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Psychological Interventions for Pregnant Black Women and Latinas with Depression or Anxiety

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Psychological Interventions for Pregnant Black Women and Latinas with Depression or Anxiety

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy in Psychology

by

Carolyn Michelle Ponting

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ABSTRACT OF THE DISSERTATION

Psychological Interventions for Pregnant Black Women and Latinas with Depression or Anxiety

by

Carolyn Michelle Ponting

Doctor of Philosophy in Psychology

University of California, Los Angeles, 2022

Professor Denise A. Chavira, Chair

This dissertation is a three-paper investigation of psychological interventions for pregnant ethnic and racial minority women with anxiety and depression. Study 1 reviews the treatment outcome literature for pregnant Black women and Latinas with depressive and anxious symptoms, including their efficacy, mode of delivery (i.e., provider of intervention, setting), and the presence of cultural adaptations. Results revealed that treatment outcome studies for Latinas and Black women are lacking, and often do not result in favorable outcomes for depression or anxiety. Though CBT and IPT are the intervention modalities most often tested to treat depression, they require additional trials to be considered efficacious. No intervention trials have achieved favorable outcomes with regard to anxiety reduction in Latinas and Black women.

Study 2 used data from a randomized controlled trial of a cognitive behavioral stress management intervention delivered to Black women and Latinas to test its efficacy for prenatal anxiety (i.e., state and pregnancy specific). We also tested whether change targets of the intervention from pre- to post-treatment might mediate the relationship between intervention

group and anxiety change at follow up timepoints. Findings revealed that while the intervention was not efficacious for reducing prenatal anxiety, women who completed the intervention showed significantly fewer state anxiety symptoms at post-treatment than did women in the control condition—effects that were not lasting. Changes in the potential mediators tested did not explain the relationship between intervention group and subsequent changes in anxiety.

Study 3 investigated pregnant Latinas' acceptability of exposure therapy to treat prenatal anxiety using a deductive qualitative design. Using an existing theoretical framework of treatment acceptability, we interviewed women about seven domains of treatment acceptability. Results of a qualitative content analysis show that culture, family, and pregnancy status are factors that can serve as relevant exposure acceptability enhancers or challenges and provide insights for tailoring psychoeducation about exposure therapy prenatally. Collectively, these studies further the treatment outcome literature for pregnant Latinas and Black women, whose outcomes in available psychological interventions have been presumed to be equivalent to those of White women.

The dissertation of Carolyn Michelle Ponting is approved.

Christine Dunkel Schetter

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2022

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Dissertation Introduction

Anxiety and depression are the most prevalent psychological disorders, and they disproportionately affect women, as compared to men. The lifetime prevalence of anxiety and depressive disorders in adult women residing in the United States is 40% and 26%, respectively (Kessler et al., 2012). During pregnancy, pooled prevalence rates indicate that about 15% of women will meet diagnostic criteria for an anxiety disorder (Dennis et al., 2017), while 12% will meet criteria for a depressive disorder (Woody et al., 2017). Recent estimates of the lifetime economic cost of perinatal anxiety and depression show that for each woman with elevated symptoms of anxiety or depression in pregnancy, there is a lifetime economic loss of over 34,000 euro (38,000 USD), and 75,000 euro (80, 000 USD), respectively (Bauer et al., 2015). Perinatal mood and anxiety disorders are frequent and costly.

Black women and Latinas are at heightened risk for prenatal depressive disorders (Gavin et al., 2011; Liu et al., 2016; Mukherjee et al., 2016) and elevated anxiety symptoms (Catov et al., 2010; Grobman et al., 2016; Henderson & Redshaw, 2013). Substantial evidence suggests that Black women and Latinas experience more financial, relational (Liu et al., 2016) and discrimination related stress (Rosenthal & Lobel, 2011) during pregnancy which predispose them to internalizing distress. Additionally, due to systemic racism and xenophobia, ethnic and racial minority women in the U.S. are disproportionately likely to live in poverty; in 2015 about 20% of Latinas and Black women lived in poverty as compared to 9.6% of White women (Tucker & Lowell, 2016). Economic circumstances matter given the higher rates of perinatal depression and anxiety in low-income settings (Cubbin et al., 2015; Henderson & Redshaw, 2013). Collectively, the evidence suggests that Latinas and Black women are a group at high-risk for perinatal mood and anxiety disorders.

Prenatal anxiety and depression are linked to adverse outcomes for the pregnant woman, as well as the fetus, and the subsequent development of her offspring. Women who are anxious or depressed in pregnancy are more likely to continue to report elevated symptoms of depression and anxiety in the postpartum period (Clout & Brown, 2015) and are at increased risk of perinatal suicidal ideation—important given that suicide is the leading cause of maternal death during the first year following delivery (Orsolini et al., 2016). When it comes to their offspring, women with prenatal depression and anxiety are at higher risk for delivering babies preterm and at low birth weight (Stein et al., 2014). However, the risks to their children do not end in infancy. Results from a recent meta-analysis of 73 studies examining over 8,000 mother-child dyads show that women who experience elevated symptoms of anxiety or depression in pregnancy have a 1.5-2 times greater likelihood of having children with behavioral difficulties (e.g., internalizing and externalizing problems) than mothers without these symptom elevations (Madigan et al., 2018). Finally, the effects of comorbid prenatal anxiety and depression may be more detrimental than depression or anxiety alone on outcomes such as maternal anger, and premature birth (Field et al., 2010). Thus, depression and anxiety are clearly associated with adverse intergenerational physical and psychosocial consequences.

Though core symptoms of anxiety and depression are equivalent during pregnancy and other times in a woman's life, physiological and mood changes typical during the prenatal period can complicate diagnosis. For example, symptoms common across depression and anxiety, such as fatigue, irritability, difficulty concentrating and disrupted sleep may be attributed to typical physical and hormonal changes associated with pregnancy (Misri et al., 2015; Pearlstein, 2015). In the case of anxiety disorders, it is also possible that intrusive and impairing worries associated with maternal and fetal wellbeing and delivery are difficult to separate from normative pregnancy concerns. Further, functional impairment resulting from anxiety and depression can manifest itself in ways that directly affect a woman's

pregnancy. Depressed pregnant women are less likely to comply with prenatal care and engage in positive health behaviors (e.g. exercise, taking prenatal vitamins, abstaining from substance use; Grote et al., 2010), while anxious women may avoid healthcare because it acts as a trigger for their health related worries (Prescott et al., 2018).

A challenge unique to pregnant women with depression and anxiety is that psychiatric care is often declined or delayed due to the potential adverse effects of psychotropic medications for mother and fetus (Schofield & Kapoor, 2019). However, abstaining from medication heightens risk of symptom exacerbation (Freeman, 2019) posing additional challenges to mother and fetus. Psychological interventions are of critical importance for mental health problems during the perinatal period (Goodman, 2009) given their safety profile and acceptability ratings. Though referrals from obstetric settings to mental health services are infrequent (Leddy et al., 2011), Black women and Latinas are less likely to benefit from coordinated care because they attend fewer perinatal medical appointments than white women (Kozhimannil et al., 2014; Lucero et al., 2012). Further, pregnant women and new mothers report several barriers to engaging with psychological services including fear they will lose parental rights, and prior negative experiences with perinatal health care providers (Byatt et al., 2013), experiences which are particularly salient with ethnic and racial minority women.

In addition to the challenges associated with referring ethnic and racial minority women to mental health services, we currently lack the evidence needed to clarify which interventions are most likely to work. Though cognitive behavioral therapy (CBT) and interpersonal therapy (IPT) are considered the frontline psychological interventions for perinatal depression (but not anxiety), randomized controlled trials testing these therapy modalities overwhelmingly enroll White women (O'Connor et al., 2019). Further, in RCTs that do enroll a significant number of ethnic and racial minorities, investigators infrequently report moderation analyses based on race and ethnicity (Polo

et al., 2018), continuing to obscure whether existing interventions are effective for Latinas and Black women. Testing the relative efficacy of evidence-based psychotherapies across racial/ethnic groups is worthwhile. Extant research shows that ethnic and racial minorities may respond less favorably to depression interventions than non-Latinx whites (Lau et al., 2010), and that ethnic and racial minorities show better psychological outcomes when treated with culturally adapted intervention protocols than standard protocols (Benish et al., 2011). Thus, assessing whether prenatal intervention effects are generalizable to Black women and Latinas is an important endeavor, as it provides the field with information about the generalizability of our interventions, and works to improve equity (Fisher & Kalbaugh, 2011).

The literature on psychological interventions for prenatal anxiety is substantially behind that of depression and requires that investigators begin by testing the initial efficacy of available treatments. Interventions such as cognitive behavioral therapy, considered a gold-standard intervention for anxiety in the general population (Abramowitz et al., 2019) are infrequently tested in pregnant samples. Results from studies with small sample sizes (most *n*'s< 15) have shown mixed effects with anxious pregnant women, sometimes proving beneficial (Christian & Storch, 2009; Green, Haber, Frey, & McCabe, 2015), and sometimes demonstrating no intervention effect (Bittner et al., 2014b; Salehi et al., 2016). It is possible that concerns about making time for treatment during a period of increased medical contact (Kim et al., 2010), and uncertainty about whether their symptoms are due to hormonal changes (Kingston et al., 2015) deters pregnant women from effectively engaging in CBT—leading to worse outcomes than in non-pregnant samples. The discrepancy in intervention outcomes for anxiety during pregnancy as compared to other points in women's lives argues for examining the efficacy of evidence based psychological

interventions in pregnant women, broadly. Given increased risk-factors, testing anxiety outcomes in women of color ought to be prioritized, including the acceptability of interventions in this group.

Exposure therapy and stress management programs improve anxiety symptoms in non-pregnant samples and may be particularly promising for pregnant ethnic and racial minorities. Exposure therapy requires that clients face feared objects, memories, situations, and images, and teaches clients that their most feared outcome is unlikely to occur or can be handled; this expectancy violation supports inhibitory learning and reduces anxiety and avoidance. Exposure therapy is a potent intervention by itself, or as an adjunct to CBT (Norton & Price, 2007), and has been shown to improve symptoms in as few as 1-5 sessions (Craske et al., 2006; Öst, Alm, Brandberg, & Breitholtz, 2001), with symptom improvements that outlast medication (Fedoroff & Taylor, 2001). Cognitive Behavioral Stress Management programs (CBSM) also show favorable effects for anxiety reduction. CBSMs emphasize control of physical/physiological stress reactions and modifying beliefs and responses to stressors. While CBSMs advocate for a modification of anxiety related stressors and coping responses, exposure favors directly approaching anxiety provoking stimuli, and reducing behavioral avoidance. Both brief evidence-based interventions warrant testing during pregnancy as they may address concerns with time, key barriers for pregnant women who already manage increased engagement with medical care. Further, evaluating the efficacy of these distinct approaches would increase provider and consumer choice for treating prenatal anxiety, an important aspect of maternity care associated with improved maternal emotional health outcomes (Butler et al., 2015).

To this end, it is also important to understand the acceptability of these interventions among minority women who are disproportionately burdened by prenatal anxiety. Treatment acceptability refers to an individual's perceptions of a treatment as fair, reasonable and appropriate for their

problem (Kazdin, 1980) and is relevant to intervention adherence, clinical outcomes and premature dropout (Milosevic, Levy, Alcolado, & Radomsky, 2015). The acceptability of psychological interventions is often assessed once a clinical trial is over, yet there is value in prospective assessment, especially when trials include meaningful numbers of ethnic and racial minority individuals. Given issues of mistrust of health systems in minority communities, additional costs associated with recruiting minorities in to clinical trials (Lau et al., 2010), and worse treatment engagement (Maura & Weisman de Mamani, 2017), it is important to test acceptability of an intervention with varying stakeholders, but perhaps most importantly with consumers (i.e., patients) prior to service delivery.

We have identified notable gaps in the prenatal treatment literature that this dissertation will address. First, there is a need to describe the current treatment outcome literature for pregnant ethnic and racial minority women with symptoms of anxiety and depression. We aim to understand whether evidence-based interventions for mood and anxiety disorders during the prenatal period are in fact efficacious for Latinas and Black women, as well as the characteristics of effective interventions (e.g.., presence of cultural adaptation, intervention length, context of delivery). Second, due to the paucity of evidence for anxiety interventions and the mixed results of CBT approaches, analyses to examine the efficacy of interventions that have empirical support in the general population, ought to be extended to samples of pregnant women. As such, we aim to test the efficacy of a cognitive behavioral stress management intervention to reduce symptoms of anxiety for pregnant Latinas and Black women. Further, we will test potential mediators of intervention effects. Third, exposure therapy is the leading evidence-based intervention for treating anxiety disorders, though it is infrequently used with pregnant populations. We aim to assess pregnant Latinas' acceptability of this intervention, given its potential to improve symptomology

efficiently and longitudinally, and inform future treatment studies with minority women. Taken together, results from these studies stand to add significantly to our understanding of available, efficacious, and acceptable intervention for pregnant Latinas and Black women in the United States.

Study 1

Psychological Interventions for Depression and Anxiety in Pregnant Latina and Black Women in the United States: A Systematic Review

Abstract

Objective: Black women and Latinas have more symptoms of depression and anxiety during pregnancy than do their non-Latina White counterparts. Although effective interventions targeting internalizing disorders in pregnancy are available, they are primarily tested with White women.

Method: This article systematically reviews randomized controlled trials and nonrandomized studies to characterize the effectiveness of psychological interventions for anxiety and depression during pregnancy in Latinas and Black women. Additionally, this review summarizes important characteristics of interventions such as intervention format, treatment modality, and the use of cultural adaptations.

Results: Literature searches of relevant research citation databases produced 68 studies; 13 of which were included in the final review. Most studies were excluded because their samples were not majority Latina or Black women or because they did not test an intervention. Of the included studies, three interventions (i.e., cognitive behavioral therapy, interpersonal therapy, behavioral activation) outperformed a control group condition and showed statistically significant reductions in depressive symptoms. No intervention was found to reduce anxiety symptoms. Five studies made cultural adaptations to their treatment protocols.

Limitations: Findings are confounded by socioeconomic status as all women included in the review were considered low-income, thus it is unclear whether clinical outcomes were suboptimal due to cultural fit or socioeconomic adversities.

Conclusions: Cognitive behavioral therapy was the modality with most evidence for reducing depressive symptoms in pregnant Black and Latina women. There is an urgent need to build the treatment efficacy literature for prenatal anxiety among women of color, and to continue to understand the importance of cultural modifications to improve engagement and clinical outcomes.

Introduction

Prevalence rates of depression during pregnancy range from 12% to 27%. Rates of anxiety during pregnancy are similar, affecting 9% to 22% of women (Mahaffey & Lobel, in press). Variability in these rates often depends on whether the data are taken from epidemiological or high-risk samples. A diagnosis of depression (Grote et al., 2010) or anxiety (Ding et al., 2014) during the prenatal period increases risk for complications during delivery such as preterm birth and low birthweight, and is a robust predictor of postpartum depression (Coelho, Murray, Royal-Lawson, & Cooper, 2011; Robertson, Grace, Wallington, & Stewart, 2004). Black women and Latinas in the U. S. have higher rates of depression (e.g., Rich-Edwards et al., 2006) and anxiety (Collins & David, 2005) during pregnancy than do their non-Latina White counterparts. Immigrant Black and Latina women are at especially high-risk for internalizing distress during pregnancy due to a host of social stressors such as separation from extended families and lack of familiarity with medical systems of the countries they have immigrated to (Edge, Baker, & Rogers, 2004; Fung & Dennis, 2010). Black women and Latinas are also disproportionately exposed to financial and cultural stressors (e.g. poverty, discrimination), which invoke additional risk for clinical distress (Rosenthal & Lobel, 2011).

Data indicate disparities in mental health service utilization during the perinatal period; rates of services use in Latinas and Black women, are 5% and 4% respectively, and the rate of service use in White women, is 10%, a statistically significant difference (Kozhimannil et al., 2011). Black women and Latinas are at a greater disadvantage than White women when it comes to treating their depression and anxiety during pregnancy because they are less likely to attend perinatal medical appointments than White women, where symptoms are often first detected (Kozhimannil, Trinacty, Adams, Huskamp, & Busch, 2011; Lucero, Beckstrand, Callister, &

Sanchez Birkhead, 2012). Even when Latinas and Black women initiate mental health treatment, they are less likely to receive follow up or continued care (Kozhimannil et al., 2011). System level barriers include infrequent screening for anxiety and depression by obstetrics providers during pregnancy (Goodman & Tyer-Viola, 2010), which is even more pronounced in under-resourced clinics which are often attended by Black women and Latinas. Other barriers that disproportionately affect ethno-racial women include difficulties accessing transportation and child care, unmet or unrealistic expectations about treatment outcome, stigma, and healthcare mistrust (Levy & O'Hara, 2010). A challenge unique to pregnant women with depression and anxiety more broadly is that psychiatric care is often declined or delayed due to the potential adverse effects of psychotropic medications for mother and fetus (Schofield & Kapoor, 2019). Psychological interventions fare better in terms of safety and acceptability during pregnancy (Goodman, 2009), yet it is relatively uncommon for women with internalizing distress to receive psychological interventions during this time (Ko, Farr, Dietz, & Robbins, 2012).

