TARGETING BARRIERS TO CARE FOR PREGNANT WOMEN
AT RISK FOR DEPRESSION:
EXAMINING THE ROLE OF STIGMA AND THE FEASIBILITY
OF A WEB-BASED DEPRESSION PREVENTION PROGRAM

by

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Abstract

Felder, Jennifer (Ph.D., Psychology and Neuroscience)

Targeting Barriers to Care for Pregnant Women at Risk for Depression: Examining The Role of Stigma and the Feasibility of a Web-Based Depression Prevention Program

Thesis directed by Associate Professor Sona Dimidjian

Depression is common in pregnancy and postpartum, and associated with negative consequences for women, their families, and society at large. Despite evidence-based treatment options, few women receive treatment. In the context of three studies, this dissertation addresses the overall aim to examine strategies to increase treatment engagement among pregnant and postpartum women, including identifying and targeting barriers to depression care and disseminating interventions in innovative ways to overcome barriers. The Public Attitudes About Perinatal Depression study was developed in response to research suggesting that perceived stigma is a barrier to pregnant and postpartum women seeking help for depression. This study examines public attitudes about perinatal depression using 241 participants from Amazon’s Mechanical Turk who completed measures assessing attitudes about, warmth towards, and spontaneous associations with depressed pregnant women, depressed postpartum moms, depressed women, as well as depressed dads-to-be, depressed postpartum dads, and depressed men. Results provide no evidence that people view depressed pregnant or postpartum women more harshly than they view depressed women in general. Limitations and future research directions are addressed. The Depression Screening and Feedback study tested the feasibility and impact of a brief, mailed intervention on depression symptom severity, and examined barriers to help-seeking and actual help-seeking actions among perinatal women with elevated depression symptom severity recruited from a local Obstetrics/Gynecology clinic (n=20). Data collection for this study is
ongoing, and results from the data collected to date are presented. Finally, the Mindful Mood Balance for Moms study examines the feasibility and preliminary outcomes of a web-based depression-prevention program for at-risk pregnant women (n=37). Results suggest that the web-based program was feasible, and self-report and interview data nominate areas for further refinement. Contrary to hypotheses, participants did not evidence significant reduction in depression symptom severity. Future studies should address the extent to which this program helps to prevent depressive relapse among this vulnerable population. Together these studies emphasize the continued importance of identifying and targeting barriers to care among at-risk and depressed perinatal women.
Dedication

I dedicate this work with love to my parents, Sharon and Harry Felder, and my husband, Ryan McMurray, for their support, nurturance, and encouragement.
Acknowledgements

First, I would like to express my deep gratitude to my mentor and chair of my dissertation committee, Sona Dimidjian, for her dedication to and guidance of this dissertation project. I would also like to thank my committee members, Loriliai Biernacki, Vijay Mittal, Sanyu Mojola, Bernadette Park, Soo Rhee, and Mark Whisman, for their feedback. These studies would not have been possible without the help of several key collaborators, including Bernadette Park and Sarah Banchefsky on the Public Attitudes of Perinatal Depression study, Kate Kripke, Kerry Shea, and Elizabeth Lemon on the Depression Screening and Feedback study, and Zindel Segal, Sherryl Goodman, Arne Beck, and Nancy Sherwood on the MMB for Moms study. I would also like to acknowledge the important work of volunteer research assistants Brittany Weeks, Kaitlyn Haak, Alison Conner, Chelsea Neely-Holt, and Ellen Arkfeld. A Beverly Sears Graduate Student Grant from the University of Colorado Boulder helped support this research. Finally, I would like to give a heartfelt thanks to the women and men who participated in this research.
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CHAPTER 1

General Introduction

Approximately 1 in 8 women become depressed during pregnancy or postpartum (Bennett, Einarson, Taddio, Koren, & Einarson, 2004; Gavin et al., 2005; O'Hara & Swain, 1996), but only about 3 in 10 receive treatment (Flynn, Blow, & Marcus, 2006). As described in greater detail below, improving treatment engagement is important considering the associations between perinatal depression and negative consequences for women (Grote et al., 2010; Kurki, Hiilesmaa, Raitasalo, Mattila, & Ylikorkala, 2000), their offspring (S. H. Goodman, Broth, Hall, & Stowe, 2008; S. H. Goodman et al., 2011; Hay, Pawlby, Waters, & Sharp, 2008; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Stein et al., 2014) and relationships (Whisman, Davila, & Goodman, 2011), and the public (Dagher, McGovern, Dowd, & Gjerdingen, 2012).

The overarching goals of this dissertation are to examine strategies to increase treatment engagement among pregnant and postpartum women, including identifying and targeting barriers to depression care and disseminating interventions in innovative ways to overcome barriers.

Patterns of Help Seeking

Research on national trends of outpatient treatment of depression suggests that the rate of treatment among those who are depressed is low, with only 50.76% of individuals meeting criteria for past-year depression indicating receipt of any depression therapy (Gonzalez et al., 2010). The rate of treatment for depression among perinatal women is even lower than that among the general population of depressed individuals. Data suggest that only 14% of women in an obstetrics clinic who scored above a cut-off for depression reported receiving any formal treatment (Marcus, Flynn, Blow, & Barry, 2003). A separate study in which symptom severity
cutoffs were confirmed with a clinical interview found that 33% of clinically depressed pregnant women reported receiving any depression treatment (Flynn et al., 2006).

Although few women report receiving treatment, a meta-analysis of pharmacologic and psychotherapy treatment for perinatal depression concluded that those receiving treatment experienced significantly greater reductions in depressive symptoms compared to participants in control groups (Sockol, Epperson, & Barber, 2011). Though antidepressant medication is the most common form of treatment both for pregnant and non-pregnant women of childbearing age (Ko, Farr, Dietz, & Robbins, 2012), some studies have suggested that its use is associated with increased risk for low birth weight and preterm birth (Huang & Bridge, 2014), and qualitative research reveals that talk therapy is the preferred treatment option among pregnant women (Dennis & Chung-Lee, 2006; J. H. Goodman, 2009). Numerous individual studies document the efficacy of a variety of psychotherapy modalities for perinatal depression, including cognitive-behavioral therapy (CBT) and interpersonal psychotherapy (IPT) (Ammerman et al., 2005; Grote et al., 2009; Honey, Bennett, & Morgan, 2002; Meager & Milgrom, 1996; O'Hara, Stuart, Gorman, & Wenzel, 2000; Spinelli & Endicott, 2003). However, the majority of depressed perinatal women do not receive adequate psychotherapy for depression. Pregnant depressed women reported an average of 2 psychotherapy sessions in the previous 3 months (Flynn et al., 2006).

**The Costs of Depression Among Perinatal Women**

The societal and personal costs of depression among perinatal women are high. Women with depression during pregnancy are at increased risk for adverse obstetric outcomes including preeclampsia (Kurki et al., 2000), miscarriage among women with a history of miscarriage (Nakano et al., 2004), risk for epidural analgesia, cesarean section and instrumental vaginal
delivery, and preterm birth (Grote et al., 2010). Compared to non-depressed postpartum women, depressed postpartum women have significantly greater health care expenditures, including use of mental health services and emergency room visits (Dagher et al., 2012).

The personal costs of perinatal depression are also evident for families. Depressed mothers demonstrate significantly lower positive parenting behaviors and significantly higher negative parenting behaviors compared to non-depressed mothers (S. H. Goodman et al., 2008; Lovejoy et al., 2000), and maternal depression can have long-lasting psychological consequences for offspring (S. H. Goodman et al., 2011; Hay et al., 2008; Stein et al., 2014). Furthermore, perinatal women with higher depression symptom severity later experience lower relationship adjustment (Whisman et al., 2011).

Barriers to Obtaining Help and The Present Research

Given the prevalence of perinatal depression, low rates of help-seeking, associated costs for women, their families, and society, it is important to identify barriers to help seeking. In this dissertation, I present three studies that identify and target barriers to depression care among perinatal women. In chapter 2, I present results from the Public Attitudes About Perinatal Depression study, which was developed in response to research suggesting that perceived stigma is a barrier to pregnant and postpartum women seeking help for depression. However, there has been no rigorous empirical research to date examining how the public perceives these women. The anonymous survey reported in this study allows us to examine the following questions: What attitudes and feelings do people hold towards pregnant and postpartum women who are depressed? Are people forgiving or harsh? Do attitudes differ for depressed women versus depressed perinatal women, or depressed perinatal women versus depressed perinatal men? The results of this study help to elucidate the social-cultural context in which perinatal women seek
treatment. Ultimately, such information may be useful in refining clinical interventions to directly address such barriers and adapting future clinical services to be sensitive to addressing these challenges.

In chapter 3, I describe the Depression Screening and Feedback Study, which tests the feasibility and impact of a brief, mailed intervention on depression symptom severity, and examines barriers to help-seeking and actual help-seeking actions among perinatal women with elevated depression symptom severity. Data collection for this study is ongoing, and preliminary results are presented.

The study described in Chapter 4 examines the feasibility and preliminary outcomes of Mindful Mood Balance (MMB), a web-based MBCT program developed by Zindel Segal and Sona Dimidjian. Preliminary data suggest that MMB is a feasible and acceptable intervention among the general population (Boggs et al., 2014; Dimidjian, Beck, et al., 2014; Felder, Dimidjian, Beck, Boggs, & Segal, 2014); however, it has not previously been investigated with at risk pregnant women.
Chapter 2

Public Attitudes About Perinatal Depression
Introduction

Depression occurs during pregnancy and postpartum in as many as 10-20% of women (Gavin et al., 2005; O'Hara & Swain, 1996), and rates of help-seeking are low (Flynn et al., 2006; Marcus et al., 2003). In numerous qualitative studies (Abrams, Dornig, & Curran, 2009; Bilszta, Ericksen, Buist, & Milgrom, 2010; Dennis & Chung-Lee, 2006; Flynn, Henshaw, O'Mahen, & Forman, 2010; Maloni, Przeworski, & Damato, 2013) and three quantitative studies (J. H. Goodman, 2009; Kopelman et al., 2008; Maloni et al., 2013) perinatal women report that stigma is a barrier to seeking treatment for depression. Recent research suggests that perinatal depression is not just a women’s problem: in fact, perinatal depression occurs in about 10% of men. Though there is no published research on rates of help-seeking among depressed perinatal dads specifically, we know that rates for help-seeking are low among depressed men generally (Padesky & Hammen, 1981; Rickwood & Braithwaite, 1994), and it has been proposed that societal norms about masculinity are obstacles to men seeking help for depression (Moller-Leimkuhler, 2002).

Perceived stigma has deleterious consequences, including stress (Major & O'Brien, 2005), higher depression severity among depressed individuals in treatment (Pyne et al., 2004), higher rates of treatment discontinuation among older depressed patients (Sirey, Bruce, Alexopoulos, Perlick, Raue, et al., 2001), and poorer adherence to a recommended antidepressant medication regimen (Sirey, Bruce, Alexopoulos, Perlick, Friedman, et al., 2001). Perceived stigma about mental health treatment also has been shown to be negatively associated with beliefs that consulting with friends and family would be helpful (Pattyn, Verhaeghe, Sercu, & Bracke, 2014).

Research on how the public actually views depressed individuals is mixed, with some research suggesting that people express supportive and anti-stigma attitudes (Reavley &
Pilkington, 2014), pity, sympathy, and wanting to help individuals with depression (Angermeyer, Millier, Remuzat, Refai, & Toumi, 2013), and other research suggesting that the public holds negative beliefs such as that depressed individuals are unpredictable or dangerous (Angermeyer et al., 2013; Cook & Wang, 2010). Of particular relevance to the current study, over 70% of French adults surveyed by Angermeyer and colleagues (2013) reported that they would be unwilling to allow a person with depression take care of a young child. No research to date has examined how the public views depressed perinatal individuals. Prior research also has suggested that people may view women more positively than they view men (Eagly & Mladinic, 1989), and express benevolent attitudes towards pregnant women in traditional gender roles (Hebl, King, Glick, Singletary, & Kazama, 2007). However, there is no research examining whether depressed women are judged differentially from depressed men, and how perinatal status affects attitudes about depressed women and men.

The current study represents an initial step to examine societal attitudes about perinatal depression. This study used three measures to assess spontaneous associations with, attitudes about, and warmth toward depressed women, pregnant women, and postpartum moms, and depressed men, dads-to-be, and postpartum dads. We explored the interaction between target perinatal status and gender for the three measures. For example, does the relationship between participant attitudes about depressed males and females depend on whether the target is pregnant, postpartum, or neither? The goal of this study was to provide an additional perspective on the unique barriers and issues that depressed perinatal individuals face with the ultimate goal of developing more comprehensive, sensitive treatment engagement strategies.
Method

Participants

The Institutional Review Board at the University of Colorado Boulder approved the study protocol. In August 2013, 241 participants \((n = 106\text{ female})\) were recruited through Amazon’s Mechanical Turk (MTurk) marketplace, and paid $0.50. MTurk has been shown to be a useful strategy to collect high quality data rapidly (Berinsky, Huber, & Lenz, 2012; Buhrmester, Kwang, & Gosling, 2011) that is more representative of the United States population than other convenience samples, such as undergraduate students and data collected via other Internet sources (Buhrmester et al., 2011; Paolacci, Chandler, & Ipeirotis, 2010). Furthermore, MTurk has been used previously to assess public stigma of depression (E. J. Henshaw, 2014). Table 1 displays participant demographic characteristics.

