

ASSESSING THE IMPACT OF MINDFULNESS AND LIFE STRESS ON MATERNAL
WELL-BEING

BY

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THESIS

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ABSTRACT

Dispositional mindfulness has been shown to protect against affective symptoms in the general population. However, very little is known about whether and how these benefits may extend to a particularly high-risk period for affective distress—the postpartum. In this study, we tested within-person and between-person associations between maternal mindfulness and symptoms of anxiety and depression across the first 18 months postpartum. We further investigated whether mindfulness moderated the effect of life stress on mothers' symptoms. Participants were 89 mothers from a larger longitudinal study on mother-infant stress regulation. Mothers completed self-report measures of dispositional mindfulness, life stress, anxiety, and depression at 3, 6, 12, and 18-months postpartum. Hierarchical linear modeling was used to assess the impact of mindfulness and life stress on both symptom trajectories and deviations from those trajectories over time. Absolute levels of maternal mindfulness predicted lower maternal depression symptoms at 18 months, and relative increases in mindfulness predicted concurrent decreases in both anxiety and depression symptoms over time. There was no evidence for moderated effects; rather, life stress related independently to anxiety and depression. Implications for understanding mindfulness as a dynamic construct and potential applications to improving postpartum mental health are discussed.

Keywords: Dispositional Mindfulness; Life Stress; Mother; Anxiety; Depression

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CHAPTER 1: LITERATURE REVIEW

Women are particularly vulnerable to affective disorders during the postnatal period (Goodman, Watson, & Stubbs, 2016; O'Hara & Wisner, 2014). Even when the severity of symptoms does not meet criteria for clinical significance, many women experience mild to moderate levels of distress and impairment after childbirth (O'Hara et al., 2014). These affective symptoms impact not only the mother's well-being but also her ability to engage with and provide adequate care to her infant (Field, 2010). Early parenthood is therefore a critical period in which the well-being of multiple members of a family may be at risk. Ascertaining which environmental or individual characteristics make this time more or less risky for maternal mental health is a prerequisite to alleviating the stress of this transition and preventing its potentially deleterious effects. In recent years, mindfulness has been proposed as one individual-level characteristic that can protect against affective distress and promote well-being (Brown & Ryan, 2003). However, little is known about how individual differences in mindfulness relate to maternal symptoms of anxiety and depression during the postnatal period. The current study was designed to examine whether dispositional mindfulness helps protect women against symptoms of anxiety and depression during early motherhood, both as an independent influence and as a potential buffer against difficulties in the larger context of their lives.

Mindfulness involves bringing a present-centered, non-judgmental awareness to one's experience as it unfolds; this includes becoming aware of and accepting the pleasant and unpleasant aspects of one's thoughts, emotions, and physical sensations (Brown & Ryan, 2003). Mindfulness can be conceptualized and measured in one of two ways: as a predisposition to be mindful (Brown & Ryan, 2003; Rau & Williams, 2016), and as a practice-based skill that one can learn to exercise in one's daily life (Bishop et al., 2004). While both forms of mindfulness

have been related to positive psychological outcomes, there is some specificity as to which outcomes they are related to (see review by Keng, Smoski, & Robins, 2011), making it important to distinguish effects of both mindfulness practice and dispositional measures in non-practitioners.

To date, the majority of the research on mindfulness in the perinatal period has approached the construct as a teachable skill that could reduce maternal distress. Mindfulness-based interventions have been shown to decrease self-reported maternal anxiety, depression, and stress (Dimidjian et al., 2016; Dunn, Hanieh, Roberts, & Powrie, 2012; Perez-Blasco, Viguier, & Rodrigo, 2013; Rowe et al., 2014). In particular, Dimidjian et al. (2016) found that mindfulness practice reduced rates of relapse and symptom severity in women with histories of depression up to 6 months postpartum. Similarly, Duncan and Bardacke (2010) found that engaging in a 9-week mindfulness-based parenting program reduced symptoms of both anxiety and depression in pregnant women by the end of the third trimester.