Most existing interventions for internalizing distress have been examined during the postpartum period (Mahaffey & Lobel, 2018). However, a growing body of literature shows that psychological interventions can successfully reduce depressive symptoms during pregnancy for women considered high-risk (i.e. elevated symptoms, below clinical levels) (Bledsoe & Grote, 2006; Dennis & Hodnett, 2007; Werner et al., 2015) and clinically impacted (van Ravesteyn et al., 2017). The evidence for treating anxiety during pregnancy is much more sparse, and existing interventions to treat prenatal anxiety require more rigorous evaluation (Loughnan et al., 2018). Importantly, the vast majority of intervention trials for prenatal depression and anxiety have been tested with non-Latina White women (Nillni, Mehralizade, Mayer, & Milanovic, 2018). The lack of

representation of ethno-racial minority women in clinical trials during pregnancy makes it difficult to ascertain whether these interventions are effective for Black and Latina women.

Evidence for Psychological Interventions for Depression and Anxiety in Pregnancy

Meta-analytic findings show that the most effective psychological intervention modalities for depression during pregnancy are Cognitive Behavioral Therapy (CBT) and Interpersonal Therapy (IPT) (Curry et al., 2019; Dennis & Hodnett, 2007; van Ravesteyn et al., 2017). There is less of an evidence base for prenatal anxiety, and CBT delivered in a group setting is the only modality with any research support (Nillni, Mehralizade, Mayer, & Milanovic, 2018). CBT conceptualizes depression and anxiety as caused and maintained by maladaptive patterns of thinking, emotional responses and behavior, and targets thoughts and activities in order to improve mood. IPT, on the other hand, conceptualizes depression as caused and maintained in large part by interpersonal dysfunction; thus, it targets interpersonal functioning and social support. Both CBT and IPT are time-limited interventions and are most often delivered in-person by a therapist (Sockol et al., 2011). However, despite the success of these evidence-based interventions at reducing depression, and the emerging support for anxiety reduction during the perinatal period (e.g. Goodman et al., 2014), their efficacy with ethno-racial minority women is mixed (Nillni, Mehralizade, Mayer, & Milanovic, 2018). Nillni and colleagues (2018) report that while several pilot studies for pregnant ethno-racial minority women have shown that psychotherapies such as CBT and IPT successfully reduce depressive symptoms, larger scale RCTs often report null findings. Findings that have indicated no intervention effect are often attributed to worse treatment engagement of minority women when compared to White women (Grote, Zuckoff, Swartz, Bledsoe, & Geibel, 2007) but it is possible that other factors are at play.

Taken together, findings suggest that pregnant Latinas and Black women appear to utilize and benefit from interventions to treat internalizing distress less often than pregnant White women, indicating

a potential mental health care disparity. The present study systematically reviewed the treatment outcome literature with Latina and Black pregnant women in order to better understand mental health care and treatment disparities in this group. This systematic review examined 1) outcomes of psychological interventions for anxiety and depression during the prenatal period in Latina and Black women; 2) treatment characteristics (i.e., treatment modality, format, context of delivery, provider type) of effective interventions with pregnant Latina and Black women and 3) types of cultural adaptations used to tailor interventions to meet the needs of ethnic/racial minority women. Given that treatment during pregnancy is uniquely positioned to create positive intergenerational change at a particularly sensitive developmental period (Stewart, 2011), a better understanding of the evidence for treating ethno-racial minority women prenatally is critical to addressing service gaps for pregnant Black and Latina women and their infants.

Method

Protocol and registration

The review was preregistered with PROSPERO, the International Prospective Register of Ongoing Systematic Reviews (ID: CRD42018106228), and can be found at: https://www.crd.york.ac.uk/PROSPERO/display_record.php?RecordID=106228

Eligibility Criteria (Inclusion/Exclusion Criteria)

The following criteria had to be met for inclusion in the review: Studies were published in peer reviewed journals or as a doctoral thesis and tested the effect of a psychological intervention on depressive or anxious symptoms during pregnancy. Psychological interventions were inclusive of manualized psychoeducational strategies, cognitive behavioral therapy, interpersonal psychotherapy, psychodynamic therapy, acceptance and commitment therapy, and mindfulness

training delivered during the prenatal period via telephone, home or clinic visits, or individual or group sessions by a health professional or lay person (Dennis & Hodnett, 2007). Unstructured interventions (e.g. providing social support) were excluded from the review because of the difficulties replicating their delivery and ascertaining fidelity of delivery—of concern when assessing the evidence for a particular intervention modality (Chambless & Ollendick, 2001) . Studies also had to measure depression and anxiety symptoms as an outcome using standardized depression and anxiety instruments (e.g. Edinburgh Postnatal Depression Scale; EPDS; Cox, Holden, & Sagovsky, 1987).

Additionally, in order for a study to eligible for inclusion, study participants had to be: a) pregnant women, b) 18 years or older, and c) residing in the United States. Further, a majority of the sample (75% or more) had to identify as Latina/Hispanic or Black/African American. This threshold was chosen based on previous reviews and meta-analyses (Huey & Polo, 2008; Pina et al., 2019) where a 3:1 ratio of ethnic minority participants to White participants was identified as providing sufficient representation to suggest that observed treatment effects are in fact applicable to minorities. However, studies were also included if they had fewer than 75% of Latina or Black women but provided a separate analysis with a subset of ethnic/racial minority participants. Inclusion was constrained to women living in the United States in order to more easily interpret results based on common system level factors (e.g., perinatal health care policies), and specific sociocultural experiences related to being Latina or Black in the United States that may impact anxiety and depression in this population.

Search Strategy

The following databases were searched: Cumulative Index to Nursing and Allied Health Literature (CINAHL®), PubMed®, PsycINFO®, Web of Science® and ProQuest Dissertation and

Theses AI® using the following search terms: (prenatal OR antenatal OR pregnancy) AND (intervention OR treatment OR therapy) AND (postpartum depression OR depression OR anxiety), AND (African-American OR Black OR Latino(a) OR Hispanic OR minority); see Appendix for exact search syntax. Reference sections of the articles that met inclusion criteria were also examined. No date restrictions were placed on database searches, and unpublished studies were not considered due to the increased likelihood that identified studies would introduce greater methodological weakness (Copeland et al., 2019) in a review that was already inclusive of non-randomized trials. Database searches were conducted from 6/2018-9/2018, by authors CP and HZ, with consultation as needed from NM and DC. In total, searches produced 503 studies, with 363 remaining once duplicates were removed. Duplicates were identified using Mendeley's duplication feature, and manually checked by the authors. Abstracts and titles were subsequently screened using inclusion criteria, eliminating 296 articles, most often because the studies did not test an intervention (n=243) (of note, search terms did not include design specifications such as "RCT"). Of the 67 articles remaining, methods sections were examined to further assess inclusion criteria (e.g., intervention was delivered during pregnancy). An additional 56 articles were excluded (see Figure 1, below, for detailed information about exclusion), leaving 13 studies that met all inclusion criteria and were included in the final review.

Data Extraction

Data were extracted from the 13 articles independently by two members of the research team, who conferred to check for accuracy. Variables extracted from each study were: intervention characteristics (i.e., intervention format, treatment modality, provider type, number of sessions, setting and fidelity indices), participant demographics (i.e., race/ethnicity, language spoken, US vs. foreign born, indicators of income), the perinatal period during intervention delivery, type of study

design (e.g., RCT, pre-post design, study sample), the use of a control group and what kind, if applicable, attrition rates, outcomes pertaining to depression or anxiety, and the use of intervention cultural adaptations.

Data Quality Assessment

The methodological biases of the studies in this review were assessed using the Cochrane Risk of Bias Assessment. The risk of bias tool is recommended over the use of other quality scales (e.g., Outcome Reporting Bias in Trials, ORBIT-II; GRADE rating of quality evidence; see Page, McKenzie & Higgins, 2018 for extensive list) due to the assessment of different aspects of biases in trial conduct. Specifically, six categories of bias are assessed: a) selection bias, (b) performance bias, (c) detection bias, (d) attrition bias, (e) reporting bias, and (f) baseline imbalance. In addition, the tool requires that researchers provide evidence (e.g. direct quotes from the article) that support each judgment of bias, increasing transparency (Higgins et al., 2011). Studies were coded as having a high risk of bias, low risk of bias, or an unclear risk of bias by the first author, who was not blind to study authors, place of publication, or results. Studies rated as "low risk of bias" on four of the six categories were considered to have an overall low risk of bias; studies with two or three categories rated as "low risk of bias" were considered to have an overall medium risk of bias; and studies with one or fewer categories rated as "low risk of bias" were considered to have an overall high risk of bias. Documentation supporting bias ratings is available upon request.

Results

Of the 13 studies that met the inclusion criteria, 10 were randomized controlled trials (RCT) and three of these studies were self-described as pilot studies. Only one RCT used an active control group, which consisted of a social support intervention in addition to regular prenatal care

(Field, Diego, Delgado, & Medina, 2013). Three other studies were non-randomized pre-post designs (one did not use a comparison group, one used a comparison group similar in demographic characteristics, and one study used a TAU comparison group).

Sample sizes in the studies ranged from 13 to 913, and the combined sample size of included studies totaled 1,971 women whose outcomes are included in this review. Among the 13 studies, four tested interventions in Black-only samples, three in Latina-only samples, three with a combination of Latina and Black women, and three with a combination of Black and White women. Women across all studies were considered low-income, and most Latinas were of Mexican origin. Most studies required women to have elevated symptoms of depression (Crockett, Zlotnick, Davis, Payne, & Washington, 2008; Grote et al., 2009; Jesse et al., 2015.; Le, Perry, & Stuart, 2011; Muñoz et al., 2007; Sampson, Villarreal, & Rubin, 2016), or meet a clinically significant cutoff for depression (Field et al., 2013; Jesse et al., 2010; Lenze & Potts, 2017; McKee, Zayas, Fletcher, Boyd, & Nam, 2006). None of the 13 eligible studies required women to meet any anxiety symptom cutoff. In addition, only two studies measured anxiety as a secondary outcome (Field et al., 2013; Lenze & Potts, 2017). For detailed sociodemographic information about included participants see Table 1.1.

Intervention Characteristics

A variety of psychological interventions to reduce perinatal depressive symptoms among Black women and Latinas emerged as part of this review. The most common treatment modality was CBT (El-Mohandes et al., 2008; Jesse et al., 2010; Jesse et al., 2015; Le et al., 2011; Muñoz et al., 2007; Sampson et al., 2016), followed by IPT (Crockett et al., 2008; Field et al., 2013; Grote et al., 2009; Lenze & Potts, 2017). CBT+ social support (McKee et al., 2006), behavioral activation (Kieffer et al., 2013) and mindfulness (Zhang and Emory, 2015) were also examined. Of the six

interventions that included Latina participants, four of them gave the option for the delivery of the intervention to be in Spanish (Le et al., 2011; Kieffer et al., 2013; McKee et al., 2006; Muñoz et al., 2007).

Interventionists were primarily master's or PhD level therapists (Crockett et al., 2008; El-Mohades et al., 2008; Field et al., 2013; Grote et al., 2009; Jesse et al., 2010; Jesse et al., 2015; Lenze & Potts, 2018; McKee et al., 2006; Muñoz et al., 2007; Zhang and Emory, 2015), followed by community health workers (Kieffer et al., 2013) or community case workers (Sampson et al., 2016). Only one study relied on trained bachelor's level study staff (Le et al., 2011). Most often, interventions were delivered in group format (Crockett et al., 2008; El-Mohandes et al., 2008; Field et al., 2013; Jesse et al., 2015; Le et al., 2011; Zhang and Emory, 2015) although some studies provided a combination of group and individual sessions (Kieffer et al., 2013; Muñoz et al., 2007) or individual sessions only (Grote et al., 2009; Lenze & Potts, 2017; McKee et al., 2006; Sampson et al., 2016). Jesse and colleagues (2010) allowed women to choose whether they wanted to complete the intervention individually or in a group. For details regarding the characteristics and efficacy of each included intervention, see Table 1.2.

Treatment Response

Treatment response was determined by evaluating clinical outcomes for depression or anxiety (which was a secondary outcome in two studies). Outcomes are reported first for randomized controlled trials and then for non-randomized intervention studies.

Randomized Controlled Trials

Depression. Of the 10 RCTs, two studies reported statistically significant reductions in depressive symptoms when compared to a control group receiving prenatal care as usual. The first study used a CBT group intervention lead by master's level therapists (El-Mohades et al., 208); and the

second study used a combined (i.e., group and individual sessions) behavioral activation intervention delivered by community health workers (Kieffer et al., 2013). One study using IPT lead by master's and doctoral level therapists outperformed *enhanced* usual prenatal care (Grote et al., 2009). Four studies found that the tested intervention reduced depressive symptoms from baseline to post-treatment, however, these interventions did not outperform prenatal care as usual (Le et al., 2011; McKee et al., 2006; Field et al., 2013; Lenze & Potts, 2017). Three studies found no effect of the intervention on depressive symptoms (Crocket et al., 2008; Muñoz et al., 2007; Zhang et al., 2015). While randomized trials demonstrated that CBT and IPT approaches were effective, it is notable that there were more CBT and IPT interventions that did not outperform standard care than those that did.

Of the three efficacious interventions, only two examined long term benefits. Grote and colleagues (2009) reported significant reductions in depressive symptoms that were maintained from immediate post-intervention to six-months postpartum. However, Kieffer et al. (2013) reported that the intervention effect did not extend into the early postpartum period (6 weeks postpartum), and thus was only significant immediately post-treatment (in late pregnancy).

Anxiety. Of the 10 RCTs, only two measured anxiety symptoms as an outcome. Of those, one study showed a significant reduction in anxiety symptoms from pre- to post-treatment (Field et al., 2013); however this was not different from the active control condition.

Non-Randomized Trials.

Depression. Of the three non-randomized trials included in this review, two studies reported statistically significant reductions in depressive symptoms from pre- to post-treatment. Both studies tested a CBT intervention, though the method of delivery differed by study. The first was led by mental health and perinatal professionals (e.g., marriage and family therapists, licensed

clinical social workers, midwife) (Jesse et al., 2010), while the second study was led by community caseworkers (Sampson et al., 2016). Jesse and colleagues (2015) found significant reductions in depressive symptoms in Black women, only when they were considered high-risk for depression (as opposed to low or moderate risk), demonstrating a moderating effect of depressive symptom severity. Jesse and colleagues (2010; 2015) reported significant reductions in depressive symptoms that continued from immediate post-intervention to six-month post-treatment. Importantly, the lack of randomization in the aforementioned studies limits our ability to confidently attribute symptom change to the intervention.

Anxiety. There were no non-randomized trials that examined anxiety as an outcome.

Attrition and Attendance

Attrition ranged from 8% to 45% but was low overall (mean attrition=17%). Most studies kept attrition rates below 10% (Crockett et al., 2008; Field et al., 2008; Jesse et al., 2010; Le et al., 2011; Lenze & Potts, 2017; Muñoz et al., 2007 & Sampson et al., 2016), and only two studies had attrition rates larger than 30% (McKee et al., 2006; Zhang & Emory, 2015). Intervention duration ranged from four to 14 sessions, with a modal intervention length of eight sessions. Across studies, pregnant women attended about 6 sessions on average (M=6.21). For additional information about average session length by study (when reported), see Table 1.1.

Cultural Adaptations

Only a minority of studies (five of 13) included cultural adaptations to their treatment protocols (Grote et al., 2009; Jesse et al., 2010; Jesse et al., 2015; Le et al., 2011; Muñoz et al., 2007). Those interventions that did include adaptations were CBT protocols, and used focus groups with stakeholders (both clients and providers) to inform the adaptation process. As an example, in a sample of Latinas of primarily Mexican origin, Muñoz and colleagues (2007) attempted to

improve cultural fit of the intervention by reinforcing values such as collectivism and familism, fostering new outlets of support in a foreign context, validating cultural values regarding pregnancy, motherhood, religion and spirituality, and providing women with an opportunity to discuss their frustrations with discrimination and racism. In another study, Le and colleagues (2011) incorporated parenting issues of particular salience to Central American families (e.g. immigration stressors), and linguistic changes relevant for the population. Finally, in a sample of rural Black women, adaptations included adjustments to the reading level of intervention materials, adding colorful and attractive graphics, assigning brief homework assignments using real-world examples, and using guided visualization and inspirational literature and affirmations (Jesse et al., 2010; 2015). The RCTs that used cultural adaptations (Grote et al., 2009; Le et al., 2011 Muñoz et al., 2007) were not more likely to be effective than the RCTs without adaptations; of the three RCTs that outperformed a control condition and significantly reduced depressive symptoms, only one had been culturally adapted (Grote et al., 2009).

Data Quality

Included studies were of mixed methodological bias. Though most studies used random sequence generation (n=8) to avoid selection bias, fewer studies described allocation concealment in detail (n=4). Further, most studies did not blind study personnel to intervention condition. Finally, it was not possible for the authors to assess selective reporting with certainty, as only five studies had pre-registered their trials, and thus had pre-defined variables of interest. For a summary of bias estimates by study see Table 1.3.

Discussion

This review is the first to assess the efficacy of interventions for anxiety and depression during pregnancy among the two largest minority groups in the United States (U.S. Census, 2018).

Overall, findings suggest that most treatment outcome studies with pregnant Latina and Black women are limited and often do not result in favorable outcomes for depression. Although CBT is the treatment modality most often tested for depression with pregnant ethno-racial minority women, methodological limitations and a preponderance of nonsignificant findings (i.e., lack of favorable support for interventions) preclude us from naming CBT an efficacious intervention in this group of women. Indeed, for Black and Latina women, only behavioral activation had unanimously favorable research support but this was based on just one randomized trial. All other modalities (i.e. IPT, mindfulness) had more limited support.

