


Self-Regulation Mechanisms Explain How Dispositional Mindfulness Promotes Well-Being

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Abstract

Most empirical studies of mindfulness have focused on the relation between mindfulness and decreased maladaptive outcomes (e.g. depression, anxiety, somatization disorders), and relatively fewer have examined the mechanisms linking dispositional mindfulness with adaptive outcomes such as well-being (e.g., happiness, life satisfaction, and positive affect). The goal of this study was to address this gap in our understanding by testing a theoretical model in which two distinct types of self-regulation (goal-directed self-regulation and cognitive emotion dysregulation) and perceived stress would mediate the relationship between dispositional mindfulness and well-being in a sample of 442 young adults. As hypothesized, goal-directed self-regulation partially mediated the relation between dispositional mindfulness and well-being. Additionally, self-regulation variables fully mediated the link between dispositional mindfulness and perceived stress. There was also an indirect relation between goal-directed self-regulation and well-being, through perceived stress. When these mediators were included in the model, the direct relation between dispositional mindfulness and well-being became smaller but was still present. Further, the hypothesized multi-step mediation model fit significantly better and improved the data fit indices versus the single-step mediation model comparator. Taken together, these data supported a meaningful role of self-regulatory processes and perceived stress in explaining the role of dispositional mindfulness in promoting well-being.

Keywords: Mindfulness, self-regulation, stress, well-being

Introduction

Mindfulness, or non-judgmental present moment awareness (Kabat-Zinn, 2003), has received an enormous amount of empirical attention in recent years, given the emergence of robust links between practicing mindfulness and a variety of positive mental and physical health outcomes (e.g., Carmody & Baer, 2008; Evans, 2010; Hofmann, Sawyer, Witt, & Oh, 2010; Lakhan & Schofield, 2013; Strauss, Cavanagh, Oliver, & Pettman, 2014). Mindfulness comprises trait-like and state-like behaviors (e.g., dispositional and situational;

Brown & Ryan, 2004) in that there are individual differences in its manifestation, yet it can also be increased during periods of mindful meditation practice. Dispositional mindfulness is defined here as the trait-like tendency to be mindful of one's experiences in daily life. While this is distinct from the intentional state of mindfulness that is achieved during mindfulness practice, one of the goals of mindfulness practice is to become more mindful in daily life, and meditation practice has been shown to be related to higher scores on measures of dispositional mindfulness (Baer, et al.,

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2006). Individual differences in dispositional mindfulness have been linked to differences in self-regulation and well-being as well as maladaptive outcomes (e.g. depression, anxiety, pain, and substance abuse; Atanes et al., 2015; Lykins & Baer, 2009).

Well-being is distinguishable from the mere absence of psychopathology and includes life satisfaction, happiness, and positive affect (Diener, 1984; Diener, Oishi, & Lucas, 2003). It is related to many positive outcomes, such as better physical and mental health, longevity, social connection, and productivity (CDC, 2016). This study is particularly focused on mechanisms of the relation of dispositional mindfulness to these positive aspects of well-being as the link between dispositional mindfulness and negative affect has been better studied.

Indeed, there has been little scientific study of whether and/or how dispositional mindfulness or mindfulness practices relate to improved health and well-being (Bishop, 2002). Many studies tout the wide-ranging benefits of mindfulness, but most often this is referring to a reduction in psychopathology rather than an increase in positive functioning (e.g. Gu, Strauss, Bond, & Cavanagh, 2015). Yet, several studies have documented that dispositional mindfulness as well as mindfulness practice relate to positive aspects of well-being. For example, Brown and Ryan (2003) showed that dispositional mindfulness was associated with more positive affect, vitality, life satisfaction, self-esteem, optimism, and self-actualization. A study of preadolescent youth demonstrated a significant increase in optimism, and a nearly (but not quite) significant increase in positive affect in a mindfulness practice group, compared to a control group (Schonert-Reichl & Lawlor, 2010). Two studies with cancer patients found that patients experienced improvements in well-being after completing mindfulness-based stress reduction (MBSR) training, including life satisfaction and joy (Kieviet-Stijnen, Visser, Garssen, & Hudig, 2008) and positive affect and quality of life (Branstrom, Duncan, & Moskowitz, 2010).

Though these descriptive results are encouraging and clearly show an important link between mindfulness and well-being, less work has examined why mindfulness confers advantages like enhanced positive functioning and well-being (Schreiber, 2008). The goal of this study was to examine multiple aspects of self-regulation (cognitive emotion dysregulation and goal-directed self-regulation) and perceived stress as putative mediators of the link between dispositional mindfulness and well-being.

Why Does Mindfulness Confer Benefits?

