The Role of Mindfulness in Maternal Mental Health: A Multi-Method Investigation

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Abstract

The purpose of the current series of 3 investigations was to determine if mindfulness is a skill that may protect women's mental health and wellbeing during pregnancy and the postpartum period. Study 1 was a Canada-wide cross-sectional investigation of 481 pregnant and 498 postpartum women. Study 2 was a longitudinal follow-up of 150 pregnant women who participated in Study 1. Study 3 was a randomized-control trial of a community sample of 29 pregnant participants who were randomly assigned to either a Brief Mindfulness Group (MG) or a Comparison Group (CG). Participants in all 3 studies completed questionnaires assessing various mental health symptoms, wellbeing variables, and mindfulness engagement. In Study 3, participants also provided feedback on their program experience. In both Study 1 and 2, a negative association was observed between mindfulness engagement and several measures of mental health (stress, depression, anxiety, and obsessive-compulsive symptoms) and difficulties in mother-infant bonding, with moderate to large effect sizes. As well, a positive association was observed between mindfulness engagement and measures of wellbeing (resiliency and quality of life), as well as a measure of mania (Study 1 only). In Study 3, the results did not reveal statistically significant group differences on the mental health or wellbeing measures. However, it was found that both the MG and CG were well received by participants and that subjective impressions by participants in both groups were that the groups were beneficial for their wellbeing. Combined, the results suggest that mindfulness may protect pregnant and postpartum women's mental health and wellbeing. Future research might examine the potential benefits of a lengthier perinatal mindfulness program in cultivating mindfulness skills and to better determine if an extended program may be helpful as a pro-active supportive intervention to protect maternal mental health and wellbeing during pregnancy and the postpartum period.

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List of Abbreviations

ASRMS	Altman Self-Rated Mania Scale
BRS	Brief Resilience Scale
CG	Comparison Group
EPDS	Edinburgh Postnatal Depression Scale
FFMQ	Five Facet Mindfulness Questionnaire
GAD	Generalized Anxiety Disorder
HADS-A	The Hospital Anxiety and Depression Scale – Anxiety Subscale
MBCT	Mindfulness-Based Cognitive Therapy
MBSR	Mindfulness-Based Stress Reduction
MG	Mindfulness Group
MSPSS	Multidimensional Scale of Perceived Social Support
OCD	Obsessive Compulsive Disorder
OCI-R	Obsessive-Compulsive Inventory-Revised
PBQ	Postpartum Bonding Questionnaire
PRF-D	Personality Research Form – Desirability Scale
PRF-IN	Personality Research Form – Infrequency Scale
PSS	Perceived Stress Scale
QoL	Quality of Life
WHOQOL	World Health Organization Quality of Life Scale

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Perinatal Mental Health

Motherhood has been long equated with womanhood and is depicted in many cultures as a natural time of excitement and happiness (Lee, 1997; Ulrich & Weatherall, 2000). However, although pregnancy and childbirth may represent a deeply fulfilling and joyous transition for some women, such an all-encompassing positive experience appears to be the exception rather than the rule. Pregnancy and childbirth are marked by unique changes in the social role of the new mother, complicated further by co-occurring shifts in her psychological, physical, and hormonal functioning. Thus, pregnancy, childbirth, and motherhood are periods of significant adjustment for women (Blehar, 2006). Consequently, although the transition to motherhood can be a very positive experience for some women, it is also a particularly vulnerable time when psychological distress, stress, interpersonal difficulties, and physical complications can arise for many women (Bener, Gerber, & Sheikh, 2012; Song, Kim, & Ahn, 2015).

When it comes to maternal mental health, the postpartum blues and postpartum depression are commonly reported in the empirical literature. More recently, however, it has become increasingly evident that women are also susceptible to other mental health symptoms and disruptions during both pregnancy and the postpartum period. Specifically, in addition to depression, clinical and subclinical levels of anxiety, mania, hypomania, obsessions and compulsions have all been found to occur during pregnancy and the postpartum period in some women (Davey, Tough, Adair, & Benzies, 2011; Pope, Sharma, & Mazmanian, 2014; Russell, Fawcett, & Mazmanian, 2013; Yeaton-Massey & Herrero, 2019). Moreover, even when symptoms do not reach clinically defined thresholds, they may still cause distress and interfere with a mother's functioning and quality of life (QoL) (Josefsson et al., 2002).

The finding that high levels of stress and psychological symptoms are common to the perinatal period speaks to the need for perinatal psychosocial services directed at enhancing mothers' coping skills. Enhancing maternal coping skills may in turn promote maternal resiliency when faced with the many changes and challenges of pregnancy, childbirth, and motherhood (Bandura, 1991; Rutter, 1987). In response, the primary purpose of the present set of investigations was to assess the potential benefits of mindfulness for protecting maternal mental health and wellbeing during pregnancy through to the postpartum period.

Maternal Stressors in the Perinatal Period

Several stressors can arise as a result of various pregnancy-specific issues, including physical symptoms and bodily changes. Moreover, concerns about parenting, role transition, interpersonal and relationship strains, as well as concerns about labour, delivery, and the baby's health are also common (Affonso, Liu-Chiang, & Mayberry, 1999). For some women, the process of conceiving and struggles with infertility may have also been challenging (Chernoff, Balsom, & Gordon, 2020). Furthermore, some women may lack adequate socioeconomic and psychosocial resources or may struggle with balancing pre-existing work obligations or family responsibilities, which may include caring for other young children (Dunkel Schetter, 2011).

During the postpartum period, women may encounter additional physical and psychological stressors, related to the demands of motherhood (Hammen, Hazel, Brennan, & Najman, 2012). Perinatal pain, backaches, urinary incontinence, haemorrhoids, constipation, fatigue, physical exhaustion, sleep disruption, and breastfeeding difficulties are common experiences following childbirth (Saurel-Cubizolles, Romito, Lelong, & Ancel, 2000). As well, women may struggle with any number of psychosocial stressors, such as feeling compelled to return to their pre-pregnancy weight, apprehensions about the mothering role, difficulties

regarding infant feeding, concerns about the growth and development of the newborn, or concerns about infant illness. Women may also experience sexual changes or may lack adequate social resources and support (Beck, Gable, Sakala, & Declercq, 2011; Cheng & Li, 2008; Song et al., 2015). Moreover, some new mothers may struggle with efforts to balance the needs of the new infant with the needs of other children in the home or may encounter relationship difficulties with their partner.

In addition to adjusting to bodily and environmental changes, new mothers are also working to attain their maternal identity. Through this process the mother develops an attachment with her baby and builds competence in mothering behaviours (Mercer, 2004). However, the novelty of childcare responsibilities and struggling to adapt to the mothering role can result in some mothers feeling they lack adequate skill or knowledge and may in turn feel unprepared to care for their infant. Some new mothers may also feel they have little time for themselves. Finally, some women may also feel that they have little control in their lives, feeling that they are constantly at the mercy of their new baby's needs. These stressors and demands may in turn lead to maternal distress and fatigue (Kanotra et al., 2007).

Psychological Symptoms in the Perinatal Period

Psychological symptoms that may emerge during the perinatal period are experienced on a continuum in terms of severity and can be acute, chronic, or wax and wane (Kettunen, Koistinen, & Hintikka, 2014). Regardless of the severity or course, these symptoms can be disruptive and distressing, and even at subclinical levels can adversely affect a mother's functioning (Josefsson et al., 2002). Specifically, emerging research indicates that pregnant and postpartum women are particularly vulnerable to an increase in depressive and anxious symptoms (Marcus, 2009). Emerging research also suggests that some perinatal women are also

at risk of experiencing hypomanic symptoms (Heron, Haque, Oyebode, Craddock, & Jones, 2009). As well, other recent research has found that obsessions and compulsions are particularly common in the perinatal period (Howard et al., 2014; Russell et al., 2013). In some cases, women experience a mixture of symptoms at subclinical levels from more than one category and comorbidity is common for women reaching clinical thresholds for a perinatal mental health disorder (Hendrick, Altshuler, Strouse, & Grosser, 2000; O'Brien, Buikstra, & Hegney, 2008; Russell et al., 2013; Sharma, Khan, Corpse, & Sharma, 2008).

Depressive Symptoms

Research suggests that up to 84% of women will experience the "baby blues," which is a period of emotional disturbance that includes tearfulness, mood lability, insomnia, irritability, and anxiety (O'Hara & Wisner, 2014). Symptoms of the baby blues usually begin within the first few days following childbirth and remit by about the twelfth day postpartum (Heron et al., 2009). Despite the short time frame, the "baby blues" can be very distressful for the mother and is a risk factor for postpartum depression (O'Hara & McCabe, 2013).

The "baby blues" or the "blues" is distinguished from postpartum depression, as the "blues" is a common and transient experience of emotional distress occurring in the early postpartum period. In contrast to the "blues", postpartum depression affects fewer women, with reported estimates ranging between 13% and 19% of women who have recently given birth (O'Hara & McCabe, 2013). Symptoms of postpartum depression are experienced to a greater severity than are the "blues" and often include a persistent low mood following childbirth, as well as feelings of worthlessness, hopelessness, or loss of interest. Postpartum depression can be long lasting and debilitating if left untreated (O'Hara & McCabe, 2013). Considering that up to

one in every five women who give birth may be affected by postpartum depression (O'Hara & McCabe, 2013), much research has been devoted to understanding the disorder.

Though the label "postpartum depression" is commonly found throughout the empirical literature and within clinical settings, there is evidence to suggest that maternal depressive symptoms may begin during pregnancy, as well as during the postpartum period (Gaynes et al., 2005). In response, *the Diagnostic and Statistical Manual for Mental Disorders - Fifth Edition* defines depression with peripartum onset as requiring onset during pregnancy or within the first four weeks postpartum (American Psychiatric Association, 2013). Meanwhile, the *International Classification of Diseases* (11th edition) uses the label "mental or behavioural disorders associated with pregnancy, childbirth or the puerperium" and defines it as "syndromes associated with pregnancy or the puerperium (commencing within about 6 weeks after delivery) that involve significant mental and behavioural features" (World Health Organization, 2019). As well, in contrast to the current diagnostic recommendations, some experts recommend that this timeframe be updated in future revisions of these guides to account for episode onset anytime within the first year postpartum, as such timeframes better align with what is commonly seen in clinical practice (O'Hara & Wisner, 2014; Sharma & Mazmanian, 2014). This recommendation is also supported by research evidence (Wang, Wu, Anderson, & Florence, 2011). Thus, while there appears to be consensus that perinatal women are particularly vulnerable to experiencing depression, controversy continues to exist as to the timeframe for symptom onset required to be classified as a disorder related to childbirth.

Some factors such as low socioeconomic status, high perceived stress, low perceived social support, and multiple births are known to put women at increased risk for postpartum depression (Pope, Mazmanian, Bédard, & Sharma, 2016; Ross, McQueen, Vigod, & Dennis,

2011). As well, postpartum depression is associated with numerous short- and long-term consequences for offspring. For instance, the number of depressive symptoms endorsed is associated with difficulties in mother-infant bonding (Moehler, Brunner, Wiebel, Reck, & Resch, 2006). Additionally, depression is associated with disturbances in mother-infant interactions, as well as deficiencies in parenting and parental safety practices (Field, 2010). Moreover, postpartum depression is associated with adverse infant outcomes, as well as poorer social, emotional, cognitive, or physical child development (Field, 2010; Lautarescu, Craig, & Glover, 2020; Misri et al., 2004).

Major Depressive Disorder is a leading cause of disability and premature death worldwide (Mood Disorder Society of Canada, 2009). Thus, postpartum depression is a significant public health problem (Almond, 2009). As such, early intervention, and effective therapeutic strategies for the prevention of postpartum depression are important areas of empirical inquiry. Preventative strategies have the potential to curb health care costs (Public Health Agency of Canada, 2006) in addition to having important clinical implications (Meltzer-Brody & Stuebe, 2014; Pope et al., 2014).

Manic and Hypomanic Symptoms

Symptoms of excessive or abnormally high arousal, elevated mood, or irritability, as well as abnormal and persistent elevations in energy levels can occur, varying in duration and severity. Individuals who experience severe elevation in these symptoms for a period of at least one week are described as having a manic episode and meet criteria for bipolar I disorder. Individuals who experience these symptoms to a lesser degree and for a period of less than one week, and more than four days, are considered to have a hypomanic episode. If in addition to a hypomanic episode a person also has a history of at least one episode of depression, they would

meet criteria for a diagnosis of bipolar II disorder. Thus, people can experience a hypomanic episode without meeting criteria for bipolar II disorder (American Psychiatric Association, 2013).

During the early postpartum period, maternal elation is a common experience. Thus, deciphering normal elevations in mood from clinically concerning elevations can be difficult, making the recognition of hypomanic symptoms challenging. As a result, hypomanic symptoms (e.g., elevated mood, less need for sleep, heightened energy) may be misattributed to normal physiological or psychosocial changes associated with childbirth. As well, women may view the symptoms positively due to feelings of increased energy and productivity (Merikangas et al., 2011; Viguera, Baldessarini, & Tondo, 2001). As the symptoms are unlikely to cause self-perceived distress or impairment, they may go unreported by the mother unless she is directly questioned about hypomanic symptoms. This lack of insight has the potential to lead to a delay in the identification of hypomanic episodes or the recognition of a bipolar disorder with postpartum onset. Moreover, postpartum bipolar disorder is often misdiagnosed as postpartum depression (Sharma et al., 2008). Misdiagnosis can have serious repercussions with regards to prognosis and treatment. For example, antidepressant monotherapy, the first line pharmacological treatment for depression, is contraindicated for individuals with bipolar disorder and may exacerbate symptoms of the illness (Pope et al., 2014; Sharma et al., 2008).

Identification of bipolar disorder with onset in the perinatal period may be further complicated by symptom presentation. That is, manic and hypomanic symptoms in the perinatal period can present differently than at other time points. For instance, one study found that, compared to women experiencing a non-postpartum manic episode, manic episodes in postpartum women were associated with a number of mixed features, including inner tension,

worrying over trifle matters, and muscular tension. As well, postpartum manic episodes were also found to be associated with more symptoms of sadness, lethargy, emotional response, lability, confusion, and disorganization. The postpartum women in this study were also found to experience significantly more depressive and anxious symptoms than did the women with a non-postpartum manic episode (Ganjekar, Desai, & Chandra, 2013).

Furthermore, manic and hypomanic symptoms have the potential to cause significant distress in the perinatal period and can instigate interpersonal conflict and marital difficulties (Gavin et al., 2005). This is of concern, as a strong social support system can be very helpful with regards to enhanced symptom management. Moreover, in addition to marital and intimate relationship difficulties, bipolar disorder may also have adverse consequences on the mother's relationship with her children as it may impair the mother-infant interaction (Beck, 1995).

Anxious Symptoms

Research on the prevalence of anxiety disorders during pregnancy and the postpartum period is also growing. Although more research is needed to allow for more precise estimates, the information we do have suggests that anxiety (ranging from excessive worry to panic attacks) is prevalent during pregnancy and the postpartum period. In some cases, the severity of anxiety symptoms (e.g., worry, avoidance, and obsessions) do not meet criteria for an anxiety disorder diagnosis; nevertheless, the experience of anxiety even at subclinical levels can still cause at least mild-to-moderate levels of distress and impairment, and for this reason should not be dismissed (Howard et al., 2014; O'Hara & Wisner, 2014; Paschetta et al., 2014). In addition, anxiety symptoms may arise as part of a perinatal depressive disorder or as a separate disorder (Rallis, Skouteris, McCabe, & Milgrom, 2014).

Though the data are limited, the reported prevalence rate for generalised anxiety disorder (GAD) during pregnancy was found in one study to be 1.9% (Mota, Cox, Enns, Calhoun, & Sareen, 2008). During the postpartum period, rates of GAD have been found to range between 6.1% and 7.7%. Thus, although the rate of GAD is comparable during pregnancy to the 12-month population estimate (2.9%), GAD rates during the postpartum period have been reported to be at least twice the rate found in the general population (American Psychiatric Association, 2013). For panic disorder the ranges are reported to be between 1.4% and 9.1% during pregnancy and 0.5% and 2.9% during the postpartum period. Thus, some rates reported during pregnancy are higher than the 12-month population estimates of 2% to 3% for panic disorder found in the general population (American Psychiatric Association, 2013). As well, prevalence estimates for social anxiety disorder range from 2.0% to 6.4% during pregnancy and 0.2% to 6.5% during the postpartum period (O'Hara & Wisner, 2014). This is comparable to the 12-month population estimate of 7% for social anxiety disorder (American Psychiatric Association, 2013).

When looking at the combined prevalence of anxiety disorders during pregnancy and the postpartum period, one investigation found the prevalence rate to be between 9% and 22% (Fairbrother, Janssen, Antony, Tucker, & Young, 2016). Furthermore, a recent meta-analysis found that when looking at the prevalence rate of anxiety disorder during pregnancy and the postpartum period when combining anxiety disorder diagnoses, approximately 1 in 5 (20.7%) women met criteria (Fawcett, Fairbrother, Cox, White, & Fawcett, 2019). Both of the investigations mentioned here examined panic disorder, agoraphobia, GAD, social phobia, specific phobia, post-traumatic stress disorder, anxiety not otherwise specified, as well as obsessive compulsive disorder (Fairbrother et al., 2016; Fawcett, Fairbrother, Cox, White, & Fawcett, 2019).

During the perinatal period, the thought content related to anxious symptoms often concerns fears regarding pregnancy and infant care. For instance, there is growing interest in the perinatal experience of a specific phobia called tokophobia, which is defined as a morbid fear of childbirth (Spice, Jones, Hadjistavropoulos, Kowalyk, & Stewart, 2009). This phobia is reported to have high perinatal comorbidity with mood and anxiety disorders and may lead to emergency or elective caesarean section (Hofberg & Brockington, 2000; Zar, Wijma, & Barbro, 2002). Following delivery, a mother's fear of cot death or sudden infant death syndrome (for example) may result in functional impairment (such as thorough and exhausting nighttime vigilance) (Brockington, Fraser, & Wilson, 2006). As with depression, maternal anxiety during pregnancy and the postpartum period is related to poor infant and child wellbeing (Lautarescu et al., 2020; Misri et al., 2004).

Obsessive and Compulsive Symptoms

Research findings have indicated that up to 99% of people in the general population experience intrusive thoughts at one time or another (Belloch, Morillo, Lucero, Cabedo, & Carrió, 2004). Though intrusive thoughts are usually easily dismissed by the individuals experiencing them, they can become problematic when they are not readily disregarded and start interfering with an individual's functioning. Moreover, though perinatal obsessions and compulsions may occur as an exacerbation of an existing obsessive-compulsive disorder (OCD), they can also arise during pregnancy or the postpartum period as a first occurrence in someone with no prior history (Brockington et al., 2006; Speisman, Storch, & Abramowitz, 2011).

Pregnancy and the postpartum period may be particularly vulnerable times for the experience of intrusive thoughts and the development and exacerbation of obsessive and compulsive symptoms (Fairbrother & Woody, 2008; McGuinness, Blissett, & Jones, 2011).

Reported estimates indicate that OCD affects 0.2% to 3.5% of women during pregnancy and 2.7% to 9% of women during the postpartum period (McGuinness et al., 2011). Fairbrother and colleagues (2016) reported a prevalence rate of 3.9% across the perinatal period from the beginning of pregnancy to three months postpartum. The variability in rates reflects the various ways OCD is measured, as well as differences between the samples of individuals being studied (McGuinness et al., 2011). As well, in a meta-analysis, it was found that pregnant and postpartum women are at a 1.5 to 2-fold higher risk of experiencing OCD compared to the general female population, with a reported estimate of 1.08% for the general female population, 2.07% for pregnant women, and 2.43% for postpartum women. Furthermore, rates of symptom escalation for women with a preexisting OCD are reported to range from 8% to 46.1% for pregnant women and 29% to 50% for postpartum woman (Russell et al., 2013). As well, obsessive and compulsive symptoms during pregnancy have been found to predict postpartum obsessive and compulsive symptoms, even when the investigators controlled for prenatal obsessive and compulsive symptoms (Fairbrother, Thordarson, Challacombe, & Sakaluk, 2018). These findings further support the assertion that the perinatal period is a time for both the new emergence of obsessive and compulsive symptoms, as well as intensification of preexisting obsessive and compulsive symptoms (Russell et al., 2013).

Perinatal obsessive and compulsive symptoms can be viewed as existing on a spectrum of symptom severity. As well, while there is variability with regards to symptom presentation, there are also some common themes unique to the perinatal period. Thought content for obsessive-compulsive symptoms commonly focus on the baby and caregiving. Symptoms during pregnancy commonly involve obsessions about contaminations, such as transmitting germs to the fetus, leading to compulsive behaviours such as excessive hand washing or dietary restrictions

(Speisman et al., 2011). For women with OCD, the postpartum period commonly involves obsessions about fear of deliberately harming the baby (e.g., inappropriately touching the child or throwing the child). These obsessions can lead to avoidant behaviours (e.g., avoiding bathing the baby or changing the baby's diapers) or to mental rituals to cancel out the intrusive thoughts or urges (Speisman et al., 2011). Thus, these symptoms, even at subclinical levels, have the potential to cause significant maternal burden and distress, particularly as the daily life of many of these mothers is dominated by caregiving activates (Challacombe & Wroe, 2013; O'Hara & Wisner, 2014).

Though intrusive thoughts are common in pregnancy and the postpartum period, women are more likely to be at risk for OCD if they believe that these thoughts increase the likelihood of the behaviour occurring or if they exaggerate the consequences of such an event (Abramowitz & Deacon, 2006). For instance, instead of interpreting an image of drowning one's baby in a bathtub as a fleeting thought and resuming bathing the baby, the mother may interpret the event as revealing her true feelings for her infant and may begin to avoid her infant for fear of inflicting harm. Obsessional thoughts can trigger avoidant behaviours as well as thought suppression. Such thoughts may also lead to overt or covert repetitive behaviour aimed at reducing distress (e.g., checking the baby's pulse every 15 minutes to see if the baby is still breathing in response to intrusive thoughts about sudden infant death syndrome). It is important to note that in spite of some of the intrusive thought content involving harm to their baby, research has shown that women without psychosis or a severe personality disorder who have OCD have no increased risk of aggressive harm to their infants compared to new mothers in general (Abramowitz & Deacon, 2006; O'Hara & Wisner, 2014; Speisman et al., 2011). It has been proposed that new parenthood may be a particularly vulnerable time for the development of

OCD, due in part to the magnitude of the transition from being a non-parent to a parent, as well as the fact that it is a rapid transition. These factors may increase a mother's sense of responsibility and overestimate their probability belief with respect to harm befalling their new infant (Fairbrother & Abramowitz, 2007).

Protecting Maternal Mental Health

The stressors that arise in the perinatal period are numerous, multifaceted, and often unpredictable. These stressors can lead to psychological distress such as depression or unwanted and intrusive thoughts (Fairbrother & Woody, 2008; Recto & Champion, 2020), which in some cases can have devastating consequences that affect not only the mother's mental health and wellbeing, but also impact the infant and family as well (Field, 2010; LeWinn et al., 2009; Van den Bergh et al., 2005). Thus, resilience to stress may be very important for a smooth transition to motherhood. Resilience may be defined as cognitive and behavioural adaptations or efforts to navigate stressful demands that result in positive outcomes despite threats to adaptation or development (Dunkel Schetter, 2011). Resilience can develop because of personal characteristics or resources, and increased resiliency can enhance one's ability to cope in the face of adversity and stress. Thus, the ability to optimally respond and cope in the face of the many changes and challenges of the maternal transition may enhance maternal resiliency and buffer mothers from the potentially harmful effects of stress related to the perinatal period (Guardino & Schetter, 2014).

Coping strategies have been broadly differentiated as problem-focused or emotion-focused (Skinner, Edge, Altman, & Sherwood, 2003). Problem-focused coping refers to an individual attempting to address or resolve a problem or situation directly. Problem-focused coping can be very adaptive when the stressor is something that can be influenced by the

individual's actions. In contrast, emotion-focused coping refers to an individual managing an internal feeling of distress associated with a stressful experience. Emotion-focused coping can be an effective response when faced with a stressor that cannot be influenced by the actions of an individual (Guardino & Schetter, 2014; Lazarus & Folkman, 1984). In many cases, stressors that occur within the perinatal period are unavoidable and can at times be rather unpredictable. Currently, many maternal services are problem-focused (e.g., lactation counselling), but improving maternal emotion-focused coping skills may improve a new mother's resilience to the many, and often unpredictable, stressors that arise during the perinatal period.

Mindfulness is one such skill that can enhance an individual's emotion-focused coping ability. Mindfulness may promote resiliency, not only to the multiple and diverse stressors that occur during pregnancy and the postpartum period, but also to psychological symptoms that may emerge (Creswell, Pacilio, Lindsay, & Brown, 2014; Garland, Gaylord, & Fredrickson, 2011). In particular, research has found mindfulness to be predictive of resiliency to stress (Johnson et al., 2014; Keye & Pidgeon, 2013) suggesting that proactively acquiring skills through mindfulness skills training, prior to the maternal transition, may result in women enhancing their resiliency to stressors. Moreover, it has been found that the ability to manage well in the face of stressful life or relationship experiences improves self-perceived wellness (Bandura, 1991; Rutter, 1987).

Thus, learning skills to better manage the numerous stressors that arise during pregnancy and the postpartum period may promote resiliency as well as enhance QoL and wellbeing in mothers. Dispositional mindfulness has been found to vary between individuals, and research has shown that individuals can further strengthen their mindfulness skills through formal instruction and practice (Keng, Smoski, & Robins, 2011). Considering these findings, the research presented in the following series of investigations will assess the influence of dispositional mindfulness

and mindfulness skills training on perinatal mental health and perceived stress. These investigations will also examine the potential benefits of mindfulness for enhanced psychological resiliency and QoL. Finally, as there is some evidence that maternal mental health can affect the mother-infant relationship, these investigations will also assess the potential benefits of mindfulness on mother-infant bonding. As previous research has often limited investigations to only a couple mental health or wellbeing variables, the current investigation adds to previous research by investigating mindfulness in relation to a more comprehensive list of potential mental health and wellbeing variables that often affect women during pregnancy and the postpartum period.

Study 1: Examining Mindfulness Skills and Mental Health and Wellbeing in the Perinatal Period

Pregnancy, childbirth, and motherhood are periods of significant adjustment for women (Blehar, 2006). Consequently, it is a period influenced by tremendous stressors that have the potential to lead to global effects on women's perinatal experience, general wellbeing, and QoL (Hill, Aldag, Hekel, Riner, & Bloomfield, 2006). For example, pregnancy-specific stressors include concerns such as when to tell family or an employer about pregnancy. There are also many physical stressors such as nausea or physical discomfort (Affonso et al., 1999). During the postpartum period, women encounter further stressors related to the demands of motherhood. Examples may include career or relationship changes. Women may also face difficulties with infant feeding or bonding, as well as unpredictable infant behaviours or illness (Beck et al., 2011; Cheng & Li, 2008; Pope et al., 2016; Song et al., 2015). While this list is not exhaustive, it illustrates that the changes and challenges that women experience during the maternal transition

are diverse and multifaceted and as a result, the transition to the mothering role is frequently a time accompanied by stress (Hung, Lin, Stocker, & Yu, 2011).

Despite the perinatal period being a time governed by multiple and often competing stressors, many women adjust relatively well to the maternal role. However, considering that the perinatal period is a time where multifaceted and often unpredictable stress is the rule rather than the exception, and yet a large proportion of women adjust to this transition without adverse consequences, it appears that approaches which also examine the maternal transition from a strength-based perspective are warranted (O'Hara & Wisner, 2014; Pope et al., 2016; Richardson, 2002; Zimmerman, 2013). In response, this investigation will primarily focus on examining one potential resiliency factor, namely mindfulness, and its relationship with maternal mental health and wellbeing.

Higher levels of mindfulness or dispositional mindfulness may assist pregnant and postpartum women in maintaining resiliency to stress during the maternal transition. Mindfulness is an internal characteristic described as one's ability to pay attention to moment-to-moment present experiences in a purposeful and non-judgemental way (Kabat-Zinn, 2005). In fact, research in other population samples has found higher dispositional mindfulness to be associated with better physical and mental health outcomes (Marks, Sobanski, & Hine, 2010; Slonim, Kienhuis, Di Benedetto, & Reece, 2015). In addition, research has also shown that individuals with higher dispositional mindfulness tend to endorse higher levels of self-efficacy, coping abilities, emotion and self-regulation, and motivation (Brown & Ryan, 2003; Feldman, Lavalle, Gildawie, & Greeson, 2016; Keng et al., 2011; Short, Mazmanian, Oinonen, & Mushquash, 2016; Short, Mazmanian, Ozen, & Bédard, 2015).

As there is empirical evidence showing that women are susceptible to mental health decline during the perinatal (pregnancy and the postpartum) period and that mindfulness is associated with improved mental health status in several populations, the current investigation is designed to assess the relationship between dispositional mindfulness and psychological wellbeing during pregnancy and the postpartum period. The primary intention of this study is to investigate the relationship between mental health symptoms in the perinatal period (depressive, manic, anxious, and obsessive and compulsive symptoms) and dispositional mindfulness. A secondary purpose of this investigation is to explore the association between additional indices of maternal wellbeing (perceived stress, psychological resiliency, mother-infant bond, and QoL) and their association with dispositional mindfulness in pregnant and postpartum women.

Hypotheses

Based on existing evidence which largely suggests that mindfulness skills are beneficial for mental health, it was expected that dispositional mindfulness during both pregnancy and the postpartum period would be negatively correlated with mental health symptoms, including depressive, manic, anxious, and obsessive and compulsive symptoms (primary hypotheses).

As well, based on existing evidence which largely suggests that mindfulness skills enhance general wellbeing, it was expected that dispositional mindfulness would be negatively associated with perceived stress and positively correlated with psychological resiliency and QoL during pregnancy and the postpartum period. Moreover, as ruminative thinking has been linked to impaired mother-infant attachment (Müller, Teismann, Havemann, Michalak, & Seehagen, 2013), it was expected that dispositional mindfulness would be negatively associated with difficulties in mother-infant bond, given that a focus on present experience conflicts with rumination (secondary hypotheses).

Ethical Considerations

Prior to study commencement, Lakehead University's Research Ethics Board reviewed and approved this study. This study was carried out in an ethical manner in accordance with the Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans.

Method

Materials

Participant communication. Advertisement materials included flyers and social media advertising, as well as a study website. Advertising was modified lightly throughout the recruitment period to enhance participation (see Appendix A for examples of advertising materials). An electronic covering letter with a general description of the study purpose and study tasks, as well as the corresponding consent is provided in Appendix B. The electronic debriefing form can be found in Appendix C.

Participant demographic form. Participants were asked to provide general information pertaining to their pregnancy or delivery and their health status, as well as personal and family mental health history. The questions on the demographic form were modelled after a postpartum demographic questionnaire developed by Russell (2009). Item selection for Russell's questionnaire was informed by relevant literature and studies on reproductive health. Russell's questionnaire was modified to satisfy the requirements of the present study (e.g., making the questions appropriate for pregnancy in addition to the postpartum period). Appendix D shows the list of questions which comprised the form.

Measures

To address the primary and secondary research questions in this investigation, participants completed several questionnaires. A copy of the full questionnaire battery for

pregnant and postpartum participants can be found in Appendix E. Internal consistencies obtained in the current study can be found in the results section.

The Edinburgh Postnatal Depression Scale (EPDS). The EPDS (Cox, Holden, & Sagovsky, 1987) is a widely used instrument that has been shown to be valid for assessing depressive symptoms during pregnancy and the postpartum period (Cox et al., 1987; Murray & Cox, 1990). The EPDS is a 10 item self-report scale that asks women to report the extent to which they have experienced specific depressive symptoms (e.g., low mood, crying, thoughts of self-harm) within the preceding seven-day period on a 4-point Likert-type scale ranging from *not at all* to *very often*. Scores range between 0 and 30 with higher scores reflecting a greater number or severity of depressive symptoms (Cox et al., 1987). The EPDS alpha coefficient is reported to range from .87 – .88 in past research (Dennis, 2004).

The Hospital Anxiety and Depression Scale – Anxiety Subscale (HADS-A). The Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983) is a self-report measure of the severity of depressive and anxiety symptoms. For the purposes of this study only the 7-item anxiety subscale was administered. Respondents rated their experience of each anxiety symptom on a 4-point Likert-type scale ranging from *not at all* to *very much or very often*. Total scores can range between 0 and 24. Higher scores indicate higher endorsement of anxiety symptoms. In previous investigations, the HADS-A was found to have Cronbach's alpha coefficients that varied from .68 to .93 (mean .83). The sensitivity and specificity for the HADS-A was approximately .80 and the concurrent validity of HADS has been reported as good to very good with correlations between the HADS and other measures of anxiety and depression ranging between .60 and .80 (Bjelland, Dahl, Haug, & Neckelmannd, 2002).

The Obsessive-Compulsive Inventory-Revised (OCI-R). The OCI-R (Foa et al., 2002) is designed to assess the degree to which the respondent has been bothered or distressed by 18 common obsessive and compulsive symptoms. Respondents rate each of the 18 items on a 5-point Likert-type scale ranging from *not at all* to *extremely*. The total scores can range between 0 and 72. The scale is reported to have good to excellent psychometric properties, and is reported to have Cronbach alpha coefficients ranging between .57 and .93 depending on the population being investigated (Foa et al., 2002; Hajcak, Huppert, Simons, & Foa, 2004; Huppert et al., 2007; Williams, Davis, Thibodeau, & Bach, 2013). As well, the OCI-R is reported to be sensitive to treatment response (Abramowitz, Tolin, & Diefenbach, 2005). The OCI-R has not yet been validated specifically in pregnant or postpartum populations (Chaudron & Nirodi, 2010).