These findings are particularly concerning in the context of recent data from the U.S. Preventive Services Taskforce which reviewed data from 17 randomized controlled trials of pregnant women primarily identifying as White from the U.S. and Europe, and found that both CBT and IPT had a small yet favorable effect on perinatal depression symptoms (O'Connor et al., 2019). In another study, the pooled relative risk score for depression remission, usually defined as the "proportion below a specified cut point on a depression symptom scale" across 11,869 women receiving CBT and living in North America, Europe and Australia was calculated at 1.34 (O'Connor et al., 2016), indicating a clear benefit of treatment. CBT also has been established as the intervention with the most evidence for treating prenatal anxiety in the U.S. and European population, inclusive primarily of non-Latina White women (Austin et al., 2008; Lilliecreutz, Josefsson, & Sydsjö, 2010; Thomas, Komiti, & Judd, 2014). In light of these findings, this review identifies an important treatment gap and suggests an urgent need to investigate *why* these interventions fall short when being used with pregnant women of color with internalizing distress.

Strikingly, in the current review with Black women and Latinas, only two interventions measured anxiety as an outcome and neither of these studies found that the intervention

outperformed a control condition in reducing anxiety symptoms. Anxiety during pregnancy has garnered increased attention due to its associations with adverse birth outcomes (Dunkel Schetter & Tanner, 2012) and subsequent postpartum depression (Heron, O'Connor, Evans, Golding, & Glover, 2004). Yet, detection and management of clinically significant anxiety is restricted due to a lack of valid screeners during pregnancy (Misri, Abizadeh, Sanders & Swift, 2015) and physicians' uncertainty about appropriate treatment (Leddy et al., 2011), which is understandable given the state of the evidence. This is of particular concern for Latinas and Black women who not only experience higher rates of anxiety during pregnancy than their non-Latina White counterparts (Collins & David, 2005), but also have access to poorer quality obstetric and gynecologic care (McKenney et al., 2018). Interestingly, mind-body therapies (e.g. yoga, tai-chi), which were not part of this review, have received more attention as treatments for anxiety than psychological interventions and show favorable effects on symptomatology in pregnancy (Davis et al., 2015; Field et al., 2013b; Satyapriya et al., 2013), including among primarily Black women (Jallo et al., 2014). However, systematic reviews of mind-body interventions and other complementary and alternative therapies have cautioned against drawing conclusions about these therapies given concerns about adequate power, randomization, and the measurement of anxiety (Beddoe & Lee, 2008; Hall et al., 2016; Marc et al., 2011). Thus, well designed studies examining psychological and mind-body interventions (i.e., non-pharmacological interventions) to reduce prenatal anxiety are critically needed.

It is possible that the lack of significant findings supporting psychological interventions for Black women and Latinas with anxiety and depressive symptoms relates to the level of clinical risk of participants included in the intervention trials. In general, effects of preventive interventions for depression tend to be modified by risk level, such that stronger effects are seen for participants

with higher baseline symptomology (Barrera, et al., 2007). Consistent with this pattern, Jesse and colleagues (2015) reported greater improvement for pregnant Black women with higher baseline depressive symptoms, and other authors have suggested that better treatment effects would have emerged with more severely depressed women (Le et al., 2011; McKee et al., 2008). Interestingly, findings are mixed regarding severity as a moderator of depression treatment outcome in samples of primarily non-Latina White women. While some researchers report that women with higher baseline depressive symptoms improve less (Sockol et al., 2011), others report that women "at risk" for depression show greater symptom improvement post-treatment (Bittner et al., 2014b; Dennis & Hodnett, 2007). There is a need to test psychological interventions with clinically depressed women to better elucidate whether available intervention modalities are unable to resolve depression for pregnant ethno-racial minorities, or whether effects are simply difficult to detect in a prevention context.

Despite findings suggesting that cultural adaptations can improve clinical outcomes in ethnic minority adults with depression and anxiety (van Loon et al., 2013), it is of interest that only five (of 13) of the interventions included in this review incorporated such adaptations. Adaptations varied from surface-level modifications of intervention materials (e.g., language, photos), to reinforcement of traditional values, or incorporation of culturally salient topics (e.g., coping with discrimination). In our review, two of the five effective interventions used cultural adaptations to improve fit for the respective racial and ethnic minority women. Importantly, RCTs with cultural adaptations reported less attrition on average compared to RCT's without adaptations (10% vs. 19.9%). Future studies should strive to better understand the importance of cultural modifications to improve engagement and clinical outcomes with pregnant women receiving treatment for anxiety and depression.

Findings from this systematic review should be considered in light of several limitations. First, the selection criteria, which required a minimum of 75% ethnic minority participants, limited the number of studies eligible for our systematic review. This decision was based on previous studies which have argued that a 3:1 ratio of ethnic minority participants to White participants provides strongest evidence of treatment effectiveness for the participating minority groups (Huey & Polo, 2008). A less conservative inclusion criteria of 50%, would have added an additional six RCTs—four IPT (Spinelli & Endicott, 2003; Spinelli et al., 2013; Zlotnick, Miller, Pearlstein, Howard, & Sweeney, 2006; Zlotnick, Tzilos, Miller, Seifer, & Stout, 2016), one CBT (H. O'Mahen et al., 2013) and one family systems therapy (Heinicke et al., 1999) —of which one CBT (O'Mahen et al., 2013) and two IPT interventions significantly reduced depressive symptoms and outperformed control conditions (Spinelli & Endicott, 2003; Zlotnick, Tzilos, Miller, Seifer, & Stout, 2016). Had these studies been included our conclusions would have remained largely the same—that there are few efficacious trials that include Latinas and Black women, and that though CBT and IPT are the intervention modalities that have garnered most support, neither have sufficient support to be considered well-established or in other words, "gold standard" treatments for pregnant ethnic minority women.

This review was restricted to studies conducted in the United States in order to more confidently make comparisons across studies and are not generalizable to ethno-racial minority women living in other countries. Ethnic/racial minority status is differentially associated with depressive symptoms across countries, in part because of the variance in risk factors such as ethnic discrimination encountered in these countries (Missinne & Bracke, 2012). Further, given that heterogeneity in prenatal health systems across countries would change the level of care afforded to women randomized to the prenatal care 'as-usual' control conditions, our focus on one national

context, though regionally diverse, allows us to draw conclusions and make suggestions under a more homogenous social and structural backdrop.

Finally, our results regarding the evidence base for interventions in the prenatal period for Latinas and Black women are confounded by socioeconomic status. Because all women enrolled in included studies were considered to be low income, we were not able to test the relative impact of race/ethnicity versus socioeconomic status on intervention response. It is notable that by including studies of low-income pregnant women with a greater proportion of White women (i.e., 26-50%), the number of effective RCTs would have doubled (i.e., from three to six), suggesting that interventions tested with greater numbers of White women showed better treatment response. Greater representation of Latinas and Black women from diverse SES backgrounds in clinical trials is necessary to elucidate the role of SES as a potential moderator of treatment outcomes. Until recently, few NIMH funded trials of psychological interventions have included meaningful numbers of ethnic-minorities (Mak et al., 2007). As a result, the field is at a disadvantage when it comes to creating an evidence base for ethno-racial minority women during an already understudied time in the life course—pregnancy (Mendle et al., 2016).

Depression and anxiety often persist from pregnancy to the postpartum period when left untreated (Heron, O'Connor, Evans, Golding, & Glover, 2004). Treating anxiety and depression during pregnancy is optimal as it can reduce adverse intergenerational outcomes via multiple pathways including improving parenting behaviors (Feldman et al., 2009) and reducing physiological stress responses in mothers and their infants (Urizar & Muñoz, 2011). This review finds that for pregnant Latinas and Black women, CBT, behavioral activation and IPT are promising interventions for depression though they require additional research support. Addressing

this gap in the field may help to improve physical and psychological health outcomes for ethno-racial minority pregnant women who are known to experience significant mental health disparities.

Study 2

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Anxiety Outcomes among Pregnant Ethnic/Racial Minority Women in a Stress Management Program: Efficacy and Potential Mediators of Treatment Change

Abstract

Objective: Few studies have tested cognitive behavioral therapy to reduce prenatal anxiety despite substantial empirical support among individuals seeking treatment for anxiety symptoms. We examined whether a brief cognitive behavioral intervention delivered to low-income pregnant women would be efficacious for reducing prenatal anxiety.

Method: A sample of 100 primarily ethnic and racial minority pregnant women (74% Latina, 18% Black; *M age*= 26.5) were randomized to an eight-week cognitive behavioral stress management (CBSM) intervention (n=55), or to an attentional control condition (n=45). Two forms of anxiety (state and pregnancy-specific) were measured at baseline, post-treatment, and at follow-up in the postpartum. Intent-to-treat and completer analyses were conducted using linear mixed models to test mean differences by group assignment and by intervention completion (< 7 vs. ≥ 7 sessions) in both forms of anxiety at post-treatment and follow-up time points. We also examined whether changes in potential psychological (i.e., negative cognitions, relaxation self-efficacy) and physiological (i.e., cortisol awakening response) mediators from baseline to post-treatment would explain changes in anxiety from post-treatment to third trimester follow up.

Results: Intent-to-treat results revealed no intervention group x time interactions for state ($F_{(3,356)}$=.51, p=.68) or pregnancy-specific anxiety ($F_{(2,184.50)}$=.76, p=.47), indicating no intervention effect post-treatment or at follow-up. Completer analyses showed that women who received all intervention content (34.5%) had significantly less state anxiety at post-treatment compared to women who had not completed the intervention (65.5%; $M_{sessions}$= 3.62; $F_{(6, 270.52)}$=2.35, p=.03) and those in the control condition. None of the changes in mediator variables from baseline to post-treatment resulted in subsequent anxiety symptom change from post-treatment to third trimester follow up.

Limitations: Women enrolled in this study did not meet clinical criteria for anxiety, and the outcome measures utilized do not have clinical cutoffs, limiting our ability to comment on the clinical significance of the anxiety reductions observed.

Conclusions: While we did not find support for the use of CBSM to treat prenatal anxiety among low-income women, those who received a full dose benefited in state anxiety immediately post-intervention.

Introduction

Psychotherapy is considered the first line of treatment that is recommended by obstetricians and psychologists for women who have anxiety symptoms that interfere with functioning during pregnancy (Bandelow et al., 2014; Dayan & Yoshida, 2007). However, most treatment efficacy studies for anxious pregnant women focus on complementary and alternative therapies (e.g., yoga), and many are methodologically flawed (Matthews et al., 2017; Newham, 2014). A paucity of psychological intervention trials with anxious pregnant women (Nillni et al., 2018) leave obstetric and mental health providers with an evidence base primarily derived from research with non-pregnant samples, which may not translate to women with prenatal anxiety. For example, psychotherapies with clear efficacy for anxiety reduction in the general population including cognitive behavioral therapy (CBT), exposure therapy (Deacon & Abramowitz, 2004), or acceptance and commitment therapy (Landy et al., 2015) have little to no causal research supporting their efficacy for prenatal anxiety (Arch et al., 2014; Nillni et al., 2018).

The absence of evidence-based clinical interventions for pregnant women is concerning given that prenatal anxiety disorders (i.e., GAD, SAD, Panic Disorder, Specific Phobia, OCD) are prevalent, affecting an estimated 15.6% of women—making them more common than depressive disorders during pregnancy or the postpartum (Fairbrother et al., 2016). Anxiety symptoms in pregnant women may also manifest as fears about pregnancy, described as *pregnancy-specific anxiety* (Guardino & Dunkel Schetter, 2014). Pregnancy-specific anxiety is a type of anxiety not currently captured by DSM diagnostic criteria (Sharma & Mazmanian, 2014). This category includes persistent worries during pregnancy relating to a woman's prenatal health, her delivery, the well-being of the baby, and future parenting, and is estimated to affect 14.4% of women (Poikkeus et al., 2006). Pregnancy-specific anxiety is conceptually and empirically distinct from

general trait and state anxiety (Dunkel Schetter & Ponting, in press), and also from clinical diagnoses such as generalized anxiety disorder (Blackmore et al., 2016). For example, a recent study showed that state anxiety in the previous week, only accounted for between 2% and 23% of the variance in pregnancy-specific anxiety across all trimesters (Brunton et al., 2019). Furthermore, the presence of distinctive worries, the time limited nature, and the unique outcomes (e.g., preterm birth) associated with pregnancy-specific anxiety have led researchers to consider it a distinct type of anxiety (Anderson et al., 2019).

Data suggest that ethnic and racial minority women have higher rates of prenatal anxiety than their non-Latina White counterparts. For example, findings from a British national survey on maternal health (*n*= 5,000) indicated that ethnic and racial minority women were more than 1.5 times more likely to report feeling anxious during pregnancy than non-Latina White women (Henderson & Redshaw, 2013). Similarly, results from a survey of over 3,500 pregnant Canadian women showed that 28% of Latinas and 26% of Black women reported symptoms of state anxiety above a clinical cutoff, compared to 17% of non-Latina Whites (Robinson et al., 2016). In addition to elevated symptoms of prenatal state anxiety, Latinas and Black women (Guardino & Dunkel Schetter, 2014) show greater pregnancy-specific anxiety than their non-Latina White counterparts, findings that suggest that Latina and Black women constitute a high-risk group for prenatal anxiety who stand to benefit from psychological interventions to reduce anxious symptomology.

Interventions that target elevated prenatal state anxiety and pregnancy-specific anxiety may alleviate adverse outcomes for women during pregnancy and the postpartum. Both types of anxiety are associated with adverse health behaviors during pregnancy (e.g., alcohol use; Leis et al., 2012; Lobel et al., 2008), adverse birth outcomes including preterm birth (Dunkel Schetter & Tanner, 2012) and low birthweight (Ding et al., 2014), and subsequent maternal anxiety after birth

(Blackmore et al., 2016; Heron et al., 2004). Importantly, pregnancy-specific anxiety predicts shorter gestational age, lower birthweight, and postpartum generalized anxiety diagnoses after controlling for prenatal generalized anxiety, suggesting an independent effect on maternal physiology and psychopathology (Blackmore et al., 2016). Taken together, findings suggest that both state and pregnancy-specific anxiety have significant and unique effects on mental health and birth outcomes—making reduction of both types of anxiety a prenatal health priority.

Psychological interventions for prenatal anxiety—including state anxiety, pregnancy-specific anxiety, and their combination—are urgently needed, as there is currently no intervention modality with sufficient evidence to be considered efficacious (Chambless & Ollendick, 2001). Though RCTs have examined promising therapies such as mindfulness and CBT for state anxiety symptoms, sample sizes are small and intervention effects are inconsistent (Matvienko-Sikar et al., 2016; Newman et al., 2017). Psychological interventions that target pregnancy-specific anxiety are also lacking. A recent systematic review by Stoll et al. (2018) of non-pharmacological interventions for pregnancy-specific anxiety reported that two of six RCTs tested manualized treatments, and the other four examined prenatal education or yoga courses. Both of the manualized psychotherapy trials included a CBT approach; one reported significantly reduced childbirth and related worries (outperforming a control condition; Saisto et al. 2001), and the other did not (Bittner et al., 2014). Though the evidence for state anxiety and pregnancy-specific anxiety does not yet converge on a single psychotherapeutic modality, CBT is the most tested intervention in pregnant women with anxiety (Misri et al., 2015; Nillni et al., 2018).

Cognitive behavioral stress management (CBSM) is a cognitive behavioral intervention that effectively reduces anxious symptoms in adults, but whose efficacy for prenatal anxiety has yet to be tested. To date, CBSM has been of primary interest to health psychologists who recognize that

treating psychological distress slows disease progression for chronic conditions like cancer and HIV. CBSM interventions primarily target stress reduction, ultimately aiming to improve associated physiological makers (i.e., cortisol, immune function) by teaching stress awareness and cognitive and relaxation-based coping strategies. Coping may be problem focused—changing aspects of the stressor, or emotion focused—minimizing an emotional response to a stressor. Though CBSM trials are most often conducted with adults with chronic health conditions, it has increasingly been examined among pregnant women (Guo et al., 2021; Urech et al., 2017; Urizar et al., 2021), a group whose psychological distress uniquely influences physiology and impacts fetal development (Glover, 2015).

CBSMs share several treatment targets with traditional CBT, including changing maladaptive thoughts and behaviors to reduce worry and tension. Initial evidence suggests that CBSM reduces anxiety symptoms in both clinical and "at risk" samples. For example, in treatment studies of women with preterm labor (Scherer et al., 2016) and generalized anxiety disorder (Majid et al., 2012), participants randomized to CBSM showed steeper declines in anxiety symptoms post-treatment compared to those in the control groups. CBSM can also be feasibly delivered to pregnant women (Urizar et al., 2019a), and ethnic and racial minorities (Lopez et al., 2013; Penedo et al., 2007). Moreover, CBSM is associated with reductions in correlates of anxiety like stress and cortisol during pregnancy (Karamoozian & Ghasem, 2015; Urizar & Muñoz, 2011).

CBSM also shows promise in the realm of acceptability with preliminary findings suggesting high consumer satisfaction among pregnant ethnic and racial minority samples (Urizar et al., 2019a). CBSM's emphasis on relaxation techniques to reduce physiological arousal is likely important for cultural fit given evidence that Latinx and Black Americans often express anxious distress somatically (Hunter & Schmidt, 2010; Lewis-Fernández et al., 2010). Further, CBSM's

normalizing language (i.e. “stress”) and familiar strategies (e.g. relaxation, problem solving) reduce clinical jargon, which may increase the acceptability of an intervention with minority populations (Chavira et al., 2017). Improving acceptability of psychological interventions is critical for pregnant Latina and Black women living in the United States who report high mental health service utilization stigma (Ko et al., 2012; O’Mahen et al., 2011), and disproportionate treatment dropout (Cooper & Conklin, 2015).