The findings from these studies suggest that mindfulness plays an important role in alleviating affective symptoms, but their focus is specifically on mindfulness practice. To the best of our knowledge, there are only a few studies that have examined dispositional mindfulness in the perinatal period, and the measurement of maternal outcomes has been limited. Braeken et al. (2016) found that more mindful women tended to have fewer depressive symptoms both during and after pregnancy, and van den Heuvel et al. (2015) found that maternal mindfulness during pregnancy related to lower prenatal anxiety. These findings are consistent with studies in the general population suggesting that dispositional mindfulness contributes to reductions in anxiety and depression (see review by Keng, Smoski, & Robins, 2011), but more work is required to fully delineate the nature of this relationship during early parenthood.

One under-studied dimension is time; intra-individual fluctuation in maternal affective symptoms across pregnancy and the postpartum (Monti, Agostini, Marano, & Lupi, 2008; Agrati et al., 2015) suggests that these processes should be assessed longitudinally in order to uncover factors driving symptom exacerbation vs. recovery. The need to study postnatal affective symptoms over time is made all the more pressing by research which shows that there may be trajectory-specific effects of maternal depressive symptoms on child development (Laurent, Ablow, & Measelle, 2011; Brennan et al., 2000). In particular, evidence that the chronicity of maternal affective symptoms prospectively predicts child physiological and behavioral regulation (Laurent et al., 2011; Luoma et al., 2001) highlights the importance of identifying factors that can predict the time course of perinatal depression and anxiety. Given its negative relationship with affective symptoms, dispositional mindfulness may be one potential predictor of between-mother differences in affective symptom trajectories, but this possibility has not yet been addressed.

Beyond mean-level differences in maternal mindfulness, there may be a dynamic interplay between relative shifts in mindfulness and affective symptoms over time. For example, even a person who is generally low in mindfulness may experience less affective distress at times when they are able to be more mindful than is usual for them. Because dispositional mindfulness has typically been conceptualized as a stable construct, its relationship with affective symptoms has consistently been assessed using a single measurement taken either pre- or post-natal. There is reason to believe that dispositional mindfulness can vary within individuals, though, particularly in the context of major life changes such as the birth of a child. A meta-analytic review by Quaglia et al. (2016) found that continued mindfulness practice led to increases in dispositional mindfulness over time, with effect sizes ranging from small to moderate. Recent

advances in the personality literature also suggest that mean-level changes in traits occur throughout the lifespan, and that the direction of the change is linked to specific life experiences (Roberts & Mroczek, 2008). An investigation of affective symptoms as they relate to dispositional mindfulness over time has yet to be conducted. Doing so could add a critical dimension to our understanding of how mindfulness works, and may aid in the design and implementation of mindfulness-based interventions.

Prior research in this domain has also not yet elucidated the specific paths by which mindfulness qualities may protect women's well-being across early motherhood. One proposal in the general literature on dispositional mindfulness is that it acts as a buffer against the negative effects of stressful life events on well-being (see Brown, Weinstein, & Cresswell, 2012). This idea is particularly relevant to early parenthood because welcoming a new child into a family is often a difficult process accompanied by multiple stressors (e.g., changes in work/employment and in intimate relationships). It is possible that higher levels of dispositional mindfulness during this time increases one's ability to cope with the compounded stress of having a child, and thus decreases one's vulnerability to affective symptoms. While this proposal has received empirical support outside of the parenting context in both adult (Bergomi et al., 2013; Feldman, Lavalley, Gildawie, & Greeson, 2016) and adolescent (Marks, Sobanski, & Hine, 2010) populations, it has not yet been studied in parents of young infants.

Furthermore, it is not well known whether there are particular aspects of mindfulness that are especially relevant for decreasing affective symptoms. Mindfulness has been proposed to be a multi-faceted construct that consists of the skills of Observing, Describing, Non-judgment, Non-reactivity, and Acting with Awareness (Baer et al., 2006). Baer et al. (2006; Baer et al., 2008) have found all facets except Observing to contribute to reductions in psychological

distress in both student and community samples, with higher levels of Observing instead being related to greater psychological distress. When it comes to affective symptoms, some studies have found that certain facets of mindfulness matter more for reducing anxiety while others do for reducing depression, but there are a number of conflicting findings in the field (Baer et al., 2006; Desrosiers, Klemanski, & Nolen-Hoeksema, 2013) and more systematic work is needed.