The Altman Self-Rating Mania Scale (ASRMS). The ASRMS (Altman, Hedeker, Peterson, & Davis, 1997) is a 5-item self-report assessment of manic symptoms in the week preceding the assessment. Respondents rate the severity of each item on a 4-point Likert-type scale ranging from *not affected* to *severely affected* by symptoms. Total scores can range from 0 to 20, with higher scores reflecting higher endorsement of manic symptoms. The ASRMS is reported to have adequate reliability, with alpha coefficients ranging between .70 and .86 (Stanton, Gruber, & Watson, 2017). The ASRMS has not yet been validated specifically in pregnant or postpartum populations (Smith et al., 2009).

The Perceived Stress Scale (PSS). The PSS (Cohen & Williamson, 1988) is reported to be one of the most widely used measures of perceived stress related to situations in one's life (Roberti, Harrington, & Storch, 2006). The PSS (Cohen & Williamson, 1988) consists of 10 items and respondents rate each item along a 5-point scale of occurrence over the past four weeks from *never* to *very often*. The PSS is reported to have adequate reliability in healthy

adults, with alpha coefficients ranging between .78 and .89 (Barbosa-Leiker et al., 2013; Cohen & Williamson, 1988; Roberti et al., 2006).

The Brief Resilience Scale (BRS). The BRS (Smith et al., 2008) is designed to measure a respondent's capacity to withstand and recover from life stressors. The BRS consists of 6 items that ask about an individual's ability to cope effectively when faced with adversity on a 5-point Likert-type scale ranging from *strongly disagree* to *strongly agree*. The scale creators reported that the BRS has good test-retest reliability (.62 – .69) with alpha coefficients ranging from .80 to .91(Smith et al., 2008).

The Postpartum Bonding Questionnaire (PBQ). The PBQ (Brockington et al., 2001) assesses the strength of the emotional tie between a mother and her infant and was used to assess mother-infant bond. The PBQ is a 25-item scale that asks mothers to reflect on their feelings or attitudes towards their babies on a 6-point Likert-type scale ranging from *always* to *never* with higher scores denoting greater bonding difficulty. Total scores can range from 0 to 125 (Brockington et al., 2001). For ethical reasons, questions 18 and 24 (I have done harmful things to my baby; I feel like hurting my baby) were not administered as part of this investigation due to the inability to follow-up with the respondent. The PBQ is reported to have acceptable reliability and validity with a reported alpha coefficient of .76 (Skevington, 1998; Skevington, Lotfy, & O'Connell, 2004; Skevington, Sartorius, & Amir, 2004; Wittkowski, Wieck, & Mann, 2007).

The World Health Organization Quality of Life Scale-BREF (WHOQOL). The WHOQOL (World Health Organization, 1998) is a measure of overall QoL, as well as QoL in four domains: physical health, psychological health, social relationships, and environment. The WHOQOL consists of 26 items and responses are recorded on a 5-point Likert-type scale ranging from *very dissatisfied* to *very satisfied*. Domain and total scores may be calculated with

higher score indicating better QoL. The WHOQOL domain scores show good reliability and validity, including validation in a postpartum population. The WHOQOL is reported to have alpha coefficients ranging between .66 and .80 for the domains (Webster, Nicholas, Velacott, Cridland, & Fawcett, 2010; World Health Organization, 1998). For the purposes of this investigation, only the full scale score was used.

The Five Facet Mindfulness Questionnaire (FFMQ). The FFMQ (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) is a measure of mindfulness engagement through five facets (i.e., observing, describing, awareness, nonreactivity, and nonjudging). The scale is comprised of 39 items that respondents rate using a 5-point Likert-type scale ranging from *never or very rarely true* to *very often or always true*. As well, scores from the five facets can be combined to yield a total score representing a global measure of mindfulness engagement. The FFMQ is reported to have adequate reliability, convergent and discriminant validity, and incremental validity (Baer et al., 2006; Baer et al., 2008). Internal consistency of the subscales from past research is reported to be adequate to good, with alpha coefficients ranging from .75 to .92 (Baer et al., 2006). In this investigation, participants were asked to answer each item considering two different time points: 1) within the week preceding the assessment (State); and 2) a lifetime evaluation (Trait).

The Multidimensional Scale of Perceived Social Support (MSPSS). The MSPSS (Zimet, Dahlem, Zimet, & Farley, 1988) measures levels of perceived social support. This scale is included as a descriptive baseline measure as social support is reported to be a protective factor against postpartum mental health difficulties (Pope et al., 2016). The MSPSS consists of 12 items that combine to provide a global score for perceived social support, which is made up of three social support source subscales: friends, family, and significant other. Respondents answer

each question on a 7-point Likert-type scale ranging from *very strongly disagree* to *very strongly agree*. A high total mean score on the full scale or any of the subscales is indicative of higher levels of perceived social support in general or from the source addressed in the subscale. The MSPSS is reported to have alpha coefficients ranging between .87 and .91 (Dahlem, Zimet, & Walker, 1991; Osman, Lamis, Freedenthal, Gutierrez, & McNaughton-Cassill, 2014).

Personality Research Form. The Personality Research Form (Jackson, 1984) is designed to measure normal personality dimensions. For the purposes of this investigation, eight questions from both the Infrequency (PRF-IN) and Desirability (PFR-D) subscales were included in the questionnaire battery of the current investigation. Of note, eight of the 16 questions from the PRF-In and PRF-D were inadvertently excluded due to human error when transferring the items to the electronic questionnaire. However, the information obtained from each of these subscales were nevertheless included as they still provided some information with respect to the validity of participant responses. The PRF-IN is intended as a validity check to identify careless or non-purposeful responding, confusion, language barriers, or dishonest responding that might skew assessment results. Jackson (1984) prescribes a score of four or more as indicative of careless or confused responding when administering the full set of 16 scale questions. In the initial development of the scale Jackson (1984) found a low endorsement frequency of .015, which is within the lower bound of frequency reporting. Jackson (1984) found the Kuder-Richardson formula 20 estimate for the 16 items to range between .33 and .57. The PRF-D is designed to assess for response patterns that may be influenced by a desire to answer in a manner that is socially desirable. Participant responses are compared with base-rates of endorsement from the general population. Jackson (1984) reported a normative PRF-D score with a mean of

10.97 (*SD* = 2.53) when administering the full set of 16 scale questions. Jackson (1984) found the Kuder-Richardson formula 20 estimate for the 16 items to range between .59 and .62.

Participants

Participants were primarily recruited through social media advertisements. However, advertising was also conducted through flyers mailed out to community business and organizations across Canada, who were identified through an internet search as providing perinatal care. To be eligible, women needed to either be pregnant or be living with a child they have given birth to in the past year. Due to differences in health care that may differentially influence women's perinatal experiences and wellbeing, data analysis was limited to participants residing in Canada, resulting in four participants being eliminated from the analysis. As well, three participants had a score of 2 or higher on the PRF-IN and were excluded due to this being evidence of careless or confused responding. Residing outside of Canada or a PRF-IN score of 2 or more were the only exclusion criteria. As an incentive, participants were offered a chance to win one of four $50 Visa gift cards for completing the questionnaires.

In total, 481 pregnant participants and 498 postpartum participants were included in this study. The mean age of pregnant and postpartum women who participated in this cross-sectional investigation was 30.9 (*SD* = 4.3) and 31.3 (*SD* = 4.2) years, respectively. Table 1 presents descriptive statistics for the samples of pregnant and postpartum women who participated in this investigation.

Table 1

Participant Demographic Characteristics of Study 1 Final Sample

Variable Name	*n* (%)	Mean (*SD*) Range
Pregnant Participant Sample (*N* = 481)		
Participant age		30.9 (4.3) 18 - 43 years
Weeks gestation		25.01 (9.52) 3 - 41weeks
Region		
West Coast	54 (11.2)	
Prairie Provinces	142 (29.5)	
Northern Territories	4 (0.8)	
Central Canada	225 (46.8)	
Atlantic Region	44 (9.2)	
Marital Status		
Married/ common-law partnership	447 (92.9)	
Other	23 (4.8)	
Missing responses	11 (2.3)	
Ethnic Background		
Caucasian (White)	418 (86.9)	
Aboriginal (First Nations, Métis, Inuit)	15 (3.1)	
European	13 (2.7)	
Asian	8 (1.7)	
East Indian	5 (1.0)	
African-Canadian/American (Black)	3 (0.6)	
Other	7 (1.5)	
Missing responses	12 (2.5)	
Employment Status		
Full-time	319 (66.3)	
Part-time	61 (12.7)	
Stay-at-home parent	58 (12.1)	
Disability pension	2 (0.4)	
Student	10 (2.1)	
Other	19 (4.0)	
Missing responses	12 (2.5)	
Education		
Some high school	2 (0.4)	
High school diploma	32 (6.7)	
Some post-secondary training	51 (10.6)	
Post-secondary diploma or degree	284 (59.1)	
Graduate degree	97 (20.2)	
Missing responses	15 (3.1)	
Past mental health diagnosis		
No	322 (66.9)	

Yes	146 (30.4)	
Missing responses	13 (2.7)	
Primiparous		
No	203 (42.2)	
Yes	247 (51.4)	
Missing responses	31 (6.4)	
Household Income		
Under $25000	18 (3.7)	
$25000 - $49999	56 (11.6)	
$50000 - $74999	83 (17.3)	
$75000 - $999999	96 (20.0)	
$100000 - $149999	133 (27.7)	
$150000 or above	75 (15.6)	
Missing responses	20 (4.2)	
History of Formal Mindfulness Training		
No	386 (80.2)	
Yes	58 (12.1)	
Missing responses	37 (7.7)	
Postpartum Participant Sample (N = 498)		
Participant age		31.3 (4.2) 19 - 41 years
Weeks postpartum		19.44 (13.79) 0 - 52 weeks
Region		
West Coast	52 (10.4)	
Prairie Provinces	160 (32.1)	
Northern Territories	3 (0.6)	
Central Canada	250 (50.2)	
Atlantic Region	33 (6.6)	
Marital Status		
Married/ common-law partnership	486 (97.6)	
Other	11 (2.2)	
Missing responses	1 (0.2)	
Ethnic Background		
Caucasian (White)	441 (88.6)	
Aboriginal (First Nations, Métis, Inuit)	8 (1.6)	
European	17 (3.4)	
Asian	11 (2.2)	
East Indian	6 (1.2)	
African-Canadian/American (Black)	2 (0.4)	
Other	8 (1.6)	
Missing responses	1 (0.2)	
Employment Status		
Full-time	326 (65.5)	
Part-time	68 (13.7)	
Stay-at-home parent	76 (15.3)	

Disability pension	1 (0.2)
Student	8 (1.6)
Other	18 (3.6)
Missing responses	1 (0.2)
Education	
Some high school	5 (1.0)
High school diploma	24 (4.8)
Some post-secondary training	53 (10.6)
Post-secondary diploma or degree	308 (61.9)
Graduate degree	106 (21.3)
Missing responses	2 (0.4)
Past mental health diagnosis	
No	368 (73.9)
Yes	129 (25.9)
Missing responses	1 (0.2)
Primiparous	
No	185 (37.1)
Yes	313 (62.9)
Household Income	
Under $25000	15 (3.0)
$25000 - $49999	51 (10.2)
$50000 - $74999	72 (14.5)
$75000 - $999999	102 (20.5)
$100000 - $149999	157 (31.5)
$150000 or above	31 (18.3)
Missing responses	10 (2.0)
History of Formal Mindfulness Training	
No	441 (88.6)
Yes	57 (11.4)

Procedure

Interested participants responding to study advertisements were directed to the questionnaire website hosted through SurveyMonkey®. The website first displayed a covering letter (letter of information) and then asked participants to indicate that they consented to continue by checking an agreement box on the screen. All participants were asked to complete the participant demographics form, tailored appropriately depending on if the participant was pregnant or in the postpartum period. Except for the PBQ, both pregnant and postpartum participants were asked to complete all measures listed in the Measures section of this study, at each time point. The PBQ was only given to participants completing a postpartum assessment. After completing the questionnaires, participants had the option to enter their names into a draw to win one of four $50 Visa gift cards. As well, when pregnant women completed the questionnaire, they were asked if they agreed to be contacted in the future to complete a follow-up investigation (see Study 2 for more detail regarding the follow-up investigation).

Statistical Analyses

IBM SPSS (version 25) was used to perform all statistical analyses. Little's MCAR test was conducted and the results provided evidence that the missingness of each outcome variable was independent of all other outcome variables. As a result of this analysis, person-item mean imputation was appropriate for participants missing < 20% of data (Bono, Ried, Kimberlin, & Vogel, 2007; Downey & King, 1998). When participants were missing fewer than 20% of responses on a questionnaire, the missing responses were substituted using the participant's average item score on that questionnaire. The percentage of missing values exceeded 20% for only one participant completing the pregnancy time point MSPSS. Thus, this participant's total score for this scale was not included in the analysis.

Women were stratified into two subsamples: pregnant and postpartum. Data were next examined for errors and outliers (defined as *z*-scores > ±3.29) (Tabachnick & Fidell, 2013). In total, 27 pregnant and 24 postpartum participant scores were found to meet the criteria for outlier and were corrected by replacing the score with a score that was one interval above or below the highest or lowest participant score within acceptable range.

Results

Test characteristics and reliability statistics were also computed for each outcome measure and for each subsample and are listed in Table 2.

Table 2

Descriptive Statistics and Internal Consistencies (α) of Study 1 Questionnaires for Pregnant and Postpartum Subsamples

Subgroup	Scale	*n*	Potential Range	Actual Range	*M* (*SD*)	*α*
Pregnancy	EPDS	431	0 – 30	0 – 25	7.67 (5.29)	.89
	HADS-A	427	0 – 21	0 – 19	5.82 (4.16)	.88
	OCI-R	417	0 – 72	0 – 32	7.51 (7.05)	.87
	ASRMS	413	0 – 20	0 – 11	2.35 (2.39)	.58
	PSS	409	0 – 40	0 – 38	14.53 (7.72)	.91
	BRS	402	6 – 30	6 – 30	20.88 (4.87)	.91
	WHOQOL	393	24 – 120	56 – 129	100.02 (13.86)	.92
	MSPSS	349	72 – 84	22 – 84	69.23 (12.79)	.95
	FFMQ					
	State	376	39 – 195	76 – 176	132.43 (19.97)	.91
	Trait	376	39 – 195	74 – 176	134.37 (18.34)	.92
Postpartum	EPDS	491	0 – 30	0 – 27	8.46 (5.39)	.89
	HADS-A	487	0 – 21	0 – 20	6.00 (4.20)	.86
	OCI-R	475	0 – 72	0 – 37	8.93 (7.81)	.89
	ASRMS	463	0 – 20	0 – 12	3.15 (2.72)	.60
	PSS	455	0 – 40	0 – 38	15.04 (7.53)	.91
	BRS	448	6 – 30	6 – 30	20.83 (5.06)	.90
	WHOQOL	431	24 – 120	61 – 126	100.58 (13.08)	.92
	MSPSS	399	12 – 84	24 – 84	67.27 (13.20)	.93
	PBQ	447	0 – 115	0 – 58	15.48 (12.19)	.94
	FFMQ					
	State	421	39 – 195	57 – 186.79	129.94 (22.22)	.93
	Trait	421	39 – 195	79 – 186.79	135.08 (18.99)	.91

Note. ASRMS = The Altman Self-Rating Mania Scale; EPDS = The Edinburgh Postnatal Depression Scale; FFMQ = The Five Facet Mindfulness Questionnaire; HADS-A = The Hospital Anxiety and Depression Scale – Anxiety Subscale; MSPSS = The Multidimensional Scale of Perceived Social Support; OCI-R = The Obsessive-Compulsive Inventory-Revised; PBQ = The Postpartum Bonding Questionnaire; PSS = The Perceived Stress Scale; BRS = The Brief Resilience Scale; WHOQOL = The World Health Organization Quality of Life Scale-BREF.

For the FFMQ, the relationship between participants' state (considering the past week) mindfulness scores were associated with their trait (lifetime) mindfulness scores at a level that was statistically significant, for both the pregnancy (r = .89, 95% CI = .87 - .91, p < .001) and postpartum (r = .86, 95% CI = .84 - .89, p < .001) subsamples. As well, participants in both the pregnancy [$t(375) = 4.15$, p < .001)] and postpartum [$t(420) = 9.36$, p < .001)] subsamples reported lower full-scale state FFMQ scores, compared to their trait FFMQ scores. Table 3 provides descriptive statistics and paired sample t-test statistics for each of the subscales on the FFMQ when comparing each time point. As can be seen in this table, statistically significant differences were found between state and trait FFMQ scores, except for the Nonjudging subscale taken from the pregnant subsample. However, examination of the means shows that despite statistically significant differences between most comparisons, the observed differences in the means were negligible and unlikely to be clinically meaningful. Therefore, to aid in clarity of reporting, state FFMQ ratings were the focus for statistical comparisons. Using state FFMQ ratings also aligns with the timeframes of interest (pregnancy and the postpartum period) as well as the time frames assessed by each of the outcome variables (past week).

Table 3

Internal Consistencies (α), Means (M), Standard Deviations (SD), and Paired Sample t-test Results for FFMQ Subscales

	FFMQ	State FFMQ		Trait FFMQ		
Subsample	Subscale	α	*M*(*SD*)	α	*M*(*SD*)	*t*-test
Pregnancy	Observing	.74	25.79 (5.10)	.76	25.42 (4.99)	$t(375) = 2.92$*
(*n* = 376)	Describing	.92	28.35 (6.46)	.92	29.15 (6.37)	$t(375) = 6.48$**
	Awareness	.89	26.72 (5.79)	.88	27.64 (5.25)	$t(375) = 5.81$**
	Nonjudging	.92	29.57 (6.83)	.91	29.40 (6.44)	$t(375) = 1.03^{ns}$
	Nonreactivity	.82	21.94 (4.80)	.85	22.75 (4.66)	$t(375) = 5.97$**
Postpartum	Observing	.74	24.30 (5.13)	.76	25.03 (5.12)	$t(420) = 6.26$**
(*n* = 421)	Describing	.90	28.23 (6.40)	.90	29.56 (6.05)	$t(420) = 8.82$**
	Awareness	.89	26.30 (6.18)	.88	27.67 (5.43)	$t(420) = 7.80$**
	Nonjudging	.93	28.62 (7.71)	.91	29.33 (6.66)	$t(420) = 4.09$**
	Nonreactivity	.76	22.50 (5.44)	.84	23.51 (5.08)	$t(420) = 7.82$**

Notes. FFMQ = The Five Facet Mindfulness Questionnaire; * = $p < .05$; ** = $p < .001$.

Primary Analyses

Correlational analyses for both the pregnancy subgroup and the postpartum subgroup were conducted to assess the relationship between dispositional mindfulness and the primary outcome measures assessing mental health symptoms. The results of the analyses are found in Table 4. As can be seen from this table, all analyses investigating the association between mental health symptoms and state mindfulness were statistically significant. Specifically, depressive, anxious, and obsessive and compulsive symptoms (as measured by the EPDS, HADS-A, and OCI-R) were inversely associated participants' endorsed level of mindfulness (as measured by state FFMQ), with moderate to large Cohen's *d* effect sizes.

Secondary Analyses

Separate correlational analyses for both the pregnancy subgroup and the postpartum subgroup were conducted to assess the relationship between state mindfulness and the secondary outcome measures assessing stress, psychological resiliency, and QoL (as measured by the PSS, BRS, and WHOQOL) during pregnancy and the postpartum period. In addition, a measure evaluating difficulties in mother-infant bond (as measured by the PBQ) was included and evaluated for the postpartum subsample. The results of the analyses are found in Table 5. As can be seen from this table, all the analyses investigated were statistically significant with moderate to large Cohen's *d* effect sizes and in the expected directions.

Table 4

Cross-Sectional Bivariate Correlations between Mental Health Symptom Scores and State Mindfulness Scores

			State FFMQ	
Subgroup	Scale	*n*	*r*	95% *CI*
Pregnancy	EPDS	376	-.67**	-.73, -.61
	HADS-A		-.63**	-.69, -.57
	OCI-R		-.48**	-.56, -.40
	ASRMS		.17**	.07, .27
Postpartum	EPDS	421	-.70**	-.75, -.65
	HADS-A		-.67**	-.72, -.61
	OCI-R		-.51**	-.58, -.44
	ASRMS		.14**	.04, .23

Note. ASRMS = The Altman Self-Rating Mania Scale; EPDS = The Edinburgh Postnatal Depression Scale; FFMQ = The Five Facet Mindfulness Questionnaire; HADS-A = The Hospital Anxiety and Depression Scale – Anxiety Subscale; OCI-R = The Obsessive-Compulsive Inventory-Revised; ** = $p < .001$.

Table 5

Cross-Sectional Bivariate Correlations between Wellbeing Scores and State Mindfulness Scores

			State FFMQ	
Subgroup	Scale	*n*	*r*	95% *CI*
Pregnancy	PSS	376	-.68**	-.73, -.62
	BRS		.61**	.55, .67
	WHOQOL		.65**	.58, .70
Postpartum	PSS	421	-.71**	-.75, -.66
	BRS		.66**	.60, .71
	WHOQOL		.69**	.64, .74
	PBQ		-.59**	-.65, -.53

Note. BRS = The Brief Resilience Scale; FFMQ = The Five Facet Mindfulness Questionnaire; PBQ = The Postpartum Bonding Questionnaire; PSS = The Perceived Stress Scale; WHOQOL = The World Health Organization Quality of Life Scale-BREF; ** = $p < .001$.

Validity Assessment

The mean scores on the PRF-D index were 1.88 (*SD* = 1.74) and 1.98 (*SD* = 1.83), for the pregnancy and postpartum subsamples, respectively. To determine the extent to which any of these findings might be attributable to a socially desirable response set (as measured by the PRF-D), a series of additional analyses were conducted. First, the correlations between each primary or secondary measure and social desirability score (PRF-D) were computed. For the pregnancy subsample, these values ranged from -.64 to .60, with the largest correlations observed between the PRF-D with the WHOQOL (r = -.64) and PSS (r = .60). Second, all of the primary and secondary analyses were conducted once more but controlling for social desirability. With one exception, statistically significant results observed prior to controlling for PRF-D scores remained consistent after including this variable as a control variable in the analyses. The one exception pertained to ASRMS scores. Prior to controlling for PRF-D, ASRMS scores were positively associated with both state and trait mindfulness (as measured by the FFMQ). However, after controlling for PRF-D scores, there was no statistically significant relationship observed between ASRMS and trait FFMQ scores (r = .09, p = .101).

For the postpartum subsample, the values ranged from -.66 to .64, with the largest correlations observed between the PRF-D with the WHOQOL (r = -.66) and PSS (r = .64). Second, all of the primary and secondary analyses were conducted once more but controlling for social desirability (PRF-D). Statistically significant results observed prior to controlling for PRF-D scores remained consistent after including this variable as a control variable in the analyses.

Discussion

There is a growing literature base showing that women are susceptible to mental health challenges during reproductive events, including pregnancy and the postpartum period (Davey et

al., 2011; Gordon, Rubinow, Eisenlohr-Moul, Leserman, & Girdler, 2016; O'Hara & McCabe, 2013; O'Hara & Wisner, 2014; Pope, Oinonen, Mazmanian, & Stone, 2017; Pope et al., 2014; Russell et al., 2013). Initially, such difficulties were clustered under the heading "postpartum depression." However, research now shows that women are at risk for experiencing a variety of mental health challenges, including depressive, anxiety, obsessive and compulsive, and hypomanic or manic symptoms during both pregnancy and the postpartum period (Davey et al., 2011; Pope et al., 2014; Russell et al., 2013). Furthermore, what has become most clear from this research is a growing need to protect women's mental health during these particularly vulnerable periods.

The present investigation examined the potential relationship between state mindfulness and a series of mental health symptom classifications. The results support the investigational hypotheses that mindfulness is inversely related to depressive, anxiety, and obsessive and compulsive symptoms, when measured at the same time point. Similar results were also found when examining trait mindfulness. However, in contrast to the investigational hypotheses, manic symptoms were positively associated with state mindfulness during pregnancy and the postpartum period. Interestingly, no relationship was revealed between trait mindfulness and manic symptoms measured during the postpartum period. It is possible that the positive association between state mindfulness and manic symptoms is due to the inability for the ASRMS to differentiate between none clinical elation that may occur naturally for some women during the perinatal period and clinically concerning levels of elation or irritation that may be indicative of a hypomanic or manic episode. However, as this was not specifically assessed in the current investigation, future research is needed to examine this possibility.

Overall, the results suggest a potential avenue for proactively intervening to protect women's mental health during pregnancy and the postpartum period, particularly in respect to depressive, anxious, and obsessive and compulsive symptoms. That is, interventions aimed at enhancing women's mindfulness skills during pregnancy and the postpartum period may reduce their mental health vulnerability. Moreover, the results of this investigation also showed that higher self-endorsed state mindfulness was associated with lower perceived stress, and higher resiliency and quality of life scores. As well, for women in the postpartum subsample, higher self-endorsed state mindfulness was associated with lower endorsement of difficult mother-infant bonding experiences.

Taken together the results provide support for further investigations into the potential protective relationship between mindfulness and maternal mental health and wellbeing during pregnancy and the postpartum period. A major strength of this investigation was the large sample size of pregnant and postpartum women. As well, the investigation used several measures of mental health and wellbeing, permitting evaluation from various perspectives that combine to allow for a greater understanding of mental health during pregnancy and the postpartum period. However, limitations of the current investigation must also be taken into consideration. First, this investigation utilized self-report data. Thus, there is the potential for response bias and error. However, the PRF-IN was used to help eliminate response data that may be tainted by careless or confused responding. As well, analyses were rerun including the PRF-D as a control variable to assess the potential that results were influenced by a socially desirable response style. Second, the results of this investigation are based on cross-sectional data. Thus, it does not speak to a potential time-ordered relationship, limiting the interpretation of the results from a causal perspective. Third, participants were recruited as part of a convenience sample. Therefore, it is

possible that the results may not be generalizable to all pregnant or postpartum women, particularly those who reside outside of Canada.

In conclusion, the results of the present investigation support an inverse relationship between mindfulness with several classifications of mental health challenges (depressive, anxiety, and obsessive and compulsive symptoms), perceived stress, and difficulties in mother-infant bonding. The results also support a positive relationship between mindfulness and psychological resiliency and QoL, as well as between mindfulness and manic symptoms. Thus, additional research investigating the potential longitudinal relationship between these facets is warranted and as a result, will be explored in the investigation detailed in Study 2.

Study 2: A Longitudinal Investigation of Mindfulness Skills and the Implications for Perinatal Mental Health

Mindfulness is theorized to promote emotion regulation, as thinking mindfully contrasts with cognitive thinking styles associated with psychological distress (e.g., rumination, reactivity, worry, evaluation) (Marks et al., 2010). This theory is supported by research which has found that higher levels of dispositional mindfulness are associated with better physical and mental health outcomes. For instance, research has shown that in general individuals with higher dispositional mindfulness tend to endorse lower levels of depressive and anxious symptoms and report lower levels of perceived stress (Brown & Ryan, 2003; Marks et al., 2010; Slonim et al., 2015).

Study 1 was the first study in this series of investigations and provided cross-sectional evidence that women's level of self-reported state mindfulness was inversely related to several classifications of mental health symptoms, stress, and difficulties in mother-infant bonding in a national Canada-wide study of pregnant and postpartum women. The investigation also found

that state mindfulness was positively related to psychological resiliency and QoL in pregnant and postpartum women. While this evidence is encouraging, cross-sectional data are limited because a temporal sequence cannot be established, making inferences regarding a potential causal direction impossible (Shaughnessy, Zechmeister, & Zechmeister, 2015). Using a longitudinal study design, the purpose of this second investigation was to establish evidence of a temporal relationship to speak to the potential predictive relationship between dispositional mindfulness during pregnancy and maternal mental health and wellbeing during the postpartum period.

Hypotheses

Based on the existing research literature, in conjunction with the results from Study 1 of this series, it was hypothesized that state mindfulness during pregnancy would be negatively correlated with participants perceived stress, several classifications of mental health symptoms (including depressive, anxious, and obsessive and compulsive symptoms), and difficulties in mother-infant bond during the postpartum period. The relationship between mania and mindfulness was also investigated to determine if the positive relationship found in Study 1 would be replicated. As well, it was further predicted that mindfulness during pregnancy would be positively associated with psychological resiliency and QoL during the postpartum period.

Ethical Considerations

This study was reviewed and approved by Lakehead University's Research Ethics Board. The investigational procedure was carried out in an ethical manner and in accordance with the Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans.

Method

Materials

Consent and debriefing forms for participants who completed this follow-up study can be found in Appendix F and G, respectively.

Participant demographic form. As previously described in Study 1 and shown in Appendix D, pregnant participants participating in the pan-Canada study on Maternal Wellbeing (Study 1) were asked at the baseline time point to provide general information pertaining to their pregnancy and their health status.

Postpartum follow-up health information form. Participants agreeing to the longitudinal follow-up investigation were asked at the postpartum follow-up time point to provide general information pertaining to their delivery and their health status. The questions from the follow-up health form can be found in Appendix H.

Measures

To address the research questions in this investigation, several questionnaires were combined and administered to participants. Below is a brief overview of each measure. Further details about each scale and an explanation regarding the psychometric properties of each measure can be found in the Measures section of Study 1. A copy of the full questionnaire battery can be found in Appendix E. Internal consistencies obtained in the current study can be found in the results section.

The Edinburgh Postnatal Depression Scale (EPDS). The EPDS (Cox et al., 1987) is a widely used instrument that has been shown to be valid during pregnancy and the postpartum period for assessing depressive symptoms (Cox et al., 1987; Murray & Cox, 1990).

The Hospital Anxiety and Depression Scale – Anxiety Subscale (HADS-A). The Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983) is a self-report measure of the severity of depressive and anxiety symptoms. Only the anxiety subscale was used in this investigation.

The Obsessive-Compulsive Inventory-Revised (OCI-R). The OCI-R (Foa et al., 2002) is designed to assess the degree to which the respondent has been bothered or distressed by common obsessive and compulsive symptoms.

The Altman Self-Rating Mania Scale (ASRMS). The ASRMS (Altman et al., 1997) is an assessment of manic symptoms.

The Perceived Stress Scale (PSS). The PSS (Cohen & Williamson, 1988) is a measure of perceived stress related to situations in one's life.

The Brief Resilience Scale (BRS). The BRS (Smith et al., 2008) is designed to measure a respondent's perceived capacity to withstand and recover from life stressors.

The Postpartum Bonding Questionnaire (PBQ). The PBQ (Brockington et al., 2001) assesses the strength of the emotional tie between a mother and her infant (higher scores denote greater difficulties in bonding).

The World Health Organization Quality of Life Scale-BREF (WHOQOL). The WHOQOL (World Health Organization, 1998) is a measure of overall QoL, as well as QoL in four domains: physical health, psychological health, social relationships, and environment. For the purposes of this investigation only the overall QoL score was tabulated.

The Five Facet Mindfulness Questionnaire (FFMQ). The FFMQ (Baer et al., 2006) is a measure of mindfulness engagement through five facets (i.e., observing, describing, awareness, nonreactivity, and nonjudging). In this investigation, participants were asked to answer each item

considering two different time points: 1) within the week preceding the assessment (State); and, 2) a lifetime evaluation (Trait).

The Multidimensional Scale of Perceived Social Support (MSPSS). The MSPSS (Zimet et al., 1988) measures levels of perceived social support and is included for descriptive purposes.

Personality Research Form. Eight questions from each of two subscales of the Personality Research Form (Jackson, 1984) were used as validity checks to help identify response styles that may inappropriately skew assessment results (Infrequency; PRF-IN) or response patterns that may be influenced by a desire to answer in a manner that is socially desirable (Desirability; PRF-D).

Participants

Participants in this investigation were pregnant women who participated in a Canada-wide investigation on maternal wellbeing and consented to participate in a follow-up study once they reached the postpartum period. Recruitment procedures are described in the Method section of Study 1.

Participants were eligible to be included in the data analysis so long as they confirmed they were living with the child they have given birth to in the past year and provided consistent deidentified details that permitted their postpartum follow-up data to be connected with their data collected during pregnancy. As well, due to differences in health care that may differentially influence women's perinatal experiences and wellbeing, data analysis was limited to participants residing in Canada. Of the 481 pregnant women who participated in the Canada-wide investigation described in Study 1, 156 consented and participated in the longitudinal follow-up investigation. Six of these participants were excluded from the analysis due to: PRF-IN score of

2 or more (n = 1); being more than 12 months postpartum (n = 1); baby's age at the follow-up time point not being provided (n = 2); not completing the follow-up time point outcome questionnaires after initiating the follow-up study (n = 1), or completing the follow-up outcome measures more than once (n = 1). The mean age of women who participated in this longitudinal investigation was 31.3 (SD = 4.2) as of the first assessment. Table 6 presents descriptive statistics for the women included in the analyses as part of this longitudinal investigation.