Investigating *why* certain interventions produce change is another important direction for treatment outcome research in the absence well established clinical guidelines for intervention selection. Studying potential mediators of intervention effects allows for identification of the processes through which treatments produce favorable effects (Kazdin, 2007), and is useful when the extant intervention literature has not yet identified a gold-standard intervention, as is the case with prenatal anxiety. Further, a knowledge of treatment mediators can guide clinicians in treatment planning before the field identifies supported intervention protocols by suggesting treatment elements known to affect agents of symptom change (Holly et al., 2019).

In the case of stress reduction interventions like CBSM, several mediators of treatment change have been proposed including physiological (e.g., cortisol) and psychological processes (e.g., negative thinking, cognitive biases) (Field & Diego, 2008; Gu et al., 2015). These same mediating variables are discussed in several theoretical models of anxiety development, maintenance, and treatment (Behar et al., 2009). For example, Beck and Clark (1997) propose that a bias towards interpreting stimuli as dangerous or threatening combined with an underestimation of one’s coping resources are core features of pathological anxiety. Following this model, they propose that psychological interventions for anxiety are most effective when they reduce

unwarranted physiological arousal, and negative cognitive biases, and improve coping strategies available to manage anxiety.

Cognitive biases towards threat are a frequent target of change in interventions for anxiety (Smits et al., 2012). In anxiety disorders, common cognitive biases include attention towards information conveying threat, and biases in judgment—that personal harm is likely in negative or ambiguous situations (Craske & Pontillo, 2001). These underlying biases facilitate the overestimation of the odds of a catastrophic outcome and the occurrence of automatic negative thoughts which maintain anxiety. Negative cognitions like catastrophizing, personalizing and fortune telling are byproducts of biased cognitive processing, and have been successfully reduced by CBSM (Phillips et al., 2011). Additionally, in the context of several more generic CBT interventions, reductions in negative cognitions have been linked to anxiety symptom improvement (Clark & Beck, 2010; Goldin et al., 2012, 2017). Given well established theoretical models and empirical studies that support the role of cognitive processes in anxiety, the examination of changes in negative cognitions as a potential mediator of treatment change is warranted.

Another cognitive process proposed to reduce anxiety is coping self-efficacy, or the perception that the coping strategies available to an individual will be effective for managing anxiety (Bandura, 1988). This effortful cognitive process is thought to disrupt automatic thoughts about the controllability and severity of a perceived threat by retrieving prior examples of management or tolerance of anxiety (Bandura, 1988). At least one study has shown that following a CBSM intervention, those in the intervention group reported an increased confidence (e.g., self-efficacy) that they could effectively use coping strategies such as relaxation (Phillips et al., 2008). Importantly, the relationship between relaxation self-efficacy and anxiety is also supported empirically in intervention trials, where improved confidence using relaxation skills resulted in

fewer anxiety symptoms (Alipour et al., 2017), making this cognitive process a worthy candidate mediator.

Finally, biomarkers of psychosocial stress, such as cortisol (Zorn et al., 2017), are also implicated in etiological models of anxiety. Cortisol is thought to increase and maintain anxiety by over-activating fight or flight responses including uncomfortable interoceptive cues (Bradley et al., 2006) that can appear to substantiate erroneous fears or be perceived as uncontrollable (Boswell et al., 2013). In fact, in laboratory-based experiments, cortisol secretion was highest (Smyth et al., 2013) and most reliably linked to elevations in heart rate (Reinhardt et al., 2012) when tasks were appraised as threatening and perceived ability to cope is low. Cortisol Awakening Response (CAR) is a particular measure of cortisol which captures a normative and temporary increase in cortisol in the thirty minutes after waking; its magnitude (whether large or blunted) has been linked to stress and psychopathology in pregnancy (De Weerth & Buitelaar, 2005a). Beyond the theoretical plausibility of CAR as a mediator of anxiety improvement, there is initial support for it as a target effectively engaged by psychological interventions. For example, stress management programs have been shown to decrease CAR in pregnant (Urizar, et al., 2019b) and non-pregnant samples (Gaab et al., 2003). Further, changes in CAR are associated with subsequent changes in anxiety; greater CAR has been shown to prospectively predict greater anxiety symptoms (Adam et al., 2014).

Given the dearth of evidence-based interventions for prenatal anxiety and the elevated rates of anxiety among pregnant Latinas and Black women, examining the efficacy of a psychological intervention for prenatal anxiety outcomes and potential mediators of symptom change in this group is warranted. The goal of the present study is to examine prenatal anxiety outcomes among ethnic and racial minority pregnant women following their randomization to either a CBSM

intervention or a control group. We hypothesize that women randomized to the CBSM group will report lower state and pregnancy-specific anxiety at post-treatment compared to those in the control condition. We did not have a-priori hypotheses about whether anxiety reductions would last into follow-up timepoints given limited data on treatment maintenance during the perinatal period. Finally, we test whether two conceptually distinct classes of mediators—cognitive and physiological—might explain symptom change for women in the CBSM intervention. Examining potential mediators of treatment change has the potential to bring parsimony to a field testing several different intervention modalities to reduce prenatal anxiety symptoms and identify psychological or physiological processes most likely to create change in the desired outcome when activated (Kazdin, 2007).

Method

Participants

Participants were 100 pregnant women (primarily Latina 70.3%, and African American 17.8%) recruited from six prenatal centers in California, which serve low-income populations (Urizar et al., 2019a). Recruitment was achieved through referrals by health care providers and distribution of printed flyers, or in person contact by research staff in waiting rooms of prenatal clinics. Eligible women were 18 years of age or older, less than 17 weeks pregnant, and were fluent in English or Spanish. Women were not required to reach a clinical cutoff for anxiety or depression to enroll in the study. Instead, similar to other studies of CBSM, individuals were considered "at risk" because of a sociodemographic profile that is associated with an increased likelihood of encountering systemic stressors (e.g., Antoni et al., 2009). Women with significant medical concerns (e.g., gestational diabetes) or a diagnosed mental illness (i.e. major depression, anxiety) were excluded from study participation. For additional information regarding study enrollment and

randomization procedures, see Urizar et al., 2019b.

Design

Women were randomized to receive either the CBSM intervention (*n*= 55), or to a control condition that received weekly prenatal health information sent by mail (*n*= 45). The intervention and the control group received active CBSM treatment and the educational materials respectively, for eight weeks. Women in both conditions were assessed for prenatal anxiety and hypothesized psychological mediators (i.e., negative cognitions, relaxation self-efficacy) using standardized self-report measures prior to treatment (i.e., baseline), following the eight-week intervention (i.e., post-treatment), at 30-32 weeks gestational age (i.e., third trimester follow-up), and three months postpartum. Participants also sent in saliva for cortisol analyses at each of the four study timepoints. Participants were instructed to collect saliva within two days of their scheduled study assessment visit. After participants completed the self-report questionnaires, they practiced collecting saliva in front of research staff who helped to assure proper collection and answer any questions in efforts to increase protocol adherence (Stalder et al., 2016). Study staff also reminded participants to avoid behaviors known to interfere with the cortisol assay (e.g., brushing teeth, drinking) or to change cortisol concentrations (e.g., eating, exercising) for at least 60 min before sample collection, and to track these behaviors should they have occurred within the hour prior to collection. Participants stored the samples in their freezer until a research staff member came to pick up and review the saliva samples. Participants received up to $200 in gift cards for completing all four study assessments. All study procedures were approved by California State University, Long Beach (National Institutes of Health, Clinical Trial NCT03627247).

Cognitive Behavioral Stress Management Program

The SMART Moms CBSM protocol is a manualized group-based cognitive behavioral therapy program created to teach women coping and relaxation skills for common prenatal stressors (e.g., concerns about their baby's health, financial stressors during pregnancy). The intervention combined and adapted materials from a CBT-based postpartum depression prevention intervention created for and tested with Latina and Black women (Muñoz et al., 2007; Tandon et al., 2014) and a cognitive behavioral stress management intervention for women with breast cancer (Antoni, 2003). Clinically trained facilitators were bilingual, and some groups were conducted in Spanish, using translated intervention materials to include women with a Spanish language preference. Fidelity data based on observer ratings of the video-taped intervention sessions show that adherence to the intervention manual was high, and that participants rated intervention material was as being presented "very clearly" (rating 4.7/5; Urizar et al., 2019a).

The SMART Moms CBSM was delivered at a prenatal health clinic by two group facilitators over eight weeks. Group sessions lasted two hours, were interactive, and ended with a homework assignment related to the coping and relaxation skills reviewed that week. The intervention covered topics such as stress awareness, thought monitoring and restructuring, coping skills (i.e., problem focused versus emotion focused), relaxation techniques (e.g., progressive muscle relaxation), social support, and assertive communication. For a complete description of the aims, and relaxation techniques covered by SMART Moms CBSM see Table 2.2, adapted from Urizar et al., 2019a.

Control Group

Women in the control condition were mailed printed prenatal health handouts from the "Becoming Mom" workbook from the March of Dimes Foundation (March of Dimes, 2011). Handouts provided information about prenatal wellbeing including common pregnancy

discomforts, breastfeeding and labor. Materials were sent once a week for eight weeks, and a member of the research staff called participants to confirm they had received and engaged with the workbooks.

Measures

State Anxiety. A subscale of the State-Trait Personality Inventory (Spielberger et al., 1955) was used to measure self-reported state anxiety. The STPI-State (STPI-S; Spielberger & Reheiser, 2009) is comprised of 10-items that measure the emotional state of anxiety in the moment. Example items include "I am worried" and "I feel tense." Each item is rated on a scale from 1 (*not at all)* to 4 (*very much so)* with higher scores indicating more anxiety. The STPI-S has been used and validated in pregnant populations (Woods-Giscombé et al., 2010) and its items are all derived from the State and Trait Anxiety Inventory (Spielberger at al., 1983), which has been used and validated with Spanish-speaking Latinas (Spielberger, 1971) and Black women (Williams et al., 2012). The STPI-S was administered at intervention baseline, immediately post-intervention, at 30-32 weeks gestation, and three-months postpartum. The Cronbach's alpha at each time point was .87, .85, .84 and .84 respectively.

Pregnancy-Specific Anxiety. The Pregnancy Related Anxiety (PRA) scale is a 10-item scale that assesses the frequency with which a pregnant woman feels concerned about their health, their baby's health, labor and delivery, or caring for a baby (Rini et al., 1999). Responses are made on a scale ranging from 1 (*not at all*) to 4 (*very much*), and a sum score from 4-40 is obtained, with higher scores indicating more pregnancy-specific anxiety. Sample items include: "I am worried that I will be harmed during delivery" and "I am fearful regarding the health of my baby". The measure shows good reliability and internal consistency in both English and Spanish, and has been used in community samples (Ramos et al., 2019) and clinical treatment studies (Urizar et al.,

2019a) with pregnant women. The Cronbach's alpha at baseline, post-treatment, and third trimester was .73, .74, and .85 respectively.

Intervention Group. Intervention group (i.e., CBSM vs. control group) was dummy coded with the control group serving as the reference group.

Intervention Completers. Women who attended at least seven of the eight sessions were considered to have received a full course of the intervention and are referred to hereafter as intervention completers. Women who attended seven sessions guaranteed that they were exposed to all parts of the intervention content (i.e., attended all sessions and missed the review or missed one session but received some of the missed session content in the review session). Intervention completion was coded as a categorical variable (control condition=0, non-completer=1, completer=2) to be able to compare mean symptom differences across all three groups.

Covariates. Financial hardship and depressive symptoms measured at baseline were entered as covariates in all models given their associations with prenatal anxiety (Gurung et al., 2005; Heron et al., 2004). Language (i.e. English vs. Spanish) was entered as a covariate of interest, to test whether groups delivered in Spanish and English were equally effective. Finally, parity was included as a covariate in models examining pregnancy-specific anxiety outcomes due to findings indicating that first time mothers show greater pregnancy anxiety than mothers with prior birthing experience (Huizink et al., 2016).

Financial hardship was assessed by asking women "How hard was it living on your annual income this last year?" This item was dummy coded such that women who responded "Hard" or "Somewhat hard" were compared against those who indicated "Not too hard" and "Not hard at all" (reference). Parity (nulliparous vs. multiparous) and language were also dummy coded (reference groups: nulliparous, English). Baseline depressive symptoms were measured using the Edinburgh

Postnatal Depression Scale (EPDS; Cox et al., 1987). The EPDS is a 10-item self-report scale that assesses perinatal depression severity in the past week, validated in English (e.g., Murray & Carothers, 1990) and Spanish (Alvarado et al., 2015). The Cronbach's alpha in this study was .81.

Possible Mediators

Relaxation Self-Efficacy. The Measure of Currents Status (MOCS; Carver, 2006) is a scale created specifically to measure the "active ingredients" behind cognitive-behavioral stress management programs. The MOCS is a 13-item scale that assesses an individual's self-perceived ability to relax at will, recognize their own stress triggers, assert their needs and choose appropriate coping responses. Items are rated on a five-point Likert scale from 0 (*Never*) to 4 (*Very Often*). For the purposes of this study, we examined only the relaxation subscale. The two items that comprise the subscale are "I know how to use relaxation techniques to reduce any tension I experience", and "I am able to use mental imagery to reduce any tension I experience". Scores were calculated by averaging responses across both items, as scored in prior trials of CBSM (Gudenkauf et al., 2015). This measure shows good internal consistency in both English and Spanish (Hoogland et al., 2018; Yanez et al., 2015).

Negative Cognitions. The Dysfunctional Attitudes Scale-Short Form (DAS-SF1; Beevers, Strong, Meyer, Pilkonis, Miller, 2007) is a 9-item scale that measures cognitive distortions. The short-form is highly correlated with the 40 item DAS-A, and has shown change similar to that of the DAS-A over the course of intervention trials (Beevers et al., 2007). Items assess the extent to which individuals agree with dysfunctional thoughts/attitudes and are scored on a 4-point Likert scale from 1 (*Totally* agree) to 4 (*Totally* disagree). Sample items include "If a person asks for help, it is a sign of weakness" and "If others dislike you, you cannot be happy". Sum scores are calculated for each subscale so that higher scores represent more cognitive biases and maladaptive

beliefs. The DAS-SF1 has shown to be efficient, has good concurrent, convergent, and predictive validity (Beeyers et al., 2007), and has previously been used to measure changes in cognitive distortions in perinatal intervention studies (Arrow, 2014).

Cortisol Awakening Response (CAR). Saliva samples were thawed to room temperature for biochemical analysis, then centrifuged. Samples were analyzed using a time-resolved immunoassay with fluorescence detection resulting in intra- and inter-assay variability under 10%. Cortisol Awakening Response (CAR) was calculated by subtracting the waking cortisol value from the 30 min post-waking cortisol value and dividing this number by the waking cortisol value: CAR = [(30 min post-waking – waking)/(waking) x 100]. Larger numbers indicate a greater percent increase in cortisol from waking to 30 min after waking.

Data Analytic Plan

CBSM Efficacy

We assessed efficacy of the CBSM intervention with respect to state anxiety and pregnancy-specific anxiety using separate models. Estimates of mean state anxiety and pregnancy-specific anxiety were calculated in the CBSM and control group at baseline, post-treatment, and third trimester follow-up, and again at three months postpartum for state anxiety using linear mixed models (LMM). Both state anxiety and pregnancy-specific anxiety LMM were fit with intervention condition (CBSM, control group) as the between subjects factor, time (pre-, post-intervention, third trimester follow-up) as a within subjects factor and a group by time interaction. Subject level random effects were used to account for within subject correlations. LMMs produce unbiased parameter estimates by allowing different numbers of observations per record, thus handling missing data missing at random, which allowed us to use all available data for all subjects irrespective of whether they had complete follow-up data (Fig. 1). This intent-to-treat (ITT)

analytical approach does not rely on additional ad hoc imputation techniques and preserves more statistical power than popular imputation approaches applied to longitudinal clinical trial data (e.g., last observation carried forward imputation methods) (Chakraborty & Gu, 2019). Demographic (i.e. language, financial hardship, parity) and clinical variables (i.e. baseline depressive symptoms) were added to these models as covariates.

Completer Analyses

In addition to comparing intervention efficacy by randomization group, we conducted follow-up analyses examining the efficacy of CBSM on state anxiety and pregnancy-specific anxiety for women who had received a full course of the intervention versus those who had not. Separate LMM with state and pregnancy-specific anxiety as outcomes were fit with intervention completion status (intervention completer, intervention non-completer, control) as the between subjects factor, time (pre-, post-intervention, third trimester follow-up) as a within subjects factor and a intervention completion status by time interaction. The same covariates (i.e., language, financial hardship, parity, baseline depressive symptoms) described in the intent-to-treat models were included in the intervention completer models.

Post-hoc Severity Analyses

Finally, given the women enrolled in this trial started with a range of anxiety symptoms and did not have current anxiety diagnoses, we conducted post-hoc analyses comparing intervention efficacy by state anxiety severity status at baseline. A LMM with state anxiety as the outcome was fit with intervention group (CBSM, control group) as the between subjects factor, time (pre-, post-intervention, third trimester follow-up) and anxiety severity (low anxiety STPI<22, high anxiety STPI>22; Urizar et al., 2021) as a within subjects factor. All two way and three-way interactions for time, intervention group and severity were entered to assess whether mean differences in state

anxiety at each timepoint differed by intervention group and baseline anxiety severity. The same covariates (i.e., language, financial hardship, parity, baseline depressive symptoms) described in the intent-to-treat models were included in the model.