The research reviewed above suggests that mindfulness may have beneficial effects on maternal mental health, but more empirical work is required to explicate how dispositional mindfulness may protect against depression and anxiety across the postnatal period. In particular, there are gaps in knowledge of (a) associations between mindfulness and temporal trajectories of maternal symptoms, (b) how mindfulness works with life stress to predict postnatal symptoms (i.e., as independent or interactive influences), and (c) the relative importance of specific mindfulness dimensions in relation to maternal symptoms of anxiety and depression. The present study was designed to address these gaps. In particular, we investigated mothers' affective symptoms across the first 18 months postnatal in relation to both absolute levels of and relative change in dispositional mindfulness. In addition, we tested the stress buffering hypothesis of mindfulness by examining whether dispositional mindfulness moderated the impact of stressful life events on maternal mental health. Given the evidence presented above, we expected that mothers higher in dispositional mindfulness would exhibit lower symptoms of anxiety and depression over time—a between-person association (H1); mothers' symptoms of anxiety and depression would decrease as their levels of dispositional mindfulness increased over time—a within-person association (H2); mothers who experienced more stressful life events would report higher symptoms of anxiety and depression (H3); and that the impact of stressful life events on maternal symptoms would be mitigated by dispositional mindfulness (H4). To provide a more

fine-tuned understanding of the relationship between maternal mindfulness and affective symptoms, we also explored whether specific aspects of dispositional mindfulness were particularly relevant for reducing anxiety versus depression. In the absence of solid prior evidence for mindfulness facet-specific effects on maternal affective symptoms, we approached this question in an exploratory manner.

CHAPTER 2: METHODS

Participants

Participants were recruited as part of a larger study on mother-infant stress regulation from the Women Infants Children (WIC) program and other community agencies that serve low-income families. In order to be eligible, participants had to speak English, have given birth to an infant less than 12 weeks ago, and remain in the area where the study was being conducted until the infant in question was 18 months old. All cases with data on the variables of interest at one or more time-points were included in the present study, and final analyses were based on 89 out of 91 total cases. Demographic information on the overall sample can be found in Laurent (2017).

Procedure

All study procedures were approved by the University of Oregon Institutional Review Board, and mothers were required to provide written informed consent to all procedures prior to participation. Mothers completed questionnaires assessing the variables of interest via Qualtrics at 3, 6, 12, and 18 months postnatal. The procedures relevant to the current work are described here; for a more thorough overview of the larger study, see Laurent (2017).

Measures

Depression. Mothers provided self-reports of depressive symptoms at each of the four assessments using the Center for Epidemiologic Studies Depression scale (CESD; Radloff, 1977). Example items on the CESD include: “I felt lonely” and “I had crying spells.” Mothers rated how much they experienced each item during the past week on a four-point scale from 1 (rarely or none of the time; less than one day) to 4 (most or all of the time; 5-7 days a week). Reliability of the CESD ranged from .86-.89 across assessments. Total scores were calculated for each measurement of depression and standardized prior to analysis.

Anxiety. Maternal anxiety was assessed at each time-point using the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). Example items on the BAI include “Fear of worst happening” and “Shaky or unsteady.” Mothers rated how much they experienced each item during the past month on a four-point scale from 1 (not at all) to 4 (severely – it bothered me a lot). Total BAI scores were calculated at each time-point and standardized prior to analysis. Reliability of the BAI ranged from .87-.94 across assessments.

Dispositional Mindfulness. Levels of maternal mindfulness were assessed at each of the four time-points using the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). The FFMQ has 39 items that tap 5 subscales: Observing, Describing, Acting with Awareness, Non-judging of inner experience, and Non-reactivity to inner experience. Each item is rated on a five-point scale from 1 (never or rarely true) to 5 (very often or always true) based on the extent to which respondents think each statement generally applies to them. Example items on the FFMQ include “When I am walking, I deliberately notice the sensations of my body moving” and “I make judgments about whether my thoughts are good or bad” (reversed). Scores for each subscale as well as a total score were calculated at each time-point and standardized before analysis. The reliability of the overall scale ranged from .81-86 across assessments.