Multiple mechanisms have been proposed to account for the positive effects of mindfulness including improved behavioral self-regulation (Shapiro, Carlson, Astin, & Freedman, 2006; Vago & Silbersweig, 2012), reductions in ruminative cognitions (e.g. Teasdale et al., 2002; Lykins & Bayer, 2009), and emotion regulation (e.g., Arch & Craske, 2006; Goldin & Gross, 2010; Hölzel et al., 2011). In a meta-analysis by Gu and colleagues (2015), cognitive and emotional reactivity, mindfulness, rumination, and worry were identified as mediators of the relation between mindfulness and psychopathology. A study by Desrosiers and colleagues (2013) found both shared (e.g. rumination) and unique self-regulatory mechanisms linking mindfulness with anxiety (e.g. worry) and depression (e.g. reappraisal). However, these mechanisms were specific to psychopathology, not well-being. There are likely to be multiple important pathways by which mindfulness leads to well-being, which may or may not overlap with mechanisms that have been shown to underlie psychopathology. No model has yet considered behavioral (goal-directed self-regulation, like problem solving behaviors) and cognitive emotion dysregulation as concurrent mediating processes, although such an approach would enable assessment of the extent to which these different facets of self-regulation might explain the beneficial effects of mindfulness for well-being. Furthermore, stress is often examined as an outcome in mindfulness studies, but the level of stress an individual perceives may be another mechanism by which dispositional mindfulness relates to well-being. This study examines whether and to what extent two facets of self-regulation (goal-directed self-regulation and cognitive emotion dysregulation), and perceived stress mediate the link between dispositional mindfulness and well-being.

Goal-directed self-regulation. Persistence in working towards meaningful goals has been consistently related to happiness and psychological well-being (Eisenberg et al., 1996; Sheldon & Cooper, 2008). Individuals who are more dispositionally mindful may focus on priorities that are identified as meaningful, notice and self-correct when not aligned to goals, or recover from negative emotions more quickly when goals are thwarted. In fact, higher levels of self-reported mindfulness are associated with greater engagement in valued behaviors and interests (Brown & Ryan, 2003). In another study, higher self-reported mindfulness and meditation experience both related to better behavioral self-regulation regardless of emotional state (Lykins & Baer, 2009). Thus, behavioral self-regulation is linked to

mindfulness and well-being. Greater dispositional mindfulness (e.g., noticing inner and outer experiences with open, non-judgmental, non-reactive present moment awareness, and acting with awareness) would ostensibly support the ability to persist in working towards goals during conditions of challenge, and this ability to self-regulate in the service of making progress towards meaningful goals may represent a key mechanism accounting for the documented links between mindfulness and well-being. Thus, considering whether the consequences of individual differences in dispositional mindfulness for well-being are explained by maladaptive self-regulatory behaviors (e.g. procrastination, avoidance, and substance abuse) is an important next step for research in this area.

Cognitive emotion dysregulation. Cognitive emotion regulation refers to any attempt to manage one's emotions that relies on cognitive strategies for doing so (e.g., distraction, rumination, reappraisal; Garnefski & Kraaij, 2007). Self-blame, rumination, and catastrophizing have been identified as maladaptive cognitive strategies that tend to lead to greater emotional distress and dysregulation (Garnefski & Kraaij, 2007). Aspects of mindfulness like present moment awareness, attending to thoughts and emotions, and the capacity to notice and decide whether to believe or buy into the natural flow of thoughts may be associated with a reduced reliance on these ineffective strategies. Multiple measures of mindfulness have been negatively related to difficulties in emotion regulation (Baer, 2006), and a review of the neural mechanisms of mindfulness by Marchand (2014) described differences in brain activation among people with higher dispositional mindfulness during emotion regulation including the lateral frontal regions (cortical midline structures/default mode network), interoceptive attention to body sensations, and the amygdala. Dispositional mindfulness has been shown to relate to less rumination (Paul, et al., 2013), and Gu and colleagues (2015) concluded that rumination mediates the relation between mindfulness and psychopathology. Whether rumination or other forms of cognitive emotion dysregulation may be a mechanism by which mindfulness is linked to well-being has yet to be examined. The enhanced awareness of one's experiences that is facilitated by dispositional mindfulness may foster insight that cognitive emotion dysregulation strategies are not healthy or based in reality and enable people to see the impact this type of thinking is having on one's psychological well-being. If so, this may have implications for intervention studies

using mindfulness practice or other educational approaches to increase the use of effective emotion regulation strategies and reduce reliance on rumination, catastrophizing, and self-blame.