Table 6

Participant Demographic Characteristics of Study 2 Final Sample

Variable	*n* (%)	Mean (*SD*) Range
Participant age (*n* = 149)		31.3 (4.2) 21 - 43 years
Weeks gestation at time 1 (*n* = 150)		24.99 (9.55) 4 - 40 weeks
Weeks postpartum at follow-up (*n* = 150)		6.32 (3.69) 2 - 37 weeks
Region		
West Coast	17 (11.3)	
Prairie Provinces	37 (24.6)	
Northern Territories	1 (0.7)	
Central Canada	82 (54.6)	
Atlantic Region	13 (8.7)	
Marital Status		
Married/ common-law partnership	144 (96.0)	
Other	6 (4.0)	
Ethnic Background		
Caucasian (White)	140 (93.3)	
Aboriginal (First Nations, Métis, Inuit)	2 (1.3)	
European	5 (3.3)	
Asian	1 (0.7)	
East Indian	1 (0.7)	
African-Canadian/American (Black)	1 (0.7)	
Employment Status during Pregnancy		
Full-time	108 (72.0)	
Part-time	21 (14.0)	
Stay-at-home parent	12 (8.0)	
Student	1 (0.7)	
Other	8 (5.3)	
Education		
High school diploma	3 (2.0)	
Some post-secondary training	11 (7.4)	
Post-secondary diploma or degree	100 (66.6)	
Graduate degree	37 (24.0)	
Past mental health diagnosis		
No	104 (69.3)	
Yes	46 (30.7)	
Primiparous		
No	59 (39.3)	
Yes	91 (60.7)	
Household Income		
Under $25000	2 (1.3)	
$25000 - $49999	10 (6.7)	

$50000 - $74999	28 (18.7)
$75000 - $999999	31 (20.7)
$100000 - $149999	48 (32.0)
$150000 or above	29 (19.3)
Missing responses	2 (1.3)
History of Formal Mindfulness Training	
No	125 (83.3)
Yes	25 (16.7)

Procedure

Interested participants responded to advertisements (Appendix A) asking them to participate in a parent investigation (Study 1) on maternal wellbeing. The advertisements directed interested individuals to the questionnaire website hosted through SurveyMonkey® to review the study covering letter or letter of information (Appendix B). If an individual agreed to participate then they consented to continue by checking an agreement box on the screen. For the purposes of this investigation, only pregnant women who participated in the parent study (described further in Study 1) and consented to (and completed) the follow-up time point were included in the analyses (n = 150). During the pregnancy baseline time point, participants were first asked to complete the demographics questionnaire, which included deidentified coding information to help link pregnancy baseline data with postpartum follow-up data. During initial debriefing at the pregnancy time point, participants were asked to consent to be contacted for a follow-up investigation. At follow-up, participants were again asked to consent to participate and received debriefing information at the end of the follow-up session. Except for the PBQ, participants were asked at both time points to complete all measures listed in the Measures section. During the postpartum time point, women also completed the PBQ and the postpartum follow-up health information form.

Participant assessments at the pregnancy and the follow-up time points were linked by asking women to provide their month and year of birth, the last three digits of their postal code, and their eye colour. This information was not connected with any of the participants' contact information. After completing the questionnaires at each time point, participants also had the option to enter their name into a draw to win one of four $50 Visa gift cards.

Statistical Analysis

IBM SPSS (version 25) was used to perform all statistical analyses. Little's MCAR test was conducted and the results provided evidence that the missingness of each outcome variable was independent of all other outcome variables. As a result of this analyses, person-item mean imputation was appropriate for participants missing < 20% of data (Bono et al., 2007; Downey & King, 1998). When participants were missing fewer than 20% of responses on a questionnaire, the missing responses were substituted using the participant's average item score on that questionnaire. Of the participants who completed at least part of each questionnaire, the percentage of missing values exceeded 20% for only one participant completing the postpartum time point WHOQOL. Thus, this participant's total score for the WHOQOL was not included in the analyses.

Data were examined for errors and outliers (defined as z-scores > ±3.29) (Tabachnick & Fidell, 2013). In total, eight participant follow-up scores were found to meet the criteria for outlier and were corrected by replacing the score with a score that was one interval above or below the highest or lowest score within acceptable range.

Results

Test characteristics and reliability statistics were also computed for each outcome measure and for each subsample and are listed in Table 7.

Table 7

Descriptive Statistics and Internal Consistencies (α) of Study 2 Questionnaires for Pregnant and Postpartum Time Points

Time Point	Scale	*n*	Potential Range	Actual Range	*M* (*SD*)	*α*
Pregnancy	EPDS	150	0 – 30	0 – 23	7.33 (4.73)	.86
	HADS-A	150	0 – 21	0 – 17	5.85 (3.76)	.86
	OCI-R	150	0 – 72	0 – 32	7.13 (7.02)	.88
	ASRMS	150	0 – 20	0 – 10	2.21 (2.17)	.52
	PSS	150	0 – 40	2 – 31	13.48 (6.76)	.91
	BRS	150	6 – 30	6 – 30	20.73 (4.92)	.93
	QOL	149	24 – 120	62 – 129	101.26 (11.91)	.90
	MSPSS	147	12 – 84	27 – 84	69.06 (13.13)	.95
	FFMQ					
	State	149	39 – 195	74 – 175	132.08 (20.13)	.93
	Trait	149	39-195	76 – 176	134.28 (18.68)	.92
Postpartum	EPDS	150	0 – 30	0 – 23	7.16 (4.83)	.89
	HADS-A	149	0 – 21	0 – 19	5.54 (4.35)	.89
	OCI-R	148	0 – 72	0 – 31	6.94 (5.86)	.87
	ASRMS	146	0 – 20	0 – 10	2.95 (2.61)	.55
	PSS	144	0 – 40	1 – 35	14.96 (7.00)	.91
	BRS	142	6 – 30	8 – 30	21.40 (4.63)	.91
	QOL	139	24 – 120	62 – 126	100.77 (12.50)	.92
	MSPSS	129	12 – 84	24 – 84	68.79 (13.86)	.95
	PBQ	142	0 – 115	0 – 63	17.57 (14.18)	.95
	FFMQ					
	State	138	39 – 195	55 – 185	129.86 (22.75)	.95
	Trait	138	39 – 195	81 – 186	136.00 (19.38)	.93

Note. ASRMS = The Altman Self-Rating Mania Scale; EPDS = The Edinburgh Postnatal Depression Scale; FFMQ = The Five Facet Mindfulness Questionnaire; HADS-A = The Hospital Anxiety and Depression Scale – Anxiety Subscale; MSPSS = The Multidimensional Scale of Perceived Social Support; OCI-R = The Obsessive-Compulsive Inventory-Revised; PBQ = The Postpartum Bonding Questionnaire; PSS = The Perceived Stress Scale; BRS = The Brief Resilience Scale; WHOQOL = The World Health Organization Quality of Life Scale-BREF.

As was the case with Study 1, the participants' state mindfulness scores were associated with their trait mindfulness scores at a level that was statistically significant, for both the pregnancy (r = .91, 95% CI = .88 - .94, p < .001) and postpartum time points (r = .76, 95% CI = .68 - .83, p < .001). As well, there was also a statistically significant relationship between the pregnancy and postpartum FFMQ scores when considering the past week assessments (r = .63, 95% CI = .52 - .72, p < .001) as well as lifetime assessments (r = .81, 95% CI = .75 - .86, p < .001). There was not a statistically significant difference between participants' past week FFMQ scores during pregnancy compared to scores at the postpartum follow-up time point [$t(136)$ = 0.93, p = .357)]. This finding of stability is consistent with previous research (Brassel, Townsend, Pickard, & Grenyer, 2020). However, participants rated their lifetime mindfulness higher at the pregnancy time point, when compared to the postpartum follow-up time point [$t(136) = 2.14$, $p < .05$)].

Table 8 provides paired sample t-test statistics for each of the subscales on the FFMQ when comparing each time point. When considering the past week assessment time period, only the Observing subscale score differed between the pregnancy and postpartum follow-up time points, at a level that was statistically significant. When examining participants' lifetime ratings, the Describing and the Nonreactivity subscales were the only two subscales to differ between pregnancy and the postpartum follow-up time points at a level that was statistically significant. However, any mean differences observed were marginal and unlikely to be clinically meaningful. As well, the overall, pattern of findings was the same regardless of whether state or trait mindfulness scores were assessed. Thus, as was done in Study 1, only state mindfulness is reported for statistical comparisons.

Table 8

Internal Consistencies (α), Means (M), Standard Deviations (SD), and Paired Sample t-test Results for FFMQ Subscales Comparing Pregnancy to the Postpartum Follow-up Time Point

		FFMQ - Pregnancy Time Point		FFMQ - Postpartum Time Point		
Assessment period	FFMQ Subscale	α	*M*(*SD*)	α	*M*(*SD*)	Paired *t*-test
Past week (State)	Observing	.74	25.72 (5.00)	.81	24.58 (5.63)	$t(136) = 2.96$*
n = 149	Describing	.91	27.40 (6.53)	.93	27.50 (6.81)	$t(136) = 0.22^{ns}$
	Awareness	.89	26.10 (5.95)	.87	25.66 (5.40)	$t(136) = 1.02^{ns}$
	Nonjudging	.92	29.81 (6.67)	.93	29.21 (7.44)	$t(136) = 1.06^{ns}$
	Nonreactivity	.84	22.20 (4.74)	.89	22.94 (5.13)	$t(136) = 0.03^{ns}$
Lifetime (Trait)	Observing	.77	25.32 (4.96)	.83	25.36 (5.52)	$t(136) = 0.15^{ns}$
n = 138	Describing	.92	28.31 (6.48)	.93	29.05 (6.51)	$t(136) = 2.07$*
	Awareness	.88	27.45 (5.46)	.84	27.57 (4.57)	$t(136) = 0.34^{ns}$
	Nonjudging	.91	29.69 (6.17)	.92	29.82 (6.46)	$t(136) = 0.34^{ns}$
	Nonreactivity	.85	23.10 (4.56)	.87	24.20 (4.76)	$t(136) = 3.79$**

Note. FFMQ = The Five Facet Mindfulness Questionnaire; *ns* = not statistically significant; * = $p < .05$; ** = $p < .001$.

Primary Analyses

Correlational analyses were conducted to assess the relationship between dispositional mindfulness during pregnancy and the primary outcome measures assessing mental health symptoms during the postpartum period. The results of the analyses are reported in Table 9. As can be seen from this table, scores on the EPDS, HADS-A, and OCI-R taken at the postpartum follow-up time point were inversely associated with participants endorsed level of state mindfulness during pregnancy (as measured by the FFMQ), with near moderate to large effect sizes. Interestingly, level of manic symptoms endorsed on the ASRMS was not found to be associated with mindfulness (as measured by the FFMQ) assessed during pregnancy.

Secondary Analyses

Correlational analyses were conducted to assess the relationship between state mindfulness measured during pregnancy and the secondary postpartum outcome measures assessing stress, psychological resiliency, QoL, and difficulties in mother-infant bond (as measured by the PSS, BRS, WHOQOL and PBQ, respectively). The results of the analyses are found in Table 10. As can be seen from this table, all the analyses were statistically significant and in the expected directions, with moderate to large effect sizes. These finding were consistent when examining participants self-reported pregnancy assessments of mindfulness over the preceding week (state) or their lifetime assessment.

Table 9

Longitudinal Bivariate Correlations between State Mindfulness Scores Measured During Pregnancy and Postpartum Mental Health Symptom Scores

		Pregnancy State FFMQ	
Postpartum Scale	*n*	*r*	95% *CI*
EPDS	149	-.35**	-.47, -.19
HADS-A	148	-.32**	-.46, -.16
OCI-R	147	-.39**	-.52, -.25
ASRMS	145	-.10	-.27, .05

Note. ASRMS = The Altman Self-Rating Mania Scale; EPDS = The Edinburgh Postnatal Depression Scale; FFMQ = The Five Facet Mindfulness Questionnaire; HADS-A = The Hospital Anxiety and Depression Scale – Anxiety Subscale; OCI-R = The Obsessive-Compulsive Inventory-Revised; ** = $p < .001$.

Table 10

Longitudinal Bivariate Correlations between State Mindfulness Scores Measured During Pregnancy and Postpartum Wellbeing Scores

		Pregnancy State FFMQ	
Postpartum Scale	*n*	*r*	95% *CI*
PSS	143	-.42**	-.54, -.27
BRS	141	.45**	.30, .57
WHOQOL	139	.37**	.20, .49
PBQ	141	-.34**	-.47, -.17

Note. FFMQ = The Five Facet Mindfulness Questionnaire; PBQ = The Postpartum Bonding Questionnaire; PSS = The Perceived Stress Scale; BRS = The Brief Resilience Scale; WHOQOL = The World Health Organization Quality of Life Scale-BREF; ** = $p < .001$.

Validity Assessment

The mean score on the PRF-D index was 1.78 (*SD* = 1.67). To determine the extent to which any of these findings might be attributable to a socially desirable response set (as measured by the PRF-D), a series of additional analyses were conducted. First, the correlations between each primary measure and social desirability score (measured with the PRF-D) were computed. These values ranged from -.70 to .64, with the largest correlations observed between the PRF-D and the WHOQOL (*r* = -.70) and HADS-A (*r* = .64). Second, all of the primary and secondary analyses were conducted once more but controlling for social desirability. Interestingly, there were some discrepancies with the results observed prior to controlling for PRF-D scores. Specifically, once controlling for PRF-D scores, state FFMQ scores measured during pregnancy were no longer related to postpartum EPDS (*r* = -.09, *p* = .313), HADS-A (*r* = -.06, *p* = .461), WHOQOL (*r* = .10, *p* = .26), or PBQ (*r* = -.17, *p* = .06) scores at a level that was statistically significant. Thus, a significant relationship remained with the OCI-R, PSS, and BRS.

Discussion

The present investigation extends on the Study 1 cross-sectional findings. Using a longitudinal framework, this investigation examined the potential relationship between state mindfulness during pregnancy and a series of mental health symptom classifications taken during the postpartum period. The results support a potential predictive relationship between self-endorsed mindfulness during pregnancy as inversely related to depressive, anxiety, and obsessive and compulsive symptoms experienced during the postpartum period. Interestingly, in contrast to Study 1 which showed a cross-sectional positive relationship between state mindfulness and manic symptoms measured in a postpartum sample, the present investigation did not find

evidence of a predictive relationship between mindfulness during pregnancy and the experience of manic symptoms in the postpartum period.

Overall, the results of this longitudinal investigation provide further support for mindfulness as a potential skill that may protect women's mental health during pregnancy and the postpartum period. Moreover, the results of this investigation also showed that higher self-endorsed mindfulness during pregnancy was associated with lower perceived stress and lower endorsement of difficult mother-infant bonding experiences during the postpartum period. As well, higher self-endorsed mindfulness during pregnancy was associated with higher resiliency and QoL scores taken during the postpartum period. Interestingly, when controlling for socially desirable responding, state mindfulness measured during pregnancy only showed a significant relationship with obsessive and compulsive symptoms, perceived stress, and psychological resiliency. Thus, it is possible that response style may account for some of the statistically significant relationships noted. Nevertheless, some of the analyses remained significant, suggesting that at the very least there appears to be a predictive relationship between mindfulness during pregnancy and maternal wellbeing during the postpartum period.

The findings of the present investigation lend further support to a potential protective relationship between mindfulness and maternal mental health during the postpartum period. As well, the finding that mindfulness is not only related to clinically relevant mental health symptoms, but also measures of wellbeing suggests that mindfulness may be a skill that can enhance the general wellbeing of pregnant and postpartum women, in addition to potentially offering protection from mental health challenges. A major strength of this investigation was the large sample size of pregnant women who consented and completed the postpartum follow-up time point. As well, the investigation used several measures allowing for observations to be

made considering several mental health and wellbeing categories. However, limitations of the current investigation must be taken into consideration. As discussed in Study 1, this investigation utilized self-report data and is therefore susceptible to response bias and error. However, the PRF-IN was included to help eliminate response data that may be contaminated by careless or confused responding. As well, analyses were rerun including the PRF-D as a control variable to assess the potential that results were influenced by a socially desirable response style. Second, the results of this investigation are based on data obtained from a convenience sample of participants. Thus, it is possible that the results may not be generalizable to all postpartum women, particularly those who reside outside of Canada. As well, this investigation lacks qualities that permit causal conclusions, namely experimental manipulation, or a control group (Shaughnessy et al., 2015).

In conclusion, the results of the present investigation provide evidence of an inverse and time-ordered relationship between mindfulness during pregnancy with several classifications of postpartum mental health challenges, perceived stress, and difficulties in mother-infant bonding. The results also support a positive relationship between mindfulness measured during pregnancy and later postpartum measures of psychological resiliency and QoL. This suggests a potential predictive relationship that may inform mental health preventative intervention strategies. Thus, additional research investigating the potential benefits of mindfulness skills training for enhanced maternal mental health and wellbeing is warranted and accordingly, will be explored in a third investigation detailed next.

Study 3: A Cluster Randomized-Control Trial of Mindfulness Skills Training during Pregnancy

An individual's dispositional mindfulness may promote resiliency and protect against the stressors that can arise with new motherhood. However, the level of dispositional mindfulness varies between individuals. Formal lessons in mindfulness practice may be beneficial by encouraging expectant and new mothers to further develop their skills and use mindfulness in a more intentional way. Mindfulness training aims to strengthen an individual's ability to pay attention to moment-to-moment present experiences in a purposeful and non-judgemental way (Kabat-Zinn, 2005). Programs that aim to foster mindfulness in other sample populations have been shown to be effective for enhancing the ability to cope in the face of a variety of physical conditions, including cancer, traumatic brain injury, chronic pain, and fatigue (Bédard et al., 2014; Dobos et al., 2015; la Cour & Petersen, 2015; Surawy, Roberts, & Silver, 2005).

As well, mindfulness training has been shown to be effective for enhancing participants' ability to cope with stress related to a variety of difficulties and improving QoL (Bédard et al., 2013; la Cour & Petersen, 2015; Piet & Hougaard, 2011; Short et al., 2015; Surawy et al., 2005). It has also been effective in reducing perceived stress and treating a variety of mental health disorders and difficulties, including depression and depressive-relapse, as well as anxiety and panic symptoms (Helmes & Ward, 2017; Khoury, Sharma, Rush, & Fournier, 2015; Kim, Lee, Kim, Choi, & Lee, 2016; Piet & Hougaard, 2011; Strauss, Cavanagh, Oliver, & Pettman, 2014).

Mindfulness-Based Cognitive Therapy (MBCT) (Segal, Williams, & Teasdale, 2002, 2013) was originally developed as a maintenance treatment to prevent depressive relapses for individuals who have recovered from a major depressive episode. MBCT combines strategies from two empirically supported treatment modalities: Kabat-Zinn's (2005) Mindfulness-Based

Stress Reduction (MBSR) and Beck's (1979) Cognitive Behavioural Therapy and is typically provided over the course of eight group sessions led by an instructor trained to facilitate MBCT. Much of the MBCT practice entails attention control training, which aims to increase the participants' awareness of their thoughts, to help them relate to their thoughts and experiences in more adaptive ways. Through this training, participants learn specific skills and techniques that target how participants relate to their personal cognitions and present state of being. This in turn allows participants to recognize and disengage from self-perpetuating ruminative and negative thinking. Specifically, through formal meditation practice and skills training in decentering, acceptance, awareness, and concentration, participants learn that they have the ability to better control what thoughts they attend to and how they relate to their thoughts (Segal et al., 2013).

There is some empirical support for the use of mindfulness interventions during the perinatal period, as it is reported to be an effective treatment approach for reducing depression and anxiety symptoms during pregnancy (Beddoe, Paul Yang, Kennedy, Weiss, & Lee, 2009; Goodman et al., 2014; Muzik, Hamilton, Lisa Rosenblum, Waxler, & Hadi, 2012; Sivak, 2007) and reducing anxiety, stress, and psychological distress during the postpartum period (Dunn, Hanieh, Roberts, & Powrie, 2012; Guardino, Dunkel Schetter, Bower, Lu, & Smalley, 2014; Perez-Blasco, Viguer, & Rodrigo, 2013; Vieten & Astin, 2008). Moreover, research findings suggest that mindfulness interventions delivered to both perinatal and non-perinatal individuals are well received and accepted by participants, feasible to deliver, improve wellbeing and reduce symptoms of anxiety and depression for women with prenatal elevations in anxiety or depression histories (Dhillon, Sparkes, & Duarte, 2017; Dimidjian et al., 2015; Duncan et al., 2017; Fedler et al., 2017; Goodman et al., 2014; Luberto, Park, & Goodman, 2018; Muzik et al., 2012; Perez-Blasco, Viguer, & Rodrigo, 2013; Shi & MacBeth, 2017). As well, results from a two-group

comparison trial, as well as a recent RCT showed that other mindfulness-based programs offered during pregnancy resulted in reductions in depressive symptoms and self perceive stress during the postpartum period (Felder et al., 2018; Pan, Chang, Chen, & Gau, 2019). As a result of the empirical support substantiating the use of MBCT and other mindfulness programming for depression and various perinatal mental and physical health difficulties, it is also possible that a mindfulness-based program will be a practical and effective approach for protecting maternal mental health and wellbeing.

Based on the results reported in the existing literature which show that formal mindfulness-based practice is effective for improving mental health status and preventing depressive symptom relapse, this research aims to evaluate the effectiveness of a brief mindfulness-based program, offered during pregnancy, in reducing mothers' experience of mental health symptoms and improving wellbeing during pregnancy and the postpartum period. It appears that no study to date has yet examined the implications of a *brief* (four-session) mindfulness program offered during pregnancy on maternal psychological symptoms and wellbeing. A brief program has the advantage being more economical to facilitate compared to full-length programs and requires a shorter commitment from pregnant women, who are also attempting to manage multiple other new and existing demands (e.g., prenatal appointments, work). As well, group programming can be ideal for women with mild to moderate symptomology as well as those who are asymptomatic, and can be delivered economically (McDermut, Miller, & Brown 2019; McQueen, Montgomery, Lappan-Gracon, Evans, & Hunter, 2008). Moreover, lengthier maternal mindfulness programs that have been previously investigated have often contained additional components, such as cognitive-behavioural therapy or psychoeducation related to the birth or child-raring experience (e.g. Felder et al., 2018; Pan,

Chang, Chen, & Gau, 2019). While such features may be beneficial, they limit our ability to discern if mindfulness training, specifically, is an influential mechanism of action for protecting the mental health and wellbeing of pregnant and postpartum women. Thus, the brief mindfulness program examined as part of this investigation is focused specifically on mindfulness didactics and practice.

Hypotheses

Based on existing research findings, it was expected that a brief mindfulness training during pregnancy would be associated with lower levels of depressive, manic, anxious, and obsessive and compulsive symptoms experienced during the postpartum period (primary analyses). Mindfulness training was also expected to be associated with lower levels of perceived stress and higher levels of resiliency and QoL. It was also predicted that mindfulness training would be associated with lower endorsement of difficulties in mother-infant bonding during the postpartum period (secondary analyses).

Ethical Considerations

Prior to study commencement, Lakehead University's Research Ethics Board reviewed and approved this study. This study was carried out in an ethical manner in accordance with the Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans.

Method

Materials

Participant communication. Advertising materials included: posters, pamphlets, billboards, social media advertisements, newspaper and radio advertisement, study website, and letters to service providers (see Appendix I for examples of advertising materials). An electronic covering letter with a complete description of the study purpose and study tasks, as well as the

corresponding consent is provided in Appendix J. The electronic debriefing forms can be found in Appendix K.

Participant demographic form. As shown in Appendix L, pregnant participants were asked at the baseline time point to provide general information pertaining to their pregnancy and their health status.

Follow-up health information form. Participants were asked at each follow-up time point to provide general information pertaining to their health status and pregnancy or delivery. They were also asked to provide feedback related to their group experiences. The questions from each of the follow-up health forms can be found in Appendix M.

Measures

To address the research questions in this investigation, several questionnaires were combined and administered to participants. Below is a brief overview of each measure. Further details about each scale and an explanation regarding the psychometric properties of each measure can be found in the Measures section of Study 1. A copy of the full questionnaire battery can be found in Appendix E. Internal consistencies obtained in the current study can be found in the results section.

The Edinburgh Postnatal Depression Scale (EPDS). The EPDS (Cox et al., 1987) is a widely used instrument that has been shown to be valid during pregnancy and the postpartum period for assessing depression (Cox et al., 1987; Murray & Cox, 1990). A cut-off score of 13 is suggested to indicate likely presence of depression (Cox, 1987).

The Hospital Anxiety and Depression Scale – Anxiety Subscale (HADS-A). The Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983) is a self-report measure of the severity of depressive and anxiety symptoms. Only the anxiety subscale was used in this

investigation. Recommended cut-off scores are as follows: a score < 8 = non case; 8-10 = mild anxiety; 11-14 = moderate anxiety; 15-21 = severe anxiety (Stern, 2014).

The Obsessive-Compulsive Inventory-Revised (OCI-R). The OCI-R (Foa et al., 2002) is designed to assess the degree to which the respondent has been bothered or distressed by common obsessive and compulsive symptoms. A score of 21 or more is the suggestive cut-off indicating likely presence of OCD (Foa et al., 2002).

The Altman Self-Rating Mania Scale (ASRMS). The ASRMS (Altman et al., 1997) is an assessment of manic symptoms. A score of 6 or more is the suggested cut-off for probable mania or hypomania (Altman et al., 1997).

The Perceived Stress Scale (PSS). The PSS (Cohen & Williamson, 1988) is a measure of perceived stress related to situations in one's life.

The Brief Resilience Scale (BRS). The BRS (Smith et al., 2008) is designed to measure a respondent's perceived capacity to withstand and recover from life stressors.

The Postpartum Bonding Questionnaire (PBQ). The PBQ (Brockington et al., 2001) assesses the strength of the emotional tie between a mother and her infant (higher scores denote greater difficulties in bonding).

The World Health Organization Quality of Life Scale-BREF (WHOQOL). The WHOQOL (World Health Organization, 1998) is a measure of overall QoL, as well as QoL in four domains: physical health, psychological health, social relationships, and environment. For the purposes of this investigation only the overall QoL score was tabulated.

The Five Facet Mindfulness Questionnaire (FFMQ). The FFMQ (Baer et al., 2006) is a measure of mindfulness engagement through five facets (i.e., observing, describing, awareness, nonreactivity, and nonjudging). In this investigation, participants were asked to answer each item

considering two different time points: 1) within the week preceding the assessment (State); and, 2) a lifetime evaluation (Trait).

The Multidimensional Scale of Perceived Social Support (MSPSS). The MSPSS (Zimet et al., 1988) measures levels of perceived social support and was included for descriptive purposes.

Personality Research Form. Eight questions from each of two subscales of the Personality Research Form (Jackson, 1984) were used as validity checks to help identify response styles that may inappropriately skew assessment results (Infrequency; PRF-IN) or response patterns that may be influenced by a desire to answer in a manner that is socially desirable (Desirability; PRF-D).

Participants

In total, 29 eligible participants were recruited and participated in this investigation between January 2017 and June 2019. Individuals were eligible to participate if they were pregnant, age 18 years and older, able and willing to attend the study site for the four group sessions, willing to be randomly assigned to either the MG or CG, and in generally good health. Exclusion criteria included an active severe mental health condition (e.g., psychosis, substance addiction, suicidal ideation) or mental health difficulties that would be better addressed through another form of therapy (e.g., individual therapy), active major medical illness including significant obstetric complications, inability to give informed consent, and inability to speak or understand English. One participant refused to complete the study questionnaires and was therefore not included as part of the main analyses. Descriptive statistics of the sample can be found in Table 11.

Table 11

Participant Demographic Characteristics of Study 3 Final Sample

Variable Name	Mindfulness Group (*n* = 16)		Comparison Group (*n* = 13)	
	Mean (*SD*) Range	*n* (%)	Mean (*SD*) Range	*n* (%)
Participant age	30.4 (3.9) 21 - 35		29.3 (4.8) 23 - 41	
Weeks gestation	22.14 (5.46) 14 - 36		23.15 (6.39) 11 - 32	
Marital Status				
Married/ common-law		13 (81.3)		10 (76.9)
Other		2 (12.6)		3 (23.1)
Missing responses		1 (6.3)		0 (0.0)
Ethnic Background				
Caucasian (White)		12 (75.0)		11 (84.6)
Aboriginal (First Nations, Métis, Inuit)		2 (12.5)		1 (7.7)
European		1 (6.3)		1 (7.7)
Missing responses		1 (6.3)		0 (0.0)
Employment Status				
Full-time		13 (81.3)		9 (69.2)
Part-time		0 (0.0)		2 (15.4)
Stay-at-home parent		0 (0.0)		1 (7.7)
Student		2 (12.5)		0 (0.0)
Other		0 (0.0)		1 (7.7)
Missing responses		1 (6.3)		0 (0.0)
Education				
High school diploma		0 (0.0)		0 (0.00)
Some post-secondary training		2 (18.5)		1 (7.7)
Post-secondary diploma or degree		10 (62.6)		10 (77.0)
Graduate degree		2 (12.5)		2 (15.4)
Missing responses		1 (6.3)		0 (0.0)
Past mental health diagnosis				
No		10 (62.5)		8 (61.5)
Yes		4 (25.0)		5 (38.5)
Missing responses		2 (12.5)		0 (0.0)
Primiparous				
No		3 (18.8)		2 (14.2)
Yes		10 (62.5)		11 (84.6)
Missing responses		3 (18.8)		0 (0.0)
Household Income				
Under $25000		2 (12.5)		1 (7.7)

$25000 - $49999	4 (25.0)	3 (23.1)
$50000 - $74999	2 (12.5)	3 (23.1)
$75000 - $999999	2 (12.5)	3 (23.1)
$100000 - $149999	3 (18.8)	3 (23.1)
$150000 or above	1 (6.3)	0 (0.0)
Missing responses	2 (12.5)	0 (0.0)
History of Formal Mindfulness Training		
No	9 (56.3)	8 (61.5)
Yes	3 (18.8)	5 (38.5)
Missing responses	4 (25.0)	0 (0.0)

Randomization Procedures

Cluster randomization with balancing was performed using a coin toss. Group randomization was conducted in pairs, such that the coin toss performed by the investigator would determine if the first of two programs would be either a brief Mindfulness Group (MG) or a Comparison Group (CG). The next program would be the group not selected by the coin toss. After a pair of programs was completed a new coin toss would determine the assignment of the next two groups. Of note, due to an inability to find a time that facilitated all participants randomized to the final MG, this group was split into two groups running consecutively on different weekdays.

Study Conditions

Intervention group (brief mindfulness group; MG). Group mindfulness training sessions were facilitated by a qualified instructor who had a Master's degree in Clinical Psychology, was experienced with perinatal mood disorders, and had professional training as a facilitator of mindfulness-based programs. As well, a registered Clinical Psychologist who is experienced in research on mindfulness-based interventions supervised the MG instructor. In total, 16 women participated in one of the MG programs that were facilitated between June 2017 and October 2018. Each MG program consisted of four, weekly 1.5 hour sessions. The sessions were informed by the structure used in Short, Mazmanian, Ozen, & Bédard's (2015) investigation, which is modeled after Segal and colleagues (2013) MBCT. The brief program by Short and colleagues (2015) was constructed to provide learners with direct training and education in mindfulness without emphasis on cognitive-behavioural principles. The program was designed to first enhance learners' foundational skills in mindfulness (e.g., focussing attention inward on internal sensations of the breath or body) and progressed into teaching

learners more advanced mindfulness skills (e.g., non-judgmentally and intentionally exploring the relationships between difficult emotions, body sensations, and thoughts). Short and colleagues found this brief mindfulness program to be effective for enhancing mindfulness skills and self-regulation in a sample of graduate students. As part of this program, participants were encouraged to complete daily at-home mindfulness practice.

Comparison group (CG). The use of a CG was implemented to helps control for changes in the dependent variables that may arise from simply engaging in a group activity with other expectant mothers. In total, 13 women participated in one of the CG programs which were run between June 2017 and October 2018. Participants assigned to the CG attended up to four weekly sessions that were each 1.5 hours in length. Participants completed an organized activity at each session (picture frame art, adult colouring, recipes, and indoor gardening). The CG was designed to have participants focus on specific activities during each session, while permitting activity related discussion. In this way the format was designed to parallel the MG, where participants engaged in a new activity each week and had an opportunity to discuss the activities with the group, but without an intended therapeutic component.

Procedure

A schedule of events can be found in Appendix N. A Women's Xchange Grant funded recruitment efforts and operation of the investigational group programs. Participants learned of the study through their health care professional (e.g., family practitioner, midwife), community organizations or businesses (e.g., community centers, healthcare clinics, farmer's markets), or public advertising. Potential participants contacted the study team for a telephone screening appointment where eligibility was assessed, and the person was given verbal information describing the study procedures. Women who were not eligible were directed to a local

counselling center for individualized services and group programming. Interested pregnant women who were eligible to participate were informed that they have an equal probability of being assigned to the MG or CG and would not know what group they were assigned to participate in until the first group session. Potential participants were sent an electronic letter of information, which included an electronic consent form. Participants completed the electronic consent form documentation from a computer and location of their choosing. Following the consent procedure, women were assigned a unique participant identification code (created using the participant's month and year of birth, the last three digits of her postal code, and her eye colour). Any participant identifying and contact information was held separately from the assessment information, which was deidentified. Following the consent procedures, participants were asked to provide demographic information and information related to their pregnancy. Participants then complete all the questionnaires listed in the Measures section with the exception of the PBQ.

After completing the electronic baseline assessments, participants were enrolled in the next available program (either MG or CG). Participants did not know which of the two groups they would be participating in until the first group session. One week following the end of the 4-week program all participants were asked to complete a second set of assessments (post-program time point). Follow-up time points were also scheduled for 3- and 12-weeks postpartum. Participants could complete the post-program and postpartum follow-up questionnaires online and at their convenience. At the post-program time point and at the follow-up time points, participants were asked to provide information pertaining to their pregnancy or delivery and health status. At all four time points, women were asked to complete the battery of outcome measures listed in the Measures section, except for the PBQ as this scale was only completed at

the two postpartum follow-up time points. Participants were sent two reminder emails to complete each questionnaire set.