Life Stress. Life stress was assessed at each time-point using the Psychiatric Epidemiology Research Interview Life Events Scale (PERI LES; Dohrenwend, Krasnoff, Askenasy, & Dohrenwend, 1978). The PERI LES consists of 102 items, each of which represents a significant life event—e.g. “Changed jobs for a worse one” and “Divorce.” Each of the items or events belongs to one of eleven Topic Areas: School, Work, Love and Marriage, Having Children, Family, Residence, Crime and Legal Matters, Finances, Social Activities, Health, and Miscellaneous. The PERI LES thus allows for a thorough assessment of the number of stressful

events experienced by an individual in different life domains. For our purposes, mothers self-reported whether the events happened to them at any point since the birth of their child (at the first time-point) or since the last assessment (at all subsequent time-points). A total score (summed across the eleven Topic Areas) was calculated for each time-point and standardized for analyses.

Planned Analyses

Hierarchical linear modeling (HLM) using the HLM 6.08 program (Raudenbush, Bryk, & Congdon, 2004) was selected to analyze the effects of dispositional mindfulness and life stress on the trajectory of maternal affective symptoms in the first 18 months postnatal. The HLM approach divides variability in the outcome into within-person and between-person components to obtain more accurate standard errors for testing regression coefficients. Within-person effects are examined at Level 1 and provide estimates of each mother's symptom trajectory from 3-18 months postnatal. Between-person effects are examined at Level 2 and explain the differences between mothers' symptom trajectories. Full information maximum likelihood estimation was used to arrive at parameter estimates in the presence of missing data.

Anxiety and depressive symptoms served as outcomes in separate models. We first fit baseline models without any hypothesized predictors in order to describe sample-wide symptom trajectories. Mother anxiety/depression was modeled at Level 1 with an intercept (β_0 , representing symptom levels at 18 months postnatal) and linear term (β_1 , representing the rate of change from 3 to 18 months). If found to improve model fit, a quadratic term (β_2 , representing the steepness of a curvilinear trajectory) was added as well. Then, we added explanatory predictors at Level 1 and Level 2 to explain within-person and between-person variability in symptoms. Total scores for dispositional mindfulness and life stress at each time were entered as

group mean-centered, time-varying predictors at Level 1. Mean scores across the four time-points for dispositional mindfulness and life stress were entered as grand mean-centered predictors of between-person variability in intercepts and slopes at Level 2. This pattern of mean-centering allows for a clear delineation of the within- and between-person effects of Level 1 and Level 2 predictors, respectively. Our models therefore simultaneously estimated associations between maternal symptoms and both absolute levels of mothers' overall mindfulness/life stress (Level 2 effect) and relative shifts in mothers' mindfulness/life stress from one time to the next (Level 1 effect). For illustration, the two-level equations testing (a) main effects of dispositional mindfulness and life stress, and (b) dispositional mindfulness x life stress interaction effects on mothers' anxiety symptoms are shown:

(a)

Level 1

$$\text{Mother Anxiety} = \beta_0 + \beta_1(\text{time}) + \beta_2(\text{concurrent FFMQ}) + \beta_3(\text{concurrent LES}) + \text{error}$$

Level 2

$$\beta_0 = \gamma_{00} + \gamma_{01}(\text{FFMQ mean}) + \gamma_{02}(\text{LES mean}) + \text{error}$$

$$\beta_1 = \gamma_{10} + \gamma_{11}(\text{FFMQ mean}) + \gamma_{12}(\text{LES mean}) + \text{error}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30}$$

(b)

Level 1

$$\text{Mother Anxiety} = \beta_0 + \beta_1(\text{time}) + \beta_2(\text{concurrent FFMQ}) + \beta_3(\text{concurrent LES}) + \beta_4(\text{concurrent FFMQ} \times \text{concurrent LES}) + \text{error}$$

Level 2

$$\beta_0 = \gamma_{00} + \gamma_{01}(\text{FFMQ mean}) + \gamma_{02}(\text{LES mean}) + \gamma_{03}(\text{FFMQ mean} \times \text{LES mean}) + \text{error}$$

$$\beta_1 = \gamma_{10} + \gamma_{11}(\text{FFMQ mean}) + \gamma_{12}(\text{LES mean}) + \gamma_{13}(\text{FFMQ mean} \times \text{LES mean}) + \text{error}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30}$$

$$\beta_4 = \gamma_{40}$$

CHAPTER 3: RESULTS

Descriptive statistics and correlations among the predictor and outcome variables are presented in Tables 1, 2, and 3.