Perceived stress. Perceived stress is the degree to which an individual appraises a situation as stressful (Cohen, Kamarck, & Mermelstein, 1983). Regardless of objective stress levels, the perception of stress has been associated with multiple aspects of health including cortisol levels, sympathovagal modulation, telomere length, and well-being (Puterman, et al., 2010; Rotenberg & McGrath, 2016; Segrin, et al., 2007). Perceived stress has been strongly negatively related to both mindfulness and well-being among primary care providers (Atanes, et al., 2015), suggesting its potential importance in accounting for the positive effects of dispositional mindfulness. A study by Ciesla and colleagues (2012) found that less dispositionally mindful individuals were particularly vulnerable to the negative effects of stress and that this relationship was mediated by daily rumination. Thus, perceived stress has been related to mindfulness, well-being, and rumination and represents a promising direction for research examining mechanisms of mindfulness.

The Current Study

Despite increased empirical attention to mindfulness in the past few years, the psychological processes that explain the relation between dispositional mindfulness and subjective well-being are still not clear. We examined self-regulation and perceived stress as mediators of the relation between dispositional mindfulness and well-being in young adults. We used structural equation modeling (SEM) to compare single- and multi-step mediation models as an initial test of the proposed mechanisms. We hypothesized that a multi-step mediation model would better fit the data, wherein both cognitive emotion dysregulation and goal-directed self-regulation would mediate the relation from dispositional mindfulness to perceived stress and well-being, while perceived stress would in turn mediate the relation from cognitive emotion dysregulation and goal-directed self-regulation to well-being.

Method

Participants

Participants were 442 undergraduate students (72% women) at a large research university in the Inland Empire region of Southern California, between 18 and 28 years of age ($M = 19.89$ years, $SD = 1.84$). The sample was sociodemographically diverse: Asian (34%), Latino (30%), White (16%), African-American (8%), Middle

Eastern (3%) or Multi-Ethnic/Other (9%). Participants provided informed consent before beginning research activities.

Procedure

Participants were recruited from two psychology courses, Introductory Psychology and Health Psychology. A brief announcement about mindfulness and the study was made before class. Students interested in participating in the study completed the questionnaires via surveymonkey.com within two weeks of the announcement. Participants received research credit (Introductory Psychology—partial fulfillment of a research participation requirement) or extra credit (Health Psychology, an upper-division course) for completing the surveys. Surveys took approximately one hour to complete.

Stimuli and Measures

Dispositional mindfulness. The Five Facet Mindfulness Questionnaire (FFMQ) (Baer et al., 2006) includes 39 items assessing aspects of mindfulness like observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. Sample items are, “When I’m walking, I deliberately notice the sensations of my body moving” (Observing), and, “I tell myself I shouldn’t be feeling the way I’m feeling” (Non-judging; reverse-scored item). Responses (1 = never/very rarely true; 5 = very often/always true) were averaged to create subscales (α .75 to .91), which were averaged for use in analyses. Higher scores indicate greater dispositional mindfulness.

Perceived stress. The Perceived Stress Scale (PSS-10; Cohen, Kamarck, & Mermelstein, 1983) asks about the extent to which each of ten possible life situations had affected participants during the last month using a 5-point scale (1 = not at all; 5 = very much; for example, “In the last month, how often have you felt nervous and stressed?”). Responses were averaged and higher scores indicate greater perceived stress (α = .86).

Goal-directed self-regulation. A 4-item scale assessing capacity to work toward goals from the Self-Regulation Questionnaire was used (SRQ; Brown, Miller, & Lawendowski, 1999). Example items include, “I am able to accomplish goals I set for myself,” and, “I usually keep track of my progress toward my goals” (1 = strongly disagree, 5 = strongly agree), and higher scores indicate better goal-directed self-regulation (α = .69).

Cognitive emotion dysregulation. The Cognitive Emotion Regulation Questionnaire-Short (CERQ-short; Garnefski & Kraaij, 2006) self-blame, rumination, and catastrophizing subscales were used to assess cognitive emotion dysregulation. Self-blame assessed

preoccupation with thoughts about personal mistakes and sense of guilt (e.g., “I feel that I am the one who is responsible for what has happened”; α = .68). Rumination assessed preoccupation with feelings and thoughts related to a negative experience (e.g., “I am preoccupied with what I think and feel about what I experienced”; α = .73). Catastrophizing assessed the extent to which participants reported recurring thoughts about how their experience was far worse than others’ (e.g., “I continually think how horrible the situation has been”; α = .81). Participants responded to each item using a 5-point scale (1 = never; 5 = always) and higher scores indicate more dysregulation.

