether subscales from a questionnaire designed to measure mindfulness load exclusively on a mindfulness factor, whereas subscales from a questionnaire designed to measure emotion regulation load exclusively on an emotion regulation factor. These two factors were allowed to correlate. This analysis included the TMMS clarity scale, which we hypothesized would load on the mindfulness factor, and the TMMS repair scale, which we hypothesized would load on the emotion regulation

**Table 1** Descriptive statistics and indicator inter-correlations (study 1)

Indicator	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. FFMQ observe	3.22	0.57	1												
2. DERS awareness	3.64	0.67	0.34	1											
3. FFMQ nonjudging	3.19	0.70	-0.15	0.11	1										
4. DERS acceptance (squared)	3.80	0.88	0.00	0.27	0.55	1									
5. FFMQ describe	3.29	0.65	0.10	0.37	0.20	0.28	1								
6. TMMS clarity	3.43	0.59	0.08	0.42	0.41	0.49	0.64	1							
7. DERS clarity (squared)	3.80	0.66	0.11	0.44	0.39	0.48	0.58	0.82	1						
8. FFMQ nonreactivity	2.98	0.54	0.17	0.02	0.14	0.25	0.15	0.29	0.25	1					
9. TMMS repair (squared)	3.56	0.72	0.11	0.25	0.21	0.29	0.15	0.36	0.32	0.33	1				
10. DERS goals	2.85	0.91	0.01	-0.01	0.25	0.31	0.23	0.32	0.26	0.33	0.24	1			
11. DERS impulse control (squared)	4.13	0.77	0.11	0.22	0.32	0.47	0.20	0.44	0.42	0.40	0.47	0.39	1		
12. DERS strategies (squared)	3.90	0.76	0.09	0.18	0.39	0.56	0.24	0.53	0.50	0.45	0.58	0.54	0.71	1	
13. FFMQ acting with awareness	3.16	0.61	-0.01	0.14	0.29	0.15	0.15	0.27	0.27	0.06	0.09	0.29	0.25	0.25	1

Means and standard deviations are reported in their original, rather than their transformed, units. Correlations of 0.11 or larger are significant at  $p=0.05$  or less

factor. This model proved to be a very poor fit to the data. It produced a RMSEA of 0.16 ( $CI_{90}=0.15-0.17$ ;  $\chi^2=743.64$ ,  $df=64$ ,  $p<0.0001$ ). The minimum discrepancy function, which is required for fit statistics such as the Non-Normed Fit Index (also known as the Tucker–Lewis Index) and the Comparative Fit Index, is not defined when there are missing data in a sample; thus, these fit statistics were not available. Excluding the two TMMS subscales, and testing the model with only the subscales from the FFMQ and DERS, produced a model that LISREL could not estimate.

#### Step 2: Exploratory factor analyses.

Because measures of mindfulness and emotion regulation were not well-modeled by separate mindfulness and emotion regulation factors, a second set of analyses then explored whether common factors might still be present.

All five FFMQ subscales, all six DERS subscales, and the two TMMS subscales were entered in an exploratory factor analysis using maximum likelihood estimation and direct oblimin rotation. Both the eigenvalues and the scree plot graph of the eigenvalues suggested a three or four factor solution. The three-factor solution produced poor model fit and an unclear factor structure, with the DERS acceptance subscale loading weakly on two factors and the FFMQ observe subscale failing to load on any factor ( $\chi^2=168.06$ ,  $df=42$ ,  $p<0.0001$ ). Extracting four factors, rather than three, improved the model fit and the interpretability of the factors ( $\chi^2=80.42$ ,  $df=32$ ,  $p<0.0001$ ). In particular, the following subscales now clearly loaded together: Factor 1 consisted of the DERS awareness subscale and a weaker factor loading by the FFMQ observe subscale; factor 2=FFMQ nonreactivity, TMMS repair, DERS goals, DERS impulse control, and DERS strategies; factor 3=FFMQ

describe, TMMS clarity, and DERS clarity; and factor 4=FFMQ nonjudging and DERS acceptance (Table 2). Factor loadings of 0.36 or higher were considered to indicate clear and meaningful factor loadings. Using this standard, the FFMQ acting with awareness subscale did not load meaningfully on any factor and was excluded from subsequent attempts to identify common factors.

A third exploratory factor analysis was then conducted with all preceding indicators except the FFMQ acting with awareness subscale, to ensure that the pattern of factor loadings was stable and not disrupted by exclusion of this measure. Results from this analysis confirmed the stability of the pattern of factor loadings ( $\chi^2=44.43$ ,  $df=24$ ,  $p=0.007$ ).

#### Step 3: Confirmatory factor analyses for the four factors identified in the exploratory factor analyses.

A confirmatory factor analysis was then conducted to test the model suggested by the four-factor exploratory factor analysis. Although the fit statistics suggested a reasonable fit for the data, the output provided two indications that the fit statistics did not reflect true model fit. First, the solution was a “Heywood case,” with an estimated unique variance of  $-1.67$  for the DERS awareness subscale and a reported squared multiple correlation (SMC) for that variable of 2.67. The second indication was the size of the standardized fitted residuals for the common factor comprised of the DERS awareness and FFMQ observe subscales. Standardized fitted residuals are the residuals produced when a model is fit to the data. Absolute values larger than 1.96 are statistically significant. Although some significant residuals might be expected on the basis of chance, particularly given the presence of 78 correlations in the model, four of the six

**Table 2** Exploratory factor analysis with four factors and all potential indicators (study 1)

Indicator	Factor			
	1	2	3	4
FFMQ observe	0.368	0.113	-0.019	-0.198
DERS awareness	0.941	-0.163	-0.170	0.215
FFMQ nonjudging	-0.077	0.035	-0.046	0.825
DERS acceptance (squared)	0.092	0.298	-0.091	0.492
FFMQ describe	0.033	-0.091	-0.754	-0.058
TMMS clarity	-0.022	0.120	-0.861	0.062
DERS clarity (squared)	0.052	0.107	-0.747	0.106
FFMQ nonreactivity	-0.070	0.514	-0.072	-0.093
TMMS repair (squared)	0.188	0.564	0.030	0.047
DERS goals	-0.138	0.533	-0.066	0.042
DERS impulse control (squared)	0.105	0.683	0.015	0.132
DERS strategies (squared)	0.027	0.902	0.018	0.127
FFMQ acting with awareness	0.026	0.099	-0.121	0.225

significant standardized fitted residuals were associated with either the DERS awareness or FFMQ observe subscales. Thus, although the overall model fit statistics for the four-factor model were acceptable, the common factor uniting the DERS awareness and FFMQ observe subscales appeared problematic.