Of note, principal-factor exploratory factor analyses (EFA) with oblimin rotation were performed using SPSS Version 27.0 to test the possibility that an underlying latent construct might emerge as a more robust measure of anxiety and reduce potential multicollinearity in models with depression and anxiety scales, whose symptoms are often overlapping. All non-overlapping items from the PRA (pregnancy anxiety), STPI-S (state anxiety), and the EPDS (depression) were entered into the EFA. Items were assigned to a factor if they had a factor loading of at least .3, and exceeded other loadings by at least .2 (Gorsuch, 1983). Although initial visual inspection of a scree plot of the item level data from the 100 participants suggested up to three reliable factors, when threshold and compound loadings were considered and only factors with over three items were retained (Costello & Osborne, 2005) just one 12-item latent factor (i.e., anxious misery) emerged from the combined items. The single factor captured shared aspects of depression and generalized anxiety and was titled 'anxious misery' similar to other identified factors sharing the same clinical profile with the same name (Prenoveau et al., 2010; Vollebergh et al., 2001). The anxious misery factor explained 27.5% of the variance and was comprised of seven items from the STPI-S and five items from the EPDS (see Tables A1 and A2 for item content and loading indices). No anxiety specific or fear related factor emerged from our item level data. Given that the anxious misery factor did not purely capture anxiety—our construct of interest in this study, we chose to keep the already validated anxiety scales as outcomes measures and use the EPDS to control for symptoms of depression.

Mediation Analyses.

We conducted mediation analyses using bootstrapping to assess the relationship between intervention group and anxiety outcomes, intervention group and hypothesized mediators, as well as the indirect effect of mediators on change in (i.e., CAR, negative cognitions, relaxation efficacy) controlling for baseline anxiety symptoms. Mediation using bootstrapping reduces confounds and suppression by the variables included in the regression model (Preacher & Hayes, 2008). Notably, evaluation of mediation through bootstrapping is not contingent on a significant direct effect of the predictor on the outcome (MacKinnon et al., 2000; MacKinnon et al., 2000). Multiple mediation analyses were performed for the cognitive treatment targets of interest, where change scores in negative cognitions and relaxation self-efficacy from baseline to post-treatment were entered into the regression simultaneously. CAR, the physiological treatment target was examined in a separate model due to the exploratory nature of the analyses and our interest in examining whether this variable had an effect in a less conservative model (see Figure A2).

The PROCESS macro (Version 3.4; Preacher & Hayes, 2008) was used to estimate the following parameters in four separate models: (a) the total effect of intervention group (i.e., CBSM vs. control) on state anxiety, (b) the specific effect of intervention versus control group on each mediator variable (i.e. one model entering change in CAR from baseline to post-treatment, one model entering relaxation self-efficacy and negative cognitions from baseline to post-treatment), (c) specific effects of intervention mediator variables on changes in state anxiety from post-treatment to 3rd trimester follow-up, and (d) the direct effect of intervention group with respect to changes in state anxiety from post-treatment to 3rd trimester follow-up through each proposed mediator. The same analyses were be performed with pregnancy anxiety as the outcome.

It is worth mentioning that while the hypothesized mediators meet initial requirements to be considered pathways of intervention effects, the study design does not allow for the most rigorous

tests of intervention mediation, weakening causal claims. In particular, the variables tested as mediators in the present study were assessed before and after intervention delivery, and not over the course of the intervention. Optimally, hypothesized mediators should be measured at several points during an intervention to show that any change in the variables was correlated to intervention group, providing initial support that the change was a result of intervention receipt, as opposed to any number of outside factors (Kraemer et al., 2002).

Results

Overall, women enrolled in the study towards the end of their first trimester (*M*= 9.91 weeks, *SD*= 4.24 weeks). Most had at least one child prior to the current pregnancy (62.4%; *Mode*= 2 children) and about half were single and not living with the baby's father (51.5%). Women generally reported low socio-economic status, with 75.2% reporting a total family income of less than $20,000 per year before taxes, and just over a third of women completed high school or a GED (34.7%), though 36% reported leaving school before high school completion. Women were 26.5 years old on average (*SD*=.9), and primarily unemployed at the time of their first interview (70.3%). Of the demographic and clinical variables measured (see Table 2.1), the only significant difference between completers and non-completers was that non-completers reported higher depressive symptoms ($t(42.15)=2.47$, $p=.018$) at baseline.

CBSM Efficacy

Results of the linear mixed models revealed no main effect of intervention group or time on state anxiety, indicating that there were no differences in average state anxiety between CBSM and control conditions, or between intervention timepoints (i.e., baseline, post-treatment, third trimester follow-up, or three-month postpartum follow up). Further, the interaction between intervention group and time was not significant, indicating no between group (i.e., intervention vs. control)

differences in mean state anxiety over time from baseline to third trimester follow-up. Regarding covariates, there was a significant main effect of baseline depression, $F(1, 361)=154.79$, $p<.001$. Examination of the simple effects indicated that on average, women who endorsed greater depression symptoms at baseline ($\beta = .58$, $SE=.05$, p=<.001, 95% CI [.49-.67]) reported greater state anxiety.

Results of the linear mixed model analyses revealed no main effect of intervention group or time on pregnancy-specific anxiety. Further, the interaction between intervention group and time was not significant indicating no between group (i.e., intervention vs. control) differences in mean pregnancy-specific anxiety from baseline to third trimester follow-up. Regarding covariates, there was a significant main effect of baseline depression, $F(1, 95.55)=29.80$, $p<.001$ and parity $F(1,95.08)=15.99$, $p<.001$. Examination of the simple effects indicated that on average, nulliparous women ($\beta = 2.88$, $SE=.71$, p=<.001, 95% CI [1.45, 4.30]) and women with greater baseline depressive symptoms ($\beta = .34$, $SE=.06$, p=<.001, 95% CI [.22, .47]) reported greater mean pregnancy-specific anxiety.

See Table 2.2 for the tests of fixed effects for linear mixed models for and state and pregnancy-specific anxiety. For the estimated marginal mean values for state and pregnancy-specific anxiety from baseline to three-month postpartum follow-up, see Table 2.3.

Completer Analyses

Results of the linear mixed model analyses reveled no main effect of intervention group or time on state anxiety indicating that mean state anxiety symptoms did not differ based on intervention group or timepoint (i.e., baseline to third trimester follow up). However, the interaction between intervention group and time was significant $F(1, 261.40) =2.35$, $p=.032$, indicating that there were group differences in state anxiety by timepoint. Examination of the

simple effects indicated that at post-treatment, the CBSM completers reported fewer state anxiety symptoms (β = -5.05, *SE*=1.71, p=.003, 95% CI [-8.41, -1.69]) than women in the control condition. CBSM non-completers did not differ from the control condition on mean anxiety improvement from baseline to post-treatment. Regarding covariates, there was a significant main effect of baseline depressive symptoms, $F(1,91.85)=98.92$, $p<.001$. Examination of the simple effects indicated that on average, women with greater baseline depressive symptoms (β =.59, *SE*=.06, p=<.001) reported greater state anxiety. See Figure 3 for the plotted estimated marginal mean values of state anxiety from baseline to three-month postpartum follow-up.

Results of the linear mixed model analyses reveled no main effect of intervention group or time, or the covariates on pregnancy anxiety. The interaction between intervention group and time was not significant indicating no between group (i.e., intervention vs. control) differences in anxiety symptom change over time from baseline to third trimester follow-up. Regarding covariates, there was a significant main effect of baseline depression $F(1, 93.71)= 31.59$, $p<.001$ and parity $F(1, 94.92)=14.76$, $p<.001$. Examination of the simple effects indicated that on average, nulliparous women (β =2.79, *SE*=.73, p=<.001, 95% CI [1.35, 4.24]) and women with greater baseline depressive symptoms (β =.36, *SE*=.06, p=<.001, 95% CI [.23, .49]) had greater mean pregnancy anxiety. See Figure 4 for the plotted estimated marginal mean values of pregnancy anxiety from baseline to third trimester follow-up.

Mediation Models

State Anxiety

Cognitive Variables. The full model including the independent variable (intervention group), covariates (baseline state anxiety), mediators (change in negative cognitions and relaxation self-efficacy from baseline to post-treatment) was significant $F(4, 82)=4.12$, $p=.004$, and accounted

for 16.75% of the variability in state anxiety symptom change from post-treatment to 3rd trimester follow-up. Intervention group was not associated with changes in negative cognitions from baseline to post-treatment, however, women in the intervention group did show increases in relaxation self-efficacy from baseline to post treatment (β =.81, *SE*=.20, p<.001, 95% CI [0.41, 1.20]). Changes in the cognitive treatment targets were not associated with state anxiety symptom change from post-treatment to 3rd trimester follow-up, indicating no indirect effect of negative cognitions (point estimate= .02, SE=.17, 95% CI= [-0.27, 0.44]) or relaxation self-efficacy (point estimate= -.83, SE=.47, 95% CI= [-1.78, 0.10]). Finally, no direct effect of intervention group on state anxiety change from post-treatment to 3rd trimester follow-up was found (point estimate=-1.45, *SE*=1.07, 95% CI [-3.56, 0.67]).

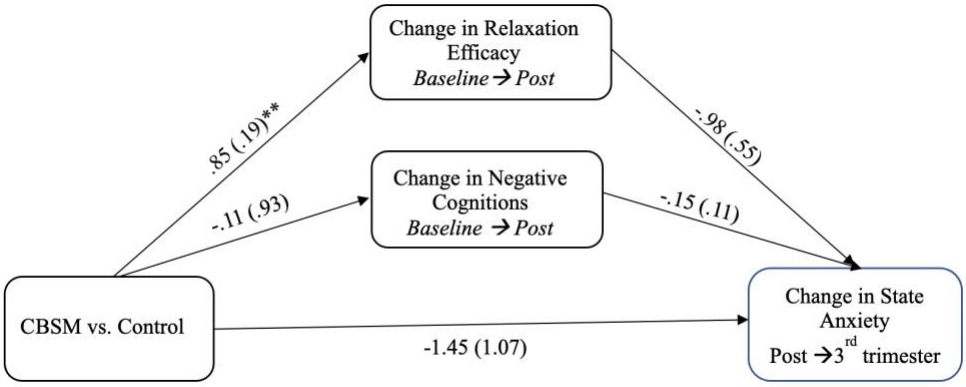


Figure 2.3.1 Mediation models for state anxiety outcomes show that regarding cognitive mediators, the CBSM group showed improved relaxation self-efficacy from baseline to post treatment. Neither cognitive mediator related to change in state anxiety from post-treatment to third-trimester follow up. ** Indicates *p*<.001.

CAR. The full model including the independent variable (intervention group), covariates (baseline state anxiety), and mediator (change in CAR baseline to post-treatment) was significant *F*(2, 78)=4.59, *p*=.005, and accounted for 15.18% of the variability in state anxiety symptom change from post-treatment to 3rd trimester follow-up. Intervention group was not associated with changes in CAR from baseline to post-treatment. Further, changes in CAR were not associated

with state anxiety symptom change from post-treatment to 3rd trimester follow-up, indicating no indirect effect of CAR (point estimate= .19, *SE*=.33, 95% CI= [-0.07, 1.16]). Finally, a significant direct effect of intervention group on state anxiety change from post-treatment to 3rd trimester follow-up was found (point estimate= -2.79, *SE*=1.05, 95% CI [-4.89, -0.70]). The direct effect indicated that women in the intervention group had a negative change in scores; in other words, they reported more state anxiety at 3rd trimester than at post-treatment, returning to baseline anxiety levels. However, the magnitude and statistical significance of this effect is likely an over-estimation, as the more stringently controlled linear mixed model of state anxiety change over time revealed no effect of intervention group at post-treatment or in the third trimester follow-up.

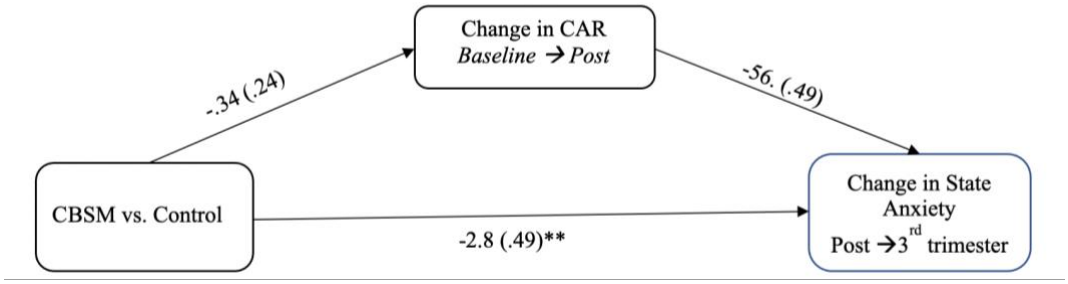


Figure 2.3.2 Mediation models for state anxiety outcomes show that intervention group does not lead to changes in CAR from baseline to post treatment. Changes in CAR are also unrelated to change in state anxiety from post-treatment to third trimester follow-up. However, the significant direct effect shows that women show symptom worsening from post treatment to third trimester follow-up in the CBSM condition. ** Indicates $p<.001$.

Mediation Models Pregnancy Anxiety

Cognitive Variables. The full model including the independent variable (intervention group), covariates (baseline pregnancy anxiety), mediators (change in negative cognitions and relaxation self-efficacy from baseline to post-treatment) accounted for 1.3% of the variability in pregnancy anxiety symptom change from post-treatment to 3rd trimester follow-up, and was not statistically significant, $F(4, 81)=.27$, $p=.90$. Intervention group was not associated with changes in negative cognitions from baseline to post-treatment, however, women in the intervention group did

show increases in relaxation self-efficacy from baseline to post treatment (β =.81, *SE*=.20, p<.001, 95% CI [.41, 1.20]). Changes in the cognitive treatment targets were not associated with pregnancy anxiety symptom change from post-treatment to 3rd trimester follow-up, indicating no indirect effect of negative cognitions (point estimate= -.001, SE=.04, 95% CI= [-0.10, 0.09]) or relaxation self-efficacy (point estimate= -.01, SE=.14, 95% CI=[-0.28, 0.30]). Finally, no direct effect of intervention group on pregnancy anxiety change from post-treatment to 3rd trimester follow-up was found (point estimate=.05, *SE*=.42, 95% CI [-0.78, 0.87]).

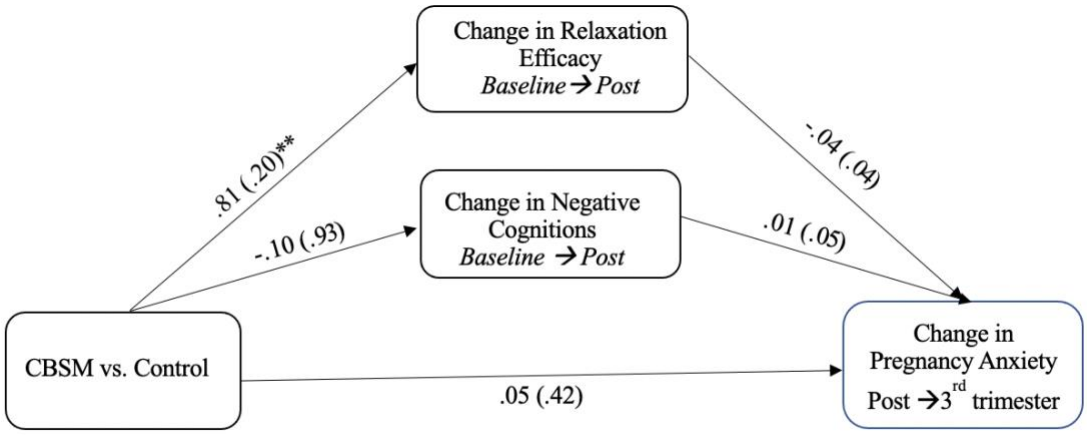


Figure 2.3.1 Mediation models for pregnancy anxiety outcomes show that regarding cognitive mediators, the CBSM group showed improved relaxation self-efficacy from baseline to post treatment. Neither cognitive mediator related to change in pregnancy anxiety from post-treatment to third-trimester follow up. ** Indicates *p*<.001.

CAR. The full model including the independent variable (intervention group), covariates (baseline pregnancy anxiety), and mediator (change in CAR baseline to post-treatment) accounted for 1.92% of the variability in pregnancy anxiety symptom change from post-treatment to 3rd trimester follow-up, and was not significant *F*(3, 78)=.51, *p*=.67. Intervention group was not associated with changes in CAR from baseline to post-treatment. Further, changes in CAR were not associated with pregnancy anxiety symptom change from post-treatment to 3rd trimester follow-up, indicating no indirect effect of CAR (point estimate= .07, SE=.09, 95% CI= [-0.12,

0.24]). Finally, no direct effect of intervention group on pregnancy anxiety change from post-treatment to 3rd trimester follow-up was found (point estimate=-.14, *SE*=.40, 95% CI [-0.93, 0.64]).