Baseline Models

Linear and quadratic models were tested for model fit. The addition of a linear term resulted in a marginally significant improvement in the anxiety symptoms model fit according to change in the deviance statistic: $\chi^2(3) = 7.28, p = .062$, and the linear slope term was not significant in the sample as a whole. However, examination of the tau statistics confirmed there was significant between-person variability to be explained in both the intercept and linear slope terms: $\chi^2(77) = 285.10$ and $116.32, p$'s $< .001$ and $.003$, suggesting that mothers varied in anxiety trajectories (i.e., some increasing and others decreasing over time). Adding a quadratic term failed to improve model fit over the linear model, $\chi^2(4) = 6.78, p = .147$. Based on the tau statistics, and in order to address primary research questions about effects on symptom change across the postpartum, a linear model was retained. In modeling depressive symptoms, there was a significant improvement from an intercept-only to linear model, $\chi^2(3) = 14.90, p = .002$, and a non-significant improvement from a linear to quadratic model, $\chi^2(4) = 6.84, p = .143$. The linear slope term was not significant in the sample as a whole, but the tau statistics again revealed significant between-person variability in the intercept and linear slope terms for depressive symptoms: $\chi^2(77) = 256.29$ and $158.66, p$'s $< .001$. Therefore, a linear model with intercept and slope terms was chosen for depressive symptoms.

Explanatory Models

First, we tested main effects models with dispositional mindfulness and life stress as Level 1 and Level 2 predictors of maternal anxiety and depressive symptoms (see Table 4).¹ Then, we tested moderation models with mindfulness x life stress effects.

Main Effects of Dispositional Mindfulness and Life Stress

Anxiety. Only life stress was found to significantly predict anxiety symptoms at Level 2. Life stress predicted a more positive intercept term, such that mothers who experienced more stressful life events tended to exhibit more anxiety symptoms at 18 months postnatal. On the other hand, only dispositional mindfulness significantly predicted anxiety symptoms at Level 1. This means that deviations from one's mean level of mindfulness predicted mothers' anxiety symptoms at a given time; mothers reported feeling less anxious when their levels of dispositional mindfulness increased.

Depression. Main effects of both dispositional mindfulness and life stress were found at Level 2. Dispositional mindfulness predicted a more negative intercept term, such that mothers who were higher in dispositional mindfulness tended to experience fewer depressive symptoms at 18 months postnatal. Life stress predicted a more positive intercept term, meaning that mothers who experienced more stressful life events exhibited more depressive symptoms at 18 months postnatal. As in the anxiety model, only dispositional mindfulness predicted changes in symptom severity at Level 1. Specifically, mothers' depressive symptoms tended to decrease when they experienced relatively higher levels of dispositional mindfulness, compared to their

¹ Models controlling for the other symptom type (represented by a grand mean-centered CESD or BAI predictor at Level 1) were also conducted to probe the specificity of mindfulness effects to each internalizing syndrome. The effect of dispositional mindfulness on anxiety symptoms was no longer statistically significant when controlling for CESD scores. When BAI scores were controlled in the depression symptoms model, the effect of dispositional mindfulness on the intercept was marginally significant ($\beta = -.223, p = .076$), and the within-person effect of dispositional mindfulness remained statistically significant ($\beta = -.336, p < .001$).

own average.

Interaction Effects of Dispositional Mindfulness and Life Stress

No significant dispositional mindfulness x life stress interaction effects were found for either the anxiety or depression models at Level 1 or Level 2. Dispositional mindfulness did not appear to moderate the effect of stressful life events on maternal affective symptoms in this sample. However, the interaction term did approach significance at Level 1 in the depression model ($\beta = -0.130, p = .053$), consistent with the hypothesized stress-buffering effect of mindfulness.