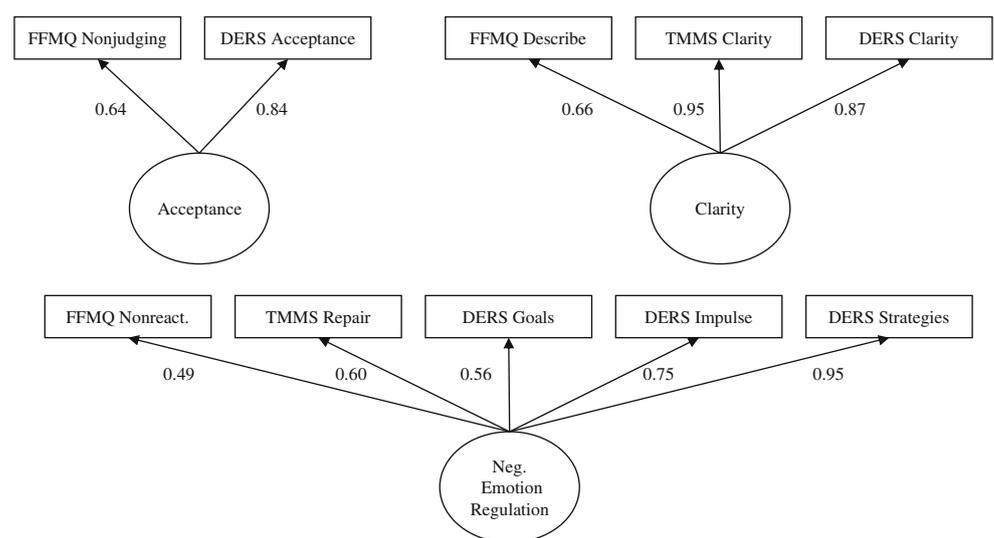
For this reason, a second confirmatory factor analysis was conducted, this time without the DERS awareness, the FFMQ observe, and their common factor. This model produced an acceptable fit, with a RMSEA of 0.055 (CI<sub>90</sub>=0.038–0.072;  $\chi^2=70.52$ ,  $df=32$ ,  $p=0.0001$ ). All SMCs, unique variances, and residuals also suggested that the model was a good fit for the data. Factor loadings are presented in Fig. 1.

Examination of the subscales associated with each of the three factors identified in this analysis suggests that they can be described as acceptance of emotional experience,

clarity about one’s feelings, and the ability to control behavior in the presence of negative affect. The FFMQ Nonjudging and DERS Acceptance subscales associated with the acceptance factor feature items that address judgmental, non-accepting, and self-critical responses to unpleasant internal experiences. The clarity factor consists of the FFMQ subscale for the ability to describe one’s experience (FFMQ describe), the TMMS subscale for clarity about one’s experience (TMMS clarity), and the DERS subscale for clarity about one’s experience (DERS clarity). Interestingly, the composition of this factor suggests that recognition of one’s internal experience (e.g., sadness) is isometric with the ability to label internal experience (e.g., “I am sad”).

The third factor consists of subscales from the FFMQ, the TMMS, and the DERS. These subscales measure the

**Fig. 1** Confirmatory factor analysis for acceptance, clarity, and negative emotion regulation (study 1)



RMSEA = 0.055  
 $\chi^2 = 70.52$ ;  $df = 32$   
 $p = 0.0001$

ability to notice internal distress without having to behaviorally react to it (FFMQ nonreactivity), the ability to alter negative moods (TMMS repair), the ability to perform necessary, goal-focused behavior in the presence of negative affect (DERS goals), the ability to control behavior in the presence of negative affect (DERS impulse), and access to emotion regulation strategies in the presence of negative affect (DERS strategies). This factor appears to be behaviorally oriented and examination of the items for each of the subscales suggests that this factor is most closely linked to traditional conceptions of emotion regulation, which often involve strategies for managing negative affect (as opposed to noticing the affect or not judging the affect). This factor also includes three of the six DERS subscales in the factor analysis. For these reasons, the factor associated with the ability to control behavior in the presence of unpleasant internal experience will be referred to as “Negative emotion regulation.”

Step 4: Path analysis examining the relationships among the common factors.

Steps 1–3 in the preceding analyses revealed that the terms “mindfulness” and “emotion regulation,” as commonly used and measured, encompass an overlapping and heterogeneous set of constructs. This presents a dilemma in the attempt to understand mindfulness: which of these constructs is mindfulness? This question becomes especially complicated because each empirically derived factor featured subscales from the FFMQ, which was designed to measure mindfulness. Moreover, the two remaining FFMQ subscales (FFMQ observe and FFMQ acting with awareness), which did not load on any of the three common factors, may still represent important aspects of mindfulness.

Theoretical work by Bishop et al. (2004) suggests that a pure rendering of mindfulness, one which attempts to distill mindfulness from its sequelae, might consist of two factors: one involving present-focused attention and a second that involves acceptance of the object of one’s attention. In the current data, the acceptance portion of the Bishop et al. (2004) definition could be represented with the acceptance factor, consisting of the FFMQ nonjudging and DERS acceptance subscales. The attention portion of this definition should optimally be represented by measures that assess present-focused attention, such as the FFMQ observe or the DERS awareness. Step 3 in the preceding analyses indicated that only one of these measures should be used as an indicator for present-centered attention, because they are not sufficiently similar to be considered expressions of the same common factor. Examination of the individual items for each measure revealed that the DERS awareness items specifically address attention to one’s emotions, whereas the FFMQ observe subscale addresses attention to present-moment experience more broadly, including physical sensations and

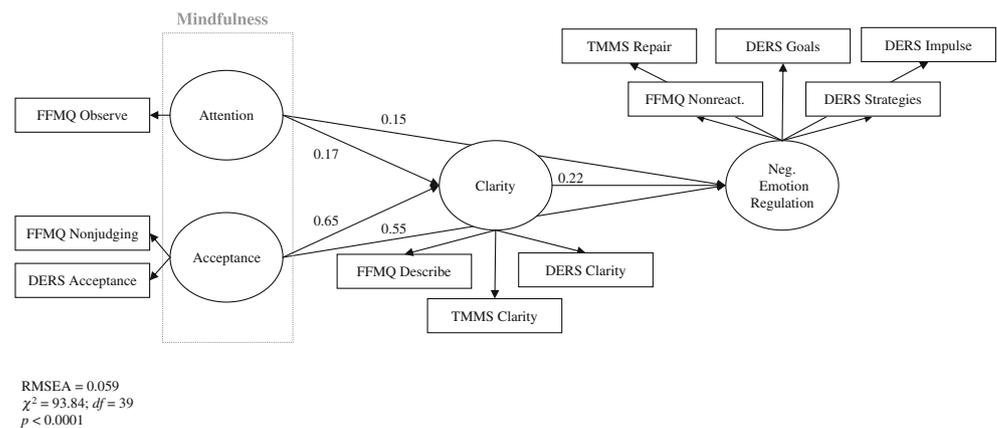
the external environment, as well as emotions. The latter was considered to more accurately reflect what is meant by present-centered attention. Thus, the attentional component of the Bishop et al. (2004) operational definition could be represented in the present data set by permitting the FFMQ observe subscale to load on its own “Attention” factor.