Table 1
Demographic Characteristics

<table>
<thead>
<tr>
<th>Participant characteristic</th>
<th>Depressed Men and Women Targets ((n = 81))</th>
<th>Depressed Pregnant Women and Dads-to-Be Targets ((n = 85))</th>
<th>Depressed Postpartum Moms and Dads Targets ((n = 75))</th>
<th>Total ((n = 241))</th>
<th>Between group comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>48.15%</td>
<td>41.18%</td>
<td>42.67%</td>
<td>43.98%</td>
<td>(\chi^2(2) = 0.90)</td>
</tr>
<tr>
<td>Age, M (SD)</td>
<td>36.07 (13.88)</td>
<td>37.51 (14.19)</td>
<td>37.27 (13.31)</td>
<td>36.95 (13.78)</td>
<td>(F(2,239) = 0.25)</td>
</tr>
<tr>
<td>White</td>
<td>82.72%</td>
<td>76.47%</td>
<td>78.67%</td>
<td>79.25%</td>
<td>(\chi^2(2) = 1.01)</td>
</tr>
<tr>
<td>Completed college</td>
<td>46.91%</td>
<td>44.71%</td>
<td>33.33%</td>
<td>41.91%</td>
<td>(\chi^2(2) = 3.37)</td>
</tr>
<tr>
<td>Currently married</td>
<td>35.80%</td>
<td>35.29%</td>
<td>42.67%</td>
<td>37.78%</td>
<td>(\chi^2(2) = 1.12)</td>
</tr>
<tr>
<td>Parent</td>
<td>43.21%</td>
<td>43.53%</td>
<td>56.00%</td>
<td>47.30%</td>
<td>(\chi^2(2) = 3.31)</td>
</tr>
<tr>
<td>Personal experience with depression</td>
<td>58.02%</td>
<td>47.06%</td>
<td>48.00%</td>
<td>51.04%</td>
<td>(\chi^2(2) = 2.40)</td>
</tr>
</tbody>
</table>
Measures and Procedures

Participants were randomized to focus on and provide responses about either: (1) depressed pregnant women and depressed dads-to-be ($n = 85$), (2) depressed postpartum moms and depressed postpartum dads ($n = 75$), or (3) depressed women and depressed men ($n = 81$). All participants also provided ratings about depressed teens to reduce demand characteristics; these data were not analyzed. There were no significant between-group differences on age, gender, personal experience with depression, parental status, marital status, college education, or race (see Table 1). Participants completed measures in the order listed below.

Adjectives Measure. An adjectives measure, in which participants listed 5 adjectives to describe each target group, was used to examine participants’ spontaneous associations with each target group. The instructions were to “think about the typical [target group] in the United States today. What are the first five adjectives that come to mind when thinking about people in this group?”

Personal Attitudes about Perinatal Depression Questionnaire. Based on a review of the qualitative literature about perceived depression stigma among pregnant and postpartum women (Abrams et al., 2009; Bilszta et al., 2010; Dennis & Chung-Lee, 2006; Flynn et al., 2010) and a review of mental illness and depression stigma measures (Barney, Griffiths, Christensen, & Jorm, 2010; Day, Edgren, & Eshleman, 2007; Griffiths, Christensen, & Jorm, 2008; Kanter, Rusch, & Brondino, 2008), items were generated for the Personal Attitudes about Perinatal Depression Questionnaire (see Table 2). Participants were asked to indicate the extent to which they disagreed (1) or agreed (7) with statements about each target group to which they were randomly assigned. The items were presented in a random order for each target group. An initial set of 18 items was administered to participants (see Table 2). As displayed in Table 2, examination of the
item-whole correlations suggested that one item (#1) had a low correlation with the remaining 
items. This item was dropped, resulting in 17 items that were averaged to create an aggregate 
attitude score for each target group, with higher means indicating more negative attitudes. 

Cronbach’s alpha at least 0.80 for each target group for the 17-item version of the questionnaire, 
indicating good internal consistency.

Table 2
*Item-Whole Correlations for the Personal Attitudes about Perinatal Depression Questionnaire  
by Target Group

<table>
<thead>
<tr>
<th>#</th>
<th>Item</th>
<th>Item-Whole Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Depressed women</td>
</tr>
<tr>
<td>1</td>
<td>*Depressed pregnant women struggle to function in their daily lives.</td>
<td>-0.05</td>
</tr>
<tr>
<td>2</td>
<td>Depressed pregnant women should temporarily give up care of their babies to someone else.</td>
<td>0.48</td>
</tr>
<tr>
<td>3</td>
<td>Depressed pregnant women are a danger to themselves.</td>
<td>0.45</td>
</tr>
<tr>
<td>4</td>
<td>Depressed pregnant women are a danger to their babies.</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td>Depression in pregnant women is a sign of moral weakness.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>0.60 0.64 0.68 0.62 0.73 0.71</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Depressed pregnant women should probably keep their depression to themselves.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.57 0.45 0.58 0.67 0.68 0.75</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>It is easy to notice the symptoms of depression among pregnant women.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.35 0.16 0.07 0.06 0.39 0.32</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Depressed pregnant women probably aren't capable of taking care of children.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.62 0.50 0.55 0.60 0.58 0.54</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Knowing that a pregnant woman is depressed tells me a lot about what kind of parent she would be.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.55 0.52 0.70 0.74 0.76 0.73</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Depressed pregnant women are bad mothers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.53 0.38 0.66 0.69 0.74 0.79</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>11</td>
<td>Depressed pregnant women are personally responsible for their depression.</td>
<td>0.50</td>
</tr>
<tr>
<td>12</td>
<td>Pregnant women have only themselves to blame if they struggle with depression.</td>
<td>0.71</td>
</tr>
<tr>
<td>13</td>
<td>Depressed pregnant women should do their best to keep their symptoms hidden.</td>
<td>0.43</td>
</tr>
<tr>
<td>14</td>
<td>There is little that can be done to control the symptoms of depression in pregnant women.</td>
<td>0.47</td>
</tr>
<tr>
<td>15</td>
<td>A person can tell that pregnant women are depressed by the way they act.</td>
<td>0.37</td>
</tr>
<tr>
<td>16</td>
<td>Depression in pregnant women can be treated successfully.</td>
<td>0.35</td>
</tr>
</tbody>
</table>
Depression in pregnant women is a common problem in our society. It is common for pregnant women to suffer from depression. (R)

<table>
<thead>
<tr>
<th>Item</th>
<th>Statement</th>
<th>Correlation 1</th>
<th>Correlation 2</th>
<th>Correlation 3</th>
<th>Correlation 4</th>
<th>Correlation 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Depression in pregnant women is a common problem in our society. (R)</td>
<td>0.50</td>
<td>0.23</td>
<td>0.32</td>
<td>0.11</td>
<td>0.43</td>
</tr>
<tr>
<td>18</td>
<td>It is common for pregnant women to suffer from depression. (R)</td>
<td>0.17</td>
<td>0.17</td>
<td>0.37</td>
<td>0.31</td>
<td>0.31</td>
</tr>
</tbody>
</table>

* This item was dropped in the final analysis.

Note. For items 2-18, the item-whole correlations are for each item with the remaining 17 items, with Item 1 omitted. The Item 1 values are the item-whole correlations using the entire original set of 18 items. (R) indicates reverse-scored items.

Warmth Ratings. Next, participants completed a “feeling thermometer,” which has been used previously to assess general liking for various target groups (Wolsko, Park, Judd, & Wittenbrink, 2000). Participants were instructed to drag a slider to indicate how coolly (0) to how warmly (100) they felt about each target group to which they were randomly assigned.

Demographic Questionnaire. A project-designed questionnaire was used to collect basic demographic information, including age, gender, parental status, and personal experience with depression. For the personal experience with depression measure, participants were asked to indicate if they had ever experienced depression generally, and whether they had ever experienced depression during pregnancy or postpartum (or, for men, during a spouse’s or partner’s pregnancy or postpartum). A categorical personal experience with depression measure was calculated such that participants who endorsed any of the personal experience with depression items were coded as having personal experience with depression.
Additionally, participants completed three additional measures assessing essentialist beliefs about mothers, fathers, and depression as part of another research study. Those data are not reported in the current manuscript.

**Data Analysis**

Data from the Adjectives Task were spell-checked prior to analysis with Linguistic Inquiry and Word Count (LIWC2007). We created two dictionaries: a judgment dictionary containing 45 words indicating participants’ moral judgment or blame of the target groups (e.g., bad, crazy, dangerous) and an incompetence dictionary containing 32 words indicating participants’ beliefs about incompetence among the target groups (e.g., incapable, inadequate, lazy).

Mixed ANOVAs were utilized to examine the interaction between target group gender and perinatal status. The within subjects variable was target gender (i.e., male or female target), and the between subjects variable was perinatal status (pregnant, postpartum, or neither pregnant nor postpartum). A model was run for each dependent variable, including adjective ratings, attitudes, and warmth. Effect sizes (partial $\eta^2$) were used to examine the proportion of variance in the dependent variable attributable to the interaction or main effect, where effect sizes below 0.06 are typically considered small, those between 0.06 and 0.14 are considered medium, and those greater than or equal to 0.14 are considered large.

**Results**

Figures 1 and 2 display the means for the percentage of words categorized into the Judgment and Incompetence dictionaries, organized by target group. There was no statistically significant interaction between perinatal status and target gender for use of judgment words, $F(2,238) = 0.56, p = .57$, partial $\eta^2 = .01$, or incompetence words, $F(2,238) = 1.21, p = .30$, 

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partial $\eta^2 = .01$. The main effect of gender showed no statistically significant difference between male and female targets for judgment words, $F(1, 238) = 1.33, p = 0.25$, partial $\eta^2 = .01$, or incompetence words, $F(1, 238) = 1.40, p = .24$, partial $\eta^2 = .01$. The main effect of perinatal status showed no statistically significant difference among perinatal status groups for judgment words $F(2, 238) = 2.72, p = .07$, partial $\eta^2 = .02$ or incompetence words, $F(2, 238) = 2.27, p = .11$, partial $\eta^2 = .02$.

**Figure 1.** Percentage of words categorized into judgment dictionary in adjectives measure.

**Figure 2.** Percentage of words categorized into incompetence dictionary in adjectives measure.
Figure 3 displays the means from the Personal Attitudes about Perinatal Depression questionnaire. There was no statistically significant interaction between perinatal status and target gender on attitudes, $F(2, 238) = 2.11, p = .12$, partial $\eta^2 = .02$. There was evidence for a significant main effect of gender with participants expressing significantly more negative attitudes about depressed male targets than depressed female targets, $F(1, 238) = 22.94, p < .001$, partial $\eta^2 = .09$. The main effect of perinatal status showed that there was no statistically significant difference in attitudes between perinatal status groups $F(2, 238) = 0.77, p = .46$, partial $\eta^2 = .01$.

Figure 4 displays the means from the Thermometer Scale, in which higher numbers indicate feeling greater warmth for the target group. There was no statistically significant interaction between perinatal status and target gender on warmth ratings, $F(2, 238) = 0.91, p = .41$, partial $\eta^2 = .01$. There was evidence for a significant main effect of gender with participants expressing significantly higher warmth towards the depressed female targets than depressed male targets, $F(1, 238) = 42.76, p < .001$, partial $\eta^2 = .15$. The main effect of perinatal status showed that there was no statistically significant difference in warmth ratings between perinatal status groups $F(2, 238) = 1.00, p = .37$, partial $\eta^2 = .01$. 

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Discussion

Numerous studies have highlighted perceived stigma as a barrier to seeking help for depression among perinatal women; the current study is the first examination of how people perceive depressed perinatal women. Our results provide no evidence that people view...
depressed pregnant or postpartum women more harshly than they view depressed women in general. Additionally, in response to recent research indicating increased prevalence of depression among dads-to-be and postpartum dads, the current research explored perceptions of depressed perinatal men and found that participants did not report viewing depressed dads-to-be or postpartum dads more negatively compared to depressed men.

Previous work has suggested that women are viewed more favorably than men on an attitudes measure comprised of five, 7-point items rating dimensions of good/bad, positive/negative, valuable/useless, pleasant/unpleasant, and nice/awful (Eagly & Mladinic, 1989; Hebl et al., 2007), and the current findings represent a novel extension of this work to depressed individuals. Within all target categories, participants in the current study had more negative attitudes about and felt more coolly towards depressed men compared to depressed women. Although depressed men may be viewed more negatively compared to depressed women generally, our exploratory survey suggests that the perinatal period may not be a time of increased vulnerability to stigma for men compared to other times in their lives.

The generally low endorsement of stigma in our study converges with prior evidence that only a minority of individuals report negative attitudes about individuals with depression, and many express neutral or even sympathetic attitudes. In an examination of English-language tweets using the hashtag “depression,” Reavley and colleagues found that 65% of tweets were supportive, 27% were neutral, and 7% were anti-stigma, compared with <1% that expressed stigmatizing attitudes (Reavley & Pilkington, 2014). French participants in an online survey endorsed positive emotional reactions to individuals with depression, such as feeling the need to help (endorsed by 80.9%), pity (70.9%), and sympathy (69.5%); in contrast, a smaller proportion expressed negative emotional reactions such as feeling uncomfortable (35.2%), and negative
beliefs that individuals with depression are unpredictable (34.4%) or dangerous (14.5%) (Angermeyer et al., 2013). A slightly higher proportion of Canadian participants in a phone survey endorsed beliefs that depressed individuals are unpredictable (45.9%) or dangerous (21.9%) (Cook & Wang, 2010). However, results in the current study are at odds with prior results suggesting that 70% of French adults reported being unwilling to allow a depressed person care for a young child (Angermeyer et al., 2013). In the current study, only 9.4% of participants reported at least some agreement that depressed pregnant women “probably aren’t capable of taking care of children,” 10.6% for depressed dads-to-be, 24% for postpartum moms, 17.3% for postpartum dads, 14.8% for depressed women, and 19.8% for depressed men. Unfortunately, a number of prior studies examining correlates of depression stigma did not report the means for stigma measures, making it impossible to assess the extent to which participants expressed stigmatizing attitudes (Griffiths et al., 2008; Pyne et al., 2004; Roeloffs et al., 2003; Sirey, Bruce, Alexopoulos, Perlick, Raue, et al., 2001). In sum, as evidenced in research on depression generally, participants in the current study did not express very negative attitudes about depressed pregnant and postpartum women, or depressed dads-to-be and postpartum dads.