Exploratory Models: Effects of Mindfulness Facets

To better understand the effects of specific aspects of mindfulness, we entered the scores for all five subscales of the FFMQ together as predictors at Levels 1 (time-varying covariates) and 2 (mean scores across times).

Anxiety. Main effects of all mindfulness facets except Acting with Awareness were found at Level 2. Interestingly, whereas higher levels of Non-judgment ($\beta = -0.532, p = .001$), and Non-reactivity ($\beta = -0.278, p = .01$) predicted lower anxiety at 18 months postnatal, higher Observing ($\beta = 0.243, p = .043$) and Describing ($\beta = 0.286, p = .025$) predicted the opposite—higher anxiety symptoms. Furthermore, Non-judgment predicted a decreasing anxiety slope from 3-18 months ($\beta = -0.141, p = .019$). At Level 1, main effects of two mindfulness facets were found; increases in Observing ($\beta = 0.317, p = .003$) and decreases in Non-reactivity ($\beta = -0.281, p = .001$) were associated with increasing anxiety over time.

Depression. Observing ($\beta = 0.351, p = .002$) and Non-judgment ($\beta = -.435, p = .009$) were significant predictors of the intercept at Level 2, with higher levels of the former and lower levels of the latter independently predicting higher depressive symptoms at 18 months postnatal.

Non-reactivity ($\beta = 0.087, p = .025$) predicted an increasing slope of depressive symptoms from 3-18 months. At Level 1, increases in Describing ($\beta = -0.312, p = .001$) and Non-judgment ($\beta = -0.185, p = .041$) predicted decreases in depressive symptoms over time. There was a marginally significant association between increases in Non-reactivity ($\beta = -0.188, p = .065$) and decreases in depressive symptoms, as well.

Summary

The findings support the proposal that dispositional mindfulness—both overall levels and relative increases over time—relates to lower internalizing symptoms during early motherhood. Rather than moderating effects of life stress, maternal mindfulness and life stress made independent (and opposite) contributions to maternal internalizing symptoms. Similar effects were found for depression and anxiety outcomes, with somewhat more robust evidence for mindfulness effects on the former. Exploration of the contribution of individual mindfulness facets highlighted Non-reactivity and Non-judgment as the most consistent contributors to lower anxiety and depression across the postpartum.

CHAPTER 4: DISCUSSION

This study investigated the relationship between dispositional mindfulness and internalizing symptoms across early motherhood. As predicted, mothers who were higher in dispositional mindfulness tended to experience fewer depressive symptoms during the first 18 months postnatal. Furthermore, within-mother variations in dispositional mindfulness were associated with changes in symptoms; increasing mindfulness related to decreasing anxiety and depression over time. These findings are consistent with the proposal that dispositional mindfulness plays a positive role in alleviating symptoms of anxiety and depression during early motherhood. They further suggest that dispositional mindfulness is not necessarily a fixed entity, but rather shows dynamic associations with well-being during a critical life juncture.

One of our primary predictions was that higher levels of dispositional mindfulness would be associated with lower symptoms of anxiety and depression in the first 18 months postnatal. This hypothesis was only partially supported; there was a significant between-person relationship between mindfulness and depression in the expected direction, but not between mindfulness and anxiety. This finding brings up the possibility that absolute levels of mindfulness may be selectively beneficial against a dimension of depression that does not overlap with anxiety. While they share certain characteristics (i.e., general distress), anxiety and depression are distinct pathologies and have been differentiated in prior work by anxious arousal and anhedonia (Nitschke et al., 2001; Spielberg et al., 2011), with the former distinguishing anxiety syndromes and the latter depression syndromes (Nitschke et al., 2001). In order to explore this possibility, we retested our explanatory models for anxiety and depression while controlling for symptoms of the other pathology. The pattern of effects that we found provided further support for the proposition that dispositional mindfulness protects against an aspect of depression that is not

shared with anxiety, but the reverse is not true (i.e., the aspect of anxiety mindfulness protects against overlaps with depression). Based on these findings, it is plausible that high levels of dispositional mindfulness protect against anhedonia and general distress but not anxious arousal. Future work should examine the relationship between dispositional mindfulness and specific facets of internalizing difficulties to gain a more fine-tuned understanding of the construct.