The last step in this sequence of analyses explored the possibility that some of the constructs identified in the preceding analyses might be sequelae of mindfulness, as operationally defined by Bishop et al. (2004), rather than true facets of mindfulness. If the data supported this possibility, it would suggest that some constructs that are generally subsumed under the term “mindfulness” are, in fact, consequences of mindfulness and not mindfulness per se. Interestingly, DBT teaches skills related to each of the common factors identified in these analyses. In DBT, participants are taught to pay attention to their experience and to notice judgments about their experience as a way of beginning to develop some clarity about their feelings and subsequently engage in more effective regulation of negative affect (Linehan 1993). Thus, the last step in the analyses tested a theory-driven model in which mindfulness, as represented by the attention and acceptance factors, predicted clarity about one’s emotional experience, which in turn predicted negative emotion regulation (Fig. 2). The model also examined the possible direct effects that attention and acceptance might exert on negative emotion regulation.

This model did not include the FFMQ acting with awareness subscale, even though this subscale most closely reflects how mindfulness was measured in a previous model for mindfulness’ mechanisms of action (Coffey and Hartman 2008). Although engaging in mindful behavior appeared to be broadly related to multiple aspects of the model, it did not clearly fit at any specific juncture in the proposed processes. Several other (non-theory-driven) models, which included the FFMQ Acting with awareness subscale, were tested as part of these analyses but none of them fit the data as well as did the original model.

The model produced an acceptable fit to the data with a RMSEA of 0.059 ( $CI_{90}=0.044-0.075$ ;  $\chi^2=93.84$ ,  $df=39$ ,  $p<0.0001$ ). In this model, both the attention and acceptance factors significantly predicted clarity and emotion regulation (see Fig. 2 for paths and associated parameter estimates). This finding is noteworthy for two reasons. First, Brown and Ryan (2004) found that the MAAS “Presence” factor subsumed an attitude of acceptance. Results from this study suggest that present-centered attention, as measured by the FFMQ observe subscale, does not subsume an attitude of acceptance, because the acceptance factor independently affected clarity and emotion regulation, above and beyond the influence of the attention factor.

Second, Baer et al. (2004) and Baer et al. (2006) found that their observe subscale (which was the single indicator

**Fig. 2** Relationships among the factors (study 1)

for the attention factor) was inconsistently related, or related in the non-predicted direction, to other relevant constructs. In the current study, attention was significantly related to clarity and emotion regulation in the predicted directions. It was not, however, significantly correlated with the Acceptance factor ( $r = -0.08$ ,  $z = -1.12$ ,  $p = 0.26$ ), which is consistent with work by Baer et al. (2006), but differs from the finding of Baer et al. (2004) that these two constructs were negatively correlated. Although the subsample of frequent meditators in the present study ( $n = 33$ ) is not sufficient to test the proposed model for meditators alone, it should also be noted that the correlation between the FFMQ observe subscale and the FFMQ nonjudging subscale, which Baer et al. (2006) proposed may differ in those with and without meditation experience, was significantly negative at  $r = -0.16$  for the 366 participants who reported that they did not meditate regularly, and not significant at  $r = 0.01$  for the 33 participants in the full sample who reported meditating at least once a week.

As depicted in Fig. 2, attention to one's experience ( $z = 3.11$ ,  $p < 0.001$ ) and Acceptance of that experience ( $z = 8.53$ ,  $p < 0.001$ ) jointly influenced an individual's clarity about his or her experience. Clarity about one's experience in turn significantly predicted one's ability to effectively regulate negative affect ( $z = 2.93$ ,  $p < 0.01$ ), as did both attention ( $z = 2.79$ ,  $p < 0.01$ ) and acceptance ( $z = 5.70$ ,  $p < 0.001$ ), directly. Notably, the acceptance component of mindfulness exerted much larger effects on both clarity and negative emotion regulation than did the attentional component of mindfulness. The model explained 43% of the variance in clarity and 50% of the variance in negative emotion regulation.

## Discussion

Each of the three study hypotheses was confirmed. First, the results are consistent with the hypothesis that multiple, conceptually distinct processes are subsumed under the terms "mindfulness" and "emotion regulation." A confirmatory factor analysis tested the appropriateness of model-

ing current conceptualizations of these terms as two distinct constructs. This model fit poorly, indicating that current conceptions of both mindfulness and emotion regulation encompass a heterogeneous set of processes.

Second, exploratory factor analyses supported the hypothesis that some of the same processes are simultaneously considered mindfulness and emotion regulation. Examination of these areas of overlap revealed that current conceptualizations of mindfulness and emotion regulation may be more accurately thought of as acceptance of internal experience, recognition of internal experience, and the ability to control behavior in the presence of unpleasant internal experiences. The three common factors were significantly correlated with each other. Notably, each of the common factors identified in these analyses included at least one subscale from the mindfulness questionnaire used here and at least one subscale from the emotion regulation questionnaire used here, demonstrating the conceptual commingling of mindfulness and emotion regulation in existing measures for these constructs. Two aspects of current conceptualizations of mindfulness, specifically present-centered attention and acting with awareness, were unique in that they were not isometric with any aspects of emotion regulation.

A path analysis tested the hypothesis that the constructs identified in the preceding analyses may contribute to or facilitate the expression of each other. Results supported this hypothesis. Both present-centered attention and acceptance of internal experience, collectively recognized as "mindfulness" according to the Bishop et al. (2004) operational definition of this construct, contributed to clarity about one's internal experience, which in turn contributed to the ability to manage negative affect. In other words, greater tendencies to attend to one's present-moment experience and accept that experience were associated with a greater ability to identify one's emotions. Higher levels of this ability were in turn associated with an improved ability to manage emotions when they were negative. The two theoretically derived aspects of mindfulness were not significantly associated with each other.

## Study 2

### Methods

**Participants** Participants included 413 undergraduate students (71% female,  $M=18.7$  years old,  $SD=0.95$  years, range=18–23) who completed the study in exchange for credit towards a course requirement. Approximately 94% ( $n=388$ ) indicated that they had never meditated or had done so less than once/month in the previous 6 months. An additional 2.7% ( $n=11$ ) had meditated one to three times/month during the previous 6 months. The remaining 3.7% of the sample ( $n=14$ ) had meditated once/week or more often during the previous 6 months.