The results and limitations of the current study raise many questions and ideas for future research. Although our goal was to obtain an index of attitudes about perinatal depression in the general public, our use of the MTurk sample may be limited. Research suggests that MTurk samples may be more generalizable than other convenience samples, but not perfectly representative of the United States population (Berinsky et al., 2012). For example, research by Paolacci and colleagues found that MTurk participants are younger, more educated, and report a lower income than the general United States population (Paolacci et al., 2010). Fewer than half of participants in the current study were female, had completed college, and were parents.
It may be more useful for future research to examine attitudes among participant subgroups and specific groups of individuals. Moderation analyses may provide important information about subgroups that tend to hold more negative attitudes. For example, two studies have suggested that men report more stigmatizing attitudes about depression (Cook & Wang, 2010; Griffiths et al., 2008). In terms of specific groups of individuals, of high interest may be those who influence decisions to seek help for depression, such as friends, family, and health care providers. Women are in frequent contact with health care providers during pregnancy and postpartum, with whom they might be most likely to interface with for initial referrals for depression treatment or prevention. Stigmatizing attitudes and negative emotions among such individuals, as compared to the general public, may have a greater impact on women’s decisions about treatment. Although research on depression stigma generally has found that health care providers expressed the least amount of stigma compared to participants of varying contact with depression (e.g., no exposure to depression to suffered from depression)(Griffiths et al., 2008), research on antenatal depression stigma specifically found that medical, pharmacy, and nursing students expressed at least some stigma towards women with antenatal depression, and that nursing students were most stigmatizing (Gawley, Einarson, & Bowen, 2011).

Our findings also should be considered in the context of our measurement methods. First, the current study constructed an attitudes measure based on qualitative literature about perceived depression stigma among pregnant and postpartum women and a review of mental illness and depression stigma measures, but it would be useful to the field to develop a standard measure for assessing stigmatizing attitudes about medical and mental health problems in order to facilitate comparisons across targets and samples.
Second, it is possible that participants did not report negative attitudes about the target groups due to social desirability (although the anonymity of the current study may have reduced demand characteristics) or lack of awareness of biases (Blair, 2002). Future research utilizing implicit measures, which measure attitudes less available to traditional explicit self report measurement methods and less vulnerable to sources of bias, may be useful for understanding negative attitudes towards depressed perinatal women and men. Research on implicit versus explicit measures of depression bias is limited, but suggests that negative attitudes about depression compared to a physical illness are more pronounced on implicit measures (Monteith & Pettit, 2011), that mental health care workers express negative implicit attitudes about people with mental illness despite reporting positive explicit attitudes (Brener, Rose, Von Hippel, & Wilson, 2013), and that implicit, but not explicit, biases are associated with recommending more controlling, restrictive, and non-autonomous interventions among mental health providers (Stull, McGrew, Salyers, & Ashburn-Nardo, 2013). However, other research suggests that mental health workers report positive attitudes about people with mental illness on both implicit and explicit measures, and that only explicit measures of bias predicted negative prognoses, whereas only implicit measures predicted overdiagnosis (Peris, Teachman, & Nosek, 2008). Future work is needed to examine dissociations between implicit and explicit mental health biases, and their unique or common correlates.

Third, in addition to implicit biases, it may be that negative attitudes are present in the public but are communicated in other ways. Indeed, research suggests that participants report higher perceived depression stigma than personal stigma (Griffiths et al., 2008). Negative attitudes toward depressed perinatal women (or men) may be communicated more powerfully at the level of popular media than at the level of individual interaction. It would be of value for
future research to utilize content analysis strategies (Durante et al., 2010) to examine the type of messages conveyed about depressed perinatal women and men on Twitter (Reavley & Pilkington, 2014), in news outlets, magazines, popular blogs, social media, and pregnancy and parenting literature.

Finally, our study does not speak to the relationships among self- and other-attitudes among depressed perinatal women and men. To what extent do depressed perinatal women and men internalize negative or stigmatizing messages, and at what cost? Recent research suggests that maternal attitudes, including beliefs related to others’ judgments (e.g., “if my baby is crying, people will think I cannot care for him/her properly”), beliefs related to maternal responsibility (e.g., “good mothers always put their baby’s needs first”), and beliefs related to maternal role idealization (e.g., “if I fail at motherhood, then I am a failure as a person”), were associated with depressive and anxiety symptoms among pregnant and postpartum first-time mothers (Sockol, Epperson, & Barber, 2014). Future research should examine the impact of self-stigma on help-seeking for perinatal depression.

In summary, the present research represents an important first step to examining societal attitudes toward perinatal depression. Although the current results suggest that depressed perinatal individuals are not viewed more harshly than non-perinatal depressed individuals generally, future research examining attitudes among specific populations and using alternate methods is needed. Specifically, this study highlights several questions for future research. First, are we surveying the right people? Second, are there better ways to examine attitudes? Third, are negative attitudes present in the public but communicated in other ways, like through the media? Fourth, to what extent do depressed perinatal women and men internalize these messages, and at what cost? Finally, this research suggests that depressed men are viewed more negatively than
depressed women; considering low-rates of help-seeking among men, future research should examine the relationship between depression stigma and treatment engagement in men.
Chapter 3

Depression Screening and Feedback Study: A Pilot Randomized Trial
Introduction

There is a robust literature examining the impact of brief, mailed interventions as cost-effective, scalable avenues to promote help seeking and positive mental and physical health outcomes. Mailed interventions, such as newsletters and tailored letters, have been shown to impact a number of physical health behaviors, including increased use of sunscreen and sun protective clothing, fewer sunburns, and fewer barriers to sun protection (Crane et al., 2012) increased mammography screening (Fox, Stein, Sockloskie, & Ory, 2001; Saywell, Champion, Skinner, Menon, & Daggy, 2004), and intentions to call 911 in a cardiac emergency (Meischke, Eisenberg, Schaeffer, Larsen, & Henwood, 1994).

Mailed interventions also have been shown to impact psychological distress and depression. For example, individuals at risk for suicide were randomized upon hospital discharge to receive either regular contact letters over the course of five years from a hospital or no contact letters (Motto & Bostrom, 2001). Participants who received regularly spaced contact letters from the hospital had a lower rate of suicide every year for five years compared to individuals who did not receive the letters. Though the authors did not test mediators of the intervention effect, they hypothesized that increased connectedness and decreased isolation helped decrease suicide rates. A single, brief mailed intervention has also been shown to be effective at reducing depression symptom severity among college students with elevated depression scores (Geisner, Neighbors, & Larimer, 2006). Participants who received a letter consisting of information about the prevalence of depression, personalized feedback about symptoms, and strategies for coping with depressive symptoms demonstrated decreased depression and hopelessness from pre-randomization to one month follow-up compared to a control group that received a thank you letter and list of community referrals. A single mailed
intervention also was found to decrease psychological distress among general practitioners compared to control participants (Holt & Del Mar, 2006).

Together, this research suggests that a brief, tailored feedback intervention may be effective at reducing symptoms of depression and increasing help-seeking (Dijkstra, De Vries, Roijackers, & van Breukelen, 1998; Kreuter, Bull, Clark, & Oswald, 1999; Kreuter & Strecher, 1996); the extension of this work to pregnant and postpartum women is warranted and is the focus of the current pilot randomized trial study.

The aim of this study was to examine the feasibility and impact of a screening and feedback intervention at a local OB/GYN office that had no formal depression screening protocol prior to this study. First, feasibility of and participant satisfaction with the intervention were examined descriptively as measured by rates of enrollment, attrition, and feedback about the intervention. Second, informed by research on the impact of feedback interventions on depression symptom severity, we hypothesized that participants in the intervention group would demonstrate significantly greater decreases in depression symptom severity from baseline to endpoint compared to participants in the usual care group. We also explored changes in anxiety symptom severity and self-compassion between groups. Third, we descriptively examined perceived barriers to help-seeking and actual help-seeking actions, and explored associations with depression symptom severity, anxiety, and self-compassion. Although the majority of research examining barriers to depression care among perinatal women has been qualitative, four quantitative studies have examined the most frequently reported barriers (J. H. Goodman, 2009; Maloni et al., 2013; Woolhouse, Brown, Krastev, Perlen, & Gunn, 2009), and the relative impact of different barriers (Kopelman et al., 2008). Each of these studies focused specifically on
barriers to seeking help from health professionals, and the current study expands upon this research by focusing on barriers to help-seeking generally.

**Method**

**Participants**

The Institutional Review Board at the University of Colorado Boulder approved the study protocol. All participants provided informed consent. We began recruiting participants in March 2014, and recruitment is ongoing. Participants were recruited from an obstetrician/gynecology (OB/GYN) practice in Boulder, Colorado. Staff gave patients the consent form and baseline measures during routine medical visits; patients were given the option of declining participation, completing baseline measures during their appointment, or participating online at home.

Eligibility criteria for the study included: 1) female, 2) 18 years of age or older, 3) pregnant or < 1 year postpartum, and 4) depressions symptom severity score > 9, as measured by the EPDS (described below). Participants who completed baseline measures were entered in one of ten study raffles for the chance to win a $25 Amazon gift card. Participants who were randomized to intervention or control were compensated with a $10 Amazon gift card after completing endpoint measures.

As of October 2014, a total of 139 participants completed baseline measures, and, of these, 20 participants scored above the depression symptom severity threshold and were randomized to the feedback intervention ($n = 10$) or usual care ($n = 10$). Table 1 displays participant demographic and clinical characteristics by group for those enrolled in the feedback component of the study ($n = 20$). Figure 1 illustrates participant flow using the CONSORT diagram. One participant randomized to the intervention reported that she did not receive the feedback letter, and was therefore categorized as usual care for all analyses.
Figure 1. CONSORT participant flow diagram.
Table 1

Baseline Demographic Characteristics for Randomized Participants

<table>
<thead>
<tr>
<th>Participant Characteristic</th>
<th>Received intervention ( (n = 7) )</th>
<th>Usual care ( (n = 10) )</th>
<th>Between-group differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, ( M (SD) )</td>
<td>36.14 (3.63)</td>
<td>34.50 (4.14)</td>
<td>( t(15) = -0.85 ) .41</td>
</tr>
<tr>
<td>Pregnant</td>
<td>100%</td>
<td>70%</td>
<td>( \chi^2(1) = 2.55 ) .23*</td>
</tr>
<tr>
<td>Weeks, ( M (SD) )</td>
<td>28.57 (7.30)</td>
<td>24.50 (8.02)</td>
<td>( t(11) = -0.96 ) .36</td>
</tr>
<tr>
<td>Postpartum</td>
<td>0%</td>
<td>30%</td>
<td>( \chi^2(1) = 2.55 ) .23*</td>
</tr>
<tr>
<td>Weeks, ( M (SD) )</td>
<td>N/A</td>
<td>7.00 (0.00)</td>
<td>N/A</td>
</tr>
<tr>
<td>Primiparous</td>
<td>16.7%</td>
<td>83.3%</td>
<td>( \chi^2(1) = 2.30 ) .30*</td>
</tr>
<tr>
<td>History of depression</td>
<td>71.4%</td>
<td>80%</td>
<td>( \chi^2(1) = 0.17 ) 1.00*</td>
</tr>
<tr>
<td>History of anxiety</td>
<td>71.4%</td>
<td>90%</td>
<td>( \chi^2(1) = 0.98 ) .54*</td>
</tr>
<tr>
<td>White</td>
<td>100%</td>
<td>100%</td>
<td>N/A</td>
</tr>
<tr>
<td>Not Hispanic or Latina</td>
<td>100%</td>
<td>100%</td>
<td>N/A</td>
</tr>
<tr>
<td>Cohabitating or married</td>
<td>100%</td>
<td>100%</td>
<td>N/A</td>
</tr>
<tr>
<td>Graduated college</td>
<td>90%</td>
<td>100%</td>
<td>( \chi^2(1) = 0.74 ) 1.00*</td>
</tr>
<tr>
<td>Employed at least part time</td>
<td>90%</td>
<td>57.1%</td>
<td>( \chi^2(1) = 2.47 ) .25*</td>
</tr>
</tbody>
</table>

*Fisher’s Exact Test was used because at least one cell had an expected count less than 5.