Subjective well-being. Subjective well-being was indexed by happiness, life satisfaction, and positive affect. Happiness was assessed by a single item; how happy participants were in comparison to their peers (1 = “a lot less happy”; 5 = “a lot more happy”). Life satisfaction was also measured with a single item; “In general, how satisfied are you with your life?” (1 = very dissatisfied; 5 = very satisfied). Positive affect was assessed using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The positive affect subscale consisted of 10 words that described different positive feelings and emotions (e.g., “interested,” “strong,” “inspired”). Participants indicated the extent to which they generally felt each emotion using a 5-point scale (1 = not at all; 5 = extremely); α = .85. On all three measures, higher scores indicate greater subjective well-being.

Analytic Approach

We investigated whether the relation between mindfulness and well-being was mediated by cognitive emotion dysregulation, goal-directed self-regulation, and perceived stress. We assessed one predictor (dispositional mindfulness), three mediators (a latent cognitive emotion dysregulation variable, goal-directed self-regulation, and perceived stress), and one latent outcome variable (well-being). The cognitive emotion dysregulation latent variable was indicated by three manifest variables (self-blame, rumination, and catastrophizing). The well-being latent variable was indicated by three manifest variables (happiness, life satisfaction, and positive affect). We used SEM to compare two theoretically-grounded mediation models. The first was a basic model examining the relations among mindfulness, well-being, and the potential mediators with only a single step of mediation. The second was the hypothesized model, which allowed for an additional step of mediation in which goal-directed self-regulation and cognitive emotion dysregulation

could additionally mediate the relation between mindfulness and perceived stress, and allowed indirect paths from self-regulation variables to well-being through perceived stress. Note that the goal of our modeling approach was to compare two mediation models as a first step toward providing clarity about the mechanisms by which dispositional mindfulness confers benefits to well-being. We did not seek to confirm a specific or “final” model in this study, and thus were more concerned with improvement in model fit from the first to second models than with indices of absolute goodness of fit (Kline, 2016; Raykov & Marcoulides, 2006; Schreiber, 2008). This approach thus contributes initial evidence for the nature of these self-regulatory

mechanisms. SEM analyses were conducted using MPlus Version 6.11 (Muthén & Muthén, 1998). When data were missing, parameter estimates and model tests were pursued in the context of Maximum Likelihood (ML) methods.

Results

Tables 1 and 2 provide descriptive statistics and intercorrelations among variables. Following recommendations of Tabachnick and Fidell (2012), data were screened to ensure sufficient multivariate normality and linearity, and no transformations or corrections were needed (skewness and kurtosis were within acceptable ranges for all variables).

Table 1. Means and standard deviations for study variables

	<i>M</i>	<i>SD</i>
<u>Predictor</u>		
Mindfulness (0-25)	16.19	2.02
<u>Mediators</u>		
Goal-directed self-regulation (1-5)	3.72	0.63
Cognitive emotion dysregulation (3-15)	6.44	0.88
Perceived stress (0-4)	1.64	0.64
<u>Outcome</u>		
Subjective Well-Being		
Happiness (1-5)	3.38	0.87
Life satisfaction (1-5)	3.79	0.85
Positive affect (10-50)	33.53	7.10

Structural Equation Models

Both the single-step and multi-step models ($N = 442$) were evaluated to determine whether the hypothesized multi-step model more closely fit the data. Standardized results are reported for ease of interpretation. Model fit was evaluated by comparing several goodness-of-fit indices, and these are presented in Table 3. Fit indices included the chi-square to degrees of freedom ratio

(χ^2/df), the comparative fit index (CFI), the Akaike information criterion (AIC), the Bayesian information criterion (BIC), standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). When comparing two models, a smaller numeric value for AIC and BIC is considered evidence of better model fit. A $\Delta\chi^2$ test was used to evaluate nested models.

Table 2. Correlations between study variables

	1	2	3	4	5	6	7	8
1 Mindfulness								
2 Goal-directed self-regulation	.474**							
3 Perceived stress	-.469**	-.341**						
4 CERQ catastrophizing	.423**	.188**	-.515**					
5 CERQ self-blame	.187**	.118*	-.218**	.284**				
6 CERQ rumination	.118*	.01	-.233**	.289**	.254**			
7 Happiness	.364**	.343**	-.519**	.280**	.06	.123*		
8 Life satisfaction	.415**	.398**	-.585**	.359**	.158**	.146*	.592**	
9 Positive affect	.528**	.557**	-.338**	.173**	.04	-0.007	.393**	.510**

Note. CERQ = Cognitive emotion regulation questionnaire; ** $p < .01$; * $p < .05$.