Each time a participant completed an assessment time point or a group session, they were invited to enter a ballot for a draw to win one of four $50 Visa gift cards. As well, at completion of the study all participants were sent a $10 Tim Horton's gift card as a gesture of appreciation for their contribution to the project.

Statistical Analyses

IBM SPSS (version 25) was used to perform all statistical analyses. Little's MCAR test was conducted and the results provided evidence that the missingness of each outcome variable were independent of all other outcome variables. As a result of this analyses, person-item mean imputation was appropriate for participants missing < 20% of data (Bono et al., 2007; Downey & King, 1998). When participants were missing fewer than 20% of responses on a questionnaire, the missing responses were substituted using the participant's average item score on that questionnaire. When examining questionnaire data where participants completed at least part the questionnaire, the percentage of missing values exceeded 20% for one participant's scores on the state FFMQ and trait FFMQ measures taken at the 3-week postpartum time point.

Data were examined for errors and outliers (defined as z-scores > ±3.29) (Tabachnick & Fidell, 2013). In total, two participant scores were found to meet the criteria for outlier and were corrected by replacing the score with a score that was one interval above or below the highest or lowest score within acceptable range. As well, while data derived from four time points were originally expected for the analysis (pregnancy pre-test, pregnancy post-group test, postpartum follow-up 3-week, postpartum follow-up 12-week), missing data at the participant level did not

permit this. In response the pregnancy post-group and 12-week postpartum follow-up assessments were not included in the analysis due to small sample sizes in the MG (n = 5).

Analysis of Primary Study Hypotheses

In order to determine if there was a significant difference between the MG and the CG, a 2(between-group) x 2(within-group) mixed ANOVA comparing change over time was conducted with the EPDS, HADS-A, OCI-R, and ASRMS. As well, despite randomization, one of the primary outcome variables (OCI-R) was determined through t-test [$t(24) = 2.609$, $p < .05$] to violate the assumption of group equivalence at baseline. To account for this an ANCOVA was also conducted for this variable, controlling for baseline OCI-R scores when comparing group outcomes.

Analysis of Secondary Study Hypotheses

A 2(between-group) x 2(within-group) ANOVA was also used to test differences in change over time between MG and the CG on the PSS, BRS, and the WHOQOL. As well, despite randomization, one of the secondary outcome variables (PSS) was determined through t-test [$t(24) = 2.146$, $p < .05$] to violate the assumption of group equivalence at baseline. To account for this, an ANCOVA was also conducted for this variable, controlling for baseline PSS scores when comparing group outcomes. As well, an independent samples t-test was conducted to determine if there were group differenced in scores on the PBQ and FFMQ scores.

Exploratory Analysis Part 1

Additional descriptive analyses were conducted to evaluate the frequency and percentages of participants who met cut-off criteria suggesting psychopathology according to the EPDS, HADS-A, OCI-R, and ASRMS at program entry and 3-weeks postpartum.

Exploratory Analysis Part 2

Additional quantitative feedback examining means, standard deviations, and score ranges were computed to determine participants self-perceived benefit of each group program.

Results

The mean attendance rate for MG participants was 2.37 (*SD* = 0.99) sessions. The mean attendance rate for CG participants was 3.15 (*SD* = 1.08) sessions. An independent samples *t*-test did not show between group differences in attendance at a level that was statistically significant $t(27) = 2.0$, $p = .056$. Test characteristics and reliability statistics were also computed for each outcome measure and for each subsample and are listed in Table 12.

Table 12

Descriptive Statistics and Internal Consistencies (α) of Study 3 Questionnaires for Each Time Point

				MG			CG		
Time point	Scale	α	Potential Range	*n*	Actual Range	*M* (*SD*)	*n*	Actual Range	*M* (*SD*)
Pregnancy	EPDS	.89	0-30	13	0-19	5.62 (5.22)	13	2-19	9.38 (5.14)
Pre-	HADS-A	.82	0-21	13	0-13	4.62 (3.50)	13	1-13	6.69 (3.68)
program	OCI-R	.80	0-72	13	0-16	7.23 (5.40)	13	2-30	14.23 (8.02)
	ASRMS	.55	0-20	13	0-10	4.15 (2.94)	13	0-9	3.39 (2.40)
	PSS	.88	0-40	13	2-29	12.15 (8.10)	13	10-31	18.23 (6.07)
	BRS	.93	6-30	13	14-30	22.46 (5.36)	13	11-27	18.31 (5.27)
	WHOQOL	.90	24-120	13	83-116	103.23 (11.54)	13	70-114	97.92 (13.96)
	FFMQ								
	State	.92	39-195	13	119.05-170	144.92 (16.81)	13	91.34-150	124.33 (20.40)
	Trait	.91	39-195	13	127 – 170	144.62 (14.74)	13	100 -156	127.23 (18.27)
Pregnancy	EPDS	.93	0-30	5	0-12	4.8 (5.36)	12	1-21	8.25 (5.66)
Post-	HADS-A	.86	0-21	5	3-9	5.2 (5.68)	12	1-14	6.33 (4.14)
Program	OCI-R	.90	0-72	5	0-4.24	2.05 (1.66)	12	1-39.18	14.35 (10.14)
	ASRMS	.76	0-20	5	1-10	4.60 (4.16)	12	0-13	4.83 (3.69)
	PSS	.94	0-40	5	8-24	13.20 (6.61)	12	7-36	17.17 (8.02)
	BRS	.95	6-30	5	16-24	20.20 (3.63)	12	6-27	19.00 (6.06)
	WHOQOL	.93	24-120	5	74-111	100.00 (14.98)	12	69-121	99.00 (15.98)
	FFMQ								
	State	.94	39-195	5	117-163	147.00 (14.73)	12	94-160.22	133.93 (22.06)
	Trait	.94	39-195	5	126-163	140.60 (18.08)	12	78-159.08	123.42 (24.71)
Postpartum	EPDS	.81	0-30	9	0-12	6.11 (4.11)	9	0-10	6.33 (3.12)
3-weeks	HADS-A	.51	0-21	9	0-7	3.89 (2.52)	9	1-8	4.11 (2.21)
follow-up	OCI-R	.72	0-72	9	0-10	4.33 (3.97)	9	3-17	9.11 (5.51)
	ASRMS	.40	0-20	9	0-8	4.22 (2.28)	9	2-11	5.78 (2.73)
	PSS	.85	0-40	9	7-23	14.00 (6.42)	9	3-19	13.11 (5.69)
	BRS	.86	6-30	9	17-28	22.00 (3.84)	9	12-30	21.89 (5.44)
	WHOQOL	.90	24-120	9	68-118	103.44 (15.08)	9	96-118	108.56 (7.25)
	PBQ	.93	0-115	9	0-40	11.78 (12.18)	9	50-84	10.22 (7.56)
	FFMQ								
	State	.88	39-195	8	121-161.13	137.14 (14.85)	9	108-157	131.79 (18.90)
	Trait	.89	39-195	8	120-153	140.58 (13.99)	9	113-160	130.89 (17.77)
Postpartum	EPDS	.85	0-30	5	1-10	3.8 (3.83)	9	1-11	6.89 (3.72)
12-weeks	HADS-A	.63	0-21	5	2-7	3.4 (2.07)	9	1-8	5.11 (2.47)
Follow-up	OCI-R	.76	0-72	5	2-9	5.4 (3.05)	9	5-28	11.00 (6.82)
	ASRMS	.70	0-20	5	0-10	5.8 (3.63)	9	2-11	5.11 (3.41)
	PSS	.86	0-40	5	7-17	12.20 (3.83)	9	8-22	15.44 (5.79)
	BRS	.93	6-30	5	15-26	21.80 (5.02)	9	14-25	19.89 (4.17)
	WHOQOL	.81	24-120	5	97-115	108.00 (6.96)	9	89-118	100.78 (8.66)
	PBQ	.93	0-115	5	2-5	4.00 (1.23)	9	4-39	14.11 (11.03)
	FFMQ								
	State	.93	39-195	5	134-148	141.40 (5.22)	9	94-161	124.54 (22.80)
	Trait	.90	39-195	5	133-149	141.60 (6.23)	9	105-161	127.06 (18.34)

Note. ASRMS = The Altman Self-Rating Mania Scale; CG = Comparison Group; EPDS = The Edinburgh Postnatal Depression Scale; FFMQ = The Five Facet Mindfulness Questionnaire; HADS-A = The Hospital Anxiety and Depression Scale – Anxiety Subscale; MG = Mindfulness Group; MSPSS = The Multidimensional Scale of Perceived Social Support; OCI-R = The Obsessive-Compulsive Inventory-Revised; PBQ = The Postpartum Bonding Questionnaire; PSS = The Perceived Stress Scale; BRS = The Brief Resilience Scale; WHOQOL = The World Health Organization Quality of Life Scale-BREF.

Primary Analyses

The 2-way ANOVA resulted in a statistically significant difference between groups on the OCI-R [$F(1,15) = 7.98$, $p < .05$] but did not result in statistically significant differences when examining group by time point (baseline vs. 3-weeks postpartum) differences for any of the other primary outcome measures (EPDS, HADS-A, and ASRMS). Results for the ANOVAs are displayed in Table 13. The ANCOVA conducted to examine group differences on the 3-week postpartum OCI-R, while controlling for baseline group OCI-R differences, did not reveal a statistically significant finding [$F(1,14) = .262$, $p = .617$].

Secondary Analyses

The 2-way ANOVA did not result in statistically significant differences when examining the group by time point (baseline vs. postpartum) differences for any of the secondary outcome measures (PSS, BRS, and the WHOQOL). Results for the ANOVAs are displayed in Table 14. Moreover, the ANCOVA conducted to examine group differences on the 3-week postpartum PSS, while controlling for baseline group PSS differences, similarly did not result in a statistically significant finding [$F(1,14) = .079$, $p = .783$]. As well, an independent samples *t*-test did not reveal group differences in scores on the PBQ at a level that was statistically significant [$t(16) = -0.325$, $p = .749$] nor was there a statistically significant difference found in 3-week postpartum mindfulness scores between groups [$t(15) = -0.643$, $p = .530$].

Table 13

Test of Between-Group Effects for Study 3 Primary Outcome Measures

	Mean Change[a]			
Outcome Measure	MG (n = 8)	CG (n = 9)	F (1, 15) =	p
EPDS	-1.00	-1.22	.087	.772
HADS-A	-2.00	-1.33	.016	.902
OCI-R	-0.25	-2.78	7.98	.013*
ASRMS	0.13	2.22	.219	.646

Note. a = mean change calculated by subtracting baseline (pregnancy) score from 3-week postpartum score (thus, a negative mean change score indicates a lower score in the postpartum period; positive mean change score indicates a higher score in the postpartum period); ASRMS = The Altman Self-Rating Mania Scale; EPDS = The Edinburgh Postnatal Depression Scale; HADS-A = The Hospital Anxiety and Depression Scale – Anxiety Subscale; OCI-R = The Obsessive-Compulsive Inventory-Revised; * = $p < .05$.

Table 14

Test of Between-Group Effects for Study 3 Secondary Outcome Measures

	Mean Change[a]			
Outcome Measure	MG (n = 8)	CG (n = 9)	F (1, 15) =	p
PSS	-0.25	-3.11	.287	.600
BRS	0.63	2.56	.883	.362
WHOQOL	1.38	4.11	.839	.374

Note. a = mean change calculated by subtracting baseline (pregnancy) score from 3-week postpartum score (thus, a negative mean change score indicates a lower score in the postpartum period; positive mean change score indicates a higher score in the postpartum period); BRS = The Brief Resilience Scale; PSS = The Perceived Stress Scale; WHOQOL = The World Health Organization Quality of Life Scale-BREF.

Validity Assessment

To determine the extent to which any of these findings might be attributable to a socially desirable response set (as measured by the PRF-D), a series of additional analyses were conducted. First, the correlations between each primary measure and social desirability score with the PRF-D were computed. For the baseline time point, these values ranged from -.60 to .67, with the largest correlations observed between the PRF-D with the BRS (r = -.60) and the PSS (r = .67). For the 3-week postpartum time point, these values ranged from -.80 to .71, with the largest correlations observed between the PRF-D with the WHOQOL (r = -.80) and PSS (r = .71).

Next, all of the primary analyses and secondary analyses were conducted once more using an ANCOVA that controlled for social desirability scores (PRF-D) and the baseline score for the corresponding outcome measure (with the exception of PBQ as this was not assessed at baseline). All results remained consistent after including the PRF-D as a control variable in the analyses as no between group effects were identified.

Exploratory Analysis Part 1

Frequencies and percentages exploring the number of participants who met cut-off criteria suggesting psychopathology according to the EPDS, HADS-A, OCI-R, and ASRMS are presented in Table 15. As can be seen in the table, while some of the women in the MG met screening cut-off criteria for depression, anxiety, and obsessive and compulsive symptoms prior to group participation, none of the women met such criteria during the postpartum follow-up. Similar trends were observed with the CG, except for one participant who endorsed mild anxiety symptoms at the 3-weeks postpartum time point. Interestingly, several (n = 2 to 4) women in both groups met criteria for a potential hypomanic or manic episode during both the pregnancy

and postpartum time points (as measured by the ASRMS). A McNemar test was then conducted as a test of two proportions for this repeated measures design to determine if there were significant differences between participants meeting criteria comparing pre-program assessments to the 3-week postpartum assessments. However, this test was unable to be conducted for the EPDS and the OCI-R as one or more cells had no cases. For the MG the McNemar test was permitted but no significant results were found for the ASRMS ($p = 1.0$). The test was not permitted for the HADS-A due to one or more cells having a value less than 1. For the CG the test was permitted for both the HADS-A and the ASRMS, but no significant results were found ($p = 1.0$, and $p = .38$, respectively).

Table 15

Frequencies and Percentages of Primary Outcome Measure Cut-Off Criteria

Scale	Cut off	Pregnancy Time Point *n* (%)		Postpartum Time Point *n* (%)	
		MG	CG	MG	CG
EPDS	Above cut-off	2 (15.4%)	4 (30.8%)	0 (0%)	0 (0%)
	Below cut-off	11(84.6%)	9 (69.2%)	9 (100%)	9 (100%)
HADS	Above severe cut-off	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Above moderate cut-off	1 (7.7%)	2 (15.4)	0 (0%)	0 (0%)
	Above mild cut-off	1 (7.7%)	3 (23.1%)	0 (0%)	1 (11.2%)
	Below all cut-offs	11 (84.6%)	8 (61.5%)	9 (100%)	8 (88.8%)
OCI-R	Above cut-off	0 (0%)	3 (23.1%)	0 (0%)	0 (0%)
	Below cut-off	13 (100%)	10 (76.9%)	9 (100%)	9 (100%)
ASRMS	Above cut-off	4 (30.8)	2 (15.4%)	3 (33.3%)	3 (33.3%)
	Below cut-off	9 (69.2%)	11 (84.6%)	6 (66.7%)	6 (66.7%)

Note. ASRMS = The Altman Self-Rating Mania Scale; CG = Comparison Group; EPDS = The Edinburgh Postnatal Depression Scale; FFMQ = The Five Facet Mindfulness Questionnaire; HADS-A = The Hospital Anxiety and Depression Scale – Anxiety Subscale; MG = Mindfulness Group; OCI-R = The Obsessive-Compulsive Inventory-Revised.

Exploratory Analysis Part 2

Additional quantitative feedback was analyzed to determine participants self-perceived benefit of each program. As can be seen in Table 16 below, during the post-program time point most of the participants who completed the questionnaires reported appreciating the groups, regardless of group assignment to the MG (n = 5) or the CG (n = 12). Similar results were found during the 12-week postpartum follow-up time point. As well, 100% of participants in both the MG (n = 5) and the CG (n = 9) endorsed thinking that the groups would also be helpful during the postpartum period when given a dichotomous choice (yes or no). However, when asked using a 5-point Likert-type scale, one participant in the CG indicated that they neither agreed nor disagreed. As well, analyses via independent sample t-tests showed that there was no significant difference in ratings between groups on any of the feedback items.

Table 16

Participant Feedback Regarding Their Experience with Each of the Study 3 Group Programs

		Mean (*SD*) Actual Range	
Time Point	Question	MG	CG
Post-program (pregnancy follow-up)	I found the group enjoyable	4.80 (.45) 4 - 5	4.58 (.52) 4 - 5
	I found the group helpful	4.80 (.45) 4 - 5	4.42 (.67) 3 - 5
	If given the opportunity I would participate in the group again	4.60 (.55) 4 - 5	4.50 (.52) 4 - 5
	I would recommend the group to a pregnant friend	4.60 (.55) 4 - 5	4.50 (.52) 4 - 5
	The group was helpful in supporting my general wellness	4.80 (.45) 4 - 5	4.50 (.52) 4 - 5
Postpartum week 12 follow-up	I found the group enjoyable	4.20 (.84) 3 - 5	4.33 (.50) 4 - 5
	I found the group helpful	4.00 (1.0) 3 - 5	3.78 (1.09) 2 - 5
	If given the opportunity I would participate in the group again	4.40 (.89) 3 - 5	4.44 (.53) 4 - 5
	I would recommend the group to a pregnant friend	4.60 (.55) 4 - 5	4.33 (.50) 4 - 5
	The group was helpful in supporting my general wellness	4.20 (.84) 3 - 5	3.89 (.93) 3 - 5
	Would a group offered during the postpartum period be helpful?	4.40 (.55) 4 - 5	4.56 (.73) 3 - 5

Note: Possible score range for each question is 1 – 5. 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree; MG = Mindfulness Group; CG = Comparison Group.

Discussion

Existing research evidence, in conjunction with the result from Study 1 and 2 in this series, suggests that mindfulness skills training may be helpful for preventing the occurrence or exacerbation of mental health symptoms during pregnancy and the postpartum period. In response, the purpose of this investigation was to examine the potential benefits of a brief-community-based mindfulness program for women's mental health and wellbeing during pregnancy and the postpartum period. It appears that this was the first investigation to assess the potential preventative effects of a *brief* perinatal mindfulness skills training program in protecting women's mental health and wellbeing. It also appears to be the first to concurrently examine the effects of mindfulness training on several different measures of mental health and wellbeing. However, the results of the present investigation did not provide evidence of a statistically significant benefit for participants in the MG over the CG.

However, interesting findings emerged when examining participant's subjective feedback for those who participated in the MG. Specifically, most participants reported that they perceived the mindfulness program to be helpful with respect to their wellbeing (100% at the post-program time point and 80% at the 12-week follow-up time point) and all participants reported that they would refer friends to the MG (100% at both the post-program and 12-week follow-up time points). As well, all participants reported that a MG offered during the postpartum period would be helpful. Moreover, when examining the qualitative feedback provided, several of the participants reported that they would prefer more sessions. Thus, it is possible that a MG consisting of more sessions or one that includes additional sessions offered during the postpartum period would be well received by participants and may offer additional benefit with

respect to further cultivation of mindfulness skills that was not observed with the brief intervention used in this investigation.

The present investigation had several strengths and limitations. Limited exclusion criteria allowed for women from diverse backgrounds to participate, increasing the potential generalizability of findings. The program was run in the community, increasing the ecological validity of the investigation. The PRF-IN was included to help eliminate response data that may be contaminated by careless or confused responding. As well, analyses were rerun including the PRF-D as a control variable to assess the potential that results were influenced by socially desirable response styles. Unfortunately, despite strong recruitment efforts and running the groups over an extended period, recruitment was not optimal, resulting a small sample size. Thus, while the use of randomization and a comparison group would typically enhance the rigor of the investigation, the low sample size negated this strength as differences between groups at baseline were still observed. Furthermore, there were also missing data that resulted in two time points having to be eliminated. As well, this investigation was limited to recruitment from a Northern Ontario city. Thus, it is possible that the results may have been different had the investigation been conducted elsewhere, such as in a larger urban or more densely populated area where recruitment may have been more optimal. Moreover, not all participants attended all group sessions, limiting the "dose" of mindfulness training received. As well, while an active comparison group was used to control for potential group effects, lack of a non-active control group limits the ability to assess if participation in either group provided benefit beyond no group participation. Furthermore, several of the women who participated in both groups had past exposure to mindfulness training, which may have confounded the investigation results.

In summary, while the results of the current RCT did not reveal statistically significant group differences on the mental health or wellbeing measures, there was evidence that the groups were well received by participants and resulted in subjective benefits to their wellbeing. Participant feedback also suggested that future research might do well to examine the potential mental health and wellbeing benefits of a mindfulness intervention that consists of more than 4 sessions, particularly one that continues sessions into the postpartum period.

Series Conclusion

Pregnancy and the postpartum period are reported to be particularly vulnerable times in women's lives for the development of mental health disorders (Kettunen, Koistinen, & Hintikka, 2014; O'Hara, & Wisner, 2014). Furthermore, mood instability is common during pregnancy and the postpartum period (Bei, Coo, & Trinder, 2015). Maternal mental health challenges can have serious implications for the wellbeing of the mother and the intra- and extra-uterine development of the infant, not to mention the family unit (Field, 2010; LeWinn et al., 2009; Van den Bergh et al., 2005). For this reason, interventions which aim to preserve or enhance maternal wellbeing are important to prevent mental health difficulties that may arise during pregnancy and the postpartum period.

The aforementioned series of investigations were aimed at evaluating the relationship between mindfulness and maternal mental health and wellbeing, as well as examining the potential benefit of a brief mindfulness group on the same factors. One major strength of this series of investigations was the inclusion of several different measures of mental health symptoms and wellbeing, as it allows for a more well-rounded picture of how mindfulness may relate to women's mental health during both pregnancy and the postpartum period.

In the first investigation, the results supported a moderate to strong relationship between mental health and wellbeing and state mindfulness during both pregnancy and the postpartum period. One interesting caveat to this is that while most of the relationships were in the expected direction, there was a positive relationship observed between manic symptoms endorsed and state mindfulness. It is possible that due to the excitement experienced by some women during pregnancy and the postpartum period, healthy elation may result in elevated scores on this measure. However, due to the potential consequences of undiagnosed hypomania and mania, additional research might examine how to better differentiate normal elation from symptoms that may represent an underlying bipolar diathesis, in pregnant and postpartum populations.

In the second investigation a similar pattern of results was found when comparing women's state mindfulness scores taken during pregnancy, with their scores on the mental health and wellbeing measures taken during the postpartum period. The results suggested a potential predictive relationship such that higher levels of mindfulness endorsed during pregnancy, were associated with better mental health and wellbeing outcomes in the postpartum period. Interestingly, in this longitudinal investigation no statistically significant relationship was found between state mindfulness during pregnancy and mania scores in the postpartum period.

Lastly, while existing research suggests that mindfulness-based therapies may be helpful for alleviating postpartum mental health difficulties (Beddoe et al., 2009; Muzik et al., 2012; Sivak, 2007), statistically significant group differences were not observed between the MG and CG. This may demonstrate equivalency between groups in preventing escalation in symptoms, particularly given that most participants endorsed the group as helpful for their wellbeing, regardless of what group they were assigned to. As well, the finding that there was no statistically significant difference evident between the two groups on mindfulness scores at the

follow-up time point may also suggest equivalency between groups with respect to level of mindfulness skill, regardless of group assignment. However, due to the limitations of the RCT outlined in Study 3, future research is needed to substantiate this possibility. In addition, despite limited exclusion criteria and extensive recruitment efforts, participants in each of these investigations were found to come from a homogeneous sample that are not considered to be at high risk for postpartum mental health difficulties. Thus, future research replicating these investigations in high-risk samples is warranted.

As there is currently a lack of maternal mental health services in many areas of Canada (Bruce, Béland, & Bowen, 2012; CMHA, 2009), there is a need to establish evidenced-based maternal mental health services that can be accessed by a large number of women and administered with a low economic impact. The results of this series of investigations suggest a role for mindfulness training, though something more intensive than a brief training program may be ideal to encourage practice and maintenance of mindfulness skills into the postpartum period.

As training and facilitation of mindfulness-based therapies are available to a wide range of mental health-care professionals and as mindfulness-based therapy for the prevention of postpartum depression is a program that can be offered in a group format, it has both economic and practical benefits such that it has the potential to reach a large number of women. Mindfulness-based programs have been reported to be well received by participants (Goodman et al., 2014), have been found to be associated with significant improvements in QoL (Demarzo et al., 2014), and may be less stigmatized than other psychosocial approaches as it is offered for a variety of issues related to health and general wellbeing. As a result, women may not be as apprehensive about participating in mindfulness-based therapies as they may be for seeking out

other mental health supports and therapies. Thus, based on the results of this series of investigations in combination with the existing research evidence, future research examining the minimum dose of mindfulness training necessary to derive benefit for maternal mental health and wellbeing is warranted.

References

Abramowitz, J. S., & Deacon, B. J. (2006). Psychometric properties and construct validity of the Obsessive-Compulsive Inventory-Revised: Replication and extension with a clinical sample. *Journal of Anxiety Disorders, 20*(8), 1016-1035. doi:10.1016/j.janxdis.2006.03.001

Abramowitz, J. S., Tolin, D. F., & Diefenbach, G. J. (2005). Measuring change in OCD: Sensitivity of the Obsessive-Compulsive Inventory-Revised. *Journal of Psychopathology and Behavioral Assessment, 27*(4), 317-324. doi:10.1007/s10862-005-2411-y

Affonso, D. D., Liu-Chiang, C. Y., & Mayberry, L. J. (1999). Worry: Conceptual dimensions and relevance to childbearing women. *Health Care for Women International, 20*(3), 227-236. doi:10.1080/073993399245728

Almond, P. (2009). Postnatal depression: A global public health perspective. *Prospects in Public Health, 129*(5), 221-227. doi:10.1177/1757913909343882

Altman, E. G., Hedeker, D., Peterson, J. L., & Davis, J. M. (1997). The Altman Self-Rating Mania Scale. *Biological Psychiatry, 42*(10), 948-955. doi:10.1016/s0006-3223(96)00548-3

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5™* (5th ed.): American Psychiatric Association.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27-45. doi:10.1177/1073191105283504

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., . . . Williams, J. M. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329-342. doi:10.1177/1073191107313003

Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes, 50*(2), 248-287. doi: 10.1016/0749-5978(91)90022-L

Barbosa-Leiker, C., Kostick, M., Lei, M., McPherson, S., Roper, V., Hoekstra, T., & Wright, B. (2013). Measurement invariance of the Perceived Stress Scale and latent mean differences across gender and time. *Stress and Health, 29*(3), 253-260. doi:10.1002/smi.2463

Beck, A. T. (Ed.). (1979). *Cognitive therapy of depression*. Guilford press.

Beck, C. T. (1995). The effects of postpartum depression on maternal-infant interaction: A meta-analysis. *Nursing Research, 44*(5), 298-304.

Beck, C. T., Gable, R. K., Sakala, C., & Declercq, E. R. (2011). Post Traumatic Stress Disorder in new mothers: Results from a two-stage U.S. national survey. *Birth, 38*(3), 216-227. doi:10.1111/j.1523-536X.2011.00475.x

Bédard , M., Felteau, M., Marshall, S., Cullen, N., Gibbons, C., Dubois, S., . . . Moustgaard, A. (2014). Mindfulness-Based Cognitive Therapy reduces symptoms of depression in people with a traumatic brain injury: Results from a randomized controlled trial. *The Journal of Head Trauma Rehabilitation, 29*(4), E13-22. doi:10.1097/HTR.0b013e3182a615a0

Bédard , M., Felteau, M., Marshall, S., Cullen, N., Gibbons, C., Dubois, S., . . . Mazmanian, D. (2013). 1494 – Mindfulness-Based Cognitive Therapy reduces depression symptoms in people who have a traumatic brain injury: Results from a randomized controlled trial. *European Psychiatry, 28*(S1). doi:10.1016/S0924-9338(13)76515-5

Beddoe, A. E., Paul Yang, C. P., Kennedy, H. P., Weiss, S. J., & Lee, K. A. (2009). The effects of mindfulness-based yoga during pregnancy on maternal psychological and physical distress. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 38*(3), 310-319. doi:10.1111/j.1552-6909.2009.01023.x

Bei, B., Coo, S., & Trinder, J. (2015). Sleep and mood during pregnancy and the postpartum period. *Sleep Medicine Clinics, 10*(1), 25-33. doi: 10.1016/j.jsmc.2014.11.011

Belloch, A., Morillo, C., Lucero, M., Cabedo, E., & Carrió, C. (2004). Intrusive thoughts in non-clinical subjects: The role of frequency and unpleasantness on appraisal ratings and control strategies. *Clinical Psychology & Psychotherapy, 11*(2), 100-110. doi: 10.1002/cpp.397

Bener, A., Gerber, L. M., & Sheikh, J. (2012). Prevalence of psychiatric disorders and associated risk factors in women during their postpartum period: A major public health problem and global comparison. *International Journal of Women's Health, 4*, 191-200. doi:10.2147/ijwh.s29380

Bjelland, I., Dahl, A. A., Haug, T.T., & Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale: An updated literature review. *Journal of Psychosomatic Research, 52*(2), 69-77. doi: 10.1016/S0022-3999(01)00296-3.

Blehar, M. C. (2006). Women's mental health research: The emergence of a biomedical field. *Annual Review of Clinical Psychology, 2*, 135-160. doi:10.1146/annurev.clinpsy.2.022305.095344

Bono, C., Ried, D. L., Kimberlin, C., & Vogel, B. (2007). Missing data on the Center for Epidemiologic Studies Depression Scale: A comparison of 4 imputation techniques.

Research in Social and Administrative Pharmacy, 3(1), 1-27. doi: 10.1016/j.sapharm.2006.04.001

Brassel, A., Townsend, M. L., Pickard, J. A., & Grenyer, B. F. (2020). Maternal perinatal mental health: Associations with bonding, mindfulness, and self-criticism at 18 months' postpartum. *Infant Mental Health Journal, 41*(1), 69-81. doi: 10.1002/imhj.21827

Brockington, I. F., Fraser, C., & Wilson, D. (2006). The Postpartum Bonding Questionnaire: A validation. *Archives of Women's Mental Health, 9*(5), 233-242. doi:10.1007/s00737-006-0132-1

Brockington, I. F., Oates, J., George, S., Turner, D., Vostanis, P., Sullivan, M., . . . Murdoch, C. (2001). A screening questionnaire for mother-infant bonding disorders. *Archives of Women's Mental Health, 3*(4), 133-140. doi: 10.1007/s007370170010

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822-848. doi:10.1037/0022-3514.84.4.822

Challacombe, F. L., & Wroe, A. L. (2013). A hidden problem: Consequences of the misdiagnosis of perinatal Obsessive-Compulsive Disorder. *British Journal of General Practice, 63*(610), 275-276. doi:10.3399/bjgp13X667376

Chaudron, L. H., & Nirodi, N. (2010). The obsessive-compulsive spectrum in the perinatal period: A prospective pilot study. *Archives of Women's Mental Health, 13*(5), 403-410. doi:10.1007/s00737-010-0154-6

Cheng, C. Y., & Li, Q. (2008). Integrative review of research on general health status and prevalence of common physical health conditions of women after childbirth. *Womens Health Issues, 18*(4), 267-280. doi:10.1016/j.whi.2008.02.004

Chernoff, A., Balsom, A.A., & Gordon, J.L (2020). Psychological coping strategies associated with improved mental health in the context of infertility. *Archives of Womens Mental Health.* Advance online publication. doi:10.1007/s00737-020-01029-9

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the U.S. In *The social psychology of health: Claremont symposium on applied social psychology*. Newbury Park, CA: Sage.

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry, 150*, 782-786. doi:10.1192/bjp.150.6.782

Creswell, J. D., Pacilio, L. E., Lindsay, E. K., & Brown, K. W. (2014). Brief mindfulness meditation training alters psychological and neuroendocrine responses to social evaluative stress. *Psychoneuroendocrinology, 44*, 1-12. doi:10.1016/j.psyneuen.2014.02.007

Dahlem, N. W., Zimet, G. D., & Walker, R. R. (1991). The Multidimensional Scale of Perceived Social Support: A confirmation study. *Journal of Clinical Psychology, 47*(6), 756-761. doi:10.1002/1097-4679(199111)47:6<756::aid-jclp2270470605>3.0.co;2-l

Davey, H. L., Tough, S. C., Adair, C. E., & Benzies, K. M. (2011). Risk factors for sub-clinical and major postpartum depression among a community cohort of Canadian women. *Maternal and Child Health Journal, 15*(7), 866-875. doi:10.1007/s10995-008-0314-8

Dennis, C. L. (2004). Can we identify mothers at risk for postpartum depression in the immediate postpartum period using the Edinburgh Postnatal Depression Scale? *Journal of Affective Disorders, 78*(2), 163-169. doi:10.1016/s0165-0327(02)00299-9

Dhillon, A., Sparkes, E., & Duarte, R. V. (2017). Mindfulness-based interventions during pregnancy: A systematic review and meta-analysis. *Mindfulness, 8*(6), 1421-1437.

Dimidjian, S., Goodman, S. H., Felder, J. N., Gallop, R., Brown, A. P., & Beck, A. (2015). An open trial of Mindfulness-Based Cognitive Therapy for the prevention of perinatal depressive relapse/recurrence. *Archives of Women's Mental Health, 18*(1), 85-94.

Dobos, G., Overhamm, T., Bussing, A., Ostermann, T., Langhorst, J., Kummel, S., . . . Cramer, H. (2015). Integrating mindfulness in supportive cancer care: A cohort study on a mindfulness-based day care clinic for cancer survivors. *Support Care Cancer, 23*(10), 2945-2955. doi:10.1007/s00520-015-2660-6

Downey, R. G., & King, C. (1998). Missing data in Likert ratings: A comparison of replacement methods. *Journal of General Psychology, 125*(2), 175-191. doi:10.1080/00221309809595542

Duncan, L. G., Cohn, M. A., Chao, M. T., Cook, J. G., Riccobono, J., & Bardacke, N. (2017). Benefits of preparing for childbirth with mindfulness training: A randomized controlled trial with active comparison. *BMC Pregnancy and Childbirth, 17*(1), 140-150.