### Measures

**Five-Factor Mindfulness Questionnaire** (Baer et al. 2006). Described above. Internal consistency reliabilities (Cronbach's  $\alpha$  coefficients) for the FFMQ subscales in this sample were: FFMQ nonreactivity=0.71, FFMQ observe=0.71, FFMQ acting with awareness=0.86, FFMQ describe=0.88, and FFMQ nonjudging=0.88.

**Difficulties in Emotion Regulation Scale** (Gratz and Roemer 2004). Described above. Internal consistency reliabilities (Cronbach's  $\alpha$  coefficients) for the DERS subscales in this sample were: DERS acceptance=0.87, DERS goals=0.91, DERS impulse control=0.88, DERS awareness=0.79, DERS strategies=0.88, and DERS clarity=0.85.

**Trait Meta-Mood Scale** (Salovey et al. 1995). Described above. Internal consistency reliabilities (Cronbach's  $\alpha$  coefficients) in this sample were 0.82 for the Repair subscale and 0.87 for the Clarity subscale.

**The Linking Inventory** (McIntosh and Martin 1992). The Linking Inventory was used to measure non-attachment. The Linking Inventory measures the extent to which respondents believe their happiness is independent of obtaining positive outcomes. It consists of 22 dichotomous, forced-choice questions, used to obtain participants' judgments about the way specific outcomes affect their happiness. For example, one item states, "One day you realize that you have all the things you want—the job you want, the spouse you want, the free time you want." The response options for this item are "(a) This will not directly influence how happy I am, because happiness is something I determine, regardless of what happens to me," and "(b) If I have all the things I want, then I will be very happy." In this example, response B represents a linking orientation, while response A represents a nonlinking, or non-attached, orientation. Internal consistency reliability (Cronbach's  $\alpha$  coefficient) for the Linking Inventory was 0.77 in this sample.

**Rumination** The Rumination subscale on the Rumination-Reflection Questionnaire (RRQ; Trapnell and Campbell 1999) measures "ruminative self-attention," or the tendency to dwell on, rehash, or reevaluate events and experiences. It consists of 12 items. Internal consistency reliability (Cronbach's  $\alpha$  coefficient) was 0.90 in this sample.

**Psychological Distress** The Brief Symptom Inventory (BSI; Derogatis 1983) is a 53-item Likert-scale derived from the Hopkins Symptom Checklist (Derogatis 1977). The BSI produces multiple indices of distress; the depression and anxiety subscales were used in this study. Internal consistency reliabilities (Cronbach's  $\alpha$  coefficients) in this sample were as follows: BSI Depression=0.82; BSI Anxiety=0.74.

**Satisfaction with Life Scale** (Diener et al. 1985). The Satisfaction with Life Scale is a 5-item scale that assesses participants' global satisfaction with their lives and circumstances. Internal consistency reliability (Cronbach's  $\alpha$  coefficient) in this sample was 0.86.

**Short Flourishing** (Keyes 2006). The Short Flourishing measure is a 14-item measure that assesses several individual and social aspects of well-being, including positive relationships with others, environmental mastery, self-acceptance, purpose in life, personal growth, autonomy, acceptance of others, a sense of belonging to a community, a belief that social groups can evolve positively, a sense that one's life is useful to society, and interest in social life. Internal consistency reliability (Cronbach's  $\alpha$  coefficient) for the total score in this sample was 0.90.

## Results

### Overview of Data Analytic Strategy

The first analysis attempted to replicate the factor structure from study 1 in an independent sample, to ensure that the factor structure was not a result of unique sample characteristics in study 1. The second part used results from Study 1 to test the potential mechanisms of action explored in the original Coffey and Hartman (2008) model. This included exploring potential mechanisms of action in the relationship between mindfulness and flourishing mental health, and between mindfulness and psychological distress.

Models were tested using LISREL 8.51 (Jöreskog and Sörbom 2001) and FIML estimation. The data were first examined for normality. To reduce the effects of negative skew, the DERS acceptance, DERS clarity, TMMS repair, and DERS strategies were transformed by squaring them,

resulting in the following distributions: DERS acceptance (skewness=-0.50, kurtosis=-0.37); DERS clarity (skewness=-0.32, kurtosis=-0.27); TMMS repair (skewness=-0.27, kurtosis=-0.37); and DERS strategies (skewness=-0.58, kurtosis=-0.32). The DERS impulse control was transformed by taking its cube (skewness=-0.73, kurtosis=-0.43). To reduce the effects of positive skew, the BSI depression and BSI anxiety scales were transformed by taking their square root, resulting in the following distributions: BSI depression (skew=0.80, kurtosis=0.17), and BSI anxiety (skew=0.79, kurtosis=0.87). Indicator means, standard deviations and inter-correlations are presented in Table 3.

#### Step 1: Confirmation of factor structure from study 1.

A confirmatory factor analysis tested the factor structure featured in Fig. 1 to ensure that it appropriately modeled the relationships among the measures in this new sample. Results indicated that the model was an acceptable fit for the data (RMSEA=0.066;  $CI_{90}=0.051-0.083$ ;  $\chi^2=90.34$ ,  $df=32$ ,  $p<0.0001$ ). Standardized factor loadings and factor inter-correlations were similar to the factor inter-correlations and factor loadings obtained in study 1, reflecting the stability of these estimates across samples.

#### Step 2: Mechanisms of action in the relationship between mindfulness and mental health.

The second step in these analyses united the factor structure developed in study 1 (and confirmed in step 1 of study 2) with the model Coffey and Hartman (2008) proposed and tested for mindfulness' mechanisms of action. In the first part of this combined model, mindfulness is operationally defined as attention to present-moment experience and acceptance of one's internal experience, and contributes to clarity about one's internal experience. Clarity, in turn, facilitates regulation of negative affect. In the second part of this model, an increased ability to regulate negative affect contributes to greater non-attachment, which is then associated with less rumination. Improved negative emotion regulation and decreased rumination then predict improved mental health. This model also expands on the model proposed by Coffey and Hartman (2008) by considering the effects of mindfulness on both positive psychological adjustment, in the form of flourishing mental health, and negative psychological adjustment, in the form of psychological distress.