Both the measurement and the structural levels of the SEM models were tested. We first looked at the measurement model for both latent variables: cognitive emotion dysregulation and well-being (each indexed by multiple variables), to assess whether and how well each indicator loaded onto the latent variables. We followed contemporary guidelines that define factor loadings of $> .30$ as acceptable (Hair, Black, Babin, & Anderson, 2006; Tabachnik & Fidell, 2012). As expected, self-blame ($\beta = .39, SE = .06, p < .01$), catastrophizing ($\beta = .75, SE = .07, p < .01$), and rumination ($\beta = .36, SE = .06, p < .01$), all significantly loaded onto the cognitive emotion dysregulation latent variable (see Figure 1A). Similarly, happiness ($\beta = .69, SE = .03, p < .01$), life satisfaction ($\beta = .80, SE = .03, p < .01$), and positive affect ($\beta = .64, SE = .04, p < .01$), all significantly loaded onto the well-being latent variable (see Figure 1B).

Mindfulness and well-being models. In the basic comparison model, the three proposed mediators were entered as a single mediation step and tested all together

in the model. This model fit the data poorly: $\chi^2(30) = 253.07, p < 0.01, \chi^2/df = 8.436, CFI = 0.82, RMSEA = 0.13$ (90% CI: 0.12-0.15), AIC = 10999, BIC = 11122. Mindfulness was significantly related to all three mediators in the model (see Figure 2). Further, two of the three proposed mediators were significantly related to well-being: goal-directed self-regulation ($\beta = .32, SE = .05, p < .01$), and perceived stress ($\beta = -.50, SE = .05, p < .01$). In contrast, cognitive emotion dysregulation did not significantly predict well-being ($\beta = .01, SE = .07, p = .86$). The direct relation between mindfulness and well-being was significant ($\beta = .21, SE = .06, p < .01$), suggesting that the relation was only partially mediated. While we did not have specific expectations about gender, age, or ethnicity, we explored these as covariates. Gender was the only significant covariate, with female identification predicting perceived stress only ($\beta = .16, SE = .04, p < .01$). The other covariates did not relate to well-being or to any other variable, and were thus dropped from the final model for parsimony.

Table 3. SEM fit indices

Model	χ^2	df	p	χ^2/df	CFI	AIC	BIC	SRMR	RMSEA (CI)
single-step	253.072	30	<.001	8.436	.816	10999.076	11121.816	.079	.130 (.115-.145)
multi-step	145.242	28	<.001	5.187	.904	10895.246	11026.168	.054	.097 (.082-.113)

Next, we tested the hypothesized multi-step mediation model (Figure 3). The fit indices indicated a relatively poor fit for this model as well, $\chi^2(28) = 145.24, p < .01; \chi^2/df = 5.19; CFI = 0.90; RMSEA = 0.10$ (90% CI: 0.08-0.11); AIC = 10895; and BIC = 11026. But, as anticipated the model fit was a significant improvement over the previous model, $\Delta\chi^2(2) = 107.83, p < .01$. Comparing the fit indices of the multi-step model to the

single-step model (Table 3), also indicated improvement in fit. The AIC and BIC are smaller than the comparison model, and the χ^2/df ratio, RMSEA, SRMR and CFI all improved. Thus, the addition of the paths from cognitive emotion dysregulation and goal-directed self-regulation to perceived stress as mediators of the relationship between mindfulness and well-being resulted in meaningful improvements to the model

Table 4. Direct, Indirect, and Total effects of Mindfulness on well-being for the multi-step model

Model	Direct Effect	Indirect Effect	Indirect Effect SE	Indirect Effect p	Total Indirect Effect	Total Indirect Effect SE	Total Indirect Effect p
Mindfulness	.204				.372	.039	< .001
Goal-directed self-regulation		.151	.025	< .001			
Cognitive emotion dysregulation		-.005	.039	.905			
Perceived stress		.046	.030	.121			
Goal-directed self-regulation and perceived stress		.042	.011	< .001			
Cognitive emotion dysregulation and perceived stress		.138	.030	< .001			