Dunkel Schetter, C. (2011). Psychological science on pregnancy: Stress processes, biopsychosocial models, and emerging research issues. *Annual Review of Psychology, 62*, 531-558. doi:10.1146/annurev.psych.031809.130727

Dunn, C., Hanieh, E., Roberts, R., & Powrie, R. (2012). Mindful pregnancy and childbirth: Effects of a mindfulness-based intervention on women's psychological distress and well-being in the perinatal period. *Archives of Women's Mental Health, 15*(2), 139-143. doi:10.1007/s00737-012-0264-4

Fairbrother, N., & Abramowitz, J. S. (2007). New parenthood as a risk factor for the development of obsessional problems. *Behaviour Research and Therapy, 45*(9), 2155-2163. doi:10.1016/j.brat.2006.09.019

Fairbrother, N., Janssen, P., Antony, M. M., Tucker, E., & Young, A. H. (2016). Perinatal anxiety disorder prevalence and incidence. *Journal of Affective Disorders, 200*, 148-155. doi:10.1016/j.jad.2015.12.082

Fairbrother, N., Thordarson, D. S., Challacombe, F. L., & Sakaluk, J. K. (2018). Correlates and predictors of new mothers' responses to postpartum thoughts of accidental and intentional harm and obsessive compulsive symptoms. *Behavioural and Cognitive Psychotherapy, 46*(4), 437-453. doi:10.1017/s1352465817000765

Fairbrother, N., & Woody, S. R. (2008). New mothers' thoughts of harm related to the newborn. *Archives of Womens Mental Health, 11*(3), 221-229. doi:10.1007/s00737-008-0016-7

Fawcett, E. J., Fairbrother, N., Cox, M. L., White, I. R., & Fawcett, J. M. (2019). The prevalence of anxiety disorders during pregnancy and the postpartum period: A multivariate bayesian meta-analysis. *Journal of Clinical Psychiatry, 80*(4), 18r12527. doi:10.4088/JCP.18r12527

Felder, J. N., Segal, Z., Beck, A., Sherwood, N. E., Goodman, S. H., Boggs, J., ... & Dimidjian, S. (2017). An open trial of web-based Mindfulness-Based Cognitive Therapy for perinatal women at risk for depressive relapse. *Cognitive and Behavioral Practice, 24*(1), 26-37. doi: 10.1016/j.cbpra.2016.02.002

Felder, J. N., Roubinov, D., Bush, N. R., Coleman-Phox, K., Vieten, C., Laraia, B., ... & Epel, E. (2018). Effect of prenatal mindfulness training on depressive symptom severity through

18-months postpartum: A latent profile analysis. *Journal of Clinical Psychology, 74*(7), 1117-1125. doi: 10.1002/jclp.22592

Feldman, G. C., Lavalle, J., Gildawie, K., & Greeson, J. M. (2016). Dispositional mindfulness uncouples physiological and emotional reactivity to a laboratory stressor and emotional reactivity to executive functioning lapses in daily life. *Mindfulness, 7*(2), 527-541. doi:10.1007/s12671-015-0487-3

Field, T. (2010). Postpartum depression effects on early interactions, parenting, and safety practices: A review. *Infant Behavior & Development, 33*(1), 1-6. doi:10.1016/j.infbeh.2009.10.005

Foa, E. B., Huppert, J. D., Leiberg, S., Langner, R., Kichic, R., Hajcak, G., & Salkovskis, P. M. (2002). The Obsessive-Compulsive Inventory: Development and validation of a short version. *Psychological Assessment, 14*(4), 485-496.

Ganjekar, S., Desai, G., & Chandra, P. S. (2013). A comparative study of psychopathology, symptom severity, and short-term outcome of postpartum and nonpostpartum mania. *Bipolar Disorders, 15*(6), 713-718. doi:10.1111/bdi.12076

Garland, E. L., Gaylord, S. A., & Fredrickson, B. L. (2011). Positive reappraisal mediates the stress-reductive effects of mindfulness: An upward spiral process. *Mindfulness, 2*(1), 59-67. doi: 10.1007/s12671-011-0043-8

Gavin, N. I., Gaynes, B. N., Lohr, K. N., Meltzer-Brody, S., Gartlehner, G., & Swinson, T. (2005). Perinatal depression: A systematic review of prevalence and incidence. *Obstetrics & Gynecology, 106*(5 Pt 1), 1071-1083. doi:10.1097/01.AOG.0000183597.31630.db

Gaynes, B. N., Gavin, N., Meltzer-Brody, S., Lohr, K. N., Swinson, T., Gartlehner, G., . . . Miller, W. C. (2005). Perinatal depression: Prevalence, screening accuracy, and screening

outcomes. *Evidence Report/Technology Assessment (Summary)*(119), 1-8. doi:10.1037/e439372005-001

Goodman, J. H., Guarino, A., Chenausky, K., Klein, L., Prager, J., Petersen, R., . . . Freeman, M. (2014). CALM pregnancy: Results of a pilot study of Mindfulness-Based Cognitive Therapy for perinatal anxiety. *Archives of Women's Mental Health, 17*(5), 373-387. doi:10.1007/s00737-013-0402-7

Gordon, J.L., Rubinow, D.R., Eisenlohr-Moul, T.A., Leserman, J., and Girdler, S.S. (2016). Estradiol variability, stressful life events, and the emergence of depressive symptomatology during the menopausal transition. *Menopause, 23*(3), 257-266. doi:10.1097/GME.0000000000000528

Guardino, C. M., Dunkel Schetter, C., Bower, J. E., Lu, M. C., & Smalley, S. L. (2014). Randomised controlled pilot trial of mindfulness training for stress reduction during pregnancy. *Psychology & Health, 29*(3), 334-349. doi:10.1080/08870446.2013.852670

Guardino, C. M., & Schetter, C. D. (2014). Coping during pregnancy: A systematic review and recommendations. *Health Psychology Review, 8*(1), 70-94. doi:10.1080/17437199.2012.752659

Hajcak, G., Huppert, J. D., Simons, R. F., & Foa, E. B. (2004). Psychometric properties of the OCI-R in a college sample. *Behaviour Research and Therapy, 42*(1), 115-123. doi:10.1016/j.brat.2003.08.002

Hammen, C., Hazel, N. A., Brennan, P. A., & Najman, J. (2012). Intergenerational transmission and continuity of stress and depression: Depressed women and their offspring in 20 years of follow-up. *Psychological Medicine, 42*(5), 931-942. doi:10.1017/s0033291711001978

Helmes, E., & Ward, B. G. (2017). Mindfulness-Based Cognitive Therapy for anxiety symptoms in older adults in residential care. *Aging & Mental Health, 21*(3), 272-278. doi:10.1080/13607863.2015.1111862

Hendrick, V., Altshuler, L., Strouse, T., & Grosser, S. (2000). Postpartum and nonpostpartum depression: Differences in presentation and response to pharmacologic treatment. *Depression & Anxiety, 11*(2), 66-72. doi:10.1002/(sici)1520-6394(2000)11:2<66::aid-da3>3.0.co;2-d

Heron, J., Haque, S., Oyebode, F., Craddock, N., & Jones, I. (2009). A longitudinal study of hypomania and depression symptoms in pregnancy and the postpartum period. *Bipolar Disorders, 11*(4), 410-417. doi:10.1111/j.1399-5618.2009.00685.x

Hill, P. D., Aldag, J. C., Hekel, B., Riner, G., & Bloomfield, P. (2006). Maternal postpartum quality of life questionnaire. *Journal of Nursing Measurement, 14*(3), 205-220. doi:10.1891/jnm-v14i3a005

Hofberg, K., & Brockington, I. (2000). Tokophobia: An unreasoning dread of childbirth. A series of 26 cases. *British Journal Psychiatry, 176*, 83-85. doi:10.1192/bjp.176.1.83

Howard, L. M., Molyneaux, E., Dennis, C. L., Rochat, T., Stein, A., & Milgrom, J. (2014). Non-psychotic mental disorders in the perinatal period. *Lancet, 384*(9956), 1775-1788. doi:10.1016/s0140-6736(14)61276-9

Hung, C. H., Lin, C. J., Stocker, J., & Yu, C. Y. (2011). Predictors of postpartum stress. *Journal of Clinical Nursing, 20*(5-6), 666-674. doi:10.1111/j.1365-2702.2010.03555.x

Huppert, J. D., Walther, M. R., Hajcak, G., Yadin, E., Foa, E. B., Simpson, H. B., & Liebowitz, M. R. (2007). The OCI-R: Validation of the subscales in a clinical sample. *Journal of Anxiety Disorders, 21*(3), 394-406. doi:10.1016/j.janxdis.2006.05.006

Jackson, D. N. (1984). *Personality Research Form manual (3rd ed.)*. Port Huron, MI.: Research Psychologists Press, Inc.

Johnson, D. C., Thom, N. J., Stanley, E. A., Haase, L., Simmons, A. N., Shih, P. A., . . . Paulus, M. P. (2014). Modifying resilience mechanisms in at-risk individuals: A controlled study of mindfulness training in Marines preparing for deployment. *American Journal of Psychiatry, 171*(8), 844-853. doi:10.1176/appi.ajp.2014.13040502

Josefsson, A., Angelsioo, L., Berg, G., Ekstrom, C. M., Gunnervik, C., Nordin, C., & Sydsjo, G. (2002). Obstetric, somatic, and demographic risk factors for postpartum depressive symptoms. *Obstetrics and Gynecology, 99*(2), 223-228. doi:10.1016/s0029-7844(01)01722-7

Kabat-Zinn, J. (2005). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness* (15th anniversary ed. ed.): Delta Trade Paperback/Bantam Dell, New York, NY.

Kanotra, S., D'Angelo, D., Phares, T. M., Morrow, B., Barfield, W. D., & Lansky, A. (2007). Challenges faced by new mothers in the early postpartum period: An analysis of comment data from the 2000 Pregnancy Risk Assessment Monitoring System (PRAMS) survey. *Maternal and Child Health Journal, 11*(6), 549-558. doi:10.1007/s10995-007-0206-3

Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review, 31*(6), 1041-1056. doi:10.1016/j.cpr.2011.04.006

Kettunen, P., Koistinen, E., & Hintikka, J. (2014). Is postpartum depression a homogenous disorder: Time of onset, severity, symptoms and hopelessness in relation to the course of depression. *BMC Pregnancy Childbirth, 14*, 402. doi:10.1186/s12884-014-0402-2

Keye, M., & Pidgeon, A. (2013). Investigation of the relationship between resilience, mindfulness, and academic self-efficacy. *Open Journal of Social Sciences, 1*, 1-14. doi:10.4236/jss.2013.16001

Khoury, B., Sharma, M., Rush, S. E., & Fournier, C. (2015). Mindfulness-Based Stress Reduction for healthy individuals: A meta-analysis. *Journal of Psychosomatic Research, 78*(6), 519-528. doi:10.1016/j.jpsychores.2015.03.009

Kim, M. K., Lee, K. S., Kim, B., Choi, T. K., & Lee, S. H. (2016). Impact of Mindfulness-Based Cognitive Therapy on intolerance of uncertainty in patients with Panic Disorder. *Psychiatry Investigation, 13*(2), 196-202. doi:10.4306/pi.2016.13.2.196

la Cour, P., & Petersen, M. (2015). Effects of mindfulness meditation on chronic pain: A randomized controlled trial. *Pain Medicine, 16*(4), 641-652. doi:10.1111/pme.12605

Lautarescu, A., Craig, M. C., & Glover, V. (2020). Prenatal stress: Effects on fetal and child brain development. *International Review of Neurobiology, 150*, 17-40. doi:10.1016/bs.irn.2019.11.002

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.

Lee, C. (1997). Social context, depression, and the transition to motherhood. *British Journal of Health Psychology, 2*(Part 2), 93-108. doi: 10.1111/j.2044-8287.1997.tb00527.x

LeWinn, K. Z., Stroud, L. R., Molnar, B. E., Ware, J. H., Koenen, K. C., & Buka, S. L. (2009). Elevated maternal cortisol levels during pregnancy are associated with reduced childhood IQ. *International Journal of Epidemiology, 38*(6), 1700-1710. doi:10.1093/ije/dyp200

Luberto, C. M., Park, E. R., & Goodman, J. H. (2018). Postpartum outcomes and formal mindfulness practice in Mindfulness-Based Cognitive Therapy for perinatal women. *Mindfulness, 9*(3), 850-859.

Marcus, S. M. (2009). Depression during pregnancy: Rates, risks and consequences. *Journal of Population Therapeutics & Clinical Pharmacology, 16*(1), e15-e22.

Marks, A. D., Sobanski, D. J., & Hine, D. W. (2010). Do dispositional rumination and/or mindfulness moderate the relationship between life hassles and psychological dysfunction in adolescents? *Australian and New Zealand Journal of Psychiatry, 44*(9), 831-838. doi:10.3109/00048674.2010.487478

McDermut, W., Miller, I.W., and Brown, R.A. (2001), The efficacy of group psychotherapy for depression: A Meta-analysis and review of the empirical research. *Clinical Psychology: Science and Practice, 8*, 98-116. doi:10.1093/clipsy.8.1.98

McGuinness, M., Blissett, J., & Jones, C. (2011). OCD in the perinatal period: Is postpartum OCD (ppOCD) a distinct subtype? A review of the literature. *Behavioural and Cognitive Psychotherapy, 39*(3), 285-310. doi:10.1017/s1352465810000718

McQueen, K., Montgomery, P., Lappan-Gracon, S., Evans, M., & Hunter, J. (2008). Evidence-based recommendations for depressive symptoms in postpartum women. *Journal of Obstetric, Gynecologic & Neonatal Nursing, 37*(2), 127-136. doi 10.1111/j.1552-6909.2008.00215.x

Meltzer-Brody, S., & Stuebe, A. (2014). The long-term psychiatric and medical prognosis of perinatal mental illness. *Best Practice & Research Clinical Obstetrics & Gynaecology, 28*(1), 49-60. doi:10.1016/j.bpobgyn.2013.08.009

Mercer, R. T. (2004). Becoming a mother versus maternal role attainment. *Journal of Nursing Scholarship, 36*(3), 226-232. doi:10.1111/j.1547-5069.2004.04042.x

Merikangas, K. R., Jin, R., He, J. P., Kessler, R. C., Lee, S., Sampson, N. A., . . . Zarkov, Z. (2011). Prevalence and correlates of bipolar spectrum disorder in the world mental health survey initiative. *Archives of General Psychiatry, 68*(3), 241-251. doi:10.1001/archgenpsychiatry.2011.12

Misri, S., Oberlander, T. F., Fairbrother, N., Carter, D., Ryan, D., Kuan, A. J., & Reebye, P. (2004). Relation between prenatal maternal mood and anxiety and neonatal health. *Canadian Journal of Psychiatry, 49*(10), 684 - 689. doi:10.1177/070674370404901006

Moehler, E., Brunner, R., Wiebel, A., Reck, C., & Resch, F. (2006). Maternal depressive symptoms in the postnatal period are associated with long-term impairment of mother-child bonding. *Archives of Womens Mental Health, 9*(5), 273-278. doi:10.1007/s00737-006-0149-5

Mood Disorder Society of Canada, M. (2009). *Quick facts: Mental illness and addiction in Canada*. Retrieved from http://www.mooddisorderscanada.ca/documents/Media%20Room/Quick%20Facts%203rd%20Edition%20Eng%20Nov%2012%2009.pdf

Mota, N., Cox, B. J., Enns, M. W., Calhoun, L., & Sareen, J. (2008). The relationship between mental disorders, quality of life, and pregnancy: Findings from a nationally representative sample. *Journal of Affective Disorders, 109*(3), 300-304. doi:10.1016/j.jad.2007.12.002

Murray, D., & Cox, J. L. (1990). Screening for depression during pregnancy with the Edinburgh Depression Scale (EPDS). *Journal of Reproductive and Infant Psychology, 8*(2), 99-107. doi: 10.1080/02646839008403615

Muzik, M., Hamilton, S. E., Lisa Rosenblum, K., Waxler, E., & Hadi, Z. (2012). Mindfulness yoga during pregnancy for psychiatrically at-risk women: Preliminary results from a pilot feasibility study. *Complementary Therapies in Clinical Practice, 18*(4), 235-240. doi:10.1016/j.ctcp.2012.06.006

Müller, D., Teismann, T., Havemann, B., Michalak, J., & Seehagen, S. (2013). Ruminative thinking as a predictor of perceived postpartum mother–infant bonding. *Cognitive Therapy and Research, 37*(1), 89-96. doi: 10.1007/s10608-012-9454-7

O'Brien, M., Buikstra, E., & Hegney, D. (2008). The influence of psychological factors on breastfeeding duration. *Journal of Advanced Nursing, 63*(4), 397-408. doi:10.1111/j.1365-2648.2008.04722.x

O'Hara, M. W., & McCabe, J. E. (2013). Postpartum depression: Current status and future directions. *Annual Review of Clinical Psychology, 9*, 379-407. doi:10.1146/annurev-clinpsy-050212-185612

O'Hara, M. W., & Wisner, K. L. (2014). Perinatal mental illness: Definition, description and aetiology. *Best Practices in Research and Clinical Obstetrics and Gynaecology, 28*(1), 3-12. doi:10.1016/j.bpobgyn.2013.09.002

Osman, A., Lamis, D. A., Freedenthal, S., Gutierrez, P. M., & McNaughton-Cassill, M. (2014). The Multidimensional Scale of Perceived Social Support: Analyses of internal reliability, measurement invariance, and correlates across gender. *Journal of Personality Assessment, 96*(1), 103-112. doi:10.1080/00223891.2013.838170

Pan, W. L., Chang, C. W., Chen, S. M., & Gau, M. L. (2019). Assessing the effectiveness of mindfulness-based programs on mental health during pregnancy and early motherhood-a

randomized control trial. *BMC Pregnancy and Childbirth, 19*(1), 346-353. doi: 10.1186/s12884-019-2503-4

Paschetta, E., Berrisford, G., Coccia, F., Whitmore, J., Wood, A. G., Pretlove, S., & Ismail, K. M. (2014). Perinatal psychiatric disorders: An overview. *American Journal of Obstetrics and Gynecology, 210*(6), 501-509.e506. doi:10.1016/j.ajog.2013.10.009

Perez-Blasco, J., Viguer, P., & Rodrigo, M. F. (2013). Effects of a mindfulness-based intervention on psychological distress, well-being, and maternal self-efficacy in breast-feeding mothers: Results of a pilot study. *Archives of Womens Mental Health, 16*(3), 227-236. doi:10.1007/s00737-013-0337-z

Piet, J., & Hougaard, E. (2011). The effect of Mindfulness-Based Cognitive Therapy for prevention of relapse in recurrent Major Depressive Disorder: A systematic review and meta-analysis. *Clinical Psychology Review, 31*(6), 1032-1040. doi:10.1016/j.cpr.2011.05.002

Pope, C. J., Mazmanian, D., Bédard , M., & Sharma, V. (2016). Breastfeeding and postpartum depression: Assessing the influence of breastfeeding intention and other risk factors. *Journal of Affective Disorders, 200*, 45-50. doi:10.1016/j.jad.2016.04.014

Pope, C.J., Oinonen, K., Mazmanian, D., & Stone, S. (2017). The hormonal sensitivity hypothesis: A review and new findings. *Medical Hypotheses*, *102,* 69-77. doi:10.1016/j.mehy.2017.03.012

Pope, C. J., Sharma, V., & Mazmanian, D. (2014). Recognition, diagnosis and treatment of postpartum bipolar depression. *Expert Review of Neurotherapeutics, 14*(1), 19-28. doi:10.1586/14737175.2014.846219

Public Health Agency of Canada. (2006*). The human face of mental health and mental illness in Canada 2006*. Retrieved from http://www.phac-aspc.gc.ca/publicat/human-humain06/6-eng.php

Rallis, S., Skouteris, H., McCabe, M., & Milgrom, J. (2014). A prospective examination of depression, anxiety and stress throughout pregnancy. *Women Birth, 27*(4), e36-e42. doi:10.1016/j.wombi.2014.08.002

Recto, P., & Champion, J. D. (2020). Psychosocial factors associated with paternal perinatal depression in the United States: A systematic review. *Issues in Mental Health Nursing*, 1-16. doi:10.1080/01612840.2019.1704320

Richardson, G. E. (2002). The metatheory of resilience and resiliency. *Journal of Clinical Psychology, 58*(3), 307-321. doi:10.1002/jclp.10020

Roberti, J. W., Harrington, L. N., & Storch, E. A. (2006). Further psychometric support for the 10-item version of the Perceived Stress Scale. *Journal of College Counseling, 9*(2), 135-147. doi: 10.1002/j.2161-1882.2006.tb00100.x

Ross, L. E., McQueen, K., Vigod, S., & Dennis, C. L. (2011). Risk for postpartum depression associated with assisted reproductive technologies and multiple births: A systematic review. *Human Reproduction Update, 17*(1), 96-106. doi: 10.1093/humupd/dmq025

Russell, E. J., Fawcett, J. M., & Mazmanian, D. (2013). Risk of Obsessive-Compulsive Disorder in pregnant and postpartum women: A meta-analysis. *Journal of Clinical Psychiatry, 74*(4), 377-385. doi:10.4088/JCP.12r07917

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry, 57*(3), 316-331. doi: 10.1111/j.1939-0025.1987.tb03541.x

Saurel-Cubizolles, M. J., Romito, P., Lelong, N., & Ancel, P. Y. (2000). Women's health after childbirth: A longitudinal study in France and Italy. *BJOG, 107*(10), 1202-1209. doi:10.1111/j.1471-0528.2000.tb11608.x

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-Based Cognitive Therapy for depression: A new approach to preventing relapse*. Guilford Press, New York, NY.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2013). *Mindfulness-Based Cognitive Therapy for depression* (2nd ed. ed.). The Guilford Press, New York, NY.

Sharma, V., Khan, M., Corpse, C., & Sharma, P. (2008). Missed bipolarity and psychiatric comorbidity in women with postpartum depression. *Bipolar Disorders, 10*(6), 742-747. doi:10.1111/j.1399-5618.2008.00606.x

Sharma, V., & Mazmanian, D. (2014). The DSM-5 peripartum specifier: Prospects and pitfalls. *Archives of Womens Mental Health, 17*(2), 171-173. doi:10.1007/s00737-013-0406-3

Shaughnessy, J. J., Zechmeister, E. B., & Zechmeister, J. S. (2015). *Research methods in psychology* (10 ed.). McGraw Hill, New York, NY.

Shi, Z., MacBeth, A. (2017). The effectiveness of mindfulness-based interventions on maternal perinatal mental health outcomes: A systematic review. *Mindfulness 8*, 823–847. doi:10.1007/s12671-016-0673-y

Short, M. M., Mazmanian, D., Oinonen, K., & Mushquash, C. J. (2016). Executive function and self-regulation mediate dispositional mindfulness and well-being. *Personality and Individual Differences, 93*, 97-103. doi:10.1016/j.paid.2015.08.007

Short, M. M., Mazmanian, D., Ozen, L. J., & Bédard, M. (2015). Four days of mindfulness meditation training for graduate students: A pilot study examining effects on

mindfulness, self-regulation, and executive function. *The Journal of Contemplative Inquiry, 2*(1).

Sivak, K. (2007). *Mindfulness-Based Cognitive Therapy for pregnant women with previous difficult postpartum mood: A mixed methods exploratory study.* (Master's). University of Victoria, Retrieved from https://dspace.library.uvic.ca:8443/bitstream/handle/1828/4540/Sivak_Katya_MA_2013.pdf?sequence=6

Skevington, S. M. (1998). Investigating the relationship between pain and discomfort and quality of life, using the WHOQOL. *Pain, 76*(3), 395-406. doi:10.1016/S0304-3959(98)00072-4

Skevington, S. M., Lotfy, M., & O'Connell, K. A. (2004). The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A report from the WHOQOL group. *Quality of Life Research, 13*(2), 299-310. doi:10.1023/b:qure.0000018486.91360.00

Skevington, S. M., Sartorius, N., & Amir, M. (2004). Developing methods for assessing quality of life in different cultural settings. The history of the WHOQOL instruments. *Social Psychiatry & Psychiatric Epidemiology, 39*(1), 1-8. doi:10.1007/s00127-004-0700-5

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin, 129*(2), 216-269. doi:10.1037/0033-2909.129.2.216

Slonim, J., Kienhuis, M., Di Benedetto, M., & Reece, J. (2015). The relationships among self-care, dispositional mindfulness, and psychological distress in medical students. *Medical Education Online, 20*, 27924. doi:10.3402/meo.v20.27924

Smith, B., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The Brief Resilience Scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine, 15*(3), 194-200. doi:10.1080/10705500802222972

Smith, S., Heron, J., Haque, S., Clarke, P., Oyebode, F., Jones, & I. (2009). Measuring hypomania in the postpartum: A comparison of the Highs Scale and the Altman Mania Rating Scale. *Archives of Women's Mental Health, 12*(5), 323-327. doi:10.1007/s00737-009-0076-3

Song, J. E., Kim, T., & Ahn, J. A. (2015). A systematic review of psychosocial interventions for women with postpartum stress. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 44*(2), 183-192. doi:10.1111/1552-6909.12541

Speisman, B. B., Storch, E. A., & Abramowitz, J. S. (2011). Postpartum Obsessive-Compulsive Disorder. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 40*(6), 680-690. doi:10.1111/j.1552-6909.2011.01294.x

Spice, K., Jones, S. L., Hadjistavropoulos, H. D., Kowalyk, K., & Stewart, S. H. (2009). Prenatal fear of childbirth and anxiety sensitivity. *Journal of Psychosomatic Obstetrics & Gynecology, 30*(3), 168-174. doi:10.1080/01674820902950538

Stanton, K., Gruber, J., & Watson, D. (2017). Basic dimensions defining mania risk: A structural approach. *Psychological Assessment, 29*(3), 304-319. doi:10.1037/pas0000337

Strauss, C., Cavanagh, K., Oliver, A., & Pettman, D. (2014). Mindfulness-based interventions for people diagnosed with a current episode of an anxiety or depressive disorder: A meta-analysis of randomised controlled trials. *PLoS One, 9*(4), e96110. doi:10.1371/journal.pone.0096110

Stern, A. F. (2014). The Hospital Anxiety and Depression Scale. *Occupational Medicine, 64*(5), 393-394. doi: 10.1093/occmed/kqu024

Surawy, C., Roberts, J., & Silver, A. (2005). The effect of mindfulness training on mood and measures of fatigue, activity, and quality of life in patients with chronic fatigue syndrome on a hospital waiting list: A series of exploratory studies. *Behavioural and Cognitive Psychotherapy, 33*(1), 103-109. doi: 10.1017/S135246580400181X

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics (6th ed.)*. Pearson, Bosten, MA.

Ulrich, M., & Weatherall, A. (2000). Motherhood and infertility: Viewing motherhood through the lens of infertility. *Feminism & Psychology, 10*(3), 323-336. doi: 10.1177/0959353500010003003

Van den Bergh, B. R., Mennes, M., Oosterlaan, J., Stevens, V., Stiers, P., Marcoen, A., & Lagae, L. (2005). High antenatal maternal anxiety is related to impulsivity during performance on cognitive tasks in 14- and 15-year-olds. *Neuroscience & Biobehavioral Reviews, 29*(2), 259-269. doi:10.1016/j.neubiorev.2004.10.010

Vieten, C., & Astin, J. (2008). Effects of a mindfulness-based intervention during pregnancy on prenatal stress and mood: Results of a pilot study. *Archives of Womens Mental Health, 11*(1), 67-74. doi:10.1007/s00737-008-0214-3

Viguera, A. C., Baldessarini, R. J., & Tondo, L. (2001). Response to lithium maintenance treatment in bipolar disorders: Comparison of women and men. *Bipolar Disorders, 3*(5), 245-252. doi:10.1034/j.1399-5618.2001.30503.x

Wang, L., Wu, T., Anderson, J. L., & Florence, J. E. (2011). Prevalence and risk factors of maternal depression during the first three years of child rearing. *Journal of Womens Health, 20*(5), 711-718. doi:10.1089/jwh.2010.2232

Webster, J., Nicholas, C., Velacott, C., Cridland, N., & Fawcett, L. (2010). Validation of the WHOQOL-BREF among women following childbirth. *Journal of Obstetrics and Gynaecology, 50*(2), 132-137. doi:10.1111/j.1479-828X.2009.01131.x

Williams, M., Davis, D. M., Thibodeau, M. A., & Bach, N. (2013). Psychometric properties of the Obsessive-Compulsive Inventory Revised in African Americans with and without Obsessive-Compulsive Disorder. *Journal of Obsessive-Compulsive and Related Disorders, 2*(4), 399-405. doi: 10.1016/j.jocrd.2013.07.003

Wittkowski, A., Wieck, A., & Mann, S. (2007). An evaluation of two bonding questionnaires: A comparison of the Mother-to-Infant Bonding Scale with the Postpartum Bonding Questionnaire in a sample of primiparous mothers. *Archives of Womens Mental Health, 10*(4), 171-175. doi:10.1007/s00737-007-0191-y

World Health Organization. (1998). Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group. *Psychological Medicine, 28*(3), 551-558. doi:10.1017/s0033291798006667

World Health Organization. (2019). *ICD-11*. Retrieved from: https://icd.who.int/browse11/l-m/en

Yeaton-Massey, A., & Herrero, T. (2019). Recognizing maternal mental health disorders: Beyond postpartum depression. *Current Opinion in Obstetrics and Gynecology, 31*(2), 116-119. doi: 10.1097/GCO.0000000000000524

Zar, M., Wijma, K., & Barbro, W. (2002). Relations between anxiety disorders and fear of childbirth during late pregnancy. *Clinical Psychology & Psychotherapy, 9*(2), 122-130. doi:10.1002/cpp.305

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatria Scandinavica, 67*(6), 361 - 370. doi:10.1111/j.1600-0447.1983.tb09716.x

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 52*(1), 30-41. doi: 10.1207/s15327752jpa5201_2

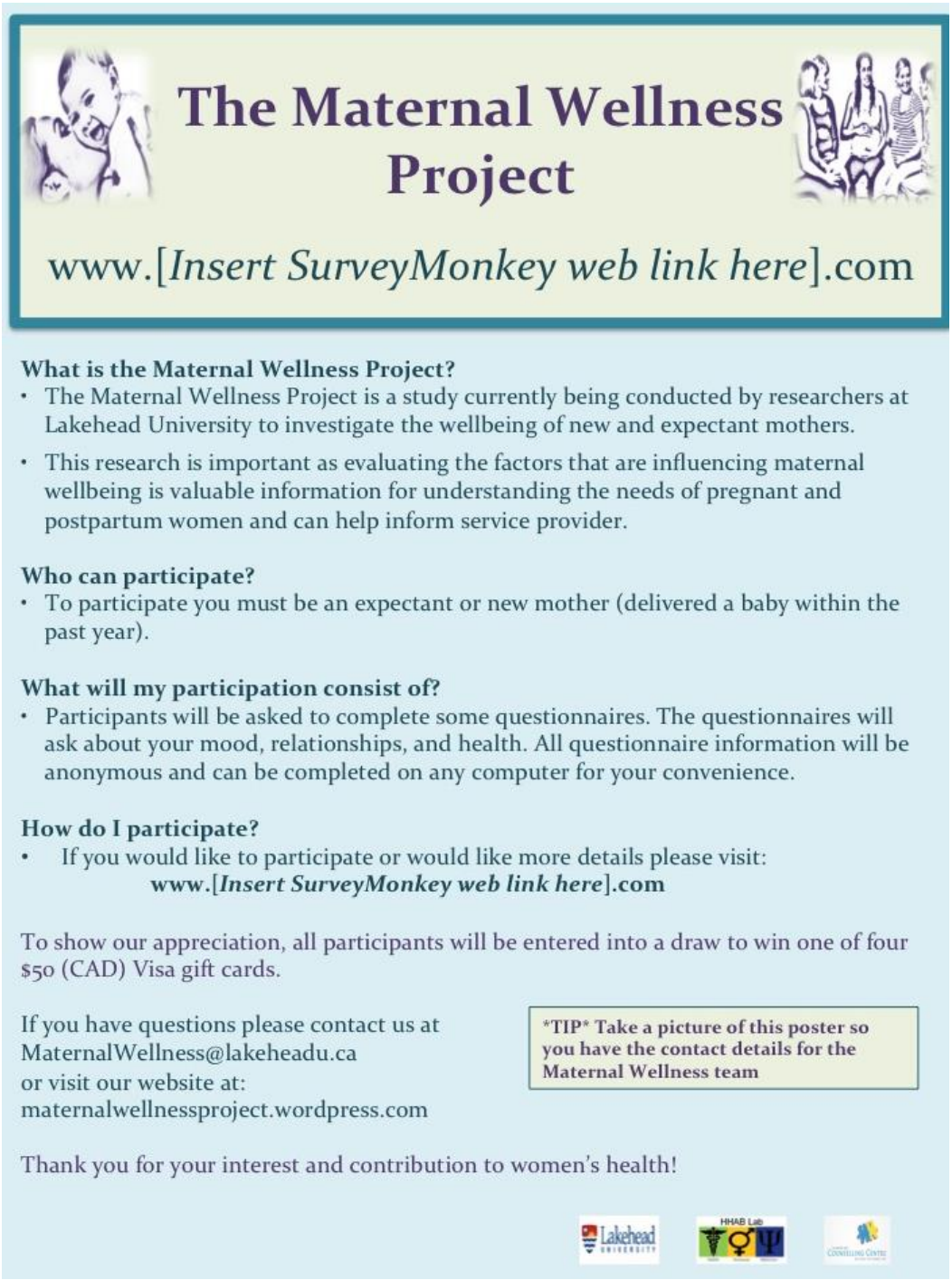
Zimmerman, M. A. (2013). Resiliency theory: A strengths-based approach to research and practice for adolescent health. *Health Education & Behavior, 40*(4), 381-383. doi:10.1177/1090198113493782

Appendices

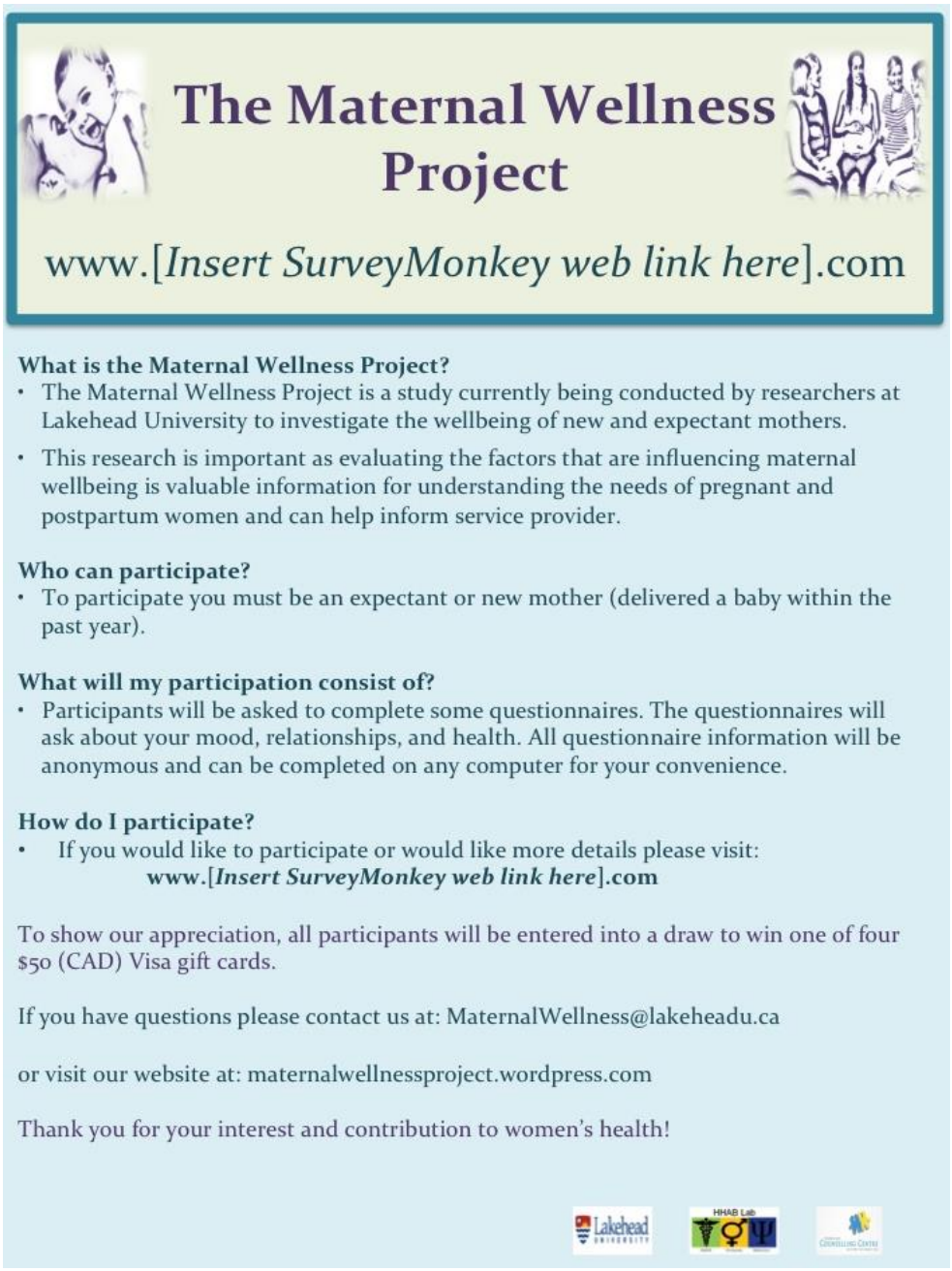
Appendix A

Advertising Materials (Study 1)

Poster



Social Media Advertisement



Website Text

Website address: maternalwellnessproject.wordpress.com

Website text:

Thank you for your interest in the Maternal Wellness Project! We are grateful that you are interested in contributing to the understanding of women's health!