Three of the factors in the model (i.e., attention, non-attachment, and rumination) were each measured with one questionnaire/factor. As a result, these factors did not have a sufficient number of indicators to produce measurement error

**Table 3** Descriptive statistics and indicator inter-correlations (study 2)

Indicator	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. FFMQ observe	3.21	0.56	1														
2. FFMQ nonjudging	3.36	0.71	-0.014	1													
3. DERS acceptance (squared)	3.98	0.77	-0.03	0.52	1												
4. FFMQ describe	3.39	0.65	0.21	0.10	0.21	1											
5. TMMS clarity	3.55	0.59	0.09	0.33	0.34	0.65	1										
6. DERS clarity (squared)	3.93	0.64	0.11	0.28	0.32	0.61	0.80	1									
7. FFMQ nonreactivity	3.06	0.52	0.13	0.18	0.14	0.11	0.26	0.24	1								
8. TMMS repair (squared)	3.71	0.67	0.13	0.13	0.25	0.14	0.29	0.28	0.23	1							
9. DERS goals	2.98	0.97	0.01	0.16	0.32	0.09	0.20	0.21	0.20	0.24	1						
10. DERS strategies (squared)	4.05	0.73	0.02	0.37	0.52	0.14	0.39	0.36	0.35	0.52	0.49	1					
11. DERS impulse control (cubed)	4.31	0.73	0.00	0.30	0.43	0.13	0.30	0.35	0.34	0.31	0.40	0.64	1				
12. Linking inventory (reverse-scored)	0.58	0.19	0.05	0.03	0.07	-0.01	0.09	0.07	0.21	0.40	0.23	0.37	0.20	1			
13. RRQ rumination scale	3.54	0.65	0.07	-0.35	-0.36	-0.203	-0.36	-0.30	-0.27	-0.34	-0.38	-0.47	-0.27	-0.28	1		
14. BSI depression (square root)	1.84	0.61	0.06	-0.37	-0.35	-0.225	-0.39	-0.37	-0.30	-0.44	-0.22	-0.58	-0.36	-0.28	0.48	1	
15. BSI anxiety (square root)	1.76	0.56	0.10	-0.35	-0.30	-0.188	-0.30	-0.27	-0.20	-0.25	-0.20	-0.41	-0.32	-0.17	0.35	0.56	1

Means and standard deviations are reported in their original, rather than their transformed, units. Correlations > 0.11 are significant at  $p=0.01$  or less

estimates. The rumination measure (i.e., the RRQ rumination) had high internal reliability (unlike the measures for attention and non-attachment), and a sufficient number of items to split the scale. Thus, this measure was divided into item parcels, such that the first half of the scale was treated as one indicator for the factor while the second half of the scale was treated as a second indicator for the factor. This allowed computation of measurement error for the rumination factor and inserted additional degrees of freedom into the model, creating a more rigorous test of the model while preserving degrees of freedom appropriate to the sample size. For the other two factors measured with one variable, attention and non-attachment, calculations based on Cronbach’s  $\alpha$  coefficient were entered into the model to approximate measurement error for the factor (Hayduk 1987).

Psychological distress was measured with the depression and anxiety subscales from the BSI. Flourishing mental health was measured with the Short Flourishing measure and the Satisfaction with Life measure. To confirm that Psychology Distress and Flourishing mental health are distinct aspects of mental health and should be treated as two separate factors, a confirmatory factor analysis was conducted in which the two indicators for Psychological Distress and the two indicators for Flourishing were allowed to load on a general “psychological adjustment” factor. This model produced a very poor fit for the data (RMSEA=0.32,  $CI_{90}$ =0.26–0.38,  $\chi^2$ =83.61,  $df$ =2,  $p$ <0.0001). In contrast, and as consistent with past empirical work (Keyes 2005), a two-factor model, consisting of a “Psychological distress” factor and a “Flourishing” factor, fit extremely well (RMSEA=0.00,  $CI_{90}$ =0.00–0.12,  $\chi^2$ =0.64,  $df$ =1,  $p$ =0.42).

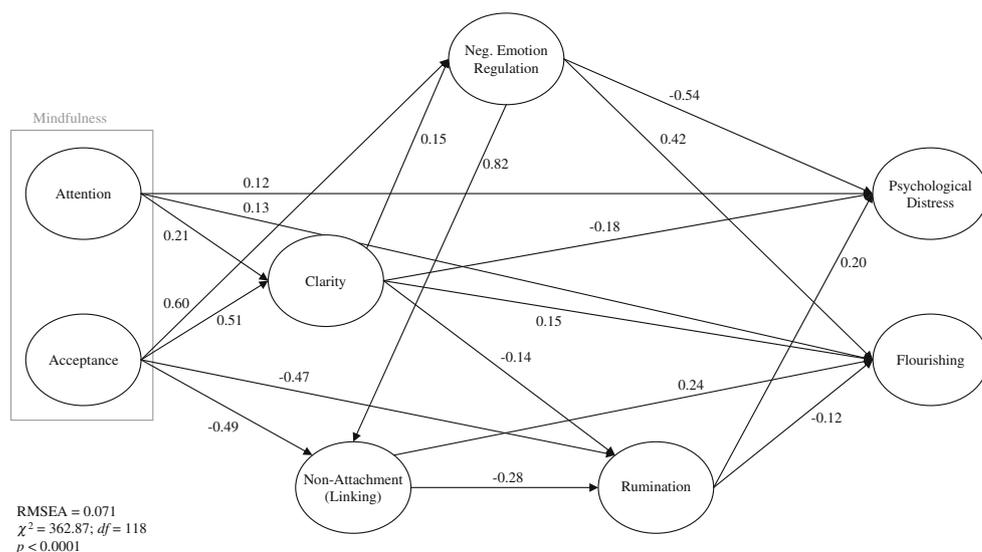
Given the absence of previous empirical work exploring the relationships among the constructs examined in the model,

coefficients for all possible paths were freed for estimation in a first version of the model. Thus, the model tested was similar to the model featured in Fig. 3, but included all possible paths. This all-inclusive model produced an acceptable fit, with a RMSEA of 0.073 ( $CI_{90}$ =0.064–0.081,  $\chi^2$ =351.16,  $df$ =110,  $p$ <0.0001). Unexpectedly, the direct effect from acceptance to non-attachment was negative ( $z$ =−3.42,  $p$ <0.0001), indicating that respondents who reported greater acceptance about their internal lives also reported an increased sense that their happiness was a function of external circumstances in their lives. Acceptance and non-attachment were related to all other variables in the expected directions.

Another unexpected finding in the model was a significant, positive, direct effect between attention and psychological distress ( $z$ =2.44,  $p$ =0.01), indicating an association between the tendency to pay attention to one’s present-moment experience and increased self-reported distress. Interestingly, Attention also exerted a positive, marginally significant direct effect on flourishing ( $z$ =1.84,  $p$ =0.07). A positive relationship between attention and flourishing is consistent with hypotheses about how mindfulness works but inconsistent with the positive relationship between attention and psychological distress. The following direct effects were not significant: attention to negative emotion regulation, non-attachment, and rumination; acceptance to psychological distress and flourishing; clarity to non-attachment; negative emotion regulation to rumination; and non-attachment to psychological distress.