Discussion

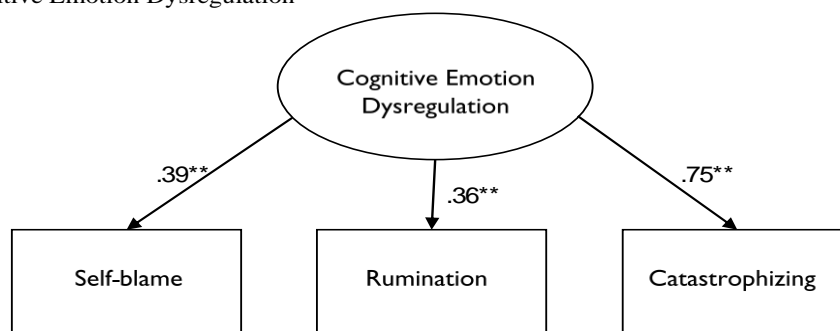
In this model, mindfulness was still a significant predictor of well-being, $\beta = .20$, $SE = .05$, $p < .01$. Mindfulness also strongly predicted goal-directed self-regulation ($\beta = .48$, $SE = .05$, $p < .01$), and cognitive emotion dysregulation ($\beta = -.50$, $SE = .05$, $p < .01$). Cognitive emotion dysregulation ($\beta = .57$, $SE = .06$, $p < .01$), and goal-directed self-regulation ($\beta = -.18$, $SE = .04$, $p < .01$) significantly predicted perceived stress. With the inclusion of paths from cognitive emotion dysregulation and goal-directed self-regulation to perceived stress, the relation between mindfulness and perceived stress was no longer significant, $\beta = -.09$, $SE = .06$, $p = .118$ supporting our hypothesized multi-step mediation model. Again, gender was a significant covariate, with being female predicting greater perceived stress, $\beta = .18$, $SE = .04$, $p < .01$.

Further supporting our hypothesized multi-step model, greater perceived stress had a strong direct association to lower well-being, $\beta = -.49$, $SE = .06$, $p < .01$, and the effect of goal-directed self-regulation on well-being persisted, $\beta = .32$, $SE = .05$, $p < .01$. Additionally, the model contributed an additional indirect effect from mindfulness and goal-directed self-regulation to well-being through perceived stress (Table 4; indirect effect of $.04$, $SE = .01$, $p < .01$), and the indirect effect from mindfulness and cognitive emotion dysregulation to well-being through perceived stress (Table 4; indirect effect of $.14$, $SE = .03$, $p < .01$).

Two possible mediation models examining the relation of dispositional mindfulness to well-being were compared. The hypothesized multi-step model fit the data significantly better than the single-step model. This indicates that self-regulation variables (goal-directed self-regulation and cognitive emotion dysregulation) mediated the relationship between dispositional mindfulness and perceived stress, demonstrating that these two self-regulatory abilities may account for the way that mindfulness reduces stress. That is, the model supports the possibility that as hypothesized, dispositional mindfulness leads to greater goal-directed self-regulation and reduced cognitive emotion dysregulation, which leads to reduced stress, which leads to improved well-being.

Goal-directed self-regulation mediated the relationship from dispositional mindfulness to well-being both directly and indirectly through perceived stress. This suggests that behavioral self-regulation and more specifically, the ability to self-regulate to accomplish goals in the face of challenges, is an important mechanism linking dispositional mindfulness and well-being. This aligns with data showing that working towards an important goal (especially one that is intrinsically motivated) relates to greater happiness (Sheldon & Houser-Marko, 2001; Sheldon, Ryan, Deci, & Kasser, 2004).

1A. Cognitive Emotion Dysregulation



1B. Well-Being

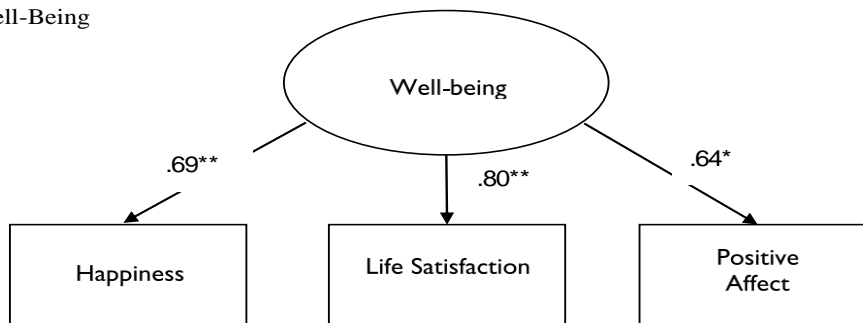


Figure 1. Measurement model for latent variables

Note. Estimates are standardized. ** $p < .01$

The direct path from cognitive emotion dysregulation to well-being was unexpectedly indistinguishable from zero. Interestingly, the relation of cognitive emotion dysregulation to perceived stress was descriptively greater than the relation from goal-directed

self-regulation to perceived stress. This lends evidence to the role of cognitive emotion dysregulation in the relation between dispositional mindfulness and perceived stress.