What is the Maternal Wellness Project?

- The Maternal Wellness Project is a study currently being conducted by researchers at Lakehead University to investigate the wellbeing of new and expectant mothers.
- This research is important as evaluating the factors that are influencing maternal wellbeing is valuable information for understanding the needs of pregnant and postpartum women and can help inform service provider.

Who can participate?

- To participate you must be an expectant or new mother (delivered a baby within the past year).

What will my participation consist of?

- Participants will be asked to complete some questionnaires. The questionnaires will ask about your mood, relationships, and health. All questionnaire information will be anonymous and can be completed on any computer for your convenience.

How do I participate?

- If you would like to participate or would like more details please visit:

  www.[*Insert SurveyMonkey web link here*].com

To show our appreciation, all participants will have the option to be entered into a draw to win one of four $50 Visa gift cards.

If you have questions please contact us at:

MaternalWellness@lakeheadu.ca

Thank you for your interest and participation!

Appendix B

Covering Letters and Participant Consent Text (Study 1)

Dear Potential Participant,

Thank you for your interest in our research study entitled "The Maternal Wellness Project." The Maternal Wellness Project is a study currently being conducted to investigate the wellbeing of new and expectant mothers. This research is important as understanding the factors that are influencing maternal wellbeing can help inform service providers and is valuable information for the development of services for pregnant and postpartum women.

To participate you must be pregnant or a new mother who lives with the child you have given birth to in the past year. As well, if you have already participated in the Mommy Matters Study at Lakehead University in Thunder Bay, Ontario you should not participate in this study.

If you chose to participate you will be asked to complete an electronic survey. The survey will ask you questions about your mood, relationships, and health. All survey information will be anonymous and can be completed on any computer for your convenience.

There are no known physical risks associated with participating in the current study; however, you may feel some minor psychological discomfort when responding to some of the questions.

It is anticipated that the survey will take you 40 minutes to 1 hour to complete. Participation is completely voluntary, and your survey information is anonymous. No identifying information will be collected, and you are free to withdraw from the study or to leave questions blank for any reason. However, due to the anonymous nature of the survey, responses cannot be withdrawn after submission of the completed questionnaire. However, answering all of the items without skipping any would be greatly appreciated and useful for the current study.

Completed paper surveys will be kept in secure storage at Lakehead University for five years and only the researchers and Dr. Mazmanian will have access to the data. Please note that the online survey tool used in the study, SurveyMonkey®, is hosted by a server located in the USA. The US Patriot Act permits U.S. law enforcement officials, for the purpose of anti-terrorism investigation, to seek a court order that allows access to the personal records of any person without the person's knowledge. In view of this we cannot absolutely guarantee the full confidentiality or anonymity of your data. With your consent to participate in this study, you acknowledge this. Furthermore, it is the researchers' intention to publish and present the outcomes from the study. Should you be interested in the results once the study is complete, at the end of the survey you will be provided with instructions on how to contact the research team.

Finally, to show our gratitude, once you complete the survey you can enter into a random draw to win one of four a $50 (CAD) Visa gift-cards. Instructions on how to enter into the draw will also be presented to you at the end of the survey. Contact information that you provide for the draw will not be in any way attached to the responses you provide in the survey.

On behalf of the Maternal Wellness team, thank you for your interest and participation. It really makes a difference!

Warm regards.

Carley Pope, M.A.
Clinical Psychology Student Investigator
MaternalWellness@lakeheadu.ca
807-632-7271

Dwight Mazmanian, Ph.D., C. Psych.
Principal Investigator
dmazmani@lakeheadu.ca
807-343-8257

This study has been approved by the Lakehead University Research Ethics Board. If you have any questions related to the ethics of the research and would like to speak to someone outside of the research team please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca

If answering any of the questions raise any issues about mental health concerns that you would like to discuss, you may contact the Ontario Mental Health Helpline at 1-866-531-2600 or the Crisis Response Program through the Canadian Mental Health Association at 807-346-8282.

Appendix C

Debriefing Form Text

DEBRIEFING FORM FOR PREGNANT WOMEN
(Please print this page for your information)

Thank you for your participation in this research project on maternal health and wellness. We hope that this study will help provide information regarding factors that influence maternal wellbeing as well as factors that enhance women's ability to cope with the many stressors that arise during pregnancy and the postpartum period. This information can help inform service providers and is valuable information for the development of services for pregnant and postpartum women.

A message to participants who are currently pregnant:
If you are a pregnant woman, we would like to ask that you complete a follow-up survey approximately one month after you have delivered your baby. Please note that participation after you deliver is completely voluntary and if you agree now you can withdraw later for any reason. If you do complete a second survey after you deliver your baby, you will have the **opportunity to submit a second entry for the Visa Gift Card Draw**. If you are agreeable to this, please:

1 - click the link below and provide your email address and your baby's due date
[insert weblink]

2 – or provide your contact information by email as **well as your baby's due date** at:
MaternalWellness@lakeheadu.ca
[please use the Subject Heading "Follow-Up Survey"]

We will email you approximately 2 weeks after your due date to remind you to complete the follow-up survey. If you deliver early you are welcome to send us an email at MaternalWellness@lakeheadu.ca to let us know.

Attention Thunder Bay Residence: If you live in Thunder Bay and are currently pregnant, please consider participating in our Wellness Program Research. More information can be found by emailing [insert study email address] - In the subject line please put "Referred from Study 1"

Information about study results
A summary of the results can be made available to you by email once the study has been completed. If you are interested in receiving these research results, please email the researcher at MaternalWellness@lakeheadu.ca with the subject heading "Results Summary Request". We will email you a copy of the Results Summary once it is made publicly available.

Furthermore, if you would like to be entered into the draw to win one of four $50 (CAD) Visa gift cards please do one of the following:

1 click the following link and provide your email address
https://www.surveymonkey.com/r/MaternalWellbeingDraw
2 or provide your contact information by email at:

MaternalWellness@lakeheadu.ca
[please use the Subject Heading "Draw Entry" when you make an email request to be entered into the draw].

***** If you are agreeable to being contacted after you deliver your baby to complete the post-partum survey please indicate so in this email and provide your baby's due date.**

If you have specific questions about the survey you may contact the Student Investigator, Carley Pope, M.A. [MaternalWellness@lakeheadu.ca] or the Principle Investigator Dwight Mazmanian, Ph.D., C. Psych. [dmazmani@lakeheadu.ca 807-343-8257].

If completing this survey has raised any issues about mental health concerns that you would like to discuss, you may contact the Ontario Mental Health Helpline at 1-866-531-2600 or the Crisis Response Program through the Canadian Mental Health Association at 807-346-8282. If you are interested in learning more about Maternal Wellbeing, please visit the following websites:

- Health Canada "Healthy Pregnancy" http://www.hc-sc.gc.ca/hl-vs/preg-gros/index-
- Public Health Agency of Canada "The Sensible Guide to a Healthy Pregnancy" http://www.phac-aspc.gc.ca/hp-gs/guide-eng.php
- The Queen's Perinatal Research Unit "The Mother's Program" http://www.themothersprogram.ca/

DEBRIEFING FORM FOR POSTPARTUM WOMEN
(Please print this page for your information)

Thank you for your participation in this research project on maternal health and wellness. We hope that this study will help provide information regarding factors that influence maternal wellbeing as well as factors that enhance women's ability to cope with the many stressors that arise during pregnancy and the postpartum period. This information can help inform service providers and is valuable information for the development of services for pregnant and postpartum women.

Information about study results
A summary of the results can be made available to you by email once the study has been completed. If you are interested in receiving these research results, please email the researcher at [insert study email address] with the subject heading "Results Summary Request". We will email you a copy of the Results Summary once it is made publicly available.

Visa Gift Card Draw
If you would like to be entered into the draw to win one of four $50 (CAD) Visa gift cards please follow the link below.
1 click here and provide your email address
2 or provide your contact information by email at: [insert study email address] [please use the Subject Heading "Draw Entry" when you make an email request to be entered into the draw].

If you do not wish to enter the draw you can simply close this browser after you have reviewed this page.

If you have specific questions about the survey you may contact the Student Investigator, Carley Pope, M.A. [insert study email address] or the Principle Investigator Dwight Mazmanian, Ph.D., C. Psych. [dmazmani@lakeheadu.ca 807-343-8257].

If completing this survey has raised any issues about mental health concerns that you would like to discuss, you may contact the Ontario Mental Health Helpline at 1-866-531-2600 or the Crisis Response Program through the Canadian Mental Health Association at 807-346-8282.

If you are interested in learning more about Maternal Wellbeing, please visit the following websites:

- Health Canada "Healthy Pregnancy" http://www.hc-sc.gc.ca/hl-vs/preg-gros/index-
- Public Health Agency of Canada "The Sensible Guide to a Healthy Pregnancy" http://www.phac-aspc.gc.ca/hp-gs/guide-eng.php
- The Queen's Perinatal Research Unit "The Mother's Program" http://www.themothersprogram.ca/

As well, we invite you to visit the following YouTube video if you would like to take some time

to listen to soothing music: https://www.youtube.com/watch?v=yGcwvd0yaxM

With sincere thanks,
The Maternal Wellness Team

Appendix D

Participant Demographic Forms (Study 1)

Are you currently pregnant? ☐ yes ☐ no
Have you delivered a baby in the past 12 months? ☐ yes ☐ no If yes, do you live with the baby? ☐ yes ☐ no
Have you adopted a baby in the past year? ☐ yes ☐ no
What is your month and year of birth?: _____(mm) _____ (yyyy) How old are you? _____
What province/state and country do you currently live in?: _____(prov/state) _____(country)
What is your Eye Colour? Please choose the one that most closely describes your eye colour even if it does not match perfectly. ☐ brown ☐ blue ☐ green ☐ gray ☐ amber
What are the last 3 digits of your postal code or zip code: _____
How did you hear about the Maternal Wellness Study? _____
What is your marital status? ☐ Married/ Common law (cohabitating) ☐ Widowed ☐ Dating ☐ In a long term relationship (not cohabitating) ☐ Single ☐ Divorced/separated
If you are in a relationship, please indicate if your current partner identifies as: ☐ male ☐ female ☐ transgender ☐ different identity
If you are in a marital or long-term relationship, how long have you been with your partner? _____years and _____ months
What is your ethnic background? ☐ Caucasian (White) ☐ African-Canadian/American (Black) ☐ Aboriginal (First Nation, Métis, Inuit) ☐ Hispanic/Latino ☐ European ☐ Middle Eastern ☐ East Indian ☐ Asian ☐ other (please specify):_____
Are you currently employed? ☐ yes ☐ no ☐ on maternity leave ☐ other: _____
What is your overall employment situation? ☐ full-time ☐ stay-at-home parent ☐ student ☐ part-time ☐ disability pension ☐ other (please specify): _____
What is your current household income? ☐ under $25000 ☐ $25000 - $49999 ☐ $50000 - $74999 ☐ $75000 - $99999 ☐ $100000 - $149999 ☐ $150000 or above

What is the highest level of education you have received?

☐ some high school ☐ some university
☐ high school diploma ☐ university degree
☐ some college ☐ master's degree
☐ college diploma ☐ doctoral degree

Have you ever received a mental health diagnosis? ☐ Yes ☐ No

If YES, please specify the diagnoses and indicate if it was related to childbirth

Diagnosis given:	**Related to pregnancy for childbirth?**
_____	☐ yes ☐ no
_____	☐ yes ☐ no
_____	☐ yes ☐ no
_____	☐ yes ☐ no

Are you currently taking any prescription medication?: ☐ Yes ☐ No

Please list the prescription medication you are currently taking (if applicable):

_____
_____
_____

Are you currently taking any Non-prescription medication?: ☐ Yes ☐ No

Please list the non-prescription medication you are currently taking (if applicable):

_____
_____

Have you ever participated in the following types of counselling? (Check all that apply)

☐ Cognitive Behavioural Therapy
☐ Dialectical Behavior Therapy
☐ Mindfulness-Based Therapy (e.g., MBCT, MBSR)
☐ Individual therapy
☐ Group therapy
☐ Couples/ Family therapy
☐ Other therapy: _____

Have you ever received counselling services for emotional difficulties? ☐ yes ☐ no

How many times have you been pregnant? _____

How many children have you given birth to? _____

How old are they now? _____

How many children have you adopted? _____

How old are they now? _____

How many children currently live with you? _____

Have you ever had an abortion? ☐ yes ☐ no

Have you ever had a miscarriage? ☐ yes ☐ no

Have you had a past episode of depression (not associated with childbirth)? ☐ yes ☐ no

If YES,

a. how many times have you been depressed? _____
b. at what age did the depression(s) start to occur? _____
c. did you use anti-depressant medication? ☐ yes ☐ no

d. what other kinds of treatment did you receive? _____

Have you had a past episode of anxiety (not associated with childbirth)? ☐ yes ☐ no

If YES,

a. how many anxiety episodes have you had? _____
b. at what age did the anxiety (s) start to occur? _____
c. did you use anti-depressant medication to treat the anxiety? ☐ yes ☐ no
d. what other kinds of treatment did you receive? _____

Have you ever been treated for other mental health symptoms or a mental health disorder that was not associated with childbirth? ☐ no ☐ yes

If YES, please specify:_____

a. at what age did the symptoms(s) start to occur? _____
b. did you use prescription medication to treat the symptoms? ☐ yes ☐ no
c. what other kinds of treatment did you receive? _____

Are you currently receiving any counselling?

☐ no ☐ yes ☐ please indicate for what general difficulties: _____

Now we would like to ask you some questions about your experience with some of your past reproductive events:

At what age did you first begin menstruating (i.e. get your period)? _____

I believe that going through puberty affected my mood: (Mark the one best answer)

☐ very negatively
☐ slightly negatively
☐ in no way at all
☐ slightly positively
☐ very positively
☐ I've never had a period

Please rate the extent to which you agree to the following statements:

a. I have had significant trouble with premenstrual distress (PMS or problems right before my period):

☐ strongly disagree
☐ disagree
☐ agree
☐ strongly agree
☐ I've never had a period

b. I believe that my premenstrual symptoms affected my mood: (Mark the best answer)

☐ very negatively
☐ slightly negatively
☐ in no way at all
☐ slightly positively
☐ very positively
☐ I've never had a period

Have you used oral contraceptives in the past (i.e. birth control pills)? ☐ yes ☐ no

- IF YES, how long did you continue to use oral contraceptives? _____ years _____ months
- IF YES, I believe that using oral contraceptives affected my mood:

☐ very negatively
☐ slightly negatively
☐ in no way at all
☐ slightly positively
☐ very positively

Is there any history of mental or emotional illness in your close biological relatives (e.g., your parents, siblings, aunts, uncles, or grandparents)? ☐ yes ☐ no ☐ not sure

If YES, please check all illnesses that apply:
☐ depression
☐ bipolar disorder (or manic-depression)
☐ anxiety disorders
☐ schizophrenia
☐ other (please specify): _____

Have you ever participated in any formal mindfulness training?
☐ no ☐ yes ☐ please explain when and what the program was: _____

FOR PREGNANT PARTICIPANTS ONLY

The following questions pertain to your current pregnancy:

How many weeks pregnant are you? _____

Is this a multiple birth? ☐ no ☐ yes → how many babies are you pregnant with? _____

Was your current pregnancy planned? ☐ yes ☐ no

Was the pregnancy unwanted? ☐ yes ☐ no

Have you experienced any medical complications during this pregnancy? ☐ yes ☐ no

Have you experienced extreme positive mood during this pregnancy? ☐ yes ☐ no

Have you experienced any type of negative mood change during the pregnancy? ☐ yes ☐ no

During your pregnancy, did a medical doctor or mental health care professional tell you that you were struggling with a mental health condition? ☐ no ☐ yes

If yes, please check which conditions they said you had
☐ depression
☐ anxiety
☐ obsessions and compulsions
☐ bipolar disorder
☐ other → please specify:_____

Have you received any medication during this pregnancy for mood change?
☐ no ☐ yes → please explain: _____

Have you received any counselling or psychotherapy during this pregnancy for mood change?
☐ no ☐ yes → please indicate for what general difficulties: _____

Other than your current pregnancy, have you given birth to other babies previously? ☐ no ☐ yes

If yes,

Did you experience any medical complications during any previous pregnancies?	☐ yes ☐ no
Did you ever experience extreme positive mood during any previous pregnancies?	☐ yes ☐ no
Did you ever experience extreme positive mood within the first two weeks following the deliveries of your previously born children?	☐ yes ☐ no
Did you experience any type of negative mood change during any previous pregnancies?	☐ yes ☐ no
Did you experience any type of negative mood change within the first two weeks following the deliveries of your previously born children?	
Other than your current pregnancy, has a medical doctor or mental health care professional ever told you that you were struggling with a mental health condition related to your pregnancy or the delivery of a child (the postpartum)?	☐ not applicable as this is my first child ☐ yes ☐ no If yes, please check which conditions they said you had

	☐ depression ☐ anxiety ☐ obsessions and compulsions ☐ bipolar disorder ☐ other → please specify:_____

FOR POSTPARTUM PARTICIPANTS ONLY

The following questions pertain to the birth of your most recent baby. That is, to the delivery of your most recent baby that has occurred in the past 12 months.

How many weeks old is your baby now? _____

What was the Expected Date of Delivery (dd/mm/yyyy): _____

What was the Actual Date of Delivery/ Birthday (dd/mm/yyyy): _____

Was this a multiple birth?

☐ no ☐ yes ☐ how many babies were born in this delivery? _____

Sex of infant(s): ☐ boy(s) ☐ girl(s) ☐ at least one boy and one girl ☐ other

What was your baby's weight at birth: ____ pounds _____ ounces or _____ grams
For multiple births please enter the weight of your heaviest and lightest babies only

How often did you take vitamins while you were pregnant with this baby?

☐ always ☐ most of the time ☐ sometimes ☐ never

My baby was delivered: ☐ in a hospital ☐ at home ☐ other (please specify): _____

My baby was delivered by a(n): ☐ family physician ☐ obstetrician ☐ midwife
☐ nurse ☐ other (please specify): _____

Was the pregnancy of your most recently born baby planned? ☐ yes ☐ no

Was the pregnancy of your most recently born baby unwanted? ☐ yes ☐ no

Did you experience any complications during or after delivery? ☐ yes ☐ no
If YES, please specify (check all that apply):
- ☐ premature contractions
- ☐ instrumental delivery (e.g., forceps)
- ☐ caesarean section
- ☐ induced labour
- ☐ given oxytocin
- ☐ postpartum bleeding
- ☐ other (please specify):_____

How are you currently feeding your infant? (Check all that apply)

☐ breastfeeding

☐ bottle feeding (formula)

☐ bottle feeding (breast-milk)

☐ water

☐ solids

Did you experience breastfeeding complications at any time? ☐ no ☐ yes
If you experienced breastfeeding complications, please briefly explain:
_____

Did you receive counselling services when you were pregnant with your most recent baby?:

☐ yes ☐ no

Have you received counselling services since delivering your most recent baby?:

☐ no ☐ yes please indicate for what general difficulties: _____

Other than with the baby you most recently delivered, have you given birth to other babies previously?

☐ no ☐ yes

If yes,

Did you experience any medical complications during any previous pregnancies?	☐ yes ☐ no
Did you ever experience extreme positive mood during any previous pregnancies?	☐ yes ☐ no
Did you ever experience extreme positive mood within the first two weeks following the deliveries of your previously born children?	☐ yes ☐ no
Did you experience any type of negative mood change during any previous pregnancies?	☐ yes ☐ no
Did you experience any type of negative mood change within the first two weeks following the deliveries of your previously born children?	
Other than your current pregnancy, has a medical doctor or mental health care professional ever told you that you were struggling with a mental health condition related to your pregnancy or the delivery of a child (the postpartum)?	☐ yes ☐ no If yes, please check which conditions they said you had ☐ depression ☐ anxiety ☐ obsessions and compulsions ☐ bipolar disorder ☐ other → please specify:_____

Appendix E

Questionnaire Battery

EDINBURGH POSTNATAL DEPRESSION SCALE [EPDS]

Instructions: We would like to know how you are feeling. Please check the answer that comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today.

Here is an example, already completed.

I have felt happy:	☐ Yes, all the time. ☐ Yes, most of the time. ☐ No, not very often. ☐ No, not at all.	This would mean, "I have felt happy most of the time" during the past week. Please complete the other questions in the same way.

In the Past 7 Days:

1. I have been able to laugh and see the funny side of things.	☐ – As much as I always could ☐ – Not quite so much now ☐ – Definitely not so much now ☐ – Not at all
2. I have looked forward with enjoyment to things.	☐ – As much as I ever did ☐ – Rather less than I used to ☐ – Definitely less than I used to ☐ – Hardly at all
3. I have blamed myself unnecessarily when things went wrong.	☐ – Yes, most of the time ☐ – Yes, some of the time ☐ – Not very often ☐ – No, never
4. I have been anxious or worried for no good reason.	☐ – No, not at all ☐ – Hardly ever ☐ – Yes, sometimes ☐ – Yes, very often
5. I have felt scared or panicky for no very good reason.	☐ – Yes, quite a lot ☐ – Yes, sometimes ☐ – No, not much ☐ – No, not at all
6. Things have been getting on top of me.	☐ – Yes, most of the time I haven't been able to cope at all ☐ – Yes, sometimes I haven't been coping as well as usual ☐ – No, most of the time I have coped quite well ☐ – No, I have been coping as well as ever
7. I have been so unhappy that I have had difficulty sleeping.	☐ – Yes, most of the time ☐ – Yes, sometimes ☐ – Not very often ☐ – No, not at all
8. I have felt sad or miserable.	☐ – Yes, most of the time ☐ – Yes, quite often ☐ – Not very often ☐ – No, not at all

9. I have been so unhappy that I have been crying.	☐ – Yes, most of the time ☐ – Yes, quite often ☐ – Only occasionally ☐ – No, never
10. The thought of harming myself has occurred to me.	☐ – Yes, quite often ☐ – Sometimes ☐ – Hardly ever ☐ – Never

HOSPITAL ANXIETY AND DEPRESSION SCALE – ANXIETY SUBSCALE [HADS-A]

Instructions: Please check the response that is closest to how you have been feeling in the past week. Don't take too long over you replies: your immediate answer is best.

1. I feel tense or 'wound up':	☐ – Not at all ☐ – From time to time, occasionally ☐ – A lot of the time ☐ – Most of the time
2. I get a sort of frightened feeling as if something awful is about to happen:	☐ – Not at all ☐ – A little, but it doesn't worry me ☐ – Yes, but not too badly ☐ – Very definitely and quite badly
3. Worrying thoughts go through my mind:	☐ – Only occasionally ☐ – From time to time, but not too often ☐ – A lot of the time ☐ – A great deal of the time
4. I can sit at ease and feel relaxed:	☐ – Definitely ☐ – Usually ☐ – Not often ☐ – Not at all
5. I get a sort of frightened feeling like 'butterflies' in the stomach:	☐ – Not at all ☐ – Occasionally ☐ – Quite often ☐ – Very often
6. I feel restless as if I have to be on the move:	☐ – Not at all ☐ – Not very much ☐ – Quite a lot ☐ – Very much indeed
7. I get sudden feelings of panic:	☐ – Not at all ☐ – Not very often ☐ – Quite often ☐ – Very often indeed

OBSESSIVE COMPULSIVE INVENTORY – REVISED [OCI-R]

Instructions: The following statements refer to experiences that many people have in their everyday lives. Using the scale below, please select the response that best describes HOW MUCH that experience has DISTRESSED or BOTHERED you during the PAST WEEK.

0 - Not at all
1 - A little
2 - Moderately
3 - A lot
4 - Extremely

1. I have saved up so many things that they get in the way.	0 1 2 3 4
2. I check things more often than necessary.	0 1 2 3 4
3. I get upset if objects are not arranged properly.	0 1 2 3 4
4. I feel compelled to count while I am doing things.	0 1 2 3 4
5. I find it difficult to touch an object when I know it has been touched by strangers or certain people.	0 1 2 3 4
6. I find it difficult to control my own thoughts.	0 1 2 3 4
7. I collect things I don't need.	0 1 2 3 4
8. I repeatedly check doors, windows, drawers, etc.	0 1 2 3 4
9. I get upset if others change the way I have arranged things.	0 1 2 3 4
10. I feel I have to repeat certain numbers.	0 1 2 3 4
11. I sometimes have to wash or clean myself simply because I feel contaminated.	0 1 2 3 4
12. I am upset by unpleasant thoughts that come into my mind against my will.	0 1 2 3 4
13. I avoid throwing things away because I am afraid I might need them later.	0 1 2 3 4
14. I repeatedly check gas and water taps and light switches after turning them off.	0 1 2 3 4
15. I need things to be arranged in a particular order.	0 1 2 3 4
16. I feel that there are good and bad numbers.	0 1 2 3 4
17. I wash my hands more often and longer than necessary	0 1 2 3 4
18. I frequently get nasty thoughts and have difficulty in getting rid of them.	0 1 2 3 4

THE ALTMAN SELF-RATING MANIA SCALE [ASRMS]

Instructions: For the next set of questions please carefully read each available option and choose the statement in each question group that best describes the way you have been feeling FOR THE PAST WEEK.

Please note: The word "occasionally" when used here means once or twice; "often" means several times or more and "frequently" means most of the time.

1. Mood
   - ☐ I do not feel happier or more cheerful than usual.
   - ☐ I occasionally feel happier or more cheerful than usual.
   - ☐ I often feel happier or more cheerful than usual.
   - ☐ I feel happier or more cheerful than usual most of the time.
   - ☐ I feel happier or more cheerful than usual all of the time.

2. Self-Confidence
   - ☐ I do not feel more self-confident than usual.
   - ☐ I occasionally feel more self-confident than usual.
   - ☐ I often feel more self-confident than usual.
   - ☐ I feel more self-confident than usual, most of the time.
   - ☐ I feel extremely self-confident all of the time.

3. Sleep Patterns
   - ☐ I do not need less sleep than usual.
   - ☐ I occasionally need less sleep than usual.
   - ☐ I often need less sleep than usual.
   - ☐ I frequently need less sleep than usual.
   - ☐ I can go all day and night without any sleep and still not feel tired.

4. Speech
   - ☐ I do not talk more than usual.
   - ☐ I occasionally talk more than usual.
   - ☐ I often talk more than usual.
   - ☐ I frequently talk more than usual.
   - ☐ I talk constantly and cannot be interrupted.

5. Activity Level
   - ☐ I have not been more active (either socially, sexually, at work, home or school) than usual.
   - ☐ I have occasionally been more active than usual.
   - ☐ I have often been more active than usual.
   - ☐ I have frequently been more active than usual.
   - ☐ I am constantly active or on the go all the time.

THE PERCEIVED STRESS SCALE [PSS]

Instructions: The questions in this scale ask you about your feelings and thoughts during THE PAST WEEK. In each case, you will be asked to indicate HOW OFTEN you felt or thought a certain way [using the scale below].

0 - Never
1 - Almost never
2 - Sometimes
3 - Fairly often
4 - Very often

1. In the past week, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the past week, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the past week, how often have you felt nervous and stressed?	0	1	2	3	4
4. In the past week, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the past week, how often have you felt that things were going your way?	0	1	2	3	4
6. In the past week, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the past week, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the past week, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the past week, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
10. In the past week, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

THE BRIEF RESILIENCE SCALE [BRS]

Instructions: We would like to know how you are feeling. Please check the answer that comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today.

1 - Strongly disagree
2 - Disagree
3 - Neutral
4 - Agree
5 - Strongly agree

1. I tend to bounce back quickly after hard times.	1 2 3 4 5
2. I have a hard time making it through stressful events.	5 4 3 2 1
3. It does not take me long to recover from a stressful event.	1 2 3 4 5
4. It is hard for me to snap back when something bad happens.	5 4 3 2 1
5. I usually come through difficult times with little trouble.	1 2 3 4 5
6. I tend to take a long time to get over set-backs in my life.	5 4 3 2 1

THE POSTPARTUM BONDING QUESTIONNAIRE [PBQ]

Instructions: Please indicate how often the following are true for you. There are no 'right' or 'wrong' answers. Choose the answer which seems right in your recent experience.

	Always	Very Often	Quite Often	Some-times	Rarely	Never
1. I feel close to my baby						
2. I wish the old days when I had no baby would come back						
3. I feel distant from my baby						
4. I love to cuddle my baby						
5. I regret having this baby						
6. The baby does not seem to be mine						
7. My baby winds me up						
8. I love my baby to bits						
9. I feel happy when my baby smiles or laughs						
10. My baby irritates me						
11. I enjoy playing with my baby						
12. My baby cries too much						
13. I feel trapped as a mother						
14. I feel angry with my baby						
15. I resent my baby						
16. My baby is the most beautiful baby in the world						
17. I wish my baby would somehow go away						
18. My baby makes me feel anxious						
19. I am afraid of my baby						
20. My baby annoys me						
21. I feel confident when caring for my baby						
22. I feel the only solution is for someone else to look after my baby						
23. My baby is easily comforted						

THE WORLD HEALTH ORGANIZATION QUALITY OF LIFE SCALE-BREF [WHOQOL]

Instructions: This assessment asks how you feel about your quality of life, health, or other areas of your life. Please answer all the questions. If you are unsure about which response to give to a question, please choose the one that appears most appropriate. This can often be your first response. Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life in the LAST WEEK.