We also predicted that increases in dispositional mindfulness relative to one's own mean would predict decreases in symptoms of anxiety and depression. This hypothesis was fully supported, suggesting that changes in levels of dispositional mindfulness are important to maternal mental health. This particular finding is encouraging from an intervention standpoint; experiencing a relative increase in mindfulness, even if the mother does not start at the high end of the distribution for mindfulness, may be enough to enhance well-being. However, the factors driving these within-person changes in mindfulness are as yet unknown, as is the question of whether mindfulness directly influences affective symptoms or operates via a third variable. One possible candidate for future research is the level and type of social support received by mothers during the postpartum period. Being embedded in a supportive social network may allow mothers the space to be more mindful and less depressed or anxious as they navigate the challenges of motherhood. On the other hand, it could also be that higher or increasing levels of mindfulness allow mothers to more effectively utilize the other resources in their lives (including social support), thus reducing affective symptoms.

The current multilevel approach highlighted a divergence in the scope of (overall) mindfulness effects across symptom areas, with dispositional mindfulness predicting lower depression at both within- and between-person levels, and lower anxiety at the within-person level alone. Examination of the individual facets of mindfulness suggests that this discrepancy

may stem from measurement issues. The FFMQ subscales are designed to pick up on either attentional (Observing, Describing, Acting with Awareness) or attitudinal (Nonreactivity, Nonjudgment) components of mindfulness. The exploratory analyses revealed that the attentional components of mindfulness were positively associated with anxiety symptoms, while the attitudinal ones were negatively related to them. When combined, these diverging relationships worked in opposition to one another and resulted in a non-significant net effect at the between-person level. This pattern is in line with the idea that mindfulness—at least, the attentional component—may not be beneficial for anxious arousal (somatic anxiety). Paying close attention to one’s internal experiences may exacerbate physical symptoms of anxiety when it occurs in the absence of a mindful attitude. Assessing the interplay between attentional and attitudinal components of mindfulness during or immediately after a stressful event may help clarify their role in anxiety syndromes. Relatedly, examining this issue in mindfulness meditation practitioners vs. non-practitioners may help to elucidate whether a more fully developed mindful attitude alters the impact of attentional focus.

Interestingly, the attitudinal and attentional aspects of mindfulness tended to work in opposition to one another at the between-person level in the depression model as well. However, this did not hold true at the within-person level, where increases in both Describing and Non-judgment predicted decreases in depressive symptoms. This discrepancy in the depression model indicates that perhaps the attentional-attitudinal distinction is too broad, and that specific facets matter in different ways for affective syndromes. For example, Describing may represent a healthy ability to articulate and manage difficult experiences in depression, as opposed to a hyper-focus on internal cues in anxiety. Overall, the facet-level analyses reveal that while representing mindfulness as a single score is a useful heuristic, it may obscure substantial

variance in the relationships captured at the subscale level. More work needs to be conducted on the facets of mindfulness to determine under which circumstances particular attentional and attitudinal skills protect against different types of mental health difficulties.

We also predicted that mothers who experienced more stressful life events would report higher symptoms of anxiety and depression over time, and that dispositional mindfulness would moderate this relationship. Higher levels of life stress did predict between-mother differences in symptom severity, but mindfulness did not attenuate the strength of this relationship. There may be a number of factors driving this finding. First, mindfulness and life stress may independently contribute to symptoms of anxiety and depression and not interact in any meaningful way. However, the interaction between mindfulness and life stress did approach significance at the within-person level in our depression model. It may be that an interaction does exist, and our study was simply not adequately powered to detect it. Future work should seek to replicate this effect with a larger sample. It may also be the case that mindfulness buffers the subjective experience of stress, which is not necessarily reflected in the number of negative life events one undergoes. As a result, the stress buffering effect of mindfulness may have been obscured in our study, but would become apparent in a study of perceived stress.