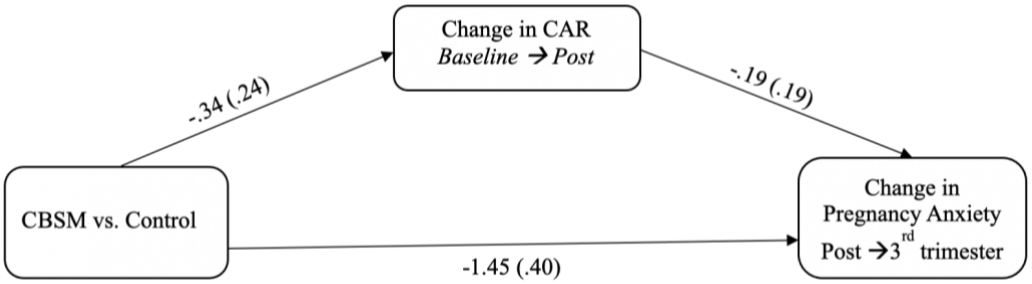


Figure 2.3.2 Mediation models for pregnancy anxiety outcomes show that intervention group assignment does not lead to changes in CAR from baseline to post treatment. Changes in CAR are also unrelated to change in pregnancy anxiety from post-treatment to third trimester follow-up.

Discussion

This is the first randomized controlled trial to test a cognitive behavioral intervention to reduce prenatal anxiety with a sample of low-income ethnic and racial minority pregnant women. Although this CBSM intervention was delivered with high fidelity, and participants reported good understanding of intervention content (Urizar et al., 2019a), stringently controlled longitudinal analyses suggest that women randomized to the CBSM group did not differ significantly from those in the control condition on state or pregnancy-specific anxiety at any post-treatment assessment. While previous studies have found that CBSM may be a promising intervention for prenatal stress (Urizar et al., 2019b), findings from this study suggest that in its current form, it may not be efficacious for prenatal anxiety among low-income Latinas and Black women. Finally, our examination of hypothesized mediators of the intervention show that neither cognitive or physiological variables examined explained changes in anxiety from post-treatment to follow-up based on group membership.

Considering this study is one of the first to examine CBSM for prenatal anxiety, we turn to the larger prenatal CBT literature to help interpret our findings. In studies with primarily non-Latina White women, cognitive behavioral interventions examined during pregnancy have also lacked efficacy for state (Austin et al., 2008; Bittner et al., 2014) and pregnancy specific anxiety (Bittner et al., 2014). Findings with ethnic and racial minority women mirror the state of the literature among non-Latina White women (Nillni et al., 2018). In fact, a recent systematic review found that there are currently no efficacious psychological interventions—including CBT—for prenatal anxiety in samples with significant representation of Latinas and Black women (Ponting et al., 2020). However, intervention studies for prenatal anxiety are sparse and tend to target physical activity, not psychological processes (Field, 2017). Given the widespread empirical support for CBT for treating anxiety in ethnic and racial minority adults (Carter et al., 2012), and that existing trials with pregnant women are limited, additional research is necessary to adequately understand the efficacy of CBT as a potentially viable treatment option for ethnic and racial minority pregnant women.

In fact, there were intervention components likely important for prenatal anxiety reduction that prior CBT trials for prenatal anxiety (Austin et al., 2008; Bittner et al., 2014) and the present study's CBSM did not include. For example, the absence of exposure in CBSM, an important component of other CBTs for anxiety, might have reduced intervention effects for both state and pregnancy-specific anxiety. Researchers have suggested that exposure to 1) birthing videos (in vivo), 2) prior delivery experiences or future concerns about delivery and parenting (imaginally), and 3) bodily sensations (interoceptive), may be fast acting and potent interventions for both pregnancy-specific anxiety (Stoll et al., 2018) and more generalized prenatal anxiety (Arch, et al., 2012). It is also possible that the inclusion of prenatal health education would have increased

intervention potency. Though the control condition received educational prenatal health information via mail, the CBSM intervention did not incorporate this content. Prenatal health education has been linked to reductions in pregnancy-specific anxiety as a stand-alone intervention in other studies (Madhavanprabhakaran et al., 2016), and may help women manage pregnancy related uncertainties (Yuvaci et al., 2020).

Another possibility is that CBSM targets would have led to greater change if optimally engaged. In fact, results were more promising for women who completed the full course of the eight-week CBSM intervention. Intervention completers showed significant reductions in state anxiety at post-treatment, a finding that is novel among ethnic/racial minority pregnant women. It is encouraging that at least in the short term, this culturally adapted cognitive behavioral program focused on stress reduction was effective. However, pregnancy-specific anxiety remained unchanged among completers—lending support to conceptual models of pregnancy distress which consider pregnancy-specific anxiety to be distinct from generalized anxiety symptoms (Blackmore et al., 2016), working through different pathways (Dunkel Schetter, 2011). Pregnancy-specific worries may be better targeted by prenatal health programs like Centering Pregnancy—which focus on labor and delivery, nutrition, and common pregnancy stressors, and are linked to better maternal mental health and birthing confidence among ethnic and racial minority women (Benediktsson et al., 2013).

While a full course of CBSM may be efficacious in reducing state anxiety for pregnant women, these findings are qualified by the fact that improvements were not maintained at follow-up. Moreover, in line with substantial data identifying depression as a robust predictor of premature dropout in CBTs (Fernandez et al., 2015), women with greater baseline depressive symptoms were less likely to complete the intervention, and thus showed less favorable state

anxiety outcomes post-treatment. Though the majority of randomized trials for prenatal anxiety do not measure anxiety or distress at follow up time points (Evans et al., 2018), when they do, increases in the postpartum are common (Guardino et al., 2014; Lönnberg et al., 2020; Vieten & Astin, 2008). Rebound effects are not specific to the perinatal period. About half of adults treated for anxiety experience relapse (Delgadillo et al., 2018)—most within the first six months post-treatment (Ali et al., 2017). Nonetheless, using relapse-prevention techniques in trials for women transitioning to parenthood may be particularly relevant. Saxbe et al. (2018) argue that changes in biological (i.e., stress hormones, brain structure) and social (e.g., shifts in self-concept, and daily routines) processes put women in the perinatal period at increased risk for adverse psychological outcomes. Saxbe et al. (2018) note that low-income women are particularly vulnerable to internalizing symptoms in the postpartum due to structural inequities (e.g., family leave policies) that are associated with increased stress. Taken together, these findings underscore the need to examine innovative strategies for sustained engagement post-treatment (e.g., booster sessions, text message check-ins; Malins et al., 2020) for low-income women receiving psychotherapy prenatally to reduce the chance of relapse.

Identifying treatment targets that account for significant reductions in symptoms might serve as a strategy to improve engagement —in particular increasing self-efficacy and treatment credibility early on when dropout is most likely (Saxon et al., 2017). To this end, we conducted mediational analyses to examine how hypothesized targets of change may account for treatment improvement. However, neither cognitive (i.e., change in relaxation efficacy, negative cognitions), nor physiological (i.e., change in CAR) hypothesized mediators were found to have an indirect effect on symptom change during follow up timepoints. We found that negative cognitions and relaxation self-efficacy did not explain change in anxiety, results that are contrary to theoretical

understandings and empirical tests of anxiety interventions. A recent systematic review examining mediators of anxiety prevention interventions (i.e., among samples without anxiety diagnoses), found that among eight studies, six potential cognitive mediators including self-efficacy and cognitive distortions were identified as indirectly reducing anxiety symptoms (Moreno-Peral et al., 2020). Thus, cognitive processes remain important targets in cognitive behavioral anxiety interventions for sub-clinical samples irrespective of our findings.

Our null findings with regard to CAR are less surprising, as its relationship with anxiety remains mixed. Meta-analytic data examining the relationship between psychosocial functioning and CAR in adults shows that anxiety is related to lower CAR in some studies and higher CAR in others (Boggero et al., 2017). Boggero and colleagues (2017) found that both positive and negative associations had evidential value (i.e., were not spurious findings), suggesting that the differences in the direction of the associations between anxiety and CAR are likely explained by individual level moderators. These heterogeneous findings extend to pregnancy as well, where some studies show that anxiety is associated with lower CAR (Pluess et al., 2010; van den Heuvel et al., 2018) while others show no associations (Hellgren et al., 2013; Shea et al., 2007). Regarding treatment related changes in CAR, a systematic review measuring salivary cortisol outcomes in randomized controlled treatment trials (Ryan et al., 2016) found that in a majority of trials, clinical reductions in psychopathology are not accompanied by reductions in salivary cortisol. Admittedly, our tests of mediation were ambitious, as they relied on an assumption that treatment effects would persist at follow up, which is uncommon in the perinatal period (Cox et al., 2016). Still, had we found an effect, interpreting changes in CAR in the context of pregnancy and anxiety would have been difficult as the field has yet to define an optimal CAR response (Boggero et al., 2017), leaving

investigators unsure about whether observed values are indicative of hyper, hypo or typical CAR responses.

This randomized controlled trial has several strengths, including the recruitment and retention of low-income ethnic and racial minority women in their first trimester, and the longitudinal examination of treatment effects controlling for conceptually relevant variables. Moreover, the examination of both state anxiety and pregnancy-specific anxiety in an RCT is novel. Nevertheless, there are notable limitations. Enrollment in the trial did not depend on symptom cutoffs for depression or anxiety, and women diagnosed with a mental health disorder (e.g., depression, anxiety) were excluded. Though these exclusion criteria were important because of the effects of internalizing disorders on stress (Zinbarg & Sutton, 2012) and cortisol (Vreeburg et al., 2013), the primary outcomes of the parent trial, they obscure our understanding of the effects of CBSM on a more severely impacted sample who may benefit more from CBT during the prenatal period (Bittner et al., 2014). Similarly, our outcome measures, though common in perinatal intervention science, do not have clinical cutoffs, limiting our ability to comment on the clinical significance of the anxiety reductions observed.

Further, though CBSM has been associated with relaxation and negative cognitions in experimental contexts (i.e., RCTs), and both mediators have theoretical plausibility and coherence based on proposed targets of CBSM (Stanton, Luecken, MacKinnon & Thompson, 2013), our mediational analyses were limited in at least three important ways. First, our sample size was about a third of what is recommended (n>300) to achieve 80% power for moderately correlated longitudinal data (Pan et al., 2018), making the study underpowered to detect associations over time. Second, the anxiety outcomes for our mediation models relied on symptom change from post-treatment to third trimester follow-up, about 13 weeks post- intervention receipt. This is a

particularly demanding test of an intervention for prenatal anxiety, as treatment gains are infrequently maintained in the studies to date (Guardino et al., 2014; Lönnberg et al., 2020; Vieten & Astin, 2008). Third, our study design did not permit a true test of intervention mediation and disallows causal inferences. Specifically, while relaxation self-efficacy, negative cognitions and CAR were measured prior to intervention receipt and at the same time as several treatment outcomes, variables were not measured *during* intervention receipt. Our inability to observe how the hypothesized mediators changed over the course of the intervention leaves open the possibility that factors aside from the intervention are responsible for observed changes in our mediators. Though this design limited our ability to carry out a true mediational test (Weersing & Weisz, 2002), the identification of relaxation self-efficacy improvements from pre to post treatment make it a good candidate variable for future study before, during and after treatment in RCTs for prenatal anxiety—contexts under which causality may be warranted.

The SMART Moms CBSM is a culturally adapted cognitive-behavioral group intervention delivered to pregnant Latinas and non-Latina Black women who were also low-income. The ethnic and racial composition of the participants in this trial is meaningful, as Latinx and Black adults are significantly underrepresented in randomized trials for anxiety (e.g., Williams et al., 2010). Using intent to treat analyses, we found that the CBSM intervention did not reduce prenatal anxiety symptoms at any point post-treatment. However, the benefit seen by treatment completers immediately post-treatment suggests that future work should examine factors associated with intervention engagement. Further, studying the optimal use of booster sessions (i.e., at what point during pregnancy, how many) appears warranted in order to extend intervention effects into the postpartum, when changing biopsychosocial processes put women at increased risk for psychological distress. It will be imperative to grow the evidence base of interventions for ethnic

and racial minority women with prenatal anxiety. Continuing to test second and third wave cognitive behavioral interventions, considered widely efficacious during other developmental periods, ought to be part of this effort.

Study 3

Exposure Acceptability During Pregnancy: A Qualitative Content Analysis of Interviews with Latinas in California

Abstract

Introduction: Exposure therapy is the frontline treatment for treating anxiety among adults (Abramowitz, 2019), but to date few randomized controlled trials have tested its efficacy in pregnancy. In the context of uncertainty regarding the effects of exposure therapy on a developing fetus (Arch et al, 2012), and elevated precautions taken by regulatory research bodies overseeing psychological intervention studies for pregnant women, little is known about how this group perceives exposure therapy. Understanding consumer acceptability of exposure therapy can improve engagement (Gulliver et al., 2021) and clinical outcomes (Walsh et al., 2018), important for pregnant women with anxiety who infrequently access or sustain mental health care.

Method: Pregnant Latinas (*n*=25) with elevated anxiety symptoms living in California were interviewed regarding their acceptability of exposure therapy following the receipt of a clinical video vignette explaining the therapy. Using deductive content analysis to apply an existing theoretical framework of treatment acceptability (the Theoretical Framework of Acceptability Framework, Sekhon et al., 2017), we explored how a) affective attitude, b) burden, c) ethicality, d) intervention coherence, e) opportunity costs, f) perceived effectiveness and g) self-efficacy shaped pregnant Latinas views about exposure therapy.

Results: Nineteen themes were identified across the seven subdomains of acceptability. Women expressed acceptability enhancing factors for exposure therapy across affective attitude (i.e., hopefulness), ethicality (i.e., exposure aligned with prioritizing family), and self-efficacy (e.g., increased confidence in using exposure during pregnancy). Women also expressed challenges to exposure therapy acceptability in the subdomains of burden (i.e., managing family reactions), opportunity costs (i.e., letting go of cultural conceptions of the maternal role) and self-efficacy (i.e., difficulty using exposure for avoidance related to prenatal health).

Limitations: Findings may be an overestimate of acceptability ratings in Latinas given that the sample was highly acculturated and that women selecting to participate in the interview were open to discussing mental health issues during pregnancy.

Conclusions: Findings related to acceptability facilitators and challenges can help intervention scientists and community clinicians understand opinions about exposure therapy to improve engagement among pregnant Latinas.

Introduction

Effective psychological interventions for prenatal anxiety are lacking (Goodman, Chenausky, et al., 2014). Only eight randomized treatment studies worldwide have tested cognitive behavioral therapies (CBT) to reduce anxiety in pregnancy (Green et al., 2020; Maguire et al., 2018). Of those, only four trials showed significant intervention effects on anxiety, a surprising finding given CBT's broad support with anxious adults (Tolin, 2010). Further, existing trials have not included ethnic minority women, such as Latinas (Goodman et al., 2014; Green et al., 2015; Lilliecreutz et al., 2010), a group that is at elevated risk for anxiety (Collins & David, 2005) and experiences suboptimal mental health care during pregnancy (Accortt & Wong, 2017). The absence of evidence based interventions for prenatal anxiety (Field, 2017) deters obstetric referrals to mental health care (Coleman et al., 2008), and may help to explain why use of psychological care is strikingly low (i.e., 15%) among anxious pregnant women (Goodman & Tyer-Viola, 2010).

Even when treatment is initiated, ongoing receipt of psychosocial services during pregnancy is rare, underscoring the importance of intervention engagement during the prenatal period. Engagement, defined as the initial uptake and continuing participation in an intervention (Cavanagh, 2010), is low for women accessing mental health care prenatal anxiety. In publicly funded obstetrical clinics, for example, only six percent of women receive sustained treatment (i.e. attending at least one, but fewer than the number of sessions necessary to complete treatment) during the perinatal period (Smith et al., 2009). These sustainment estimates are substantially lower than those of adults seeking outpatient treatment for anxiety disorders, where 70% are considered treatment completers according to meta-analytic findings (Fernandez et al., 2015; Hans & Hiller, 2013; van Ingen et al., 2009). In the presence of differential rates of engagement across pregnant and non-pregnant groups, it is essential to consider the factors that limit community engagement.

One factor affecting engagement with mental health care is the acceptability of the psychological intervention being offered. Intervention acceptability is a construct that describes the extent to which people receiving a healthcare intervention consider it appropriate based on anticipated cognitive and emotional responses to the intervention (Sekhon et al., 2017). Conceptual models of treatment acceptability hypothesize that initial perceptions of acceptability impact treatment selection and engagement (Eckert & Hintze, 2000). Empirical studies support and extend these hypotheses. For example, non-Latinx White adults with anxiety who rate interventions as highly acceptable are more likely to adhere to the treatment (Santana & Fontenelle, 2011), less likely to drop out (Swift & Callahan, 2009), and subsequently show more favorable clinical outcomes (Cavanagh et al., 2009).

Researchers and clinicians alike have expressed concerns about the acceptability of certain components of evidence-based treatments with pregnant women— exposure therapy, in particular (Arch et al., 2012). Exposure is a treatment approach that reduces anxiety by having individuals confront stimuli that are feared or avoided, deliberately and repeatedly, weakening learned associations between feared stimuli and negative outcomes, and strengthening inhibitory learning (i.e., a feared stimulus does not signal threat) (Craske, 2015). Exposure can be done in vivo (confronting fears in real time), imaginally (by visualizing the fear) or interoceptively (by bringing on feared body sensations) (Otte, 2011). Further, exposure based CBT and exposure therapy alone are both efficacious interventions across a wide range of anxiety disorders (Norton & Price, 2007), and show treatment effects in as little as one to two sessions (Norton & Price, 2007; Tolin, 2010), which are favorable treatment characteristics for pregnant women who often have constraints on their time and mobility, as their pregnancies advance (Arch et al., 2012). At present, only two RCTs for anxiety and depression conducted in Iran (Fathi-Ashtiani et al., 2015; n=135) and

Australia (Loughnan et al., 2019; n=77), and one open trial (n=30) for injection phobia in Sweden (Lilliecreutz et al., 2010) have tested the efficacy of exposure-based CBT for pregnant women. One of the RCTs (Loughnan et al., 2019) showed benefits of the intervention on anxiety symptoms, and the open trial showed significant reductions in injection fears.