Procedures

After consenting, participants completed the demographics form, depression measure, anxiety measure, and self-compassion measure. All participants were provided a list of depression resources at baseline. Participants who scored above a 9 on the EPDS (described below) were randomized to receive the feedback letter or to usual care. Participants had a 50-50 chance of being randomized to either condition. The randomization sequence used a block size of four and no stratification. The allocation was concealed from study staff until after the participant had completed consenting and baseline measures. Block randomization was by a computer-generated list prepared by an investigator with no involvement in this study, and was revealed by study staff per participant after all enrollment activities were completed. Within one week of consenting, participants randomized to the intervention condition were sent the feedback letter by mail or email. Two to three days after the letter was sent, a study staff member followed up to ensure that the letter was received, and to answer any questions. Approximately two weeks...
after consenting, all randomized participants were emailed a link to complete the depression, anxiety, and self-compassion measures again, as well as measures assessing the impact of various barriers on likelihood of seeking help for depression, and actual help-seeking actions.

**Measures**

**Demographic information.** A project-designed questionnaire was used to collect basic demographic and clinical information. Participants completed a brief demographic questionnaire at baseline, and randomized participants provided additional demographic information at endpoint.

**Feasibility and satisfaction.** Feasibility and engagement were examined descriptively using rates of enrollment, reasons for declining participation, and attrition among women in the feedback component of the study. Participants not interested in participating in the study were asked to indicate their reason for declining on a provided form. The percentage of individuals who declined is likely a significant underestimate; BWC staff indicated that some participants declined participating but did not complete the provided form. Participants indicated at endpoint whether they received the mailed letter and read it, and the degree to which they found it helpful, warm, informative, and personal on a scale of 1 (strongly disagree) to 7 (strongly agree). Cronbach’s alpha on the four-item measure of satisfaction with the letter was 0.85.

**Depression symptom severity.** The Edinburgh Postnatal Depression Scale (EPDS) is a 10-item self-report measure designed to measure postpartum depression symptom severity, and is frequently used to assess depression during pregnancy (Cox, Holden, & Sagovsky, 1987). Cronbach’s alpha was 0.80 at baseline and 0.87 at endpoint. A depression symptom severity scale score was calculated as the sum of scale items. Scores can range from 0-30 with higher scores indicating higher depression symptom severity.
Anxiety. Participants completed the six-item State Trait Anxiety Inventory (STAI-6), which has been used in research with new moms (Tluczek, Henriques, & Brown, 2009). Cronbach’s alpha was 0.80 at baseline and 0.91 at endpoint. An anxiety symptom severity scale score was calculated as the sum of scale items. Scores can range from 6-24 with higher scores indicating higher anxiety symptom severity.

Self-Compassion. The Self-Compassion Scale (SCS) is a 26-item self-report questionnaire designed to measure the degree to which participants respond with self-compassion during difficult times (Neff, 2003). We administered the self-judgment, self-kindness, isolation, common humanity subscales of the SCS. The mindfulness and over-identified subscales were not administered. Cronbach’s alpha was 0.78 at baseline and 0.60 at endpoint for the self-judgment subscale score, 0.87 at baseline and 0.83 at endpoint for the self-kindness subscale score, 0.86 at baseline and 0.79 at endpoint for the isolation subscale score, and 0.75 at baseline and 0.88 at endpoint for the common humanity subscale score. SCS subscale scores were calculated as the mean of scale items. Scores can range from 1-5.

Barriers measure. Participants read over a list of 25 commonly reported barriers to help-seeking and indicated the extent to which each barrier affects the likelihood of seeking help for depression. The scale ranged from 1 (not at all affect) to 4 (greatly affect). Cronbach’s alpha was 0.86. A barriers scale score was calculated as the mean of scale items.

Help seeking actions. Participants indicated whether they sought help for depression in the past two weeks from a list of 12 possible sources (e.g., partner or spouse, professional counselor or therapist, OB/GYN doctor). A help-seeking scale score was calculated as the number of sources from which participants reported seeking help. Cronbach’s alpha was 0.48.
Participants completed four additional measures assessing intentions to seek help, perceived social norms, perceived control, and attitudes about help-seeking as part of another research study. Those data are not reported in the current manuscript.

**Intervention**

Participants randomized to the intervention received a letter with personalized feedback about their depression symptom severity score, a validating statement about the prevalence of perinatal depression, an expression of care and concern from their provider, and resource information.

**Usual Care**

Participants not randomized to the intervention received care as usual, and were not restricted from participating in depression treatment.

**Results**

**Feasibility and Satisfaction**

Since March 2014, 139 women have completed baseline measures. An additional 74 women declined participation because of lack of time ($n = 38$), not interested in research ($n = 26$), or other reasons ($n = 10$). Figure 1 illustrates participant flow using the CONSORT diagram, including rates of attrition. Of the 20 women who were randomized, two in the intervention group and one in the usual care group were lost to follow-up for reasons unknown. On average, participants neither agreed nor disagreed that the letter was helpful ($M = 4.57, SD = 1.81$), and somewhat agreed that it was warm ($M = 5.43, SD = 0.98$), informative ($M = 5.29, SD = 1.50$), and personal ($M = 5.14, SD = 1.46$).
Impact of the intervention

Table 2 displays means and standard deviations for depression symptom severity, anxiety symptom severity, and self-compassion at baseline and endpoint. There were no significant between group differences at baseline on the EPDS: a preliminary Levene’s test for equality of variances indicated that the variances of the two groups were significantly different, so an independent samples t-test that does not assume equal variances was conducted; \( t(8.06) = -1.52, p = .17 \). There were also no significant between group differences at baseline on the STAI-6 (\( t(15) = -1.89, p = .08 \)), or self-kindness (\( t(15) = 1.68, p = .11 \)), self-judgment \( t(14) = -0.63, p = .54 \), common humanity (\( t(14) = 0.86, p = .41 \)), or isolation (\( t(14) = 0.40, p = .70 \)) subscales of SCS.

Contrary to hypotheses, mixed ANOVAs revealed no significant group by time interactions for depression symptom severity (\( F(1,15) = 2.01, p = .18 \), partial \( \eta^2 = 0.12 \)). There was also no main effect of time for depression symptom severity (\( F(1,15) = 3.56, p = .08 \), partial \( \eta^2 = 0.19 \)). There was a marginally significant main effect of group, such that intervention participants had significantly higher depression symptom severity compared to usual care participants across timepoints, (\( F(1,15) = 4.35, p = .05 \), partial \( \eta^2 = 0.23 \)). There was no significant group by time interaction for anxiety symptom severity, (\( F(1,15) < 0.001, p = 0.99 \), partial \( \eta^2 <0.001 \)), or main effect of time (\( F(1,15) = 0.12, p = .74 \), partial \( \eta^2 = 0.01 \)). There was a main effect of group for anxiety symptom severity, such that intervention participants had significantly higher anxiety symptom severity compared to usual care participants across timepoints, (\( F(1,15) = 5.90, p = .03 \), partial \( \eta^2 = 0.28 \)). There were no significant group by time interactions, main effects of time, or main effects of group for scores on the self-kindness, self-judgment, common humanity, and isolation subscales.
Table 2
Baseline and Endpoint Scores on Self-Report Measures by Group

<table>
<thead>
<tr>
<th>Participant Characteristic, M (SD)</th>
<th>Received intervention (n = 7)</th>
<th>Received usual care (n = 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Endpoint</td>
</tr>
<tr>
<td>EPDS</td>
<td>12.86 (2.67)</td>
<td>12.43 (5.41)</td>
</tr>
<tr>
<td>STAI-6</td>
<td>14.43 (3.05)</td>
<td>14.71 (2.81)</td>
</tr>
<tr>
<td>SCS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-judgment</td>
<td>3.49 (0.71)</td>
<td>3.11 (0.55)</td>
</tr>
<tr>
<td>Self-kindness</td>
<td>2.49 (0.70)</td>
<td>2.46 (0.66)</td>
</tr>
<tr>
<td>Isolation</td>
<td>3.18 (0.89)</td>
<td>3.29 (1.07)</td>
</tr>
<tr>
<td>Common humanity</td>
<td>2.79 (0.93)</td>
<td>2.57 (1.01)</td>
</tr>
</tbody>
</table>

Note. SCS self-judgment and isolation data were missing from one usual care participant at baseline; common humanity data were missing from one intervention participant at baseline.

Barriers to help-seeking and help-seeking actions

Table 3 displays women’s reports of the extent to which barriers would impact their likelihood of seeking help for depression. On average, participants did not report being greatly impacted by the barriers. The top three barriers impacting likelihood of seeking help for depression were “I don’t think I am depressed,” “I don’t know the difference between clinically significant depression and normal mood changes that happen in pregnancy or postpartum,” and “I believe I should be able to handle this on my own.”

Table 3
Impact of Barriers on Likelihood of Seeking Help for Depression

<table>
<thead>
<tr>
<th>Item, M (SD)</th>
<th>Total (n=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1.61 (0.44)</td>
</tr>
<tr>
<td>I don't think I am depressed.</td>
<td>2.53 (1.28)</td>
</tr>
<tr>
<td>I don't know the difference between clinically significant depression and</td>
<td>2.47 (1.28)</td>
</tr>
<tr>
<td>normal mood changes that happen in pregnancy or postpartum.</td>
<td></td>
</tr>
<tr>
<td>I believe I should be able to handle this on my own.</td>
<td>2.24 (1.2)</td>
</tr>
<tr>
<td>I don't have time for treatment.</td>
<td>2 (1.17)</td>
</tr>
<tr>
<td>I can't afford help.</td>
<td>1.94 (1.09)</td>
</tr>
<tr>
<td>My insurance does not cover treatment.</td>
<td>1.94 (1.03)</td>
</tr>
<tr>
<td>I don't know where to go for help.</td>
<td>1.82 (1.13)</td>
</tr>
<tr>
<td>It's hard to find childcare.</td>
<td>1.82 (1.02)</td>
</tr>
<tr>
<td>I can't take time off work.</td>
<td>1.82 (1.02)</td>
</tr>
<tr>
<td>My health care provider lacks the skill to assess or treat depression.</td>
<td>1.65 (0.86)</td>
</tr>
<tr>
<td>Shame, guilt, or embarrassment.</td>
<td>1.59 (0.94)</td>
</tr>
</tbody>
</table>
I'm afraid of being judged or labeled. 1.59 (1.06)
I'm afraid that people would think I'm responsible for being depressed. 1.59 (1)
Treatment waiting lists are too long. 1.53 (0.87)
My health care provider minimizes my symptoms of depression. 1.53 (0.94)
I'm afraid that people would think I'm a bad mom. 1.53 (1.01)
My health care provider pushes a treatment strategy I am not interested in. 1.47 (0.94)
I believe that good mothers don't get depressed. 1.29 (0.77)
I'm afraid that other people might think I'm a danger to my baby. 1.24 (0.56)
My family would not support or approve of me getting help for depression. 1.18 (0.53)
My partner would not support or approve of me getting help for depression. 1.18 (0.39)
It's hard to find transportation. 1.12 (0.33)
I'm afraid of losing custody of my child(ren). 1.12 (0.49)
My friends would not support or approve of me getting help for depression. 1.12 (0.33)
I'm afraid of being hospitalized. 1 (0)

Note. Participants provided responses on a 4-point Likert scale where 1 was “not at all affect” and 4 was “greatly affect” the likelihood of seeking help for depression.

All except one participant reported seeking help for depression from at least one source in the prior two weeks (94.1%), and participants sought help from an average of 2.94 sources (SD=1.56). Table 4 displays the percentage of participants reporting seeking help for depression from twelve sources. The most common sources utilized were partner or spouse (94.1%), family member (52.3%), and friend (52.3%).

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner or spouse</td>
<td>94.1</td>
</tr>
<tr>
<td>Family member</td>
<td>52.3</td>
</tr>
<tr>
<td>Friend</td>
<td>52.3</td>
</tr>
<tr>
<td>Internet</td>
<td>29.4</td>
</tr>
<tr>
<td>Professional counselor or therapist</td>
<td>23.5</td>
</tr>
<tr>
<td>OB/GYN doctor</td>
<td>23.5</td>
</tr>
<tr>
<td>Psychiatrist</td>
<td>5.9</td>
</tr>
<tr>
<td>Nurse</td>
<td>5.9</td>
</tr>
<tr>
<td>Self-help books</td>
<td>5.9</td>
</tr>
<tr>
<td>Support group</td>
<td>0</td>
</tr>
<tr>
<td>Leader in a religious organization (e.g., priest, pastor, rabbi)</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4
Sources From Which Participants Sought Help for Depression in Prior Two Weeks
Table 5 displays Pearson bivariate correlations between these variables, and endpoint depression and anxiety symptom severity, and self-compassion. Depression symptom severity was positively associated with anxiety symptom severity and impact of barriers, and negatively associated with self-compassion at endpoint. None of the variables were significantly associated with the number of sources from which participants reported seeking help for depression.

Table 5: Correlations Between Endpoint Depression, Anxiety, Self-Compassion, and Impact of Barriers to Help-Seeking and Number of Sources From Which Participant Sought Help

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EPDS</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. STAI-6</td>
<td>.78**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. SCS Self-judgment</td>
<td>.29</td>
<td>.31</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. SCS Self-kindness</td>
<td>-.55*</td>
<td>-.41</td>
<td>-.48</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. SCS Isolation</td>
<td>.62**</td>
<td>.6*</td>
<td>.66**</td>
<td>-.58*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. SCS Common humanity</td>
<td>-.36</td>
<td>-.17</td>
<td>-.31</td>
<td>.56*</td>
<td>-.47</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Impact of barriers</td>
<td>.49*</td>
<td>.59*</td>
<td>.35</td>
<td>-.35</td>
<td>.53*</td>
<td>-.2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Number of help-seeking sources</td>
<td>.11</td>
<td>-.01</td>
<td>-.39</td>
<td>.22</td>
<td>-.08</td>
<td>-.04</td>
<td>-.14</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**. Correlation is significant at 0.01 level. *. Correlation is significant at 0.05 level.