A second model tested only the significant paths from the all-inclusive model. This model also included the marginally significant direct effect from attention to flourishing mental health, because eliminating non-significant parameters can allow a marginally significant path coefficient to become significant. Results from this

**Fig. 3** Mediators in the relationship between mindfulness and measures of both positive and negative mental health (study 2)



model are presented in Fig. 3. This model produced a RMSEA of 0.071 ( $CI_{90}=0.063-0.079$ ,  $\chi^2=362.87$ ,  $df=118$ ,  $p<0.0001$ ). All included path coefficients were significant, including the direct effect from attention to flourishing ( $z=2.46$ ,  $p=0.01$ ). Consistent with results from study 1, the correlation between attention and acceptance was not significant ( $r=-0.11$ ,  $z=-1.56$ ,  $p=0.12$ ).

The overall model fit and the significant parameter estimates connecting attention and acceptance to the mediators, which in turn influenced psychological distress and flourishing, support the hypothesis that mindfulness influences mental health in part by facilitating clarity, negative emotion regulation, non-attachment, and rumination. The specific paths via which this occurred were complex, however. For this reason, the impact that attention and acceptance exerted on psychological distress and flourishing mental health is dismantled into direct, indirect, and total effects. Parameter estimates for the direct effects are presented in Fig. 3. A summary of the standardized indirect and total effects are presented in Tables 4 and 5, respectively.

Figure 3 and Tables 4 and 5 highlight the distinctiveness of attention and acceptance as components of mindfulness, and the importance of examining direct, indirect, and total effects in understanding the complex meditational paths among attention, acceptance, and mental health, as measured by psychological distress and flourishing. Acceptance did not exert significant *direct* effects on either psychological distress or flourishing, but it exerted significant *total* effects on both psychological distress ( $z=-9.24$ ,  $p<0.0001$ ) and flourishing ( $z=7.10$ ,  $p<0.0001$ ). In contrast, attention exerted significant, positive *direct* effects on both psychological distress ( $z=2.30$ ,  $p=0.02$ ) and flourishing ( $z=2.46$ ,  $p=0.01$ ). The *total* effect attention exerted on psychological distress was not significant ( $z=1.05$ ,  $p=0.29$ ), however, reflecting the influence of the significant and negative, *indirect* effect

of attention on psychological distress ( $z=-2.91$ ,  $p=0.004$ ) via other variables in the model. In other words, an increased tendency to attend to present-moment experience simultaneously directly increased psychological distress and, via other variables in the model, indirectly decreased it, such that these two influences canceled each other out and attention did not exert a significant overall, total effect on psychological distress. Attention did exert a significant total effect on flourishing ( $z=3.42$ ,  $p<0.001$ ).

Consistent with the findings from study 1, Table 5 reveals the greater beneficial impact that acceptance exerted on other variables in the model compared to Attention. Every one-standard-unit change in acceptance was associated with a 0.68-standardized unit total increase in the ability to regulate negative affect, a 0.57-standardized unit total decrease in psychological distress, and a 0.44-standardized unit total increase in flourishing. In contrast, attention had a much smaller effect on the other variables in the model. Every one standard unit shift in attention was associated with a 0.03-standardized unit total increase in negative emotion regulation, a 0.06-standardized unit total increase in psychological distress (*ns*), and a 0.19-standardized unit total increase in flourishing.

Lastly, as can be seen in Fig. 3, the variables that significantly predicted psychological distress and flourishing are almost identical. Attention, clarity, negative emotion regulation, and rumination exerted significant direct effects on both mental health outcome variables, and acceptance did not significantly predict either mental health variable directly. The only exceptions were the direct effects from non-attachment to psychological distress and to flourishing. Non-attachment significantly predicted flourishing ( $z=3.78$ ,  $p=0.0002$ ) but did not significantly predict psychological distress.

The model explained 60% of the variance in psychological distress and 54% of the variance in flourishing.

**Table 4** Indirect effects (standardized) of each factor on other factors (study 2)

Predictor variable	Response variable				
	Emotion regulation	Non-attachment	Rumination	Psychological distress	Flourishing
Attention	0.03	0.03	-0.04	-0.06	0.06
Acceptance	0.08	0.55	-0.09	-0.57	0.44
Clarity	–	0.12	-0.04	-0.12	0.12
Emotion regulation	–	–	-0.23	-0.05	0.23
Non-attachment	–	–	–	-0.06	0.03

There are no columns for the attention, acceptance, and clarity factors because there is no opportunity for the other constructs in the model to predict attention or acceptance, or clarity via indirect paths. There are no rows for the rumination, psychological distress, and flourishing factors because there is no opportunity in the model for psychological distress and flourishing to predict other factors, or for rumination to predict other factors via indirect paths. “–” indicates that there are no indirect paths connecting the relevant row and column factors. All indirect effects are significant at  $p=0.05$  or less

**Table 5** Total effects (standardized) of each factor on other factors (study 2)

Predictor variable	Response variable					
	Clarity	Emotion regulation	Non-attachment	Rumination	Psychological distress	Flourishing
Attention	0.21	0.03	0.03	−0.04	0.06 ( <i>ns</i> )	0.19
Acceptance	0.51	0.68	0.07 ( <i>ns</i> )	−0.56	−0.57	0.44
Clarity	–	0.15	0.12	−0.18	−0.29	0.26
Emotion regulation	–	–	0.82	−0.23	−0.59	0.65
Non-attachment	–	–	–	−0.28	−0.06	0.28
Rumination	–	–	–	–	0.20	−0.12

There are no columns for the attention and acceptance factors because, as exogenous factors, there is no opportunity for the other constructs in the model to predict these two factors. There are no rows for the psychological distress and flourishing factors because, as the final variables in the model, there is no opportunity in the model for these two factors to predict other factors. “–” indicates that there are no paths connecting the relevant row and column factors, thus no opportunity for the row variable to predict the column variable. “*ns*” denotes total effects that are not statistically significantly different from zero. All other effects are significant at  $p=0.05$  or less

## Discussion

Study 2 replicated in an independent sample the common factors in mindfulness and emotion regulation measures identified in study 1, as well as the relationships among mindfulness and its most proximal sequelae (i.e., clarity and negative emotion regulation). Study 2 then integrated these findings with other possible mechanisms of action, specifically non-attachment and rumination, by which mindfulness might influence psychological distress and flourishing mental health.

Results provided additional support for the study 1 finding that present-centered attention and acceptance of one’s experience are distinct constructs, at least among individuals with no or limited formal mindfulness training. Results also confirmed the hypothesis that clarity about one’s internal life, negative emotion regulation, non-attachment, and rumination are important mechanisms of action. As was found in study 1, acceptance exerted much stronger effects on other variables in the model than did attention, suggesting its relatively greater importance to psychological distress, flourishing mental health, and related constructs.