For example, thinking about the last week, a question might ask:

Do you get the kind of support from others that you need?

You should check the box that best fits how much support you got from others over the last week. So you would check the "a great deal" box if you got a great deal of support from others as follows.

Example A. Do you get the kind of support from others that you need?

Not at all	Not much	Moderately	A great deal	Completely
☐	☐	☐	X	☐

Example B. You would check the "not at all" box if you did not get any of the support that you needed from others in the last week.

Not at all	Not much	Moderately	A great deal	Completely
X	☐	☐	☐	☐

Please begin here:

Considering your life in the past week:

	Very Poor	Poor	Neither poor nor good	Good	Very good
1. How would you rate your quality of life?	☐	☐	☐	☐	☐

	Very Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2. How satisfied are you with your health?	☐	☐	☐	☐	☐

The following questions ask about **how much** you have experienced certain things in the last week.

	Not at all	A little	A moderate amount	Very much	An extreme amount
3. To what extent do you feel that physical pain prevents you from doing what you need to do?	☐	☐	☐	☐	☐
4. How much do you need any medical treatment to function in your daily life?	☐	☐	☐	☐	☐
5. How much do you enjoy life?	☐	☐	☐	☐	☐
6. To what extent do you feel your life to be meaningful?	☐	☐	☐	☐	☐

The following questions ask about how much you have experienced certain things in the last week.

	Not at all	A little	A moderate amount	Very much	Extremely

7. How well are you able to concentrate?	☐	☐	☐	☐	☐
8. How safe do you feel in your daily life?	☐	☐	☐	☐	☐
9. How healthy is your physical environment?	☐	☐	☐	☐	☐

The following questions ask about **how completely** you experience or were able to do certain things in the last week.

	Not at all	A little	Moderately	Mostly	Completely
10. Do you have enough energy for everyday life?	☐	☐	☐	☐	☐
11. Are you able to accept your bodily appearance?	☐	☐	☐	☐	☐
12. Have you enough money to meet your needs?	☐	☐	☐	☐	☐
13. How available to you is the information that you need in your day-to-day life?	☐	☐	☐	☐	☐
14. To what extent do you have the opportunity for leisure activities?	☐	☐	☐	☐	☐

	Very poor	Poor	Neither poor nor good	Good	Very good
15. How well are you able to get around?	☐	☐	☐	☐	☐

The following questions ask you to say **how good or satisfied** you have felt about various aspects of your life over the last week.

	Very dissatisfied	dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16. How satisfied are you with your sleep?	☐	☐	☐	☐	☐
17. How satisfied are you with your ability to perform your daily living activities?	☐	☐	☐	☐	☐
18. How satisfied are you with your capacity for work?	☐	☐	☐	☐	☐
19. How satisfied are you with yourself?	☐	☐	☐	☐	☐
20. How satisfied are you with your personal relationships?	☐	☐	☐	☐	☐
21. How satisfied are you with your sex life?	☐	☐	☐	☐	☐
22. How satisfied are you with the support you get from your friends?	☐	☐	☐	☐	☐
23. How satisfied are you with the conditions of your living place?	☐	☐	☐	☐	☐
24. How satisfied are you with your access to health services?	☐	☐	☐	☐	☐
25. How satisfied are you with your transport?	☐	☐	☐	☐	☐

	Never	Seldom	Quite often	Very often	Always
26. How often do you have negative feelings such as blue mood, despair, anxiety, depression?	☐	☐	☐	☐	☐

THE FIVE-FACET MINDFULNESS QUESTIONNAIRE [FFMQ].

Instructions: For each of the following statements, please check the option [number] that best describes your own opinion of what is true for you. For each question, there are two rows [columns] to allow you to respond to each question twice. Once to indicate what is generally true for you, and once to indicate what is true for you considering the past week only.

1 - never or very rarely true
2 - rarely true
3 - sometimes true
4 - often true
5 - very often or always true

	Considering your life generally [trait]	Considering the past week only [state]
1. When I'm walking, I deliberately notice the sensations of my body moving.	1 2 3 4 5	1 2 3 4 5
2. I'm good at finding words to describe my feelings.	1 2 3 4 5	1 2 3 4 5
3. I criticize myself for having irrational or inappropriate emotions.	1 2 3 4 5	1 2 3 4 5
4. I perceive my feelings and emotions without having to react to them.	1 2 3 4 5	1 2 3 4 5
5. When I do things, my mind wanders off and I'm easily distracted.	1 2 3 4 5	1 2 3 4 5
6. When I take a shower or bath, I stay alert to the sensations of water on my body.	1 2 3 4 5	1 2 3 4 5
7. I can easily put my beliefs, opinions, and expectations into words.	1 2 3 4 5	1 2 3 4 5
8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.	1 2 3 4 5	1 2 3 4 5
9. I watch my feelings without getting lost in them.	1 2 3 4 5	1 2 3 4 5
10. I tell myself I shouldn't be feeling the way I'm feeling.	1 2 3 4 5	1 2 3 4 5
11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.	1 2 3 4 5	1 2 3 4 5
12. It's hard for me to find the words to describe what I'm thinking.	1 2 3 4 5	1 2 3 4 5
13. I am easily distracted.	1 2 3 4 5	1 2 3 4 5
14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	1 2 3 4 5	1 2 3 4 5
15. I pay attention to sensations, such as the wind in my hair or sun on my face.	1 2 3 4 5	1 2 3 4 5
16. I have trouble thinking of the right words to express how I feel about things	1 2 3 4 5	1 2 3 4 5
17. I make judgments about whether my thoughts are good or bad.	1 2 3 4 5	1 2 3 4 5
18. I find it difficult to stay focused on what's happening in the present.	1 2 3 4 5	1 2 3 4 5
19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.	1 2 3 4 5	1 2 3 4 5

20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.	1 2 3 4 5	1 2 3 4 5
21. In difficult situations, I can pause without immediately reacting.	1 2 3 4 5	1 2 3 4 5
22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.	1 2 3 4 5	1 2 3 4 5
23. It seems I am "running on automatic" without much awareness of what I'm doing.	1 2 3 4 5	1 2 3 4 5
24. When I have distressing thoughts or images, I feel calm soon after.	1 2 3 4 5	1 2 3 4 5
25. I tell myself that I shouldn't be thinking the way I'm thinking.	1 2 3 4 5	1 2 3 4 5
26. I notice the smells and aromas of things.	1 2 3 4 5	1 2 3 4 5
27. Even when I'm feeling terribly upset, I can find a way to put it into words.	1 2 3 4 5	1 2 3 4 5
28. I rush through activities without being really attentive to them.	1 2 3 4 5	1 2 3 4 5
29. When I have distressing thoughts or images I am able just to notice them without reacting.	1 2 3 4 5	1 2 3 4 5
30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.	1 2 3 4 5	1 2 3 4 5
31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.	1 2 3 4 5	1 2 3 4 5
32. My natural tendency is to put my experiences into words.	1 2 3 4 5	1 2 3 4 5
33. When I have distressing thoughts or images, I just notice them and let them go.	1 2 3 4 5	1 2 3 4 5
34. I do jobs or tasks automatically without being aware of what I'm doing.	1 2 3 4 5	1 2 3 4 5
35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.	1 2 3 4 5	1 2 3 4 5
36. I pay attention to how my emotions affect my thoughts and behavior.	1 2 3 4 5	1 2 3 4 5
37. I can usually describe how I feel at the moment in considerable detail.	1 2 3 4 5	1 2 3 4 5
38. I find myself doing things without paying attention.	1 2 3 4 5	1 2 3 4 5
39. I disapprove of myself when I have irrational ideas.	1 2 3 4 5	1 2 3 4 5

THE MULTIDIMENSIONAL SCALE OF PERCEIVED SOCIAL SUPPORT [MSPSS]

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement considering the past week.

1 = Very Strongly Disagree
2 = Strongly Disagree
3 = Mildly Disagree
4 = Neutral
5 = Mildly Agree
6 = Strongly Agree
7 = Very Strongly Agree

1. There is a special person who is around when I am in need.	1 2 3 4 5 6 7
2. There is a special person with whom I can share my joys and sorrows.	1 2 3 4 5 6 7
3. My family really tries to help me.	1 2 3 4 5 6 7
4. I get the emotional help and support I need from my family.	1 2 3 4 5 6 7
5. I have a special person who is a real source of comfort to me.	1 2 3 4 5 6 7
6. My friends really try to help me.	1 2 3 4 5 6 7
7. I can count on my friends when things go wrong.	1 2 3 4 5 6 7
8. I can talk about my problems with my family.	1 2 3 4 5 6 7
9. I have friends with whom I can share my joys and sorrows.	1 2 3 4 5 6 7
10. There is a special person in my life who cares about my feelings.	1 2 3 4 5 6 7
11. My family is willing to help me make decisions.	1 2 3 4 5 6 7
12. I can talk about my problems with my friends.	1 2 3 4 5 6 7

PERSONALITY RESEARCH FORM - INFREQUENCY SCALE [PRF-IN]

Instructions: Read each statement and decide whether or not it describes you.
If you agree with the statement or decide that it does describe you, answer TRUE. If you disagree with a statement or feel that it is not descriptive of you, answer FALSE. Answer every item either true or false, even if you are not completely sure of your answer.

1. I could easily count from one to twenty-five	☐ True	☐ False
2. I have never talked to anyone by telephone	☐ True	☐ False
3. I make all my own clothes and shoes	☐ True	☐ False
4. Things with sugar in them usually taste sweet to me	☐ True	☐ False
5. I try to get at least some sleep every night	☐ True	☐ False
6. I have attended school at some time during my life	☐ True	☐ False
7. I have never had any hair on my head	☐ True	☐ False
8. I have never ridden in an automobile	☐ True	☐ False

PERSONALITY RESEARCH FORM - DESIRABILITY SCALE (PRF-D)

Instructions: Read each statement and decide whether or not it describes you.
If you agree with the statement or decide that it does describe you, answer TRUE. If you disagree with a statement or feel that it is not descriptive of you, answer FALSE. Answer every item either true or false, even if you are not completely sure of your answer.

1. I am never able to do things as well as I should	☐ True	☐ False
2. I believe people tell lies any time it is to their advantage	☐ True	☐ False
3. I would be willing to do something a little unfair to get something that was important to me	☐ True	☐ False
4. I did many bad things as a child	☐ True	☐ False
5. I often question whether life is worthwhile	☐ True	☐ False
6. My daily life includes many activities I dislike	☐ True	☐ False
7. Many things make me feel uneasy	☐ True	☐ False
8. I find it very difficult to concentrate	☐ True	☐ False

Appendix F

Follow-Up Covering Letters and Participant Consent Text (Study 2)

Dear Potential Participant,

Thank you agreeing to be contacted for the follow-up portion of the research study entitled "The Maternal Wellness Project." As was explained to you before, the Maternal Wellness Project is a study currently being conducted to investigate the well-being of new and expectant mothers. Should you choose to participate, the information you provide will be used to better understand some of the factors that are influencing maternal wellbeing. This information is important as it can help inform service providers and is valuable information for the development of services for pregnant and postpartum women.

To participate in the follow-up component of this study you must be a new mother who has given birth to a baby in the past year. As well, if you have already participated in the Mommy Matters Study at Lakehead University in Thunder Bay, Ontario you should not participate in this study.

If you choose to participate you will be asked to complete an electronic survey. The survey is comprised of several questionnaires that ask you questions about your mood, relationships, and health. All the information that you provide will be anonymous and can be completed on any computer for your convenience.

There are no known physical risks associated with participating in the current study. However, some of the material in the surveys ask questions on sensitive subject matter that might result in some minor psychological discomfort for some people.

It is anticipated that the survey will take you 40 minutes to 1 hour to complete. Participation is completely voluntary and your survey information is anonymous. No identifying information will be collected, and you are free to withdraw from the study or to leave questions blank for any reason. However, due to the anonymous nature of the survey, responses cannot be withdrawn after they have been submitted. Answering all of the items without skipping any would be greatly appreciated and useful for the current study.

Please note that the online survey tool used in the study, SurveyMonkey®, is hosted by a server located in the USA. The US Patriot Act permits U.S. law enforcement officials, for the purpose of anti-terrorism investigation, to seek a court order that allows access to the personal records of any person without the person's knowledge. In view of this we cannot absolutely guarantee the full confidentiality and anonymity of your data. With your consent to participate in this study, you acknowledge this.

Please note that as an alternative to SurveyMonkey® you can complete paper-and-pencil assessment, which are not subject to the US Patriot Act. If you wish to complete a paper-and-

pencil version of the questionnaire, please email the researchers at [enter study email address here].

Completed paper surveys will be kept in secure storage at Lakehead University for five years and only the researchers and Dr. Mazmanian will have access to the data. Furthermore, it is the researchers' intention to publish and present the outcomes from the study. Should you be interested in the results once the study is complete, at the end of the survey you will be provided with instructions on how to contact the research team.

Finally, to show our gratitude, once you complete the survey you can once again enter into a random draw to win one of four $50 (CAD) Visa gift cards. Instructions on how to enter into the draw will also be

presented to you at the end of the survey. Contact information that you provide for the draw will not be in any way attached to the responses you provide in the survey.

On behalf of the Maternal Wellness team, thank you for your interest and participation. It really makes a difference!

Warm regards.

Carley Pope, M.A.

Clinical Psychology Ph.D. Student Investigator

{enter email address for study contact here}

{enter phone number for study contact here}

Dwight Mazmanian, Ph.D., C. Psych.

Principal Investigator

Department of Psychology, Lakehead University

dmazmani@lakeheadu.ca

807-343-8257

The Maternal Wellness Project has been approved by the Lakehead University Research Ethics Board. If you have any questions related to the ethics of the research and would like to speak to someone outside of the research team, please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca

If answering any of the questions raise any issues about mental health concerns that you would like to discuss, you may contact the Ontario Mental Health Helpline at 1-866-531-2600 or the Crisis Response Program through the Canadian Mental Health Association at 807-346-8282.

By clicking “I Agree to Participate” I am indicating that:

• I understand the information provided and agree to participate in the study.

• I understand that my participation is voluntary and I may choose not to answer any question.

• I understand I can withdraw from the study at any time before I submit my responses.

• I understand that the data I provide will be securely stored at Lakehead University for five years, and that I can email the researcher to receive a summary of the findings once they are available.

• I understand that my identity will remain anonymous in any publication or public presentation resulting from this research.

Appendix G

Follow-Up Debriefing Form Text (Study 2)

Thank you for your participation in this research project on maternal health and wellness. We hope that this study will help provide information regarding factors that influence maternal well-being as well as factors that enhance women's ability to cope with the many stressors that arise during pregnancy and the postpartum period. This information can help inform service providers and is valuable information for the development of services for pregnant and postpartum women.

Information about study results
A summary of the results can be made available to you by email once the study has been completed. If you are interested in receiving these research results, please email the researcher at [insert study email address] with the subject heading "Results Summary Request". We will email you a copy of the Results Summary once it is made publicly available.

Visa Gift Card Draw and Permission for Follow-Up
If you would like to be entered into the draw to win one of four $50 (CAD) Visa gift cards please follow the link below.
1 click the following link and provide your email address [insert SurveyMonkey weblink]

2 or provide your contact information by email at:

[insert study email address]
[please use the Subject Heading "Draw Entry" when you make an email request to be entered into the draw].
If you do not wish to enter the draw you can simply close this browser after you have reviewed this page. If you have specific questions about the survey you may contact the Student Investigator, Carley Pope, M.A. [insert study email address and phone number] or the Principle Investigator Dwight Mazmanian, Ph.D., C. Psych. [dmazmani@lakeheadu.ca 807-343-8257].

If completing this survey has raised any issues about mental health concerns that you would like to discuss, you may contact the Ontario Mental Health Helpline at 1-866-531-2600 or the Crisis Response Program through the Canadian Mental Health Association at 807-346-8282. If you are interested in learning more about Maternal Wellbeing, please visit the following websites:

• Health Canada "Healthy Pregnancy"
[insert web link]

• Public Health Agency of Canada "The Sensible Guide to a Healthy Pregnancy"
[insert web link]

• The Queen's Perinatal Research Unit "The Mother's Program"
[insert web link]

As well, we invite you to visit the following YouTube video if you would like to take some time to listen to soothing music: [insert web link]

With sincere thanks,
The Maternal Wellness Team

Appendix H

Follow-up Health Information Form (Study 2)

Pregnant Participant Demographic and Health History Information Form for Postpartum Follow-Up

What is your month and year of birth?: _____(mm) _____ (yyyy)
What province/state and country do you currently live in?: _____(prov/state) _____(country)
What is your Eye Colour? Please choose the one that most closely describes your eye colour even if it does not match perfectly. ☐ brown ☐ blue ☐ green ☐ gray ☐ amber
What are the last 3 digits of your postal code or zip code: _____
Are you currently employed? ☐ yes ☐ no ☐ on maternity leave ☐ other: _____
Are you currently taking any prescription medication?: ☐ Yes ☐ No Please list the prescription medication you are currently taking (if applicable): _____ _____ _____
Are you currently taking any Non-prescription medication?: ☐ Yes ☐ No Please list the non-prescription medication you are currently taking (if applicable): _____ _____
Are you currently receiving any counselling or psychotherapy? ☐ no ☐ yes → please indicate for what general difficulties: _____

The following questions pertain to the birth of your most recent baby.

How many weeks old is your baby now? _____
What was the Expected Date of Delivery (dd/mm/yyyy): _____
What was the Actual Date of Delivery/ Birthday (dd/mm/yyyy): _____
Was this a multiple birth? ☐ no ☐ yes how many babies were born in this delivery? _____
Sex of infant(s): ☐ boy(s) ☐ girl(s) ☐ at least one boy and one girl ☐ other
What was your baby's weight at birth: ____ pounds _____ ounces or _____ grams For multiple births please enter the weight of your heaviest and lightest babies only
How often did you take vitamins while you were pregnant with this baby? ☐ always ☐ most of the time ☐ sometimes ☐ never
My baby was delivered: ☐ in a hospital ☐ at home ☐ other (please specify): _____
My baby was delivered by a(an): ☐ family physician ☐ obstetrician ☐ midwife ☐ nurse ☐ other (please specify): _____

Did you experience any complications during or after delivery? ☐ yes ☐ no

If YES, please specify (check all that apply):

- ☐ premature contractions
- ☐ instrumental delivery (e.g., forceps)
- ☐ caesarean section
- ☐ induced labour
- ☐ given oxytocin
- ☐ postpartum bleeding
- ☐ other (please specify):_____

Are you living with the baby you were most recently pregnant with (when you completed the questionnaires previously for the maternal wellness study)? ☐ yes ☐ no

How are you currently feeding your infant? (Check all that apply)

- ☐ breastfeeding
- ☐ bottle feeding (formula)
- ☐ bottle feeding (breast-milk)
- ☐ water
- ☐ solids

Did you experience breastfeeding complications at any time? ☐ no ☐ yes

If you experienced breastfeeding complications, please briefly explain:

_____

Did you receive counselling services *when you were pregnant* with your most recent baby?:

☐ yes ☐ no

Have you received counselling services *since delivering* your most recent baby?:

☐ no ☐ yes ☐ please indicate for what general difficulties: _____

Have you ever participated in the following types of counselling? (Check all that apply)

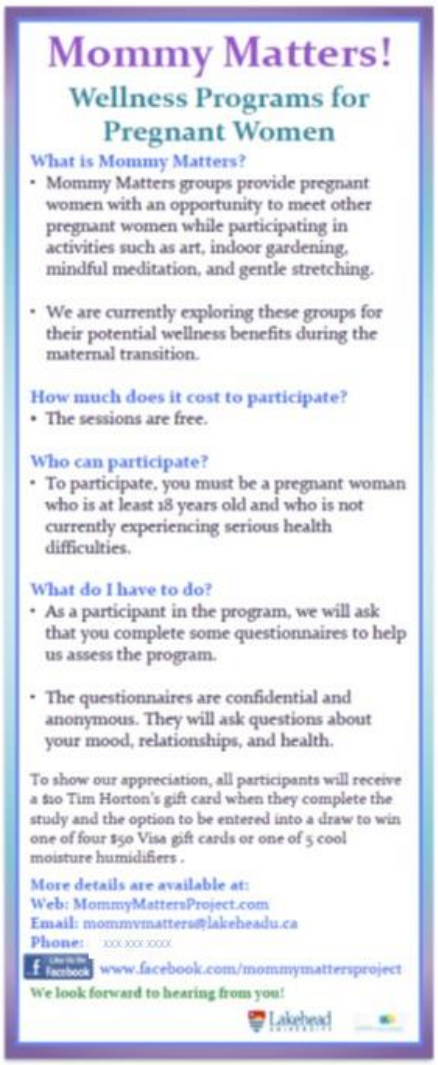
- ☐ Cognitive Behavioural Therapy
- ☐ Dialectical Behavior Therapy
- ☐ Mindfulness-Based Therapy (e.g., MBCT, MBSR)
- ☐ Individual therapy
- ☐ Group therapy
- ☐ Couples/ Family therapy
- ☐ Other therapy: _____

Appendix I

Examples of Advertising Materials (Study 3)

Poster

Study 3 Pamphlet Advertisement



Mommy Matters!

Wellness Programs for Pregnant Women

What is Mommy Matters?

- Mommy Matters groups provide pregnant women with an opportunity to meet other pregnant women while participating in activities such as art, indoor gardening, mindful meditation, and gentle stretching.
- We are currently exploring these groups for their potential wellness benefits during the maternal transition.

How much does it cost to participate?

- The sessions are free.

Who can participate?

- To participate, you must be a pregnant woman who is at least 18 years old and who is not currently experiencing serious health difficulties.

What do I have to do?

- As a participant in the program, we will ask that you complete some questionnaires to help us assess the program.
- The questionnaires are confidential and anonymous. They will ask questions about your mood, relationships, and health.

To show our appreciation, all participants will receive a $10 Tim Horton's gift card when they complete the study and the option to be entered into a draw to win one of four $50 Visa gift cards or one of 5 cool moisture humidifiers .

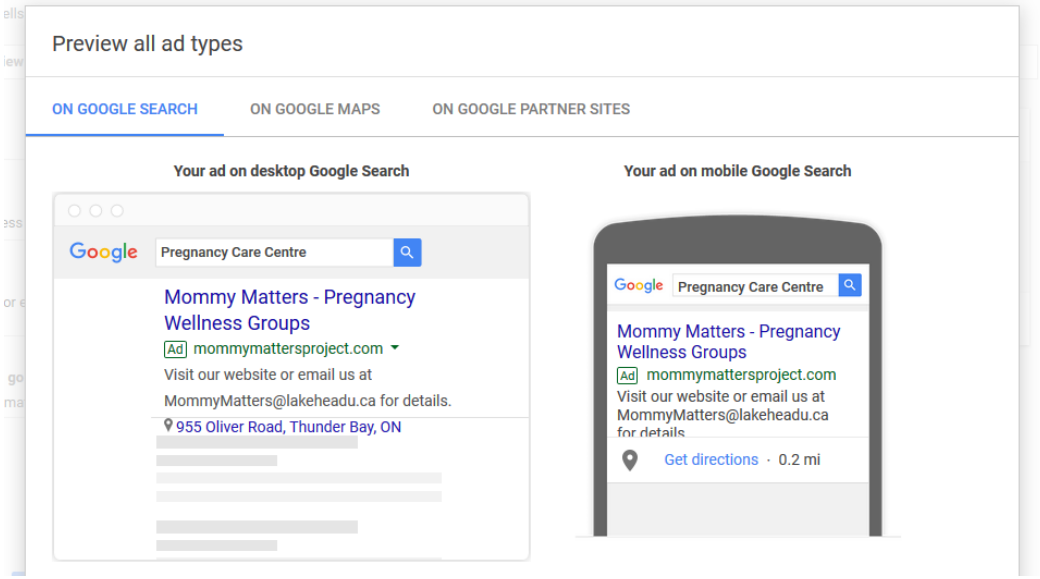
More details are available at:
Web: MommyMattersProject.com
Email: mommymatters@lakeheadu.ca
Phone: xxx xxx xxxx
www.facebook.com/mommymattersproject

We look forward to hearing from you!

Lakehead

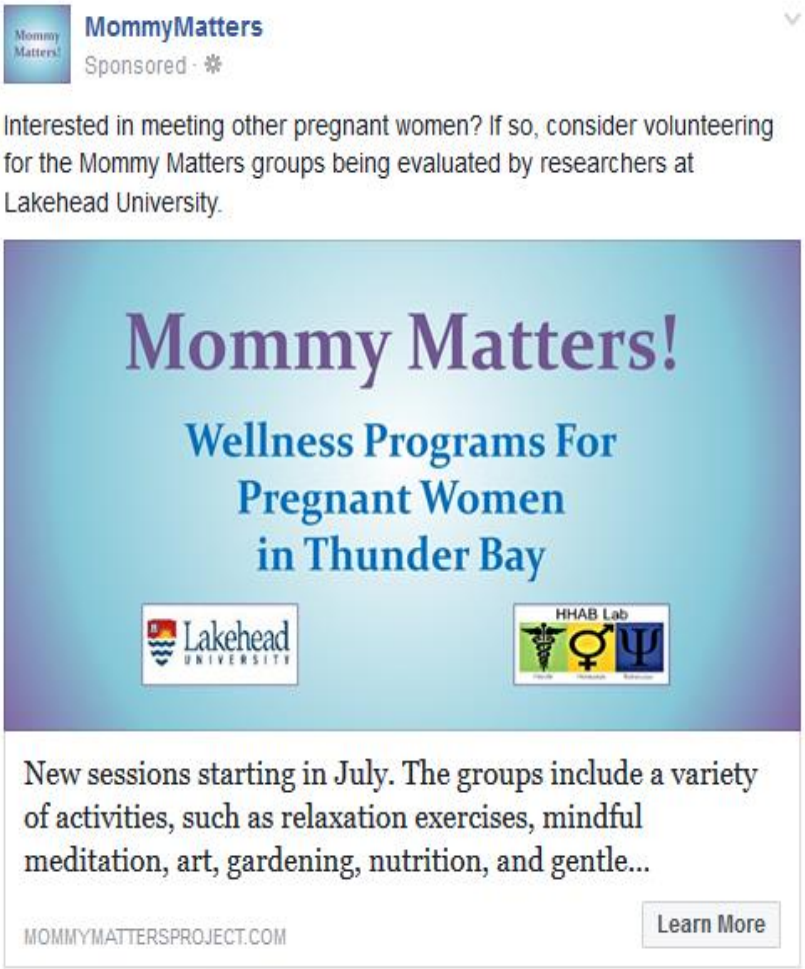
Study 3 Newspaper Advertisement

Study 3 Google Advertisement



Study 3 Billboard Advertisement

Study 3 Social Media Advertisements



Study 3 Website Text

Website Text

Website address: MommyMattersProject.com
Website text:
HOME PAGE
Thank you for your interest in the Mommy Matters Project!
This is a free program for pregnant women residing in Thunder Bay, Ontario.
The program is currently being studied by researchers at Lakehead University and the study is supported through research grants awarded by Women's College Hospital, Lakehead University, and the Canadian Psychological Association.
Please click on the 'About' tab for more information about eligibility and further details about the program. Should you have any questions or if you are interested in the program, please contact us at MommyMatters@lakeheadu.ca or XXX-XXX-XXXX

Thank you for your interest and we look forward to hearing from you!

ABOUT
What is Mommy Matters?
For pregnant women who are interested in meeting other women at a similar stage in life, the Mommy Matters groups provide an opportunity to meet other pregnant women while participating in activities such as art, indoor gardening, mindful meditation, and gentle stretching.
We are currently exploring these groups for their potential wellness benefits during the maternal transition.
How much does it cost to participate?
The groups are free.
Who can participate?
To participate, you must be a pregnant woman who is at least 18 years old and who is not currently experiencing serious health difficulties.
What do the Mommy Matters programs consist of?
Participants in the Mommy Matters group programs will meet once a week for four weeks. Each meeting will consist of a different activity and participants will have an opportunity to engage in the activity and discussion.
What do I have to do?
As a participant in the program we will ask that you complete some questionnaires to help us assess the program.

The questionnaires are confidential and anonymous. They will ask questions about your mood, relationships, and health.
Where are the groups held?
The groups are held either at Insight on Memorial (594 Memorial Avenue) or at Lakehead University. The specific location details will be available closer to the session start date.
Who can I contact for more information?

- If you would like to participate or are interested in obtaining more information, you are welcome to contact Carley at: MommyMatters@lakeheadu.ca or XXX-XXX-XXXX

To show our appreciation, all participants will have the option to receive a $10 Tim Horton's gift card when they complete the study. As well, each time you come out to a group meeting or complete a survey you will have the option to enter a draw to win one of four $50 Visa gift cards. Participants will also be invited to attend a participant appreciation day during the postpartum period.

Please contact us for more details.

Email: MommyMatters@lakeheadu.ca or XXX-XXX-XXXX

We look forward to hearing from you!

Dwight Mazmanian, Ph. D., C. Psych.
Principle Investigator, Lakehead University

Carley Pope, M.A.
Program Facilitator and Graduate Student Investigator, Lakehead University

Register

Thank you for your interest in the Mommy Matters program! Please complete the registration information below and we will contact you with upcoming session dates.

Name(required)
Email(required)
Please provide your availability here (i.e., Monday through Sunday; Morning/Afternoon/Evening)
How many weeks pregnant are you?
Phone number or additional contact information:
What sessions are you most interested in participating in (enter month)? (List upcoming sessions)

Upcoming session dates

The current session started (enter date).
Next scheduled sessions are planned to start (enter dates). Registration is open.
Each group consists of 4 sessions, all held on the same day of the week and time as the start date. Please click here or on the 'registration' link above or email us at mommymatters@lakeheadu.ca if you are interested in the scheduled or future sessions. As well, if the scheduled dates conflict with your schedule please register with your availability as additional sessions are being organized.

Study 3 Letter to Service Providers

Lakehead UNIVERSITY

Department of Psychology
t: (807) 343-8527
dwight.mazmanian@lakeheadu.ca

Re: Mommy Matters - Free Wellness Programs for Expectant Mothers 2018

Dear Service Provider.

We are writing to you to let you know about a study we are conducting that may be of interest to your pregnant clients or patients. We are currently conducting a study investigating group programming intended to promote the wellness of expectant mothers. The programs are offered to pregnant women free of charge and are designed to offer expectant mothers a time and place to meet and engage in enjoyable activities with other expectant mothers.

Each group will be comprised of a different set of activities comprised of topics that may include: art, nutrition, mindful meditation, relaxation exercises, indoor gardening, or gentle stretching. Participants in the Mommy Matters group programs will meet once a week for four weeks and each session will last 1.5 hours. Participants will also be asked to complete questionnaires during and after the program.

The groups are currently running. New session start dates are frequently being added and we expect to run several groups through to April 2018.

Main eligibility:

- Pregnant and at least 18 years of age or older
- no active severe mental health condition (e.g., psychosis or at risk for self-harm)
- no active severe physical health condition (e.g., at high risk for pre-term delivery)

Please provide your interested clients or patients with our contact information so they can learn more about this project and decide if the Mommy Matters Program is of interest to them:

MommyMattersProject.com

mommymatters@lakeheadu.ca or XXX-XXX-XXXX

On behalf of the Mommy Matters team, thank you for your time, interest, and support.

Warm regards.

Dwight Mazmanian, Ph. D., C. Psych.
Principle Investigator

Carley Pope, M.A.
Study Coordinator

Health, Hormones, and Behaviour Lab, Department of Psychology, Lakehead University
955 Oliver Road, Thunder Bay, Ontario, P7B 5E1

Appendix J

Covering Letters and Participant Consent Text (Study 3)

Project Title: Mommy Matters: Evaluating the Benefits of Wellness Programming for Expectant Mothers

Principal Investigators:
Dwight Mazmanian, Ph.D., C. Psych., Lakehead University, Thunder Bay, Ontario
Email: dmazmani@lakeheadu.ca Tel: (807) 343-8257

Ph.D. Student Investigator and Study Coordinator:
Carley Pope, M.A., Lakehead University, Thunder Bay, Ontario
Email: MommyMatters@lakeheadu.ca Tel: XXX-XXX-XXXX

Lakehead University's Research Ethics Board has approved the proposal for this research. If you have any ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Research Ethics Board at 1-807-343-8283.

If you experience a mental health crisis you can contact your family physician or Thunder Bay Crisis Response Services, telephone 1-807-346-8282, where a counsellor will be available to speak with you immediately or you can call 911.

Dear Potential Participant. Thank you for your interest in the Mommy Matters Study.

The Mommy Matters Study is designed for pregnant women interested in participating in group wellness programming. To be eligible, you should be:

- a pregnant woman, who is at least 18 years of age or older.
- not currently suffering from an active severe mental or physical health condition.
- not experiencing significant obstetric complications.

Before agreeing to participate in our study, it is important that you read and understand the following information outlining what this study involves. Once you understand what this study involves you may or may not decide to give informed consent to participate.

Purpose: Pregnancy and childbirth come with unique physical, social, environmental, and psychological changes that may affect some women's mental health or wellbeing. The purpose of the Mommy Matters study is to examine the effects of wellness programming on women's well-being during pregnancy and the postpartum period. Programming aimed at promoting maternal well-being is important as the transition to motherhood is often accompanied by many new and sometimes unexpected stressors. You are being asked to participate in this study to help us evaluate some wellness programming for expectant mothers.

Study Tasks and Procedures: Participants in the Mommy Matters Study will be randomly assigned (such as with a flip of a coin) to one of two types of groups.