Discussion

The current study aimed to examine the feasibility and impact of a brief, mailed intervention on depression symptom severity. Because data collection for this study is ongoing and analyses are likely underpowered, discussion points are presented in brief.

Rates of participant enrollment and retention suggest that the screening and feedback procedures of this study may be feasible. Study staff took responsibility for copying, assembling, and scoring the measures, sending the feedback letter, being available for questions, administering endpoint measures, and sending reminders. It is uncertain whether it would be feasible for and acceptable to clinic staff to implement these procedures independently, though there may be options for streamlining procedures to reduce workflow burden. The satisfaction data suggest that revision of the current feedback letter is warranted. Future iterations of this
work may benefit from pilot testing of the feedback letter in order to improve ratings of satisfaction (e.g., helpfulness, warmth, etc).

Contrary to our predictions, participants who received the feedback letter did not report a greater decline in depression severity compared to participants in usual care. In their feedback letter to college students with elevated depression symptom severity, Geisner and colleagues included in their letter suggestions about ways to cope with depression. Future iterations of this study should examine whether including information about how to cope with depression improves depression outcomes.

The barrier having the greatest impact on likelihood of seeking help for depression was “I don’t think I am depressed.” Indeed, the average endpoint EPDS score was 9.94, which is below what has been suggested in prior research as indicative of major depression. Conventionally, scores above 9 are considered to indicate that additional follow-up is warranted (Cox et al., 1987), and 13 is considered the optimum cut-off score for screening major depression in postpartum women, and 15 for pregnant women (Matthey, Henshaw, Elliott, & Barnett, 2006). However, when considered together with the second more impactful barrier (“I don’t know the difference between clinically significant depression and normal mood changes that happen in pregnancy or postpartum”), it is possible that participants in this sample may benefit from receiving information describing common symptoms of depression during pregnancy and postpartum, how perinatal depression differs from normal mood fluctuations, how to know when to get help, and descriptions of a variety of options ranging from low intensity interventions such as self-guided, social-support or peer-support options, to more high intensity interventions, such as psychotherapy. Of note, participants in the current study indicated that stigma did not greatly impact the likelihood of seeking help for depression, in contrast to three prior studies in which
stigma was one of the top three barriers (J. H. Goodman, 2009; Maloni et al., 2013; Woolhouse et al., 2009).

It is striking that all but one participant reported seeking help for depression from at least one source in the two weeks prior to completing endpoint measures. It may be important to examine the impact of barriers to care specifically among women who have not yet sought help for depression. Consistent with research by Henshaw and colleagues (2013), more women reported seeking help from their social support networks than from health care providers. Because the majority of participants reported seeking help from a partner or spouse (94%), family member (53%) or friend (53%), future research may examine ways to leverage women’s trusted social support networks to improve depression identification and treatment.

As expected, depression symptom severity was significantly associated with anxiety symptom severity and self-compassion at endpoint. Though numerous other studies have documented the relationship between depression symptom severity and self-compassion, the present study is the first to our knowledge to extend this to perinatal women. Depression symptom severity was also associated with barriers, such that more depressed individuals reported a higher impact of barriers on the likelihood of seeking help for depression.

Although these data suggest that ongoing development of the screening and feedback intervention is warranted, analyses are likely underpowered due to small sample size, and generalizability is limited by the fact that all participants recruited to date have been white, highly educated, and employed.
Chapter 4

Mindful Mood Balance for Moms
Introduction

Women with a history of depression are at greater risk for becoming depressed during the perinatal period (C. T. Beck, 2001; Bloch, Rotenberg, Koren, & Klein, 2006), with rates as high as 30% of women meeting criteria for depression during pregnancy (S. H. Goodman & Tully, 2009). Preventive approaches may have unique benefit in averting the obstetric, neonatal, and developmental risks associated with perinatal depression. In recent research both with pregnant women generally and pregnant African American women specifically, there were strong preferences for preventive approaches that involve psychotherapy (i.e., IPT and Mindfulness Based Cognitive Therapy) compared to pharmacotherapy (Dimidjian & Goodman, 2014; S.H. Goodman, Dimidjian, & Williams, 2013). Further, perceived credibility and personal reactions to the psychotherapy preventive approaches were significantly more positive than for pharmacotherapy.

A recent review (Dennis & Dowswell, 2013) and meta-analysis (Sockol, Epperson, & Barber, 2013) suggest that interventions to prevent postpartum depression effectively reduce depressive symptoms and risk for future episodes or elevated symptom severity. Findings from clinical trials provide support for the efficacy of IPT and CBT as prevention strategies for perinatal women (Austin et al., 2008; Cho, Kwon, & Lee, 2008; Lara, Navarro, & Navarrete, 2010; Le, Perry, & Stuart, 2011; Nieuwsma & Pepper, 2010; Tandon, Perry, Mendelson, Kemp, & Leis, 2011; Wisner et al., 2004; Zlotnick, Johnson, Miller, Pearlstein, & Howard, 2001).

In addition, data from an open trial examination of Mindfulness Based Cognitive Therapy (MBCT) adapted for the perinatal period shows promise for depression prevention among pregnant women (Dimidjian, Goodman, et al., 2014), consistent with the substantial evidence base for MBCT among non-perinatal population (Godfrin & van Heeringen, 2010; Kuyken et al.,
Several recent studies document the acceptability of mindfulness interventions among perinatal women (Dunn, Hanieh, Roberts, & Powrie, 2012; J. H. Goodman et al., 2014; Vieten & Astin, 2008), and beneficial impacts of maternal mindfulness on infants (van den Heuvel, Donkers, Winkler, Otte, & Van den Bergh, 2014).

Despite the availability of evidence based prevention options, research suggests that few perinatal women receive care. Pragmatic barriers to care have been reported in survey studies among depressed individuals, including location and convenience of care, patient and provider time, insurance (CooperPatrick et al., 1997), travel time (Fortney, Rost, Zhang, & Warren, 1999), and out-of-pocket cost (Simon, Grothaus, Durham, VonKorff, & Pabiniak, 1996). Additionally, qualitative research shows that perinatal women report a preference for mental health care that occurs within the home or obstetrics clinic, is timely, and includes flexible options (Flynn et al., 2010). In a recent open trial of MBCT tailored for the perinatal period to prevent depression relapse among pregnant women with histories of depression (MBCT-PD), participants evidenced significant pragmatic barriers to obtaining treatment despite its location within obstetrics clinics (Dimidjian, Goodman, et al., 2014). Among participants who completed a phone screen to participate in the open trial of the MBCT-PD, 6% declined to participate because the distance to the clinic where the group was held was too far to travel, and 26% were unavailable for the scheduled group time.

To overcome many of the pragmatic barriers of help seeking, recent clinical innovation has focused on the development of web based services. A review of 26 randomized control trials (RCT) demonstrates substantial growth over time in the number of RCTs evaluating the efficacy of web-based interventions for depression or anxiety, all of which utilized a CBT approach.
In a meta-analysis of 12 randomized control studies evaluating web-based treatment for adult depression, Andersson and Cuijpers (2009) found an effect size of 0.41 for those comparing computerized/web-based treatment to control, and an effect size of 0.61 for those that included some form of therapist support, such as email or phone contact. A randomized controlled trial found that web-based CBT with therapist support was as effective as face-to-face CBT for reducing depression symptom severity over the course of the 8-week intervention, and that it outperformed face-to-face CBT at the 3-month follow-up (Wagner, Horn, & Maercker, 2014). These findings are consistent, also, with meta-analytic findings suggesting that computer-based treatments for depression are effective, and interventions that include additional support are associated with better outcomes and retention (Richards & Richardson, 2012). Examples of additional support include email reminders and non financial incentives (Moritz, Schilling, Hauschildt, Schroder, & Treszl, 2012), email guidance from a therapist (Berger, Hammerli, Gubser, Andersson, & Caspar, 2011), and program tailoring based on participant intake self-report and interview data (Johansson et al., 2012).

Few studies have examined the use of web- or computer-based delivery either for prevention (versus treatment) or for mindfulness-based interventions. Hollandare and colleagues (2013) found that participants in a web-based depression prevention program experienced significantly lower rates of relapse over two years compared to control participants. Among undergraduates at high risk for developing a common mental disorder (e.g., depression, anxiety, substance use disorder, eating disorder), participation in a web-based prevention program was associated with a decrease in depression and anxiety symptom severity (Musiat et al., 2014). Three studies suggest the feasibility of web-based interventions using mindfulness strategies (Boettcher et al., 2014; Morledge et al., 2013a; Thompson et al., 2010).
Taken together, these studies suggest that web-based interventions for depression have promising outcomes that may be augmented by program tailoring, including offering support and guidance to assist with participant retention, and that exploration of preventive and mindfulness-based approaches may be warranted. Moreover, the extension of such work to at-risk pregnant women may be of particular value. Research shows that many pregnant women use the Internet to seek pregnancy-related information (L. Lagan, Sinclair, & Kernohan, 2006) and to inform their decisions (B. M. Lagan, Sinclair, & Kernohan, 2010), and that many postpartum women experiencing at least mild symptoms of depression seek information about postpartum depression using the Internet (Maloni et al., 2013). Several recent studies have examined the feasibility and outcomes of web-based depression treatments for perinatal women. For example, in a feasibility trial of MomMoodBooster, Danaher and colleagues (Danaher et al., 2013) found that 86% of postpartum women with mild to moderate depression symptom severity completed all 6 sessions and demonstrated significant improvement in depression symptom severity over the course of the intervention. Mom-Net, a web-based CBT intervention with weekly phone coaching, was developed for disadvantaged mothers of young children with elevated depression symptom severity (Sheeber et al., 2012). Participants in the intervention group completed an average of 6.4 out of 8 sessions and evidenced a significant decrease in depression symptom severity compared to a waitlist control group.

As is true for web-based depression treatment programs generally, additional program support appears to be important for perinatal women. In their original iteration of Netmums, O’Mahen and colleagues (2013) offered minimal program support and observed high attrition (i.e., 39% completed 15-week follow-up measures). Significantly fewer intervention participants were categorized as depressed compared to TAU participants at 15-week follow-up. A later
version of this program offered phone call support, and was associated with better retention (i.e., 83% completed 15-week follow-up measures), and intervention participants evidenced significantly lower depression scores post-treatment compared to TAU (O'Mahen et al., 2014).

In the present study, pregnant women at risk for depressive relapse, based on prior history of depression, were recruited to examine the feasibility and preliminary outcomes of a within-subjects open trial design of Mindful Mood Balance (MMB), a web-based MBCT program designed to prevent depression relapse. Study hypotheses were informed by prior research suggesting that MMB is a feasible web-based intervention for individuals with a history of depression (Boggs et al., 2014; Dimidjian, Beck, et al., 2014; Felder et al., 2014), and that in-person MBCT is associated with beneficial clinical outcomes for pregnant women with a history of depression (Dimidjian, Goodman, et al., 2014).

We examined four hypotheses. First, we predicted that MMB would be feasible to deliver among at-risk pregnant women and examined descriptively rates of identification and enrollment. Second, we predicted that participants would demonstrate engagement with MMB, as measured by session completion, participation in phone coaching calls, home practice completion, scores on self-report satisfaction questionnaires, and responses on an exit interview. Third, we tested the hypothesis that women would demonstrate significant decreases in depression symptom severity over the course of the intervention. Fourth, we tested the hypothesis that participants would experience significant improvements in various indices of psychological well-being from intake to post-treatment, including significant decreases in measures of stress, anxiety, dysfunctional attitudes, and rumination, and significant increases in mindfulness, decentering, social support, relationship satisfaction, acceptance, and self-compassion.
Method

Participants

The study protocol was approved by the institutional review boards at University of Colorado Boulder, Kaiser Permanente Colorado, and HealthPartners Institute for Education and Research. All participants provided written informed consent. Participants were recruited from the Boulder community from April – December 2013 via online resources (e.g., Boulder Rockn Moms listserv, CU-Boulder Today emails, and craigslist), flyers posted at local medical settings in which participants may be identified for prior depression or current pregnancy, and flyers posted in retail stores catering to pregnant women. Participants were recruited from Kaiser Permanente Colorado from April 2013 – January 2014 via flyers, brochures, and direct referral from obstetric care providers. Participants were recruited from HealthPartners from January – April 2014; a programmer identified women 18 years old and older receiving prenatal care, and sent a message to each woman’s provider asking for approval to invite them to the program. If approval was received or there was no answer in five business days, HealthPartners staff sent an invitation letter and conducted a follow up call within five days.