Greater acceptance of experience was associated with improved functioning for all constructs except non-attachment. Higher levels of acceptance of experience were unexpectedly associated with lower levels of self-reported non-attachment. At the same time, acceptance was associated, as expected, with increased clarity about one’s internal experience and an increased ability to regulate negative affect, which in turn predicted *higher* levels of non-attachment. Thus, acceptance was directly associated with less non-attachment at the same time that it was indirectly associated with greater non-attachment. These two influences balanced each other such that acceptance did not exert a significant total effect on non-attachment.

Examination of the questionnaire items from the Linking Inventory, which was used to measure non-attachment,

provides a possible explanation for this complex relationship. The Linking Inventory examines the extent to which respondents “link” their happiness to specific external circumstances in their lives. Less “linking” reflects more non-attachment. Some of the questionnaire items are sufficiently extreme; however, that it would be unlikely for a respondent to endorse the more non-attached position in the absence of training or a specific practice intended to cultivate this orientation. For example, one item asks “Think about the things in your life that you really want, but just can’t get. Maybe you want to be a doctor, but you realize that your grades are not going to be good enough to get into medical school. Or maybe you want to go out with a certain person, but that person won’t go out with you. How does this affect your happiness?” The response choices are “The more things I want but can’t get, the less happy I am,” (reflecting less non-attachment) and “Wanting things I can’t get does not make me less happy” (reflecting more non-attachment). Respondents who are not intentionally cultivating equanimity probably do feel less happy in the presence of disappointed life aspirations or unrequited affection. The negative association between acceptance of internal experience and non-attachment may reflect an increased propensity among those who are more accepting of themselves to be honest with themselves, even about painful realities. Thus, more accepting respondents might report less non-attachment at the same time that they report greater clarity about their internal experience, an increased ability to manage negative internal experience, and better overall psychological adjustment.

A similarly noteworthy and intriguing finding in the study was the paradoxical relationship between present-centered attention and psychological distress. Directly attending to one’s present moment experience both decreased psychological distress, by beneficially impacting other constructs which then decreased distress, and increased psychological distress, via a direct association. Taken cumulatively, these two simultaneous

influences canceled each other out, such that a participant's tendency to notice his or her experience did not affect his or her levels of psychological distress. One explanation for the paradoxical relationship between present-centered attention and psychological distress is that directly attending to one's experience may make that experience more salient in awareness. Individuals who attend to their experience may be more aware of the times they feel anxious and depressed, as well as the times they feel satisfied with their lives and fulfilled. This awareness may intensify negative affect in the short term, but it could also provide individuals with information they can use to better manage their internal lives. For example, a tendency to notice internal and external stimuli might make a person more aware of her or his depression or anxiety, but it might simultaneously provide information about the context in which the emotion has arisen, the effectiveness of emotion regulation strategies, reactions to other, potentially positive aspects of one's experience, and other information that could down-regulate present and future distress. Thus, at the same time that directly attending to negative affect may augment it in the moment, it may simultaneously provide information that ultimately serves to diminish it.

In contrast to the complex relationship between attention and psychological distress, attention was both directly and indirectly associated with increased flourishing. In other words, a greater tendency to attend to one's present-moment experience was associated higher levels of flourishing, as well as beneficially associated with other constructs in the model, which were then associated with higher levels of flourishing.

Despite the fact that psychological distress and flourishing mental health are distinct aspects of mental health, mindfulness and the mediators explored here appear to influence these distinct aspects of mental health via virtually identical mechanisms. This suggests that although remediation of psychological distress is not the same as creating flourishing mental health, the same processes act comparably on both. The coping skills that must be addressed to treat depression and anxiety, such as recognizing what one is feeling, managing negative affect, etc., may be identical to those necessary to help a non-distressed person achieve even greater life satisfaction. Flourishing mental health and psychological distress were correlated at  $r = -0.51$ . This moderately strong correlation is consistent with their shared dependence on some of the same processes, and also with their distinctiveness as psychological outcomes.

## General Discussion

The two studies presented here contribute to an enriched understanding of mindfulness as a construct, and the mecha-

nisms by which individual differences in mindfulness influence both positive and negative measures of mental health. The first study contributes to a more precise understanding of the component processes in current conceptualizations of mindfulness and emotion regulation, and how these processes are related to each other. Results indicated that "mindfulness" and "emotion regulation" subsume multiple sub-processes. This suggests that it may not be appropriate to use the FFMQ and the DERS, as they are designed, to measure "mindfulness" and "emotion regulation." Instead, using a combination of subscales from both questionnaires may most accurately reflect the constructs that underlie these terms.

These findings also call into question which of the FFMQ subscales or common factors should be considered "mindfulness." For guidance, the present studies used the operational definition for mindfulness proposed by Bishop et al. (2004), which posits that mindfulness is composed of an attentional component and an attitudinal, acceptance-based component. These two components are common to almost every existing definition for mindfulness. We found that some of the constructs identified in Study 1, such as the ability to identify and label emotional experience and the ability to manage negative affect, may be better conceptualized as sequelae of present-centered attention and acceptance of one's experience. This suggests that the Bishop et al. (2004) definition for mindfulness may represent a maximally parsimonious definition for the construct, which differentiates mindfulness from its sequelae more clearly than other popular conceptualizations of the construct. The attached "Carolina Empirically-Derived Mindfulness Inventory" (CEDMI; [appendix](#)) features the combination of FFMQ and DERS subscales we used to measure this conceptualization of mindfulness.

Significantly, this work replicated previous research on the lack of association between present-centered attention and a non-judgmental approach towards one's experience in samples with little or no formal mindfulness training (Baer et al. 2006). This highlights the importance of treating these two dimensions of mindfulness as distinct constructs that may not be related when mindfulness is examined as a naturally varying individual difference.

Study 2 used the findings from study 1 on the nature of mindfulness to more accurately model the mechanisms by which dispositional mindfulness might influence two aspects of mental health, psychological distress and flourishing mental health. Previous work has found dispositional differences in mindfulness to be associated with meaningful outcomes, such as global measures of mental health (e.g., Brown and Ryan 2003; Baer et al. 2006). Therefore, the effort to identify how dispositional mindfulness might influence mental health is an important contribution to understanding of both mindfulness and mental health. Results provided support for the hypothesis that dispositional, naturally varying mindfulness impacts mental health in

part by first impacting other constructs, which in turn impact mental health. These mediating constructs include clarity about one's internal experience, the ability to regulate negative affect, the ability to view one's happiness as independent of external circumstances, and rumination.

A noteworthy finding from both studies was the greater importance to mental health of accepting one's experience, and refraining from judging it, relative to simply attending to it. In study 2, acceptance of one's experience was more important to positive and negative psychological functioning than any other construct in the model except the ability to regulate negative emotions. (The ability to regulate negative emotions was itself more strongly influenced by acceptance than by any of the other preceding variables in the model.)