Pregnant women are often excluded from therapeutic and prevention trials for mental health, despite increasing calls for equitable enrollment of this group by scientific organizations like the NIH Office of Research on Women's Health (Blehar et al., 2013). However, progress enrolling pregnant women has been slow as University internal review boards (IRBs), research ethics and advisory committees, and some investigators cite concerns regarding ethical and legal liability—should the fetus be adversely affected due to research participation (Van Der Zande & Browne, 2016). Further, some investigators and regulatory bodies report excluding pregnant women from treatment studies pre-emptively due to assumptions that pregnant individuals will be unwilling to enroll (Van Der Zande & Browne, 2016). In the case of exposure therapy, it is likely that funders, regulatory boards, and clinicians have also grappled with concerns that the physiological and psychological arousal provoked by exposure exercises during pregnancy may be harmful to the fetus (Arch et al., 2012; Lemon et al., 2015).

Additional concerns reported by clinicians working with anxious clients include beliefs that exposure may lead to symptom exacerbation and premature termination (Olatunji et al., 2009). Though in need of empirical testing, researchers have argued that short term upsurges in physiological stress are offset by the long-term benefits of reduced physiological reactivity and fear, especially during pregnancy when biological changes associated with untreated anxiety can result in suboptimal birth outcomes (Arch et al., 2012; Lemon et al., 2015). Further, several studies in the general population have shown that exposure therapy is well tolerated, and that symptom

exacerbation is rare. In fact, premature drop out in exposure therapy is no more common than in other types of psychotherapies (e.g., cognitive therapy, integrative therapy) for anxiety disorders including OCD, panic disorder and social phobia (Ong et al., 2016; Swift, 2014). Thus, it is possible that researchers, clinicians, and regulatory boards are overestimating the risk that exposure therapy poses to pregnant women.

Little is known regarding pregnant women's willingness to participate in exposure therapy. In the one empirical study that has directly examined acceptability of exposure based CBT in a primarily non-Latina White sample of potential consumers, pregnant women were more likely than non-pregnant women to indicate willingness to participate in exposure-based CBT as compared to pharmacotherapy to manage their anxiety (Arch, 2014). Though this study provides preliminary evidence that pregnant women may find exposure-based therapies to be an acceptable treatment for anxiety, pharmacotherapy may not be the optimal comparison group. Many women will not consider taking psychiatric medications while pregnant (Cohen et al., 2010). Concerns about medication may be particularly pronounced in Latinx individuals who are less likely than non-Latinx Whites to consider pharmacotherapy for anxiety as helpful (Hunt et al., 2013) and instead often have stigmatizing attitudes toward this form of treatment (Vargas et al., 2015). Thus, going forward, it is important to assess the acceptability of exposure therapy on its own or in comparison to less controversial interventions.

Given disagreements about the safety of exposure therapy and the lack of empirical tests of exposure adherence or efficacy during pregnancy, this study qualitatively assessed the acceptability of exposure therapy among pregnant Latinas with anxiety. Throughout this study we use the Theoretical Framework for Acceptability (TFA), a useful model by which to systematically assess the acceptability of an intervention. The TFA considers seven distinct components that make up

acceptability: a) affective attitude towards the intervention, b) perceived burden, c) ethicality of the intervention, d) coherence, e) opportunity costs, f) perceived effectiveness, and g) self-efficacy related to participation (See Figure 3.1 for definitions of the TFA constructs; Sekhon et al., 2017). Latinx are more likely to drop out of exposure based trials for anxiety (Chavira et al., 2014) and have less favorable outcomes in trials for perinatal mood disorders (Ponting et al., 2020), making it essential to better understand the importance of exposure acceptability among pregnant Latinas. Further, these data may provide guidance for clinicians interested in reducing prenatal anxiety using a robust treatment approach—exposure therapy—but who are uncertain about how the intervention will be received.

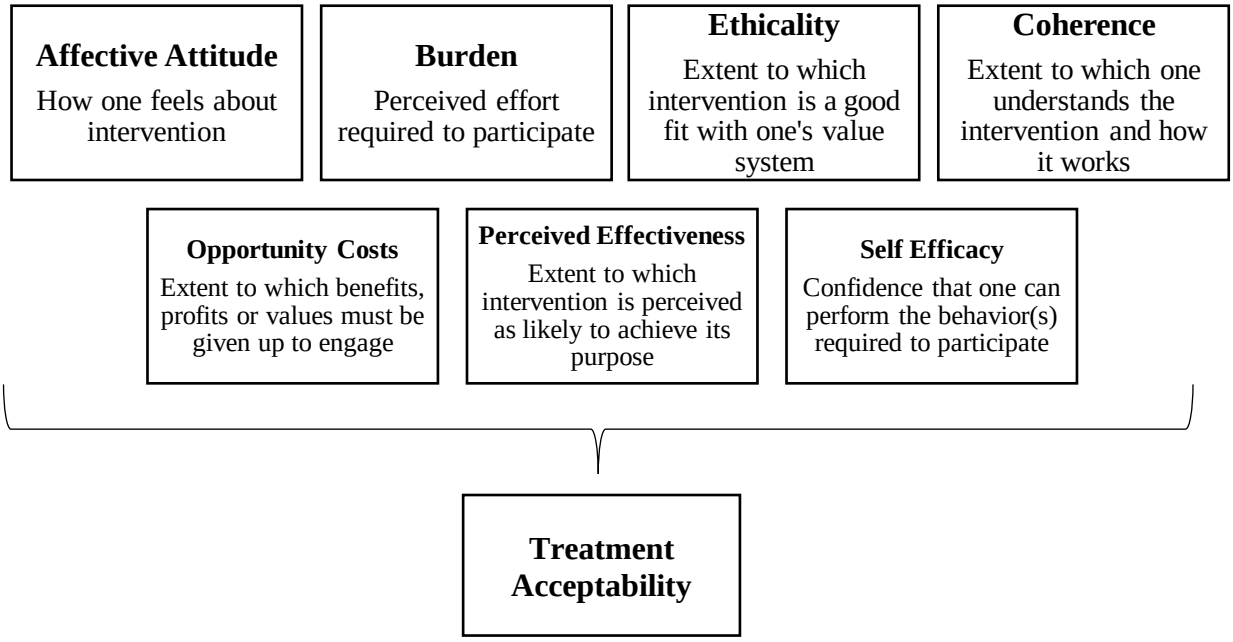


Figure 3.1. Definitions of the seven components that comprise the Theoretical Framework for Acceptability.

Method

Participants and Procedures

Participants were 27 individuals who self-identified as Latina and were pregnant. Transcripts were analyzed for 25 English-speaking women after two transcripts from Spanish-speakers were excluded given the subsample was not large enough to draw meaningful conclusions (Vasileiou et al., 2018). Participants were recruited through social media postings (e.g., Facebook) and email blasts sent by prenatal health clinics in California. The prenatal health clinics that agreed to distribute study information provided medical (e.g., ultrasounds, wellness visits), parenting and breastfeeding services and primarily served low-income women. Eligibility criteria included that women identify as Hispanic/Latina, read and speak fluent English or Spanish, be 18-40 years old, and pregnant at the time of study participation. Interested women called by study staff and were screened using a standardized script (see 'Phone Screening' in the Appendices) for these criteria as well as anxiety symptoms over the phone. Women who reported at least mild general, or pregnancy specific anxiety using validated screeners, endorsed avoidance related to these symptoms, and were unfamiliar with exposure therapy (i.e., had not received exposure therapy, were not mental health professionals) were invited to participate in the interview. All parts of the study visit were conducted remotely to ensure participant safety due to the ongoing COVID-19 pandemic.

Eligible women were provided with a detailed overview of the study and were encouraged to ask questions about their study participation. Common questions included whether interviews would be shared publicly and how payment would be received. Women who consented verbally were scheduled for a 90-minute virtual study visit. During the first thirty minutes of the appointment, women filled out an online questionnaire (via SurveyMonkey platform), that assessed basic sociodemographic information. The survey also included a brief written explanation of exposure therapy (adapted from Barlow & Craske, 2006) that was available as a two-minute-long

audio file to increase accessibility; two of the 25 participants listened to the audio explanation. Research staff had real-time access to participants' survey responses and called any participant who had not begun their survey within 15 minutes of the scheduled time to remind them of the visit and provide technical support (e.g., difficulty locating the link) as needed.

Video Vignette. Following their reading of or listening to the brief rationale for exposure therapy, women watched a 10-minute scripted video interaction between a Latina therapist and a pregnant Latina client that was embedded within the survey. The video demonstrated 1) a therapist helping a client to identify her avoidant behaviors, 2) a therapist identifying the reason for the client's avoidance (i.e., her feared outcome should she engage with the behavior), and 3) the client and therapist setting up an exposure exercise that would test whether her feared outcome actually occurred or could be tolerated. Video vignettes provide advantages over written vignettes as they allow for a visual representation of a client's clinical presentation, enhancing clinical realism (Ceuterick et al., 2020), and provide a standard example of treatment, especially important for individuals naïve to therapy. The written rationale for exposure therapy and the accompanying video vignette were written for a seventh-grade reading level as measured by Flesch Kincaid grade level test and piloted for accuracy and understanding among graduate and undergraduate students in psychology, as well clinical psychologists who deliver exposure-based treatments. This piloting process is similar to that described by Arch (2014) in the study of intervention acceptability in pregnant and non-pregnant women and increased our certainty that exposure therapy was being described neutrally and accurately. The text for the exposure rationale and the accompanying video script are provided in the Appendix.

After participants finished the survey and watched the video vignette (this was monitored by a researcher using the Survey Monkey platform to track participant progress in real-time), the

final page of the survey instructed participants to open a HIPAA-compliant Zoom link (https://zoom.us; see Lobe et al., 2020) to begin the semi-structured interview. The interviewer checked in about any difficulties with the survey, confirmed that participants had read the exposure rationale and watched the video vignette, reminded all participants that the interview would be recorded, and that they were welcome to skip any questions that made them uncomfortable before beginning the recorded interview. Our use of remote interviewing is well supported; qualitative data collection via videoconferencing platforms is increasingly common (Irani, 2019). Participants from previous studies have reported that Zoom interviews provide a more convenient (i.e., time-saving) alternative to in face-to-face interviews (Archibald et al., 2019), and that there is an increased comfort associated with discussion of personal topics in a setting of their choosing (Gray et al., 2020). Women were compensated with $50 gift cards upon study completion. All study procedures were approved by the IRB at the University of California, Los Angeles.

Interview Guide. A semi-structured interview based on the TFA, a theoretical model of health care intervention acceptability, was developed by the research team and delivered by the first author, an advanced doctoral student in clinical psychology. The interview guide (see Appendix) included 12 questions with subsequent follow-up probes which assessed women's acceptability of exposure therapy delivered during pregnancy. The interview was organized so that separate questions and probes corresponded to each of the seven domains of prospective intervention acceptability identified in the TFA (Sekhon et al., 2017) , including a) affective attitude, b) burden, c) ethicality, d) intervention coherence, e) opportunity costs, f) perceived effectiveness and g) self-efficacy. The interview was piloted among the research team in both Spanish and English to assess potential researcher biases, similar to the "interviewing the investigator" technique (Chenail, 2011). Interviewing the investigator puts the interviewer in the

role of the study participant, answering interview questions administered by a colleague to assess whether questions allow for an adequate range of responses (i.e., questions are not leading), whether pacing, and length of the interview are comfortable, and tone is neutral (Chenail, 2011). This process of piloting the full interview among members of the research team (with experience working clinically in Latinx communities) served as a quality check, assured language was appropriate for the target population, and identified assumptions about what participants might respond to questions—before the start of data collection.

Measures

Sociodemographics. A demographic questionnaire assessed Latinas' heritage (e.g., Mexican, Salvadoran) as well as their place of birth. Women also reported on their employment status, educational attainment, combined family income, relationship status, past births, and current or prior access to mental health care services.

Anxiety Screening Measures

General and pregnancy specific anxiety were both assessed for study eligibility, though women had to be elevated on only one kind of anxiety to meet criteria for participation. The Generalized Anxiety Disorder Screener 7-item (GAD-7; Spitzer et al., 2006) was used to screen for symptoms and severity of generalized anxiety, and is considered a reliable screening tool among pregnant Latinas (Zhong et al., 2015). The scale measures the frequency of DSM-5 related anxiety symptoms in the previous two weeks. Items are scored on a 4-point Likert scale (0= *Not at all sure* to 5= *Nearly every day*). Rated items are summed, and a total score of 0-21 is possible. Sample items include: "Feeling nervous, anxious or on edge" and "Not being able to stop or control worrying". The GAD-7 is validated in English (Spitzer et al., 2006) and Spanish (Garcia-Campayo et al., 2010), and shows good internal validity and convergent validity with related measures of

mental health in Latinx samples (Mills et al., 2014). Women with a score of five or greater (classified as mild anxiety; Spitzer et al., 2006) were eligible for the study.

Pregnancy specific anxiety was measured using the Pregnancy Related Anxiety Scale (Rini et al., 1999), a 10-item self-report questionnaire that asks women to indicate how often they have felt concern, worry or fear about various aspects of their pregnancy and delivery. Items are scored on a 4-point Likert scale (from 1= *never* to 4= *almost all the time*) and summed for a total score of 10-40. Sample items include: "I am worried that the baby might not be normal" and "I am concerned or worried about taking care of a new baby". The measure shows good reliability and internal consistency in both English and Spanish, and has been used in community samples (Ramos et al., 2019) and clinical treatment studies (Urizar, Yim, et al., 2019b) of Latinas. Women with a score of 17 or greater (classified as elevated pregnancy anxiety; Urizar et al., 2019b) were eligible for the study.

Data Analysis

Interview recordings were transcribed verbatim and verified by a research team of bilingual and bicultural undergraduate research assistants supervised by the lead author. Transcripts were analyzed using directive qualitative content analysis, a deductive approach that identifies manifest content from interview data (Hsieh & Shannon, 2005). Deductive content analysis uses the words and experiences of participants to advance a theoretical framework by increasing its specificity to specific subgroups (Elo & Kyngäs, 2008). Further, this approach allows for the conceptual interpretation of a phenomena while simultaneously providing counts of all themes (Vaismoradi et al., 2013) so that readers are able to assess the representativeness of the findings (Hannah & Lautsch, 2011). Atlas-TI (Version *9.0.7*, 2020), a qualitative coding software was be used to manage, code and store interview transcriptions and coded data.

The corpus of analyzed text included all 25 transcribed interviews. Meaning units within the transcripts were sentences or paragraphs of text that reflected participants' perceptions of the acceptability of exposure treatment. First, all coders read and re-read transcripts to familiarize themselves with the content. Then, using a structured matrix of coding categories (Elo & Kyngäs, 2008)—one category for each of the seven domains of the acceptability framework—coders each came up with an exhaustive list of initial themes within each category of the codebook. Codes were then named and defined, and example quotes representative of each code were selected. All members of the research team then met to review the codebook, further organizing categories, collapsing across duplicates, and eliminating codes that had not reached saturation. This updated codebook was then jointly applied to a sample transcript, following established guidance to revise and pilot the coding framework on a selection of data (Schreir, 2012). This process resulted in a pared down master codebook of mutually exclusive categories and subcategories that described pregnant Latina's acceptability of exposure as an intervention for anxiety during the prenatal period. The final set of codes, or themes, for each subdomain of the TFA matrix can be found in Figure 3.2.

Next, coders independently applied codes to a set of five randomly selected transcripts. Inter-coder reliability was calculated after the coding of each transcript using two measures of reliability—Holsti's index of reliability (Holsti, 1969) and Krippendorff's binary alpha (Krippendorff, 2011). Holsti's index calculates the overall percentage of code agreement to non-code agreement (Coe & Scacco, 2017), while Krippendorff's binary alpha calculates how often multiple coders apply the same codes to the same segment of text, and corrects for potential inflation in reliability estimates due to chance (Krippendorff et al., 2016). This process identified places where coding was divergent (e.g., disagreement about the application of a code, substantial

difference in length of coded segment), and was used to guide consensus meetings between coders. This iterative process of calculating inter-coder reliability has been recommended as a way to increase coder understanding of individual codes, and reach consensus regarding rules about length of code segments (Burla et al., 2008; Macphail et al., 2016), increasing the trustworthiness of the analyses. Ultimately this process resulted in strong kappa coefficients (Krippendorff's c-∝ binary= .82; Holsti's Index=85.4%), and coders were able to proceed with coding the remaining 20 transcripts independently (10 each).

Results

Women reported a mean age of 29.68 (*SD*=5.27) and were between their second and third trimester of pregnancy at the time of the interview (*M* weeks gestation=26.7, *SD*=9.56). Forty four percent of women were married (n=11), about half of the participants were first time mothers (*n*=12), and about half had at least one child (n=13). All 25 women identified as Latina, and the majority (*n*=22) reported that they were of Mexican origin. Women were primarily born in the United States (*n*=22), and all chose to speak English for the interview, though 48% of women reported that they were equally bilingual in English or Spanish. Most women (n=17) reported total household incomes of $74,999 or less and 8 reported incomes of under $35,000. On average, women reported moderate generalized anxiety symptoms, and elevated pregnancy-specific anxiety. A full summary of sociodemographic characteristics can be found in Table 3.1.