Inclusion criteria included: 1) currently pregnant, 2) 18 years of age or older, 3) history of at least one past major depressive episode. Kaiser Permanente participants were additionally required to have a PHQ-9 score ≤12. Exclusion criteria included: 1) currently meeting criteria for a major depressive episode, 2) current suicidality, 3) indication of serious mental illness or other disorders or symptoms that necessitate priority treatment. Table 1 displays participant demographic and clinical characteristics. Participants were reimbursed up to $50 in gift cards for completing study assessments.
### Table 1
**Participant Demographic and Clinical Characteristics at Intake**

<table>
<thead>
<tr>
<th>Participant Characteristic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, $M (SD)$</td>
<td>30.49 (4.09)</td>
</tr>
<tr>
<td>Gestational week at intake, $M (SD)$</td>
<td>24.53 (7.81)</td>
</tr>
<tr>
<td>Primiparous</td>
<td>48.6%</td>
</tr>
<tr>
<td>Currently married or cohabiting</td>
<td>91.9%</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>2.7%</td>
</tr>
<tr>
<td>African American</td>
<td>5.4%</td>
</tr>
<tr>
<td>White</td>
<td>86.5%</td>
</tr>
<tr>
<td>Other</td>
<td>5.4%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>10.8%</td>
</tr>
<tr>
<td>Past number of episodes</td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>16.2%</td>
</tr>
<tr>
<td>Two</td>
<td>24.3%</td>
</tr>
<tr>
<td>Three or more</td>
<td>59.5%</td>
</tr>
<tr>
<td>Psychiatric Comorbidity (PDSQ)</td>
<td></td>
</tr>
<tr>
<td>PTSD</td>
<td>13.5%</td>
</tr>
<tr>
<td>OCD</td>
<td>18.9%</td>
</tr>
<tr>
<td>Social Phobia</td>
<td>27.0%</td>
</tr>
<tr>
<td>Panic Disorder</td>
<td>2.7%</td>
</tr>
<tr>
<td>Alcohol Abuse/Dependence</td>
<td>13.5%</td>
</tr>
<tr>
<td>Drug Abuse/Dependence</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Note. PTSD = Post-traumatic stress disorder; OCD = Obsessive Compulsive Disorder.*

### Intake Procedures

Interested participants were invited to call a study coordinator for more information and phone prescreening. Participants who were eligible based on the prescreening were scheduled for an intake appointment to complete consenting and further screening. Participants for whom completing an in-person intake appointment was not feasible were given the option of completing the intake via phone. Eligible participants were oriented to the MMB program and procedures. Participants were asked to complete one MMB session per week for 8 weeks plus daily home practice, and encouraged to participate in weekly phone coaching. Orienting included
engagement strategies, and identification and troubleshooting of potential barriers for participation (Duffecy, Kinsinger, Ludman, & Mohr, 2011). Finally, participants completed intake measures online, and received their login information to the MMB program.

**Mindful Mood Balance Program**

The MMB program is delivered in 8 web sessions, featuring guided mindfulness and yoga practices, cognitive-behavioral strategies, and psychoeducation, consistent with standard in-person MBCT. Each MMB session utilizes experiential learning techniques via mindfulness practices and reflection questions, and didactic learning techniques via description of cognitive behavioral strategies. Additionally, MMB features videos from an in-person MBCT group to facilitate vicarious learning. Group members in the videos describe their experiences of mindfulness practices and challenges of the program. Table 2, previously reported in Felder et al. (2014), outlines the topic and targets of each session.

<table>
<thead>
<tr>
<th>Session Topic</th>
<th>Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Automatic pilot</td>
<td>Recognizing cognitive, behavioral, and affective automatic patterns and how such automaticity can be associated with increased risk of relapse/recurrence during periods of sad mood; committing to mindfulness practice as a means of stepping out of automatic pilot</td>
</tr>
<tr>
<td>2. Dealing with barriers</td>
<td>Practicing moving attention to specific foci to learn that attention can be intentional as opposed to automatic; identifying barriers to mindfulness practice that arise, with specific focus on automatic cognitive patterns</td>
</tr>
<tr>
<td>3. Mindfulness of breathing</td>
<td>Increasing awareness of how often the mind is busy/scattered; introducing key formal practices including mindfulness of breathing, walking, and yoga</td>
</tr>
<tr>
<td>4. Staying present</td>
<td>Increasing awareness of the ways avoidance or clinging to particular experiences can be associated with depression; practicing a new mode of responding that stays present and attentive in the face of difficulty; identifying symptoms and cognitions characteristic of depression as early warning signs</td>
</tr>
<tr>
<td>5. Allowing and Letting be</td>
<td>Increasing use of mindful attention at the first step in responding effectively to difficulties, including difficult internal experience</td>
</tr>
</tbody>
</table>
such as sadness; decreasing judgmental thoughts and avoidant responses to difficulties

6. Thoughts are not facts
Decreasing affective reactivity to thoughts previously associated with depression; learning to “de-center” from difficult thoughts, realizing that thoughts are merely thoughts; recognizing patterns of recurring thoughts

7. How can I best take care of myself?
Identifying unique warning signs of relapse (“relapse signature”); identifying activities that improve or deteriorate mood; developing action plans to implement during periods of high risk; using mindfulness practice explicitly to guide action plan steps

8. Using what has been learned to deal with future moods
Consolidating relapse prevention plans and identification of specific warning signs; anticipating future; identifying the importance of regular routines associated with well-being to maintain mood; planning a daily routine of regular mindfulness practice; reinforcing links between mindfulness practices and prevention of depression

Note. Table previously reported in Felder et al. (2014)

Participants were encouraged to participate in weekly phone coaching sessions that aimed to target barriers to participation specific to the intervention (e.g., uncertainty about how the program would help prevent depression), web-based implementation (e.g., questions about how to navigate website), or pregnancy (e.g., physical discomfort during longer meditations), and to provide the social support benefits of a group from the comfort and convenience of women’s own homes. Phone coaching sessions were offered at various times throughout the week to accommodate a range of schedules. Each call began with brief introductions, and a check-in about each woman’s experience with the weekly session content and home practice. Participants were asked to share voluntarily what they noticed during their mindfulness practices, the ways in which their experiences during the practices differ from typical ways of behaving, and the ways in which program participation may be relevant to prevention of depression during the perinatal period. Phone coaching sessions also offered an opportunity to provide psychoeducation about perinatal depression. Consistent with in-person MBCT groups, the phone coaching sessions were led with a spirit of collaboration, compassion, and curiosity about experience.
Measures

**Demographic information.** A project-designed questionnaire was used to collect basic demographic and contact information.

**Intervention feasibility, engagement, and satisfaction:** Rates of participant identification (i.e., number of participants that completed the phone prescreen) and enrollment were used to measure program feasibility. Participant engagement was operationalized as session completion, participation in home practice, and use of program support. An 8-item Client Satisfaction Questionnaire was used to assess satisfaction with the MMB Program (Larsen, Attkisson, Hargreaves, & Nguyen, 1979), with higher scores indicating greater satisfaction (Cronbach’s alpha = 0.93). A project-designed Satisfaction and Usability Survey was used to measure content readability, ease of navigation, and value of the MMB program on a seven-point Likert scale. As previously described (Felder, Dimidjian, & Segal, 2011), scores below a 5 indicate a need to examine a given dimension more closely. Participants were additionally asked to complete an exit interview upon completion or drop-out in order to provide a qualitative assessment of program satisfaction. The exit interview included 19 open-ended questions that focused both on satisfaction with the MMB program and using the website. Exit interviews were audio recorded and transcribed. Exit interview codings were conducted by two research assistants, who rated each interview for 27 thematic codes, derived from prior qualitative research of participant experiences with MBCT (Allen, Bromley, Kuyken, & Sonnenberg, 2009; Bailie, Kuyken, & Sonnenberg, 2012; Boggs et al., 2014). The intervention satisfaction measures were collected at post-treatment.

**Baseline diagnostic status:** The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) is a semi-structured interview measure designed to make clinical judgments
on Axis I of the DSM-IV five axis system (First, Spitzer, Gibbon, & Williams, 1994). The SCID-I was used to assess current and past depression at baseline. The Psychiatric Diagnostic Screening Questionnaire (PDSQ) was used at baseline to assess possible psychiatric comorbidity (Zimmerman & Mattia, 2001). The PDSQ is a self-report questionnaire containing 13 subscales. For the current study, participants completed the following subscales: Post-traumatic stress disorder (15 items assessing symptoms over last two weeks; Cronbach’s alpha = 0.80), obsessive-compulsive disorder (7 items assessing symptoms over last two weeks; Cronbach’s alpha = 0.59), social phobia (15 items assessing symptoms over last six months; Cronbach’s alpha = 0.90), alcohol abuse/dependence (6 items assessing symptoms over last six months; Cronbach’s alpha = 0.74), drug abuse/dependence (6 items assessing symptoms over last six months; Cronbach’s alpha could not be calculated for drug abuse due to zero variance), panic disorder (8 items assessing symptoms over last two weeks; Cronbach’s alpha = 0.68). Table 1 presents the percentage of participants scoring above the recommended cutoff score for each subscale, indicating that further assessment may be warranted to determine a diagnosis. The recommended cutoff scores are as follows: 5 for post-traumatic stress disorder, 1 for obsessive-compulsive disorder, 4 for social phobia, 1 for alcohol abuse/dependence, 1 for drug abuse/dependence, and 4 for panic disorder.

**Depression symptom severity:** The Edinburgh Postnatal Depression Scale (EPDS) is a 10-item self-report measure designed to measure postpartum depression symptom severity, and frequently used to assess depression during pregnancy (Cox et al., 1987) (alpha = 0.79 at intake and 0.90 at post-treatment). The Patient Health Questionnaire (PHQ-9), a 9-item measure of depression symptom severity, also was used (alpha = 0.82 at intake and 0.93 at post-treatment)
Participants completed the EPDS and PHQ-9 at intake, weekly during participation in the MMB program, and at post-treatment.

**Cognitive Variables:** The Ruminative Responses Scale (RRS) is a 22-item self-report measure of repetitive self-focused thought patterns related to negative thoughts, events, and emotions (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). The measure contains two subscales, one with 12 items confounded with depression, and another with 10 potential rumination items (Treynor et al., 2003). Further analysis suggested two factors, a “reflection” (5 items, range = 5-20) and a “brooding” factor (5 items, range = 5-20), with brooding hypothesized to be more maladaptive (alpha = 0.96 at intake and 0.94 at post-treatment on the RRS-Total scale).

Participants completed ratings of dysfunctional emotions and thoughts on the 17-item Dysfunctional Attitudes Scale (DAS-17) (de Graaf, Roelofs, & Huibers, 2009). Higher scores on the DAS-17 indicate more dysfunctional attitudes (alpha = 0.91 at intake and 0.94 at post-treatment).

**Mindfulness and Acceptance Measures:** The Five Facet Mindfulness Questionnaire (FFMQ) is a 39-item self-report measure that assesses five domains of mindfulness, including: observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Baer et al., 2008). Higher scores on the FFMQ total and subscale scores indicate greater self-reported mindfulness (alpha = 0.91 at intake and post-treatment for FFMQ total). The Experiences Questionnaire (EQ) is a 20-item self-report measure of decentering, or the ability to observe thoughts with distance (Fresco et al., 2007). Higher scores suggest greater decentering (alpha = 0.85 at intake and 0.78 at post-treatment). The Self-Compassion Scale (SCS) is a 26-item self-report questionnaire designed to measure the degree to which participants respond with self-compassion during
difficult times (Neff, 2003). The SCS contains 6 subscales, including Mindfulness, Common Humanity, Self-Kindness, Over-Identified, Isolation, and Self-Judgment (alpha = 0.93 at intake and post-treatment on the SCS-total scale). The Acceptance and Action Questionnaire (Hayes et al., 2004) (AAQ) is a nine item self-report instrument designed to measure experiential avoidance or the attempt to avoid or control, rather than accept, internal experience. Higher scores indicate more psychological acceptance and less avoidance (alpha = 0.73 at intake and 0.72 at post-treatment). The cognitive measures were completed at intake and post-treatment.

**Anxiety and Stress:** The Perceived Stress Scale (PSS) is a 14-item self-report measure of perceived stress over the last month (Cohen, Kamarck, & Mermelstein, 1983). Higher scores on the PSS indicate higher stress (alpha = 0.88 at intake and post-treatment). We used the Beck Anxiety Inventory (BAI) as a self-report measure of anxiety symptoms (A. T. Beck, Epstein, Brown, & Steer, 1988). This 21-item questionnaire yields scores indicating levels of anxiety levels over the past week; scores range from 0 to 63 with higher scores indicating greater anxiety (alpha = 0.80 at intake and 0.71 at post-treatment). It has documented concurrent validity and internal consistency, and is widely considered the preferred measure to establish baseline anxiety levels in mood disorder participants. Anxiety and stress data were collected at intake and post-treatment.

**Relationship satisfaction:** The Social Support Questionnaire (SSQ) is a 6-item self-report measure of number of and satisfaction with social support over the past month (Sarason, Sarason, Shearin, & Pierce, 1987). Higher scores on the SSQ-n subscale indicate more social supports, and higher scores on the SSQ-s subscale indicate greater satisfaction with social support (alpha = 0.84 at intake and 0.85 at post-treatment for SSQ-n; and 0.76 at intake and 0.83 at post-treatment for SSQ-s). The Dyadic Adjustment Scale is a 32-item self-report questionnaire
that measures frequency of agreement, disagreement, and happiness with a partner (Spanier & Filsinger, 1983). Higher scores indicate better dyadic adjustment (alpha = 0.89 at intake and 0.94 at post-treatment). Relationship satisfaction data were collected at intake and post-treatment.

**Data Analysis**

Results were analyzed for the intent-to-treat sample consisting of all participants who enrolled in the study. Feasibility and engagement were examined descriptively using rates of enrollment, reasons for ineligibility or participant decline, session completion, reasons for attrition, phone coaching attendance, home practice completion, and satisfaction as measured by the qualitative exit interviews and the satisfaction questionnaire.