The present work makes important strides in furthering the scientific study of mindfulness and mental health. At the same time, there are limitations to the design that warrant attention and should be used to inform future research. Foremost, it should be noted that the analyses conducted here are correlational in nature, and therefore no causal assertions can be made with these results. Future work with experimental manipulations of mindfulness would help to clarify a potential causal role in postpartum symptomatology. Additionally, the sample size was relatively small and homogenous, limiting our power to detect subtle effects such as

interactions. The findings uncovered here should be replicated in larger samples with a range of socio-demographic characteristics. Testing these effects in a clinical sample of mothers experiencing depression and/or anxiety would also be informative, as would investigating potential differences between sub-samples of mothers with and without substantial mindfulness practice experience. Addressing these further questions would help to inform intervention recommendations for new mothers. For now, the current results lay the groundwork for postnatal mindfulness interventions by providing support for the idea that increasing mindfulness during the postpartum period could reduce affective problems, benefiting both mothers themselves and their children. They also suggest that the effectiveness of postnatal interventions for particular syndromes could be enhanced by tailoring them to address specific facets of mindfulness.

CHAPTER 5: TABLES

Table 1

Descriptive statistics

	BAI	CESD	FFMQ	LES
T1				
Mean \pm SD	8.17 \pm 6.84	9.51 \pm 8.34	3.63 \pm 0.52	4.41 \pm 4.16
Range	0-28	0-44	2.70-4.69	0-28
T2				
Mean \pm SD	8.37 \pm 8.59	9.89 \pm 7.64	3.60 \pm 0.48	4.46 \pm 3.17
Range	0-50	0-34	2.36-4.86	0-15
T3				
Mean \pm SD	7.95 \pm 8.44	10.93 \pm 7.64	3.63 \pm 0.47	4.16 \pm 3.34
Range	0-44	0-37	2.48-4.47	0-14
T4				
Mean \pm SD	7.55 \pm 7.71	11.00 \pm 8.25	3.65 \pm 0.49	5.02 \pm 3.94
Range	0-34	0-31	2.24-4.45	0-19

Table 2

Correlations between study variables across time-points

	BAI	CESD	FFMQ	LES
T1				
BAI	1	.728	-.303	.227
CESD		1	-.370	.172
FFMQ			1	-.029
LES				1
T2				
BAI	1	.612	-.178	.315
CESD		1	-.429	.169
FFMQ			1	.043
LES				1
T3				
BAI	1	.514	-.282	.302
CESD		1	-.418	.190
FFMQ			1	-.033
LES				1
T4				
BAI	1	.579	-.263	.457
CESD		1	-.384	.252
FFMQ			1	-.012
LES				1

Table 3

Correlations between FFMQ subscales across time-points

	Alpha	Observing	Describing	Acting with Awareness	Non- reactivity	Non- judgment
T1						
Observing	.84	1	.544	.134	.445	-.165
Describing	.91		1	.289	.347	.048
Acting with Awareness	.87			1	.218	.376
Non-reactivity	.82				1	.169
Non-judgment	.88					1
T2						
Observing	.84	1	.476	.026	.205	-.025
Describing	.89		1	.215	.341	.248
Acting with Awareness	.90			1	.200	.533
Non-reactivity	.74				1	.282
Non-judgment	.86					1
T3						
Observing	.81	1	.403	-.066	.282	-.051
Describing	.90		1	.273	.519	.337
Acting with Awareness	.92			1	.106	.525
Non-reactivity	.77				1	.017
Non-judgment	.79					1
T4						
Observing	.86	1	.543	-.070	.405	-.046
Describing	.91		1	.178	.487	.329
Acting with Awareness	.90			1	.206	.560
Non-reactivity	.74				1	.131
Non-judgment	.85					1

Table 4

Results for main effects models

	Anxiety Coefficient, SE	Depression Coefficient, SE
Level 1		
Dispositional Mindfulness	-0.251 (0.076)**	-0.464 (0.088)**
Life Stress	-0.061 (0.072)	-0.062 (0.082)
Level 2 – Intercept		
Dispositional Mindfulness	-0.190 (0.128)	-.314 (0.124)*
Life Stress	0.495 (0.170)**	0.341 (0.147)*
Level 2 – Slope		
Dispositional Mindfulness	0.011 (0.043)	0.011 (0.047)
Life Stress	0.040 (0.047)	0.024 (0.053)

* indicates $p < .05$ and ** indicates $p < .01$

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