The qualitative content analysis revealed themes related to pregnant Latinas' acceptability of exposure therapy for each of the seven subdomains of the TFA. All themes describe *prospective* acceptability of exposure therapy (i.e., women's anticipated acceptability of the intervention). Interviews lasted 55.91 minutes on average (range 36.68 - 72.5 minutes). Coded transcripts had had a total of 435 segments, with an average of 17.4 segments per transcript (*SD*=4.02; min=9,

max=25). Below, we report on 19 themes across the seven TFA domains, providing their definition, frequency and exemplary quotes. For a list of the themes and their definitions organized by TFA subdomain, see Table 3.2.

Affective Attitude. Two themes reflected how women expected to feel about receiving exposure therapy. *Hopefulness,* a code describing feelings of optimism and expected relief from distress, was endorsed by 11 women. Participant 5 noted "Choosing to go through [the exposure] process…kind of even feels relieving because it's like bringing kind of a solution". Additionally, 7 women endorsed *Fear*, which captured women who noted they would be fearful about receiving exposure therapy because it involved confronting uncomfortable thoughts or situations. Participant 27 described her fear in detail:

> "I think like, just approaching the situation, and talking about it for me is already stressful. Like I can already feel stressed out 'cause I'm thinking about it so I'm like okay, like if I expose myself to it, will I be able to approach the situation, right? Will I be able to confront it, would I not get desperate?... I'd probably get mad or upset and not be able to face it, I think my fear would get in the way…"

Burden. Three themes reflected the perceived effort (potential burden) women would need to put forth to participate in exposure therapy. Twelve women discussed *Managing Family Reactions*, a code that captured women's expectation that participation in exposure therapy would require them to have difficult or conflictual conversations with their families surrounding their decision to seek treatment. Participant 24 discussed that for many Latinas, negotiating participation in therapy with their extended families would be important:

> "Not only you have a relationship like obviously with your boyfriend or husband, but maybe a relationship with the families, your parents, and like I said like, maybe like just knowing that … there's nothing wrong with you know therapy, and just making sure that you know they have the education to go back and let their family know that 'it's okay, what I'm going through, like it can be helped."

Eleven women discussed the burden of *The Sensitivity of Pregnancy* to describe the ways in

which pregnancy felt like a 'fragile time' that would make participation in exposure therapy more effortful. Participant 9 expressed: "So I feel like there's all this like pressure that's already placed in [the transition to] motherhood and on top of that like placing this stress and—not like pressure—but like placing the responsibility of facing your fears. I feel like it's harder". Finally, 10 women noted that *Limited Time* would make the initial uptake and ongoing engagement in exposure therapy burdensome. Participant 16 explained,

> "…when I was working full time, I would find it really hard … by the time I got home I needed to cook dinner, and then I wanted to spend time with my daughter for a couple of hours because then by then it was already 8 and I needed to put her to sleep, so I think that for working moms, it might be a little harder".

Ethicality. Two themes described the extent to which exposure therapy would fit with women's value systems. Fourteen women noted that exposure therapy *Aligned with Valuing Family*; this theme captured women who described that receiving exposure therapy would align with their prioritization of family in their lives. Women described that participating in exposure therapy was likely to make them partners and parents who were more engaged, less reactive and modeled the importance of self-care. The following excerpt from Participant 4 is illustrative:

> Interviewer: At this point, in your life, like what do you think is most important, like what are things that you value most right now?
>
> Participant: Um, right now just providing a better future for my child. And making sure that I'm good, that way, they're good, you know? That's probably what's most important to me right now.
>
> Interviewer: And how do you think then, that learning exposure strategies or participating in something like that would fit in with that value that you have?
>
> Participant: Um, I mean it definitely would get me past some of my fears. That way, I wasn't stressed or anxious while raising my child and you know, eventually as they get older, they get you know, certain anxieties and fears, and I can help them out as well.

Women also shared a sense that *Exposure is Stressful for Baby*; a theme that captured

concerns that exposure might be mismatched to their interest in striving for a 'calm' pregnancy. Women described the importance of minimizing their own stress during pregnancy, because "whatever you feel, the baby feels". The prioritization of calmness appeared to be at odds with a treatment that asked them to deliberately confront short-term discomfort, even in the context of longer-term anxiety reduction. Participant 15 describes this tension:

> "Because now it's like you have a child's life in your hands as well and you're responsible for that life. So now I'm exposing myself and the baby that I'm supposed to be taking care of in my belly. So now we're both completely exposed, you know? So I have to try to keep my guard up and theirs, and you know…. I think it would be a little bit more difficult."

Intervention Coherence. Two themes detailed the extent to which women understood exposure therapy and how it worked to reduce fear and avoidance. A majority of participants (*n*=17) reported *Understanding Exposure.* This theme captured women reporting understanding of the rationale for exposure therapy. Participant 22 said of exposure after watching the video vignette "It made sense, she just had to push herself to put herself in an uncomfortable situation so that she can see that it's not that bad". However, nine women reported *Lacking Exposure Understanding,* a theme capturing women who were confused about the rationale for exposure therapy. Of these nine women, five reported a general confusion, due to conceptualizations of their anxiety as stemming from interpersonal stress—not avoidance; these women expressed that strategies like breathing, relaxation or "talking about my feelings" appeared to make more sense. An additional four women noted that while they understood the general rationale, it was unclear how exposure would work for their specific fears. Participant 19 who described avoiding discussing her desire for a Vaginal Birth After Cesarean (VBAC) for fear of judgment by family members explained, "I don't know how I would expose myself. Would I continue thinking about it? Or is it me watching videos of moms talking about the bad part of their VBAC experience? Is that what I should be doing?"

Opportunity Costs. Three themes detailed the benefits, profits or values women believed they would need to give up in order to participate in exposure therapy. Fourteen women discussed that they would need to distance themselves from a cultural view of motherhood that prioritized the wellbeing of their children over their own. In this study, the theme was labeled *Cultural Conceptions of the Maternal Role*. This theme captured women's beliefs that their ideals of self-sacrifice in service of their children, values often passed on by their families, would make it difficult to participate in exposure therapy. Participant 5 explained this pressure:

> "… there is like the mentality of like, I no longer come first, like, me, my priorities and my feelings and what I want is no longer important, compared to what the baby needs… I can hear my family making comments about like, it's not about you anymore, it's about the baby, and having to get over things, and having to just, just get over it, like I was mentioning, rather than focusing on myself and things like that."

Thirteen women provided responses consistent with the theme, *Labeled as Unfit,* which captured women who discussed that participating in exposure therapy would open them up to criticism regarding their capacity to parent effectively within their Latinx community. Some women explained that a cost associated with seeking exposure therapy might be giving up the appearance of competency; participant 15 described her concerns about this:

> "It's bad when you're pregnant, to express or to tell people that you're gonna go seek mental help because they're gonna be like "*Ay, eso es para los locos*"(Oh, that's for crazy people)…so it definitely puts pregnant women, and you know especially Latina pregnant women in a predicament because you're like 'What do I do? Do I just follow my culture norm? Do I break out of it and be like you know what this is me?"

Finally, eleven women endorsed the theme *Getting Help from an Outsider,* which characterized value systems that discouraged people from seeking help for emotional problems outside of their families. Women noted that they would have to go against the culturally sanctioned practice of relying only on close others in times of emotional distress in order to participate in

exposure therapy. Participant 12 discussed specific beliefs in her own family that she felt she had to "not let affect me" – "You don't talk to people about your problems… you don't invite people into your laundry. You know, that's not something that you do. You don't talk to people outside of your family about these things."

Perceived Effectiveness. Three themes described the extent to which women perceived exposure therapy as likely to reduce avoidance and feelings of anxiety. Thirteen women endorsed that they perceived the intervention as *Effective*—a theme that captured women who believed that exposure would reduce their avoidance and worry. Participant 27 noted, "I think [exposure] would make me less stressed, probably like even more positive about the situation and maybe try to not be afraid to confront it, like, it would help me get rid of a lot of fears I think". Other women (*n*=7) explained that they thought exposure would be *Ineffective*. This exchange with Participant 26 highlights concerns related to engaging in exposure that was common among many women who considered exposure to be ineffective:

> "I think that most logical people would say, 'Okay, that could be worst case scenario, but we can't let that happen. We got to, we got to make sure that that doesn't happen.' You know what I mean? So, it's almost—I feel like the logical response is avoidance."

Finally, 9 women discussed feeling *Unsure* about exposure's effectiveness, describing ambiguity about its helpfulness. Participant 14 referenced other times in her life she had confronted her fears, and ultimately concluded "Maybe it might help. I'm just not too sure because like I said, I do expose myself a little bit and even that little bit doesn't really help me." Three women endorsed both *Unsure* and *Ineffective* and one woman endorsed both *Unsure* and *Effective* suggesting that a subset of participants were not decided about their views on exposure effectiveness.

Self-Efficacy. Four themes described women's confidence that they would be able to engage

with exposure exercises. The majority of women (*n*=17) endorsed a *Preference for Exposure Treatment During Pregnancy*, a theme that captured women who believed receiving exposure would be more favorable during pregnancy as compared to the postpartum. Women explained that pregnancy had logistical benefits because childcare was often not as big an issue; they also described using pregnancy to prepare for the anxiety to come in the postpartum period. Participant 24 noted "I think that when the baby's here, I don't know if people would want to commit to something during that time, and also if people you know, work on their issues, during pregnancy, it can help, it may reduce postpartum for many women, that have issues with that...". Twelve women endorsed the theme *Social Support Increases my Confidence*, which captured women who cited their social circles as being able to provide them with emotional or instrumental support, better allowing them to engage with exposure exercises. Participant 6 explained "If my husband were to support me and take care of the baby while I get the help, I'd obviously be very open to doing [exposure] therapy". Eleven women also reported a *Preference for Individual Therapy;* a theme that revealed that women who discussed this format (individual) would be more likely to engage in exposure therapy. Participant 23 explained,

> "One on one [is better] because I... feel like, I'm already stepping out of my comfort zone to speak to somebody about it, and if I'm not comfortable yet telling my family, I don't think I'd be comfortable telling other strangers what's going on in my life."

Nine other women endorsed that they had no preference for individual versus group therapy, and only four preferred group therapy—citing the benefits of learning from others and feeling motivated by watching others reach their goals.

Finally, eight women reported *Resistance to Confronting Pregnancy-Specific Fears.* This theme described women's reduced confidence in their ability to follow through with exposure exercises that were related to fears about the health of their pregnancy or their baby, as opposed to

other more general fears. Participant 22 explained that although she could be open to confronting social fears, her avoidance of uncertainty regarding her baby's health though 'over-the-top', did not feel like a comfortable treatment target:

> Participant: "I guess I'm overdoing it, going crazy, calling [the doctors]. But that's just my main worry because I have health issues, I didn't have health issues with the first [pregnancy] and I lost it …. And I want it to survive, I've seen so many videos and things of people giving stillbirths and I don't want that to happen."

Discussion

The present study aimed to describe the extent to which pregnant Latinas considered exposure therapy—a frontline intervention for anxiety in the general population—an acceptable approach to treating avoidance and anxiety. Applying a theoretical framework of prospective intervention acceptability (i.e., TFA; Sekhon et al., 2017), our deductive qualitative analysis revealed salient themes in each of the seven subdomains of the model (i.e., affective attitude, burden, ethicality, intervention coherence, opportunity cost, perceived effectiveness, and self-efficacy). Our findings suggest that while there are many aspects of exposure therapy that appear acceptable to pregnant women, there are also important concerns. In particular, pregnant Latinas in this study described that cultural norms and pregnancy-specific concerns impacted their acceptability of exposure therapy.

A majority of women reported that they understood the rationale for exposure therapy and believed it would be effective at reducing their particular worries and avoidant behaviors. Other factors that positively impacted exposure acceptability for pregnant women in this study included feeling hopeful about the intervention, believing that the intervention was in line with their family values, and that family support would increase their confidence in completing a course of exposure. Our results mirror those from studies of ethnic and racial minority families which show that leveraging family support (Keefe et al., 2016) and highlighting the connection between a

woman's wellness and that of her family (Uebelacker et al., 2012) contribute to better acceptability and engagement with evidence based interventions. In addition to increasing acceptability, engaging family members in treatment of prenatal anxiety can be clinically meaningful. New recommendations by exposure therapy researchers in pediatric settings emphasize that the inclusion of family members in treatment can improve outcomes by reducing family criticism and accommodation behaviors that support avoidance (Abramowitz et al., 2018). Our findings support extending these recommendations to treating prenatal anxiety, where engaging willing partners or extended family will likely increase exposure acceptability and outcomes.

Though families were often discussed as facilitators of exposure participation, women also described ways in which cultural messages passed down by their families might complicate intervention acceptability. Pregnant Latinas noted that participating in exposure therapy would likely open them up to familial and community stigma (e.g., labeled as crazy or bad mothers), a finding reported in several qualitative studies of prenatal anxiety (Staneva et al., 2015). Women also explained that discomfort seeking help for emotional problems outside of the family would reduce Latinas' openness to receiving exposure therapy. Discomfort disclosing emotional distress to mental health professionals has been reported in mothers from immigrant backgrounds (McLeish & Redshaw, 2017), and pregnant Latinas of Mexican origin (Hayden et al., 2013). Further, many women in the perinatal period report they receive messages that indicate being a 'good mother' requires putting their children and families ahead of themselves (O'Mahen et al., 2012). Messaging about the meaning of 'good mother' may be particularly salient for Latinas because of its intersection with *marianismo,* a traditional cultural value that considers it virtuous for women to forsake their needs for those of their family (Lara-Cinisomo & Wisner, 2013). Adherence to values of self-sacrifice have been linked to reduced treatment seeking among Latinas

with perinatal depression (Lara-Cinisomo & Wisner, 2013) further substantiating the ways in which cultural values impact intervention acceptability. Despite recognizing these messages, women endorsed that they were willing to discuss seeking mental health care with family members, but acknowledged it would require effort. Future research on the engagement of pregnant Latinas in mental health interventions may consider including culturally informed strategies to facilitate family communication about treatment seeking and test their impact on acceptability.

Women also described concerns about utilizing exposure exercises during their pregnancy. Participants characterized pregnancy as an emotionally volatile time due to changes in their hormones and family roles. While some participants concluded that this generally stressful time would make exposure therapy especially helpful, others saw participation in exposure therapy as one more thing to keep track of, and in some cases another source of stress for themselves and their unborn babies. Hesitation regarding utilizing exposure therapy was greater among pregnant women whose avoidance was linked to the health of their pregnancy (e.g., tolerating uncertainty about physical discomfort, intrusive thoughts about baby's health). To date, there are no randomized controlled trials of exposure therapy for prenatal anxiety or direct tests of physiological stress responses to exposure therapy in pregnancy (Arch et al., 2012) which restrict clinicians' ability to provide pregnant women with evidence -based answers about potential risks of exposure therapy. However, a review comparing physiological stress responses between pregnant and non-pregnant women in response to lab based stress induction tasks found that pregnant women had reduced stress reactivity than their non-pregnant counterparts (De Weerth & Buitelaar, 2005b), an encouraging finding with respect to safety. Given the broad base of empirical support for exposure therapy (Abramowitz et al., 2019) and its relatively fast and potent effects on anxiety, it may be

useful for clinicians to work collaboratively with pregnant clients and obstetrics providers (Twohig & O'Donohue, 2007) to address specific concerns regarding exposure to pregnancy specific avoidance, which are likely to increase acceptability and engagement.

Pregnant women also provided insights into their preferences for exposure therapy delivery. Most women expressed interest in initiating exposure therapy during pregnancy as opposed to waiting until the postpartum period. While some women discussed logistic advantages to attending therapy while pregnant, others spoke about the benefits of learning to manage anxiety before the postpartum period, a time they considered high-risk for worsening mental health. This preference is in line with recommendations by U.S. Preventive Services Taskforce, who posit that treating women with elevated anxiety can reduce the risk of postpartum depression and downstream adverse effects on parents and offspring (Curry et al., 2019). In addition, most women reported that they would prefer to receive individual exposure therapy, while a small minority (n=4) preferred group therapy. Quantitative survey studies have also found that Latinas prefer individual therapy (Lim-Lacsina et al., 2017), including during the perinatal period (Goodman, 2009). Though some researchers have noted that group therapy is a good fit for Latinx adults because of its alignment with collectivist worldviews (Lombana, 2021) these results suggest that clinical factors (i.e., anxiety, comfort disclosing emotional problems) also ought to be considered when designing culturally informed intervention studies.

Limitations

This study is the first to describe pregnant women's perceptions of exposure therapy, a frontline intervention for anxiety that remains untested in pregnant samples. Strengths of this study include the use of video vignettes—a standardized and clinically realistic format by which to describe psychotherapy—and the use of a theoretical model of intervention acceptability that

guided our deductive analysis. Still, there are important limitations. Though all study materials were available in Spanish, the women enrolled in this study were majority U.S. born, and all were English speaking. Further, the vast majority were of Mexican origin. Though the homogeneity of the interview sample allowed for data saturation and increased trustworthiness (Palinkas et al., 2015), these results cannot be generalized to Latinas of other national origins or those who are primarily Spanish speaking, and may be less acculturated. For example, level of acculturation (Pham et al., 2017) and Latinx country of origin (Berdahl & Torres Stone, 2009) are associated with different