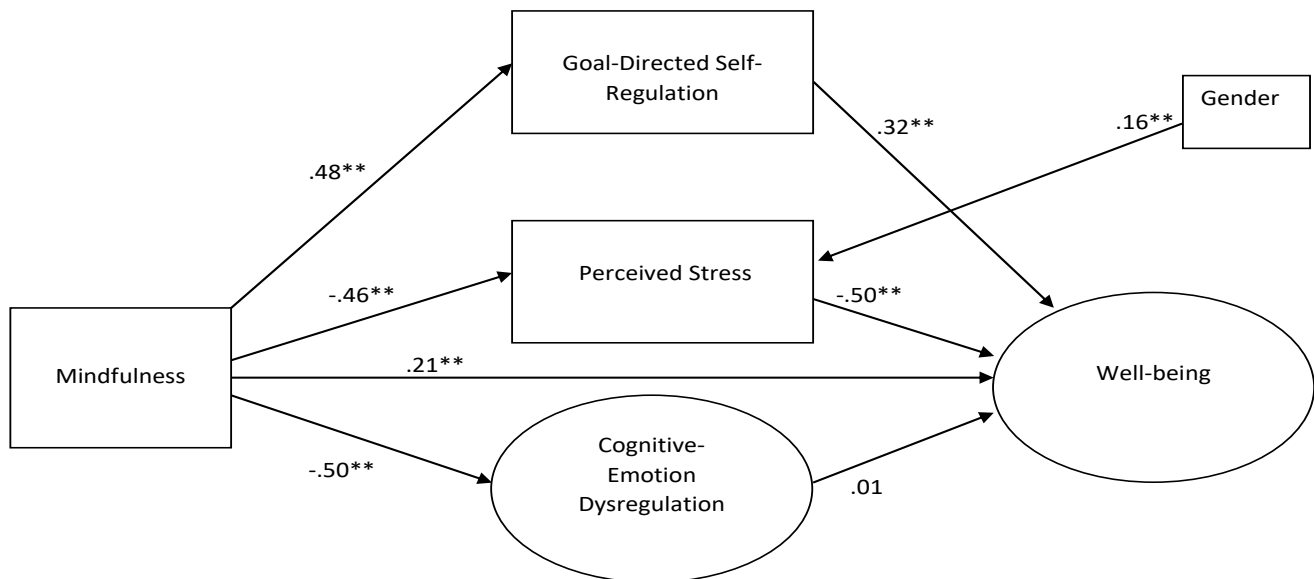


Figure 2. Basic single-step mediation model for well-being

Note. Estimates are standardized.

** $p < .01$.

Finally, though these proposed mechanisms attenuated the relation, a modest direct relation between dispositional mindfulness and well-being persisted. This indicates something beneficial about mindfulness for well-being above and beyond its benefits through goal-directed self-regulation, cognitive emotion dysregulation, and perceived stress. Perhaps there was another important self-regulatory mediator, like attention deployment or self-awareness, that was not included but would be important for future research to consider. Given the improved fit of the hypothesized, multi-step model and our analytic goal of providing a first step toward clarifying the mechanisms linking dispositional mindfulness and well-being, this idea is worthy of further examination. Taken together, our findings largely supported the hypothesized cognitive, emotional, and behavioral self-regulatory role of dispositional mindfulness for reducing perceived stress and increasing well-being.

Because this study used self-reported measures, as with all self-reported data, it is important to acknowledge the possibility of reporting bias. For example, some participants could have given answers designed to present themselves in a positive light, or responded based on ideals (e.g., her ideals for goal accomplishment, how happy he wants to be, etc.), instead of providing accurate

answers. However, participants were instructed that their survey responses would be kept confidential and used only in aggregate to increase the likelihood of accurate answers. When measuring internal experiences, moods, and thoughts, though, as in this study, a self-report approach has many advantages over other data collection techniques. Another potential limitation was our reliance on a 1-item measure of happiness and life satisfaction—though these were selected to minimize participant burden, future work could consider using other surveys to capture these constructs.

The primary goal of this study was to gain insights into the processes by which dispositional mindfulness relates to well-being. Although many correlational and intervention studies have examined the link between mindfulness and health outcomes, less work has documented the mechanisms of these associations. Using multiple steps of mediation enabled us to clarify how the link between dispositional mindfulness and well-being may be mediated sequentially, first through self-regulatory mechanisms, and then through perceived stress. This evidence for a sequential mediation pattern is valuable, because it highlights a particularly promising direction for future research in this area—to consider multiple mediating variables in studies of mechanisms of mindfulness.