Hierarchical Linear Modeling (HLM) using MIXED models in SPSS version 22.0 was used to examine change in depression symptom severity from intake, through the 8-week intervention, to post-treatment (J. D. Singer, 1998; Judith D. Singer & Willett, 2003). This approach was used to accommodate the repeated measures of the data, missing data, and unequal spacing between time intervals. For level one, a basic linear growth model was used to examine within-person change over time:

\[ Y_{ij} = \beta_0 + \beta_1(Time) + r_{ij} \]

In this model, \( \beta_0 \) is the intake depression symptom severity score (e.g., PHQ-9 or EPDS) for individual \( i \), \( \beta_1 \) is the linear rate of change for individual \( i \), and \( r_{ij} \) is the residual in the outcome variable for individual \( i \) at Time \( t \). \( Y_{ij} \) is the repeated depression symptom severity score for individual \( i \) at time \( t \). For level two, a random linear time model was used to describe between person differences in change:

\[ \beta_{0i} = \gamma_{00} + u_{0i} \]
\[ b_{1i} = \gamma_{10} + u_{1i} \]

In these models, \( \gamma_{10} \) is the predicted depression symptom severity score at intake, \( u_{0i} \) represents the deviation from the fixed intercept at intake for individual \( i \), \( \gamma_{10} \) is the predicted mean rate of change in depression symptom severity score per unit of time, \( u_{1i} \) represents the deviation from the fixed linear time slope for individual \( i \).

Paired samples t-tests were used to examine intake to post-treatment changes in psychological acceptance, decentering, number of and satisfaction with social supports, dyadic adjustment, mindfulness, including awareness, observing, describing, non-judging, and non-reacting subscales, and self-compassion, including mindfulness, common humanity, self-kindness, over-identified, isolation, and self-judgment subscales. Paired samples t-tests were also used to examine intake to post-treatment changes in dysfunctional attitudes, stress, anxiety, and rumination. Effect sizes (i.e., \( r^2 \)) were calculated to assess the magnitude of change from intake to post-treatment, where \( r^2 = 0.01 \) indicate a small effect, \( r^2 = 0.09 \) indicate a medium effect, and \( r^2 = 0.25 \) indicate a large effect.

**Results**

**Participant Enrollment and Flow**

Rates of enrollment and participant flow are presented in a CONSORT diagram in Figure 1. Of the 123 women who completed a phone screen, reasons for ineligibility were no history of major depression (\( n = 28 \)), currently depressed (\( n = 10 \)), technical barriers (\( n = 2 \)), serious mental illness (\( n = 1 \)), and miscarriage before intake (\( n = 1 \)). Reasons for decline at prescreen included the time commitment (\( n = 8 \)), dealing with a stressful life event (\( n = 1 \)), or nonresponsive (\( n = 12 \)). Reasons for decline at prescreen is missing for 13 HP participants. Reasons that participants were ineligible at intake were no history of major depression (\( n = 5 \)), currently depressed (\( n = 1 \)),
technical barriers \((n = 2)\), and serious mental illness \((n = 1)\). Reasons for decline at intake included lack of interest \((n = 1)\) and nonresponsive \((n = 1)\).

Of the 37 women who enrolled, 16 participants failed to complete the intervention, defined as completing at least four sessions. Of these, 12 were lost-to-follow up, and 4 withdrew due either to the time commitment \((n = 3)\) or because the program was not perceived to be a good fit for needs \((n = 1)\). Of the 21 women who completed the intervention, 4 were lost to follow-up and 5 withdrew after completing the fourth session because of the time commitment \((n = 1)\).

Figure 1. CONSORT participant flow diagram.

Of the 37 women who enrolled, 16 participants failed to complete the intervention, defined as completing at least four sessions. Of these, 12 were lost-to-follow up, and 4 withdrew due either to the time commitment \((n = 3)\) or because the program was not perceived to be a good fit for needs \((n = 1)\). Of the 21 women who completed the intervention, 4 were lost to follow-up and 5 withdrew after completing the fourth session because of the time commitment \((n = 1)\).
= 4) or to focus on acute (versus preventive) treatment for depression ($n = 1$).

There were no significant differences at intake by recruitment source for age, gestational week, primiparity, marital status, race, or psychiatric comorbidity.

**Participant Engagement and Satisfaction**

The completion rate for MMB was 56.76%, and participants completed an average of 4.72 sessions. Participants reported completing any home practice on 22.27 ($SD = 14.23$) out of 42 possible days, including an average of 3.29 ($SD = 2.23$) informal practices per week for an average of 55.39 ($SD = 38.79$) minutes per week, and an average of 3.84 ($SD = 2.61$) formal practices per week for an average of 64.62 ($SD = 45.25$) minutes per week. Approximately half of participants (48.65%) completed at least one phone coaching call, and, overall, participants completed an average of 2.11 ($SD=2.86$) phone coaching calls.

Participants reported satisfaction with the MMB intervention on the CSQ-8, $M = 27.53$, $SD = 4.17$. Participants also indicated high satisfaction with the MMB website and intervention on the ease of use ($M = 6.07$, $SD = 0.19$), readability ($M = 5.74$, $SD = 0.21$), and value ($M = 5.51$, $SD = 0.24$) dimensions of the Satisfaction and Usability Survey. Thematic coding of the exit interviews (see Table 3) highlights both perceived benefits of and challenges with the MMB program. The majority of respondents reported that the program increased their sense of control over depression (Control theme; 76.5%), helped them take action or respond to early warning signs of depression (Action theme; 94.1%), and helped them relate differently to depressive thoughts and feelings (Depression objectified theme; 82.4%). Almost every respondent also indicated at least some difficulty or disappointment with the program (Struggle theme; 94.1%), and many reported technical problems (Technical theme; 58.8%) and desire for more of a community component (Community theme; 70.6%).
<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Non-completers (n = 4)</th>
<th>Completers (n = 13)</th>
<th>All respondents (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control</strong></td>
<td>Increased sense of agency or control over depression</td>
<td>50.0%</td>
<td>84.6%</td>
<td>76.5%</td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td>Program helped participant take action in response to early warning signs of depression</td>
<td>75.0%</td>
<td>100%</td>
<td>94.1%</td>
</tr>
<tr>
<td><strong>Irritability</strong></td>
<td>Used the 3-Minute Breathing Space to manage irritability arising from stress</td>
<td>0.0%</td>
<td>38.5%</td>
<td>29.4%</td>
</tr>
<tr>
<td><strong>Relaxation</strong></td>
<td>Used formal or informal mindful practices to relax, or mentioning an increased feeling of relaxation as a result of the course</td>
<td>0.0%</td>
<td>30.8%</td>
<td>23.5%</td>
</tr>
<tr>
<td><strong>Awareness</strong></td>
<td>Increased mindfulness of daily activities, the intentional noticing of everyday experiences</td>
<td>75.0%</td>
<td>69.2%</td>
<td>70.6%</td>
</tr>
<tr>
<td><strong>Depression</strong></td>
<td>Relating differently to depressive thoughts and feelings; seeing thoughts as thoughts, not facts.</td>
<td>75.0%</td>
<td>84.6%</td>
<td>82.4%</td>
</tr>
<tr>
<td><strong>Objectified</strong></td>
<td>Recognizing early warning signs that depression might be returning</td>
<td>25.0%</td>
<td>46.2%</td>
<td>41.2%</td>
</tr>
<tr>
<td><strong>Discerning Relapse</strong></td>
<td>Allowing difficult emotions, experiences; completing important activities despite difficulty.</td>
<td>75.0%</td>
<td>61.5%</td>
<td>64.7%</td>
</tr>
<tr>
<td><strong>Allowing Difficulty</strong></td>
<td>Noticing negative thoughts and emotions</td>
<td>75.0%</td>
<td>84.6%</td>
<td>82.4%</td>
</tr>
<tr>
<td><strong>Awareness of Negative Emotions</strong></td>
<td>Changes in overreacting or feeling overwhelmed by demands</td>
<td>25.0%</td>
<td>30.8%</td>
<td>29.4%</td>
</tr>
<tr>
<td><strong>Reactivity</strong></td>
<td>Changes in the management of sadness and the tendency towards ruminating.</td>
<td>25.0%</td>
<td>15.4%</td>
<td>17.6%</td>
</tr>
<tr>
<td><strong>Struggle</strong></td>
<td>Experienced difficulties or disappointments with MMB</td>
<td>75.0%</td>
<td>100%</td>
<td>94.1%</td>
</tr>
<tr>
<td><strong>Valuing Self</strong></td>
<td>Increased recognition of own needs and self-care, versus always putting others first.</td>
<td>25.0%</td>
<td>38.5%</td>
<td>35.3%</td>
</tr>
<tr>
<td><strong>Self-Compassion</strong></td>
<td>Increased self-compassion, self-kindness, or self-acceptance</td>
<td>50.0%</td>
<td>46.2%</td>
<td>47.1%</td>
</tr>
<tr>
<td><strong>Self-Criticism</strong></td>
<td>Lessened guilt and self-blame about pregnancy, motherhood, or childcare.</td>
<td>0.0%</td>
<td>38.5%</td>
<td>29.4%</td>
</tr>
</tbody>
</table>
### Depression Symptom Severity

Figures 2 and 3 present depression symptom severity data over the course of the intervention. Contrary to hypotheses, participants did not evidence a significant decrease in
depression symptom severity over the course of the intervention as measured by the PHQ-9,

\[ F(1,37) = 0.11, p = .74, \] or EPDS \[ F(1,37) = 0.13, p = .73. \]

**Figure 2.** PHQ-9 scores from intake, over the course of the intervention, to post-intervention.

**Figure 3.** EPDS scores data from intake, over the course of the intervention, to post-intervention.

**Cognitive Variables**

Table 4 includes means and standard deviations for the self-report measures at intake and post-treatment. Contrary to hypotheses, participants did not evidence significant decreases in dysfunctional attitudes, \( t(18) = -1.51, p = .15, r^2=0.11 \), or rumination-total, \( t(18) = -1.23, p = .24, \)
r²=0.08, rumination-reflection, t(18) = -0.78, p = .45, r²=0.03, or rumination-brooding, t(15) = -0.87, p = .40, r²=0.04.

**Mindfulness and Acceptance Variables**

As hypothesized, participants reported increased decentering, t(17) = -2.70, p < .05, r²=0.30. Contrary to hypotheses, participants did not evidence significant increases on the FFMQ mindfulness total score, t(18) = -0.13, p = .90, r²=0.001, or the awareness, t(18) = 1.36, p = .19, r²=0.09, observe, t(18) = -1.68, p = .11, r²=0.14, describe, t(18) = 0.36, p = .72, r²=0.01, non-reactivity, t(18) = -0.93, p = .37, r²=0.05, and non-judgment subscales, t(18) = -0.05, p = .96, r²=0.0002.

Participants reported significant improvement on the self-kindness subscale of the self-compassion measure, t(18) = -2.76, p < 0.05, r²=0.30, but did not evidence significant increases on the mindfulness, t(18) = -2.02, p = .06, r²=0.18, and common humanity subscales, t(18) = -0.18, p = .86, r²=0.002. Participants also did not report significant decreases on the over-identified, t(18) = 0.66, p = .52, r=0.02, isolation, t(18) = -0.99, p = .33, r²=0.05, or self-judgment subscales, t(18) = 0.48, p = .64, r²=0.01. Contrary to hypotheses, participants did not evidence significant increases in psychological acceptance, t(18) = -0.13, p = .90, r²=0.0009.

**Anxiety and Stress**

Contrary to hypotheses, participants did not evidence significant decreases in anxiety, t(15) = -1.03, p = .32, r²=0.07, or stress, t(18) = -0.03, p = .97, r²=0.0001.