Each group will be comprised of a different set of activities comprised of topics that may include:

- nutrition
- arts and crafts
- mindful meditation
- relaxation exercises
- gardening
- gentle stretching

No previous experience is necessary. Participants do not get to select what group they will participate in and are not told ahead of time what activities they are assigned to participate in. Please note that group materials should be kept out of reach of children.

To take part in this study:

- All participants will complete a series of pre-program survey questionnaires.
- Participants will then attend 4 consecutive weekly sessions for the group they have been assigned to.
- After completing the program and then again at 3 and 12 weeks postpartum, all participants will be asked to complete electronic questionnaires. After completing the electronic questionnaire, participants will have the option to enter into a draw to win one of four $50 gift cards. Participants will get one entry per set of questionnaires completed. The winners will be drawn at random once the study is completed.

Mommy Matters Programs:

- Participants in the Mommy Matters Program will take part in 4 weekly group sessions, each 1.5 hours in length.
- Sessions will incorporate group activities and group discussion.
- In addition, home practice exercises that may take up to 40 minutes to complete may be assigned. Participants may also be asked to keep a daily record of home practice.

Duration of study and number of visits: Depending on when during your pregnancy you enroll in the study, your participation could span over a period lasting up to 36 weeks. During this time, you will be asked to complete the following tasks:

- Initially, you will be asked to complete a brief telephone visit. During this call, we will ask if you meet study eligibility criteria (described on page 1) and can answer any questions you may have.
- Following this call (and if you agree to participate) you will be asked to complete an electronic questionnaire on your computer.
- Next you will be invited to attend 4 consecutive weekly group sessions, each session will be 1.5 hours in length. Sessions will incorporate group activities and group discussion. Groups will be comprised of approximately 5 members in addition to the facilitators.
- In addition, home practice exercises that may take up to 40 minutes to complete may be provided. Participants may also be asked to keep a daily record of home practice.

- After completing the final session and then again at 3 and 12 weeks postpartum, you will be asked to complete a set of electronic questionnaires. The questionnaires will take approximately 40 minutes to complete. After completing the electronic questionnaires, you will have the option to enter into a draw to win one of four $50 gift cards. You will get one entry per set of questionnaires completed and for each group session visit attended. The winners will be drawn at random.

Risks: There is no reason to believe that any harm will result from taking part in this study. However, we recommend that you first consult with your treating health care practitioner. As well, some of the material in the surveys ask questions on sensitive subject matter that might result in some minor psychological discomfort for some people.

Physical and Medical considerations: If you choose to participate in the Mommy Matters Program, please be aware of your physical limitations throughout the program. You know your body best! At any time during any activity feel free to refrain from engaging in any of the activities during the program that you feel may be strenuous or uncomfortable for you. As well, you may also choose to modify how you participate in an activity to ensure you are doing so in a way that feels safe and comfortable for you personally.

It is also important to note that the Mommy Matters staff are not responsible for your health care. Prior to engaging in any of the group activities that are part of the Mommy Matters programs, we strongly recommend that you review a copy of this letter of information with you treating health care practitioners. Should your health care practitioner require additional information about the study, they are welcome to contact us at XXX-XXX-XXXX. Should you have any questions or concerns of a medical nature that arise during your participation, please consult with your personal medical professional right away. Should you feel that such questions or concerns are in any way related to your participation in this study or may influence your continued participation, please also advise a study team member after you have consulted with your treating health care practitioner.

Benefits: Group participation may lead to better mental health and well-being. However, you may not experience any mental health or well-being benefit from participating in these groups.

Compensation: After completing the electronic questionnaires, participants will have the option to enter into a draw to win one of four $50 gift cards or one of 5 cool moisture humidifiers. Participants will get one entry per set of questionnaires completed and for each group session visit attended. The winners will be drawn at random. As well, after completing the study, participants will be invited to attend a participant appreciation day.

Confidentially: If you agree to participate in this study, the researchers will be the only individuals that will have direct access to the interview and questionnaire information you provide us, and they will be required to uphold confidentiality. However, there are some limitations to confidentiality:

Limitations to confidentiality:

- If a study team member (facilitator/researcher) is made aware that: 1) you are at risk of harm yourself or someone else; 2) a child or elderly individual is being abused or

neglected; or 3) another regulated health care practitioner has sexually abused a patient in some way, then the study team member will have to break confidentiality and report this information to the appropriate authority (the police or children's aid society for examples). In addition, study team members have a legal obligation to comply with any subpoena issued by a court of law.

- Please note that the online survey tool used in the study, SurveyMonkey®, is hosted by a server located in the USA. The US Patriot Act permits U.S. law enforcement officials, for the purpose of anti-terrorism investigation, to seek a court order that allows access to the personal records of any person without the person's knowledge. In view of this we cannot absolutely guarantee the full confidentiality and anonymity of your data. With your consent to participate in this study, you acknowledge this.
- Please note that as an alternative to SurveyMonkey® you can complete paper-and-pencil questionnaire that can be mailed to your home or completed at the study office at Lakehead University, which are not subject to the US Patriot Act. The hardcopy data that is collected from this study will be kept in a locked, secure place for five years following the completion of the study, at which time the information will be destroyed.
- In addition, during group sessions, participants may disclose personal information to the group that could be heard by other group members. However, each participant is expected to respect the privacy of other participants by not disclosing any personal information about another participant to individuals outside of the group. However, the group facilitators and research team members cannot guarantee the discretion of group members.

Anonymity will be maintained by the investigators and study staff throughout the study. The investigators intend on publishing the findings of this research. Your name will not be published in any reports stemming from this research. All data will be coded with a participant code, and no identifying information will be associated with your responses or study results in order to maintain confidentiality and anonymity. All forms and data will be stored on a secure computer at Lakehead University for at least five years for publication purposes. Only persons directly involved with the research will have access to the data, and they will be required to uphold confidentiality.

Participation: It is important that you understand that your participation in this study is completely voluntary. If you do decide to participate, you may decide at any time during the study that you want to leave the study without providing any reason or justification. Furthermore, at any point during the study you may decide to refuse to answer any question that you would prefer not to answer. However, we appreciate you completing all the questions. We also advise that you use your discretion if you choose to establish relationships with group members outside of group sessions.

Withdrawal: Participants may withdraw their consent to participate at any time during the study. There is no penalty for non-participation. As a participant, you may withdraw your participation from this study at any point during study; however, the data obtained from your participation up until the point of withdrawal will remain in the study. As well, the investigators may suggest alternative services and withdraw you from the group if at any point the

investigators believe that your participation in the group is harmful to you or is adversely affecting the experience of the other group members.

Expenses associated with participating in the study: All participants will be provided with free parking when attending any visit or group sessions pertaining to the study. Reimbursement for extraordinary costs, such as travel, may be provided to participants requiring assistance. Please discuss this with a study team member prior to your participation.

Questions: We have tried to provide extensive information regarding what this study entails. If you have any further questions or concerns regarding this study, please do not hesitate to contact us at any time. As well, if you are interested in receiving a summary of the study results please email us and one can be made available to you once the study is completed. Please note, however, that it might take 3-6 months from the time of your participation before the study is completed and the findings are available. [mommymatters@lakeheadu.ca or XXX-XXX-XXXX]

This research is supported through research grants awarded by the following agencies: Women's College Hospital, Lakehead University, and the Canadian Psychological Association.

Consent Form

My signature on this page indicates that:

- I understand the information provided in the letter of information for study called; "Mommy Matters: Evaluating the Benefits of Wellness Programming for Expectant Mothers". I had the opportunity to ask question about the study, which were answered to my satisfaction.
- I voluntarily agree to participate in the study.
- I understand I may choose not to answer any question and that I can withdraw from the study at any time. However, I understand that any information I provide before I withdraw from the study will not be withdrawn.
- I understand that the data I provide will be securely stored at Lakehead University for five years, and that I can email the researcher for a summary of findings once they are available.
- I understand that my identity will remain anonymous in any publication or public presentation resulting from this research.
- I understand that the Mommy Matters team members and researchers are not responsible for my health care.
- I acknowledge that it is recommended that I consult with my personal health care professionals prior to starting the group activities to ensure that my doctor has no concerns about my participation in the Mommy Matters program related to my mental of physical health.
- I understand that it is my responsibility to be aware of my physical limitations and that I may refrain from engaging in any of the activities during the program. As well, I know that I can modify how I participate in the activities that are part of the Mommy Matters

program to ensure I am participating in a way that I feel is safe and comfortable for me personally.

- I understand that the study team will need to contact me for study related matters and grant the research team members permission to contact me through the following method(s):

If you consent to participate please provide the following information:

Your first name: _____
Your last name: _____
Your phone number: _____
Your email address: _____

Please provide the name and phone number for at least one emergency contact person, who you give us permission to call in the event of an emergency while you are participating in any study related activities.

Emergency contact name: _____
Relationship: _____
Phone number: _____

Appendix K

Interim and Final Debriefing Form Text (Study 3)

ELECTRONIC DEBRIEFING
(PRE-PROGRAM, POST-PROGRAM, AND 3-WEEK TIME POINT)

Thank you for completing the survey questionnaires. If you would like to be entered into the draw to win one of four $50 Visa gift cards please do one of the following:

1 click the following link and provide your email address [Insert Study website address]

2 or provide your contact information by email at:
[Insert Study Email Address]
[please use the Subject Heading "Draw Entry" when you make an email request to be entered into the draw).

The draw is anticipated to take place in the summer of 2018. Don't forget to keep an eye on your junk mail folder.

If you have specific questions about the survey you may contact the Student Investigator, Carley Pope, M.A. [Insert Study Email Address] or the Principle Investigator Dwight Mazmanian, Ph.D., C. Psych. [dmazmani@lakeheadu.ca or 807-343-8257].

If completing this study has raised any issues about mental health concerns that you would like to discuss, you may contact the Ontario Mental Health Helpline at 1-866-531-2600 or the Crisis Response Program through the Canadian Mental Health Association at 807-346-8282. You may also contact Thunder Bay Counselling Centre at 807-684-1880.

As well, we invite you to visit the following YouTube video if you would like to take some time to listen to soothing music: https://www.youtube.com/watch?v=yGcwvd0yaxM

With sincere thanks,

The Mommy Matters Team

ELECTRONIC DEBRIEFING (12-WEEK POSTPARTUM TIME POINT)

Thank you for your participation in the Mommy Matters study! We hope that this study will help provide information regarding factors that influence maternal wellbeing as well as factors that enhance women's ability to cope with the many stressors that arise during pregnancy and the postpartum period. We also hope that the results of this research will find that the Perinatal Wellness Programs you participated in as part of this study were of benefit to pregnant women and new mothers. In particular we are interested in whether or not the mindfulness activities that some of the participants engaged in had any additional benefits for mood or quality of life for expectant and new mothers.

Information about study results:
A summary of the results can be made available to you by email once the study has been completed. If you are interested in receiving these research results, please email the researcher at MommyMatters@lakeheadu.ca with the subject heading "Results Summary Request". We will email you a copy of the Results Summary once it is made publicly available.

Furthermore, if you would like to be entered into the draw to win one of four $50 Visa gift cards please do one of the following:

1. click the following link and provide your email address [insert website link]

2. or provide your contact information by email at:
   [insert study email address]
   [please use the Subject Heading "Draw Entry" when you make an email request to be entered into the draw).

The draw is anticipated to take place in the summer of 2018. Don't forget to keep an eye on junk mail folder. We will also send you an email invitation for the participant appreciation day expected to take place in the summer of 2018.

If you have specific questions about the survey you may contact the Student Investigator, Carley Pope, M.A. [insert study email address] or the Principle Investigator Dwight Mazmanian, Ph.D., C. Psych. [dmazmani@lakeheadu.ca or 807-343-8257].

If completing this study has raised any issues about mental health concerns that you would like to discuss, you may contact the Ontario Mental Health Helpline at 1-866-531-2600 or the Crisis Response Program through the Canadian Mental Health Association at 807-346-8282. You may also contact Thunder Bay Counselling Centre at 807-684-1880.

If you are interested in learning more about Maternal Wellbeing, please visit the following websites:

- Health Canada "Healthy Pregnancy"
  http://www.hc-sc.gc.ca/hl-vs/preg-gros/index-eng.php

- Public Health Agency of Canada "The Sensible Guide to a Healthy Pregnancy"
  http://www.phac-aspc.gc.ca/hp-gs/guide-eng.php

- The Queen's Perinatal Research Unit "The Mother's Program"
  http://www.themothersprogram.ca/

If you are interested in learning more about mindfulness you visit:

- The Centre for Mindfulness Studies “Resource Page” http://www.mindfulnessstudies.com/resources/

As well, we invite you to visit the following YouTube video if you would like to take some time to listen to soothing music: https://www.youtube.com/watch?v=yGcwvd0yaxM

With sincere thanks,

The Mommy Matters Team

Appendix L

Participant Pre-Program Demographic and Health History Form (Study 3)

Are you currently pregnant? ☐ yes ☐ no

Have you delivered a baby in the past 12 months? ☐ yes ☐ no

If yes, do you live with the baby? ☐ yes ☐ no

What is your month and year of birth?: _____(mm) _____ (yyyy)
How old are you? _____

What province/state and country do you currently live in?: _____(prov/state) _____(country)

What is your Eye Colour? Please choose the one that most closely describes your eye colour even if it does not match perfectly.

☐ brown ☐ blue ☐ green ☐ gray ☐ amber

What are the last 3 digits of your postal code or zip code: _____

How did you hear about the Mommy Matter's Program? _____

What is your marital status?

☐ Married/ Common law (cohabitating) ☐ Widowed ☐ Dating
☐ In a long term relationship (not cohabitating) ☐ Single ☐ Divorced/separated

If you are in a relationship, please indicate if your current partner identifies as:

☐ male ☐ female ☐ transgender ☐ different identity

If you are in a marital or long-term relationship, how long have you been with your partner?

_____years and _____ months

What is your ethnic background?

☐ Caucasian (White) ☐ African-Canadian/American (Black) ☐ Aboriginal (First Nation, Métis, Inuit)
☐ Hispanic/Latino ☐ European ☐ Middle Eastern
☐ East Indian ☐ Asian ☐ other (please specify):_____

Are you currently employed? ☐ yes ☐ no ☐ on maternity leave ☐ other: _____

What is your overall employment situation?

☐ full-time ☐ stay-at-home parent ☐ student
☐ part-time ☐ disability pension ☐ other (please specify): _____

What is your current household income?

☐ under $25000
☐ $25000 - $49999
☐ $50000 - $74999
☐ $75000 - $99999
☐ $100000 - $149999
☐ $150000 or above

What is the highest level of education you have received?

☐ some high school ☐ some university
☐ high school diploma ☐ university degree
☐ some college ☐ master's degree
☐ college diploma ☐ doctoral degree

Have you ever received a mental health diagnosis? ☐ Yes ☐ No

If YES, please specify the diagnoses and indicate if it was related to childbirth

Diagnosis given:	**Related to pregnancy for childbirth?**
_____	☐ yes ☐ no
_____	☐ yes ☐ no

Are you currently taking any prescription medication?: ☐ Yes ☐ No

Please list the prescription medication you are currently taking (if applicable):

_____

Are you currently taking any Non-prescription medication?: ☐ Yes ☐ No

Please list the non-prescription medication you are currently taking (if applicable):

_____

Have you ever participated in the following types of counselling? (Check all that apply)

- ☐ Cognitive Behavioural Therapy
- ☐ Dialectical Behavior Therapy
- ☐ Mindfulness-Based Therapy (e.g., MBCT, MBSR)
- ☐ Individual therapy
- ☐ Group therapy
- ☐ Couples/ Family therapy
- ☐ Other therapy: _____

Have you ever received counselling services for emotional difficulties? ☐ yes ☐ no

How many times have you been pregnant? _____

How many children have you given birth to? _____

How old are they now? _____

How many children currently live with you? _____

Have you ever had an abortion? ☐ yes ☐ no

Have you ever had a miscarriage? ☐ yes ☐ no

Have you had a past episode of depression (not associated with childbirth)? ☐ yes ☐ no

If YES,

a. how many times have you been depressed? _____
b. at what age did the depression(s) start to occur? _____
c. did you use anti-depressant medication? ☐ yes ☐ no
d. what other kinds of treatment did you receive? _____

Have you had a past episode of anxiety (not associated with childbirth)? ☐ yes ☐ no

If YES,

a. how many anxiety episodes have you had? _____
b. at what age did the anxiety (s) start to occur? _____
c. did you use anti-depressant medication to treat the anxiety? ☐ yes ☐ no
d. what other kinds of treatment did you receive? _____

Have you ever been treated for other mental health symptoms or a mental health disorder that was not associated with childbirth? ☐ no ☐ yes

If YES, please specify:_____

a. at what age did the symptoms(s) start to occur? _____

b. did you use prescription medication to treat the symptoms? ☐ yes ☐ no
c. what other kinds of treatment did you receive? _____

Are you currently receiving any counselling?
☐ no ☐ yes ☐ please indicate for what general difficulties: _____

Now we would like to ask you some questions about your experience with some of your past reproductive events:

At what age did you first begin menstruating (i.e. get your period)? _____

I believe that going through puberty affected my mood: (Mark the one best answer)
☐ very negatively
☐ slightly negatively
☐ in no way at all
☐ slightly positively
☐ very positively

Please rate the extent to which you agree to the following statements:

a. I have had significant trouble with premenstrual distress (PMS or problems right before my period):
☐ strongly disagree
☐ disagree
☐ agree
☐ strongly agree

b. I believe that my premenstrual symptoms affected my mood: (Mark the best answer)
☐ very negatively
☐ slightly negatively
☐ in no way at all
☐ slightly positively
☐ very positively

Have you used oral contraceptives in the past (i.e. birth control pills)? ☐ yes ☐ no

- IF YES, how long did you continue to use oral contraceptives? _____ years _____ months
- IF YES, I believe that using oral contraceptives affected my mood:
  ☐ very negatively
  ☐ slightly negatively
  ☐ in no way at all
  ☐ slightly positively
  ☐ very positively

Is there any history of mental or emotional illness in your close biological relatives (e.g., your parents, siblings, aunts, uncles, or grandparents)? ☐ yes ☐ no ☐ not sure

If YES, please check all illnesses that apply:
☐ depression
☐ bipolar disorder (or manic-depression)
☐ anxiety disorders
☐ schizophrenia
☐ other (please specify): _____

Have you ever participated in any formal mindfulness training?
☐ no ☐ yes ☐ please explain when and what the program was: _____

The following questions pertain to your current pregnancy:

How many weeks pregnant are you? _____

Is this a multiple birth? ☐ no ☐ yes → how many babies are you pregnant with? _____

Was your current pregnancy planned? ☐ yes ☐ no

Was the pregnancy unwanted? ☐ yes ☐ no

Have you experienced any medical complications during this pregnancy? ☐ yes ☐ no

Have you experienced extreme positive mood during this pregnancy? ☐ yes ☐ no

Have you experienced any type of negative mood change during the pregnancy? ☐ yes ☐ no

During your pregnancy, did a medical doctor or mental health care professional tell you that you were struggling with a mental health condition? ☐ no ☐ yes

If yes, please check which conditions they said you had

- ☐ depression
- ☐ anxiety
- ☐ obsessions and compulsions
- ☐ bipolar disorder
- ☐ other → please specify:_____

Have you received any medication during this pregnancy for mood change?
☐ no ☐ yes → please explain: _____

Have you received any counselling or psychotherapy during this pregnancy for mood change?
☐ no ☐ yes → please indicate for what general difficulties: _____

Other than your current pregnancy, have you given birth to other babies previously? ☐ no ☐ yes
If yes,

Did you experience any medical complications during any previous pregnancies?	☐ yes ☐ no
Did you ever experience extreme positive mood during any previous pregnancies?	☐ yes ☐ no
Did you ever experience extreme positive mood within the first two weeks following the deliveries of your previously born children?	☐ yes ☐ no
Did you experience any type of negative mood change during any previous pregnancies?	☐ yes ☐ no
Did you experience any type of negative mood change within the first two weeks following the deliveries of your previously born children?	

Other than your current pregnancy, has a medical doctor or mental health care professional ever told you that you were struggling with a mental health condition related to your pregnancy or the delivery of a child (the postpartum)?	☐ not applicable as this is my first child ☐ yes ☐ no If yes, please check which conditions they said you had ☐ depression ☐ anxiety ☐ obsessions and compulsions ☐ bipolar disorder ☐ other → please specify:_____

Appendix M

Follow-up Health Information Forms (Study 3)

- What is your month and year of birth?: _____(mm) _____ (yyyy)
- What province/state and country do you currently live in?:
  _____(prov/state) _____(country)
- What is your Eye Colour? Please choose the one that most closely describes your eye colour even if it does not match perfectly.
  ☐ brown ☐ blue ☐ green ☐ gray ☐ amber
- What are the last 3 digits of your postal code or zip code: _____
- Are you currently employed?
  ☐ Yes ☐ No ☐ On Maternity Leave ☐ other: _____

- Please list any prescription medication you are currently taking:
- Please list any non-prescription medication you are currently taking (e.g., vitamins):
- How many weeks pregnant are you now? _____
  ☐ not applicable/ I delivered my baby
- How often are you taking vitamins during this pregnancy?
  ☐ always ☐ most of the time ☐ sometimes ☐ never
- Have you experienced any medical complications during this pregnancy?
  ☐ yes ☐ no
- Have you experienced extreme positive mood during this pregnancy?
  ☐ yes ☐ no
- Have you experience any type of negative mood change during this pregnancy?
  ☐ Yes ☐ No
- During your pregnancy, did a medical doctor or mental health care professional tell you that you were struggling with a mental health condition?
  ☐ no ☐ yes
  If yes, please check which conditions they said you had
  ☐ depression
  ☐ anxiety
  ☐ obsessions and compulsions
  ☐ bipolar disorder
  ☐ other →please specify:_____

- Have you received any medication during this pregnancy for mood changes?
  ☐ no ☐ yes → please explain: _____
- Have you received any counselling or psychotherapy during this pregnancy for mood changes?
  ☐ no ☐ yes → please indicate for what general difficulties: _____

- Have you participated in any formal mindfulness training since you completed the Mommy Matters program?
  ☐ no ☐ not sure
  ☐ yes – please explain when and what the program was: _____
- Since you completed the Mommy Matters program, have you participated in **formal** mindfulness practice (e.g., mindful meditation)?
  ☐ no ☐ not sure ☐ yes

  - If yes – in the past week please estimate how many separate times you engaged in formal mindfulness practice: _____times this past week
  - If yes – in the past week please estimate how many hours in total you engaged in formal mindfulness practice: _____ hours this past week

- Since leaving the group do you socialize with any of the other group members?
  ☐ no ☐ yes

Postpartum 3-Week Follow-up Demographic and Health History Information Form

- What is your month and year of birth?: _____(mm) _____ (yyyy)
- What providence/state and country do you currently live in?:
  _____(prov/state) _____(country)
- What is your Eye Colour? Please choose the one that most closely describes your eye colour even if it does not match perfectly.
  ☐ brown ☐ blue ☐ green ☐ gray ☐ amber
- What are the last 3 digits of your postal code or zip code: _____
- Are you currently employed?
  ☐ yes ☐ no ☐ on maternity leave ☐ other: _____

- Please list any prescription medication you are currently taking:
- Please list any non-prescription medication you are currently taking (e.g., vitamins):
- Are you currently receiving any counselling or psychotherapy?
  ☐ no ☐ yes → please indicate for what general difficulties: _____

The following questions pertain to the birth of your most recent baby. That is, to the delivery of the baby you were pregnant with when you participated in the Mommy Matters Program:

- How many weeks old is your baby now? _____
- What was the Expected Date of Delivery (dd/mm/yyyy): _____
- What was the Actual Date of Delivery (dd/mm/yyyy): _____
- Was this a multiple birth?
  ☐ no ☐ yes → how many babies were born in this delivery? _____
  - Sex of infant(s):
    ☐ boy(s) ☐ girl(s) ☐ at least one boy and one girl ☐ other
- What was your baby's weight at birth
  ____ pounds _____ ounces or _____ grams
- How often did you take vitamins while you were pregnant with this baby?
  ☐ always ☐ most of the time ☐ sometimes ☐ never
- My baby was delivered:
  ☐ in a hospital ☐ at home ☐ other (please specify): _____
- My baby was delivered by:
  ☐ family physician ☐ obstetrician ☐ midwife ☐ nurse
  ☐ other (please specify): _____

- Did you experience any complications during or after delivery?
  ☐ yes ☐ no
  If YES, please specify (check all that apply):
  ☐ premature contractions
  ☐ instrumental delivery (e.g., forceps)
  ☐ caesarean section
  ☐ induced labour
  ☐ given oxytocin
  ☐ postpartum bleeding
  ☐ other (please specify):_____

- How are you currently feeding your infant? (Check all that apply)
  ☐ breastfeeding
  ☐ bottle feeding (formula)
  ☐ bottle feeding (breast-milk)
  ☐ water
  ☐ solids

- Did you experience breastfeeding complications at any time?
  ☐ no ☐ yes → please briefly explain:_____

- Did you receive counselling services *when you were pregnant* with your most recent baby?:
  ☐ yes ☐ no

- Have you received counselling services *since delivering* your most recent baby?:
  ☐ no ☐ yes → please indicate for what general difficulties: _____
- Have you participated in any formal mindfulness training since you completed the Mommy Matters program?
  ☐ no ☐ not sure
  ☐ yes – please explain when and what the program was: _____

- Since you completed the Mommy Matters program, have you participated in **formal** mindfulness practice (e.g., mindful meditation)?
  ☐ no ☐ not sure ☐ yes
  - If yes – in the past week please estimate how many separate times you engaged in formal mindfulness practice: _____times this past week
  - If yes – in the past week please estimate how many hours in total you engaged in formal mindfulness practice: _____ hours this past week
- Since your delivery have you socialized with any of the other Mommy Matters group members?
  ☐ no
  ☐ yes

Postpartum 12-Week Follow-up Demographic and Health History Information Form

- What is your month and year of birth?: _____(mm) _____ (yyyy)
- What providence/state and country do you currently live in?:
  _____(prov/state) _____(country)
- What is your Eye Colour? Please choose the one that most closely describes your eye colour even if it does not match perfectly.
  ☐ brown ☐ blue ☐ green ☐ gray ☐ amber
- What are the last 3 digits of your postal code or zip code: _____
- Are you currently employed?
  ☐ yes ☐ no ☐ on maternity leave ☐ other: _____

- Are you currently taking any prescription medication?: ☐ Yes ☐ No
- Please list the prescription medication you are currently taking (if applicable):
- Are you currently taking any NON-prescription medication?: ☐ Yes ☐ No
- Please list the non-prescription medication you are currently taking (if applicable):
- Are you currently receiving any counselling or psychotherapy?
  ☐ no ☐ yes → please indicate for what general difficulties: _____
- How many weeks old is your baby now? _____
- Date of Delivery (dd/mm/yyyy): _____
- Have you personally experienced any medical complications since delivering your baby (not including birth complications during delivery):
  ☐ no ☐ yes, please specify:_____
- Has your baby experienced any medical complications since they were born (not including birth complications during delivery):
  ☐ no ☐ yes, please specify:_____
- How are you currently feeding your infant? (Check all that apply)
  ☐ breastfeeding
  ☐ bottle feeding (formula)
  ☐ bottle feeding (breast-milk)
  ☐ water
  ☐ solids
- Have you participated in any formal mindfulness training since you completed the Mommy Matters program?
  ☐ no ☐ not sure ☐ yes
  If you have participated in mindfulness please explain when and what the program was:
- Since you completed the Mommy Matters program, have you participated in **formal** mindfulness practice (e.g., mindful meditation)?
  ☐ no ☐ not sure ☐ yes
  - If yes – in the past week please estimate how many separate times you engaged in formal mindfulness practice: _____times this past week
  - If yes – in the past week please estimate how many hours in total you engaged in formal mindfulness practice: _____ hours this past week

- Have you socialized with any of the other Mommy Matters group members in the past 9 weeks?
  ☐ no
  ☐ yes

Thinking back to your experience with the Mommy Matters Group, please rate how much you agree with the following statements….

- I found the Mommy Matters group enjoyable.
  ☐ Strongly disagree; ☐ Disagree; ☐ Neither agree nor disagree
  ☐ Agree; ☐ Strongly agree

- I found the Mommy Matter group helpful.
  ☐ Strongly disagree; ☐ Disagree; ☐ Neither agree nor disagree
  ☐ Agree; ☐ Strongly agree

- If I had the opportunity to do it again, I would participate in the Mommy Matters group again.
  ☐ Strongly disagree; ☐ Disagree; ☐ Neither agree nor disagree
  ☐ Agree; ☐ Strongly agree

- I would recommend the Mommy Matters group to a pregnant friend
  ☐ Strongly disagree; ☐ Disagree; ☐ Neither agree nor disagree
  ☐ Agree; ☐ Strongly agree

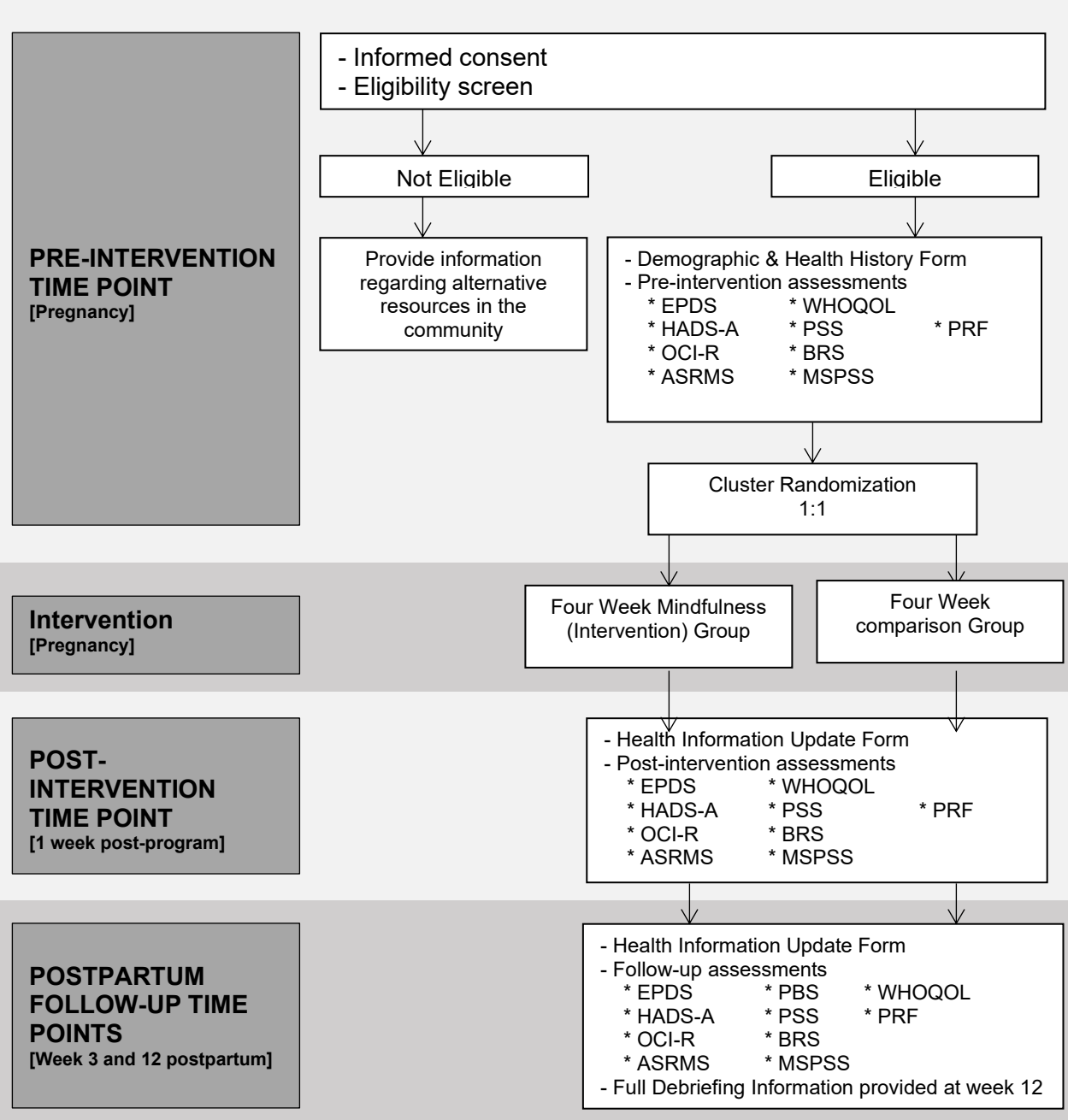
- The Mommy Matters group was helpful for supporting my general wellness.
  ☐ Strongly disagree; ☐ Disagree; ☐ Neither agree nor disagree
  ☐ Agree; ☐ Strongly agree

- Would a Mommy Matters program offered during the postpartum period (after the baby was delivered) be helpful for mothers?

  ☐ no ☐ yes (Comment optional:_____)

Appendix N

Schedule of Events (Study 3)



Note. ASRMS = Altman Self-Rating Mania Scale; BRS = Brief Resilience Scale; EPDS = Edinburgh Postnatal Depression Scale; FFMQ = Five Facet Mindfulness Questionnaire; MSPSS = Multidimensional Scale of Perceived Social Support; OCI = Obsessive Compulsive Inventory – Revised; PRF = Personality Research Form Scale; PSS = Perceived Stress Scale; PBQ = Postpartum Bonding Questionnaire; HADS-A = Hospital Anxiety and Depression Scale – Anxiety Subscale; WHOQOL = World Health Organization Quality of Life Scale-BREF.