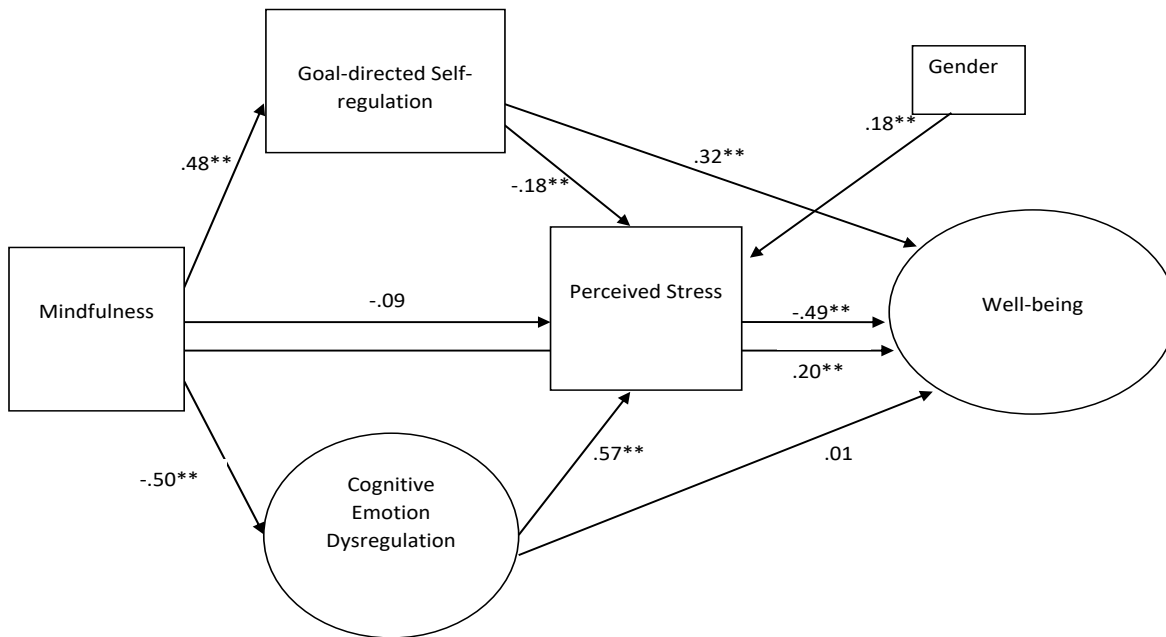


Figure 3. Hypothesized multi-step mediation model predicting perceived stress and well-being

Note. Estimates are standardized.

** $p < .01$.

When looking at the study results altogether, several key findings emerge. First, while neither model was an ideal fit, the hypothesized, theory-driven, two-step mediation model was a better fit of the data than the basic model. Although our goal for this study was to provide preliminary evidence for the putative mechanisms linking dispositional mindfulness and well-being, not to confirm a “best” model, exploration of additional mechanisms and models represents a promising direction for future work. Second, this study demonstrated that both cognitive emotion dysregulation and goal-directed self-regulation mediated the relation from dispositional mindfulness to perceived stress, consistent with a view of these processes as two distinct but related components of self-regulation. Third, dispositional mindfulness had similarly strong relations to both cognitive and behavioral aspects of self-regulation, even when both aspects differed in the degree to which they mediated the relation from dispositional mindfulness to perceived stress and well-being. Specifically, cognitive emotion dysregulation was more strongly linked to perceived stress than was goal-directed self-regulation, likely because of the emotion-based similarity between dysregulation and perceived stress. In contrast, goal-directed self-regulation directly mediated the link between dispositional mindfulness and well-being, whereas cognitive emotion dysregulation did not, aligning with previous studies showing that working towards meaningful goals increases happiness. Finally, the relation between dispositional mindfulness and well-

being was reduced but persisted, even with all three mediators in the model, further supporting the importance of considering individual differences in dispositional mindfulness for a complete understanding of people’s well-being.

In conclusion, these findings suggest that the aspects of mindfulness training and exercises that develop self-regulation capabilities may be particularly crucial for reducing perceived stress and improving life satisfaction and happiness. An important implication of this work is that learning to become mindful or improving self-regulation abilities may be especially beneficial for individuals who have lower dispositional mindfulness to begin with. Our findings suggest that dispositional mindfulness works to reduce perceived stress by improving self-regulation in the form of enhanced goal-directed self-regulation and reduced cognitive emotion dysregulation. This makes sense, given that non-judgmental present moment awareness can increase noticing and focusing on meaningful goals and foster a bottom-up style of cognitive processing that reduces maladaptive thought patterns such as self-blame, catastrophizing, and rumination. We also found that perceived stress was significantly related to well-being and a key mediator of the relation from goal-directed self-regulation to well-being, as predicted. Improving goal-directed self-regulation and reducing perceived stress are potentially important targets for preventative interventions designed to improve health and well-being. The knowledge gained from this investigation about

goal-directed self-regulation, cognitive emotion dysregulation, and perceived stress as potential mechanisms of dispositional mindfulness has meaningful implications for future research and intervention work aimed at reducing stress and improving well-being.

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