**Relationship Satisfaction**

Contrary to hypotheses, participants did not evidence significant increases in dyadic adjustment, t(17) = -0.94, p = .36, r²=0.05, number of social supports, t(18) = 0.37, p = .72, r²=0.01, or satisfaction with social support, t(18) = -1.98, p = .06, r²=0.18.
<table>
<thead>
<tr>
<th>Self-Report Measure</th>
<th>Intake</th>
<th></th>
<th>Endpoint</th>
<th></th>
<th></th>
<th></th>
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<tr>
<td></td>
<td>Completers (n = 21)</td>
<td>Non-completers (n = 16)</td>
<td>All participants (n = 37)</td>
<td>Completers (n = 16)</td>
<td>Non-completers (n = 3)</td>
<td>All participants (n = 19)</td>
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<tr>
<td>PHQ-9</td>
<td>3.62 (2.82)</td>
<td>3.00 (3.92)</td>
<td>3.35 (3.30)</td>
<td>6.00 (6.00)</td>
<td>4.33 (5.13)</td>
<td>5.74 (5.77)</td>
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<td>EPDS</td>
<td>5.86 (3.37)</td>
<td>4.38 (4.36)</td>
<td>5.22 (3.85)</td>
<td>6.13 (5.44)</td>
<td>4.00 (4.58)</td>
<td>5.79 (5.26)</td>
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<tr>
<td>BAI</td>
<td>5.24 (4.44)</td>
<td>4.75 (4.20)</td>
<td>5.03 (4.28)</td>
<td>7.92 (5.04)</td>
<td>5.33 (4.04)</td>
<td>7.44 (4.86)</td>
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<td>DAS-17</td>
<td>82.24 (17.86)</td>
<td>84.44 (17.97)</td>
<td>83.19 (17.69)</td>
<td>86.75 (18.72)</td>
<td>76.33 (24.50)</td>
<td>85.11 (19.34)</td>
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<td>Dyadic Adjustment</td>
<td>122.80 (8.53)</td>
<td>113.06 (12.59)</td>
<td>118.47 (11.47)</td>
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<td>124.67 (6.66)</td>
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<td>AAQ</td>
<td>33.86 (4.81)</td>
<td>28.00 (7.78)</td>
<td>31.32 (6.84)</td>
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<td>33.32 (6.65)</td>
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<td>Self-Compassion</td>
<td>2.54 (0.56)</td>
<td>2.90 (0.70)</td>
<td>2.69 (0.64)</td>
<td>2.62 (0.56)</td>
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<td>2.71 (0.59)</td>
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<td>Mindfulness</td>
<td>3.11 (0.80)</td>
<td>3.50 (0.83)</td>
<td>3.28 (0.83)</td>
<td>3.30 (0.75)</td>
<td>3.92 (0.29)</td>
<td>3.39 (0.73)</td>
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<td>Common Humanity</td>
<td>2.98 (0.90)</td>
<td>3.06 (0.84)</td>
<td>3.01 (0.87)</td>
<td>2.83 (0.79)</td>
<td>2.92 (0.8)</td>
<td>2.84 (0.77)</td>
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<td>Self Kindness</td>
<td>2.68 (0.69)</td>
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<td>3.16 (0.76)</td>
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<td>Over-Identified</td>
<td>3.24 (0.85)</td>
<td>2.72 (1.13)</td>
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<td>Isolation</td>
<td>3.02 (0.54)</td>
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<td>PSS</td>
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<td>15.62 (5.76)</td>
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<td>FFMQ</td>
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<td>130.22 (19.48)</td>
<td>126.56 (17.49)</td>
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<td>Aware</td>
<td>27.95 (6.04)</td>
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<td>28.03 (6.24)</td>
<td>25.50 (5.74)</td>
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<td>Observe</td>
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<td>28.75 (4.64)</td>
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<td>Nonjudge</td>
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<td>5.94 (0.83)</td>
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<tr>
<td>Value</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>5.68 (0.88)</td>
<td>4.59 (1.52)</td>
<td>5.51 (1.03)</td>
</tr>
</tbody>
</table>

*Note.* One participant who was a completer did not complete the Dyadic Adjustment Scale any either timepoint because she was not in a relationship.

PHQ-9 = Patient Health Questionnaire; EPDS = Edinburg Postnatal Depression Scale; BAI = Beck Anxiety Inventory; DAS-17 = Dysfunctional Attitudes Scale; AAQ = Acceptance and Action Questionnaire; PSS = Perceived Stress Scale; FFMQ = Five Facet Mindfulness Questionnaire; SSQ = Social Support Questionnaire; CSQ = Client Satisfaction Questionnaire.
Discussion

The current study examined the feasibility and preliminary outcomes of Mindful Mood Balance among pregnant women at risk for depressive relapse. Results suggest that MMB may be a feasible and acceptable option for perinatal women, and associated with some clinical benefit.

Results indicate that it was feasible to identify women interested in the MMB program. Important differences in identification, enrollment, and completion emerged between recruitment sites. HealthPartners identified the greatest number of women \((n = 81\) completed phone screen) in the quickest amount of time (approximately 3 months), but a fairly low proportion of women enrolled \((n = 18)\) and completed the program \((n = 8)\). Although identification of interested individuals in the Boulder community was lower \((n = 25\) in 9 months), a higher proportion enrolled \((n = 12)\) and completed \((n = 10)\). Rates of identification \((n = 17\) in 10 months) and enrollment \((n = 7)\) were similar at Kaiser Permanente, but rates of completion were much lower \((n = 3)\). Differences in the rates of identification are likely due to variations in recruitment strategies, but it would be of value for future research to examine predictors of program completion.

Although MMB allows participants to complete weekly web-sessions and home practice flexibly at their convenience, the requested time commitment is significant. As is true for MBCT generally, participants in MMB are asked to spend approximately 1-2 hours per week on the web-session, 6 hours weekly for home practice, plus time to complete daily home practice logs, weekly mood questionnaires, and weekly phone coaching. Time was the most common reason that participants gave for declining participation at prescreen and withdrawing after enrollment. Future research may examine the minimum effective dose of MBCT sessions and home practice required to achieve clinical benefit. Time may be particularly salient for pregnant
women, for whom the window of opportunity to intervene is short, and who experience many demands on their time and energy including pregnancy, work, school, and other children.

Participants demonstrated engagement with the MMB program. Approximately 57% of participants in the current study completed the MMB program, defined as completing at least four sessions. This was a slightly higher rate of completion compared to our prior work examining MMB for men and women at risk for depressive relapse (Dimidjian, Beck, et al., 2014). Web-based programs focused on reducing acute symptoms of anxiety (Boettcher et al., 2014), depression generally (Hollandare et al., 2011; Richards & Richardson, 2012; Wagner et al., 2014), and postpartum depression specifically (Danaher et al., 2013; O'Mahen et al., 2014) evidence rates of completion ranging from approximately 57-90%. A meta-analysis of computer-based treatments for depression found that dropout rates were 74% for programs offering no additional support, 38.4% for those offering administrative support, and 28% for those offering therapist support (Richards & Richardson, 2012). Rates of completion tend to be lower among participants whose eligibility does not depend on elevated symptom severity (Morledge et al., 2013b) and in prevention programs (Kelders, Bohlmeijer, & Van Gemert-Pijnen, 2013; Musiat et al., 2014), with rates ranging from 42-57%. Future research should examine predictors of dropout from MMB, including depression symptom severity. It is possible that participants experiencing greater distress may be more motivated to adhere to web-based programs (Melville, Casey, & Kavanagh, 2010). Anecdotally, a handful of women in the present study described that it was often challenging to prioritize the MMB program when they were feeling well and had many competing demands for time during their pregnancy.

On average, participants reported completing home practice on more days than not (22 out of 42 days), but less frequently than pregnant participants in the MBCT-PD open trial (33 out
of 42 days). Participants in the current study reported slightly more frequent and longer duration of formal practice compared to participants in the MMB study (Dimidjian, Beck, et al., 2014). In other words, engagement in home practice was lower than what has been observed in prior research of standard, in-person MBCT with at-risk pregnant women, but at least equivalent to what has been observed in MMB for men and women at risk for depressive relapse.

Although participants were strongly encouraged to make use of program support at weekly scheduled phone-coaching sessions and additionally as needed, few participants regularly utilized this option. Reasons for low-engagement with phone coaching were not formally collected, but it may have been challenging for participants to make time to participate in a non-required component of the program. It would be of value for future iterations of the MMB program to incorporate additional forms of support, including therapist feedback on homework responses or therapist-moderated message boards.

Participants reported finding the website readable, easy to use, and valuable, and indicated feeling satisfied overall with the MMB program. Participants nominated several areas for improvement in the exit interview including technical improvements and addition of more of a community component. Additionally, low rates of endorsement of the “relaxation,” “discerning relapse,” “valuing self” and “de-stigmatization” themes in the exit interview may indicate the importance of more explicit focus on these domains in future iterations of this program.

Participants in the current study did not evidence significant changes in depression symptom severity as hypothesized. Research that has documented the impact of MBCT on depression symptom severity has mainly focused on individuals with residual symptoms of depression, in comparison to participants in the current study who entered with minimal depressive symptoms. A notable exception is that pregnant women who participated in the
MBCT-PD open trial entered with EPDS scores comparable to those in the current study and experienced a significant decrease in symptom severity over the course of the 8-week intervention. The MBCT-PD study differed from the current study in some important ways. First, participants attended more sessions (average number of sessions attended = 6.10) than participants in the current program (average number of sessions attended = 4.72), and thus may have benefited from an increased dose of MBCT. Second, the MBCT-PD program was offered through in-person groups, which may have conferred social support benefits that may be particularly important for perinatal depression. Third, the MBCT-PD program was tailored specifically for the perinatal period. Nevertheless, the fact that participants did not evidence significant increases in depression symptom severity is encouraging when considering that MMB was designed to prevent depressive relapse and not treat acute symptoms of depression. Future randomized control research should examine whether MMB is significantly more effective at reducing relapse rates compared to control.

As hypothesized, participants demonstrated significant increases in decentering on the EQ and described related changes in the exit interview (i.e., depression objectified theme). Decentering has been described as the ability to see thoughts as mental events rather than absolute truths. A core theory of MBCT is that individuals with histories of recurrent depression are vulnerable during times of stress to engage in rumination, or ineffective attempts to problem-solve, and that mindfulness practice facilitates a more decentered relationship to negative thoughts, emotions, and body sensations, thereby reducing risk for relapse. However, participants did not demonstrate improvements in self-reported rumination on the RRS. Participants in the current study entered with rumination scores lower than what has been previously reported for individuals with a history of depression (Michalak, Holz, & Teismann, 2011; Sanders & Lam,
2010), including the original MMB open trial (Dimidjian, Beck, et al., 2014) and MBCT-PD open trial and randomized control trials (unpublished data). In fact, participants in the current study entered with rumination scores comparable to scores of participants after MBCT in other studies (Deckersbach et al., 2012; Eisendrath et al., 2008; Kingston, Dooley, Bates, Lawlor, & Malone, 2007; Manicavasagar, Perich, & Parker, 2012; Michalak et al., 2011).

It is curious that participants in the current study did not evidence significant increases in mindfulness on the FFMQ. Although participants in the current study had lower rates of completion and less engagement with home practice than what has been reported with in-person MBCT, rates were at least comparable to what was reported in the original MMB open trial which documented significant increased in mindfulness over the 8 week intervention. Future research should examine additional, more objective methods of assessing mindfulness.

There are several limitations to the current study that are worth noting. First, the current study utilized an open trial design to gather early stage data on the feasibility and impact of the MMB program among perinatal women. Although the open trial design, which lacks a control group, does not support causal inference, it is appropriate at this stage of research given the novel nature of the intervention. Data from this study will inform future controlled research studies. Second, the current study did not examine depressive relapse, which may be particularly important in future research considering that the primary evidence base for standard MBCT is for reducing rates of depressive relapse among individuals with recurrent depression. Third, the current study does not report follow-up depression symptom severity data. Data collection is ongoing for 3-month and 6-month follow-up periods and future analyses will examine depression symptom severity trajectories after the MMB program among completers.
Chapter 5: Summary and Conclusions

In response to prior research documenting low depression treatment engagement among perinatal women, the goals of this dissertation were to identify and target barriers to depression care for pregnant and postpartum women, and to disseminate interventions in innovative ways to overcome barriers. In this summary, I consider my findings as a whole, and what I think is of greatest interest.

First, the results from the Public Attitudes About Perinatal Depression study and the Depression Screening and Feedback study raise the question: have we over-emphasized the importance of stigma as barrier to help-seeking among perinatal women? Prior research has indicated that perinatal women consider perceived stigma to be an important barrier to seeking help for depression; in support of this, approximately half of the women who completed exit interviews from the MMB for Moms study reported that perceived and/or self-stigma have been or could be a barrier to seeking help for depression. However, results from the Public Attitudes About Perinatal Depression study suggest that individuals do not anonymously report strong negative attitudes or beliefs about depressed pregnant and postpartum women. Moreover, women with elevated depression symptom severity in the Depression Screening and Feedback study did not identify perceived stigma as a factor that greatly impacted the likelihood of seeking help for depression. Nevertheless, it would be premature to conclude that perinatal depression stigma is neither evident in our society, nor a problematic barrier to seeking depression care for some women. As was outlined in the discussion sections of Chapter 2 and 3, there is more work to be done. Important avenues for future research include using alternative methods for measuring biases, focusing on groups most likely to interface with depressed perinatal women, investigating the extent to which women internalize negative beliefs about perinatal depression,
and examining the impact of stigma as barrier among diverse populations. A more nuanced understanding of perinatal depression stigma and its impact on women and help-seeking is particularly important considering research suggesting the efficacy of stigma reduction interventions (Corrigan & Kosyluk, 2013; Dalky, 2012).

Second, the results from Depression Screening and Feedback study and the Mindful Mood Balance for Moms study provide further evidence that additional areas of focus in overcoming barriers to care are warranted. The ten most commonly reported barriers to seeking help for depression among women with elevated depression symptom severity in the Depression Screening and Feedback study were knowledge barriers (e.g., “I don't know the difference between clinically significant depression and normal mood changes that happen in pregnancy or postpartum”) and practical barriers (e.g., “I don't have time for treatment”). Thus, despite the non-significant results in the Depression Screening and Feedback and the Mindful Mood Balance for Moms studies, ongoing efforts focused on innovative ways to overcome barriers in order to engage perinatal women in depression treatment is important. Several adaptations to the MMB for Moms program are recommended. First, the program would benefit from tailoring for perinatal women by using the content developed by Dimidjian and Goodman for the MBCT-PD study (Dimidjian, Goodman, et al., 2014), including pregnancy-specific meditations, shorter practices, detailed information about how to discern between the ‘baby blues’ and clinically significant depression, and suggestions for involving social support in women’s efforts to stay well. Second, modifications might focus on ways to incorporate a richer community component, for example, by replacing group phone coaching calls with a live and monitored interactive community, informed by college online learning programs or social media programs like
Facebook. Third, it may be important to examine whether decreasing the number of weekly sessions increases participant engagement without compromising outcomes.

Rigorous, empirical research investigating methods to improve depression treatment engagement among perinatal women is in its nascent stages, and the results from this dissertation project suggest many important avenues for future research. A multifaceted approach to understanding and targeting barriers to care is necessary.
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