### Limitations and Future Directions

These studies examined mindfulness as a dispositional, naturally varying difference. As Davidson (2010) notes, different experimental approaches to mindfulness—such as conceptualizing it as a naturally varying individual difference, a temporary state that can be manipulated via short-term laboratory studies, or an ability that is developed over the course of long-term training—may explore different constructs. If so, these different constructs could be associated with different mechanisms of action. Future studies might test the model presented here using other experimental designs to determine whether it generalizes to other ways of understanding mindfulness. The relationship between present-centered attention and psychological distress, in particular, may be different among those with significant mindfulness training.

Intervention designs would also provide stronger tests of the proposed mechanisms of action within the model. The present studies utilized correlational data to test the proposed model. The pattern of relationships we observed is consistent with what one would expect to see if some of the constructs assessed were the sequelae of others. Even so, our data do not provide as much support for the hypothesized relationships as could experimental manipulations. On the other hand, the form of mindfulness assessed with experimental manipulation could be different from that assessed when mindfulness is considered a naturally varying individual difference. In this case, results from studies with experimental manipulation may be less relevant for understanding dispositional mindfulness and its impact on mental health. Nonetheless, if results from studies with different experimental designs identify the same mechanisms of action, this would provide increased confidence in these mechanisms. Some questions that would be interesting to explore via experimental manipulation include: Do participants who undergo training in

present-centered attention and acceptance of experience improve their ability to identify their internal experience? Does this in turn increase their ability to manage negative affect and decrease rumination? Similarly, working backwards in the model, these results indicate that distressed clients are more likely to be ruminating, linking their happiness to external circumstances, having difficulty managing negative affect, and having difficulty identifying their internal experience. If so, does mindfulness training improve these abilities?

These studies relied upon self-report measures. An inherent confound exists in asking participants who may not regularly notice their present-moment experience to report how frequently they do this: They may not be paying enough attention to know that they are not paying attention. Similarly, it may be difficult for such participants to reflect on their recent experiences and accurately remember how often they were mindful. It would be worthwhile to confirm that the factor structure and structural relationships presented here remain when assessed with behavioral measures (e.g., Smallwood et al. 2007), or when mindfulness is sampled at multiple points in a day or over a period of days.

Lastly, the present model is not intended to be a complete and exhaustive representation of potential mediators in the relationship between mindfulness and mental health. Future studies might investigate other possible mechanisms of action in this relationship, such as exposure and desensitization to unpleasant emotional experiences (Baer 2003; Brown et al. 2007; Shapiro et al. 2006), decentering (also called re-perceiving or deautomatization; Baer 2003; Brown et al. 2007; Shapiro et al. 2006; Teasdale 1999), and positive reappraisal (Garland et al. 2009; Garland et al. 2010). Decentering involves the recognition that one's thoughts may not necessarily reflect reality. This awareness is hypothesized to allow a person to disengage from habitual thought patterns and subsequently perceive the world in different, and potentially more adaptive, ways through the process of positive reappraisal.

### Conclusions

Current measures of trait mindfulness do not crisply capture the essence of this naturally occurring individual difference. Mindfulness, as conceptualized by an interdisciplinary team of researchers (Bishop et al. 2004) and empirically supported by the two studies presented here, consists of two facets: present-centered attention and acceptance of experience. We suggest that several other constructs tapped by currently popular measures of mindfulness (e.g., the FFMQ), may be best viewed as important sequelae of mindfulness rather than facets of it, including the ability to

identify and differentiate among emotions and successfully regulate negative emotions. Our data also revealed that acceptance of one's experience matters more for mental health than does present-centered attention. Finally, although

flourishing mental health is far more than the absence of depression and anxiety, we discovered that trait mindfulness triggers processes that simultaneously optimize psychological functioning as well as alleviate psychological distress.

## Appendix

### Carolina Empirically Derived Mindfulness Inventory (CEDMI)

**Table 6** Please indicate below how often the following items are true for you

Five Facet Mindfulness Questionnaire items	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
1. When I'm walking, I deliberately notice the sensations of my body moving.	1	2	3	4	5
2. I criticize myself for having irrational or inappropriate emotions.	5	4	3	2	1
3. When I take a shower or bath, I stay alert to the sensations of water on my body.	1	2	3	4	5
4. I tell myself I shouldn't be feeling the way I'm feeling.	5	4	3	2	1
5. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.	1	2	3	4	5
6. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	5	4	3	2	1
7. I pay attention to sensations, such as the wind in my hair or sun on my face.	1	2	3	4	5
8. I make judgments about whether my thoughts are good or bad.	5	4	3	2	1
9. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.	1	2	3	4	5
10. I tell myself that I shouldn't be thinking the way I'm thinking.	5	4	3	2	1
11. I notice the smells and aromas of things.	1	2	3	4	5
12. I think some of my emotions are bad or inappropriate and I shouldn't feel them.	5	4	3	2	1
13. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.	1	2	3	4	5
14. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.	5	4	3	2	1
15. I pay attention to how my emotions affect my thoughts and behavior.	1	2	3	4	5
16. I disapprove of myself when I have irrational ideas.	5	4	3	2	1
Difficulties with Emotion Regulation Scale items	Almost never (0–10%)	Sometimes (11–35%)	About half the time (36–65%)	Most of the time (66–90%)	Almost always (91–100%)
17. When I'm upset, I become angry with myself for feeling that way.	5	4	3	2	1
18. When I'm upset, I become embarrassed for feeling that way.	5	4	3	2	1
19. When I'm upset, I feel ashamed for feeling that way.	5	4	3	2	1
20. When I'm upset, I feel like I am weak.	5	4	3	2	1
21. When I'm upset, I feel guilty for feeling that way.	5	4	3	2	1
22. When I'm upset, I become irritated with myself for feeling that way.	5	4	3	2	1

Reverse-scoring for questions 2, 4, 6, 8, 10, 12, 14, 16, and 17–22 has been incorporated into the coding for the response options, so that indicating “never or very rarely true” or “almost never” yields higher scores for these items. Depending upon the format in which the questionnaire is administered to participants (e.g., paper vs. electronically), researchers may choose to maintain a consistent presentation for participants, and then reverse-score the appropriate items later. Future research is needed to test whether the more precisely anchored response options of the DERS scale can be used for the FFMQ subscales. We do not anticipate problems with the choice to use the DERS response format for the entire CEDMI

#### Components

Attention: FFMQ observe=questions 1, 3, 5, 7, 9, 11, 13, and 15.

Acceptance: FFMQ nonjudging=questions 2, 4, 6, 8, 10, 12, 14, and 16.

Acceptance: DERS acceptance=questions 17, 18, 19, 20, 21, and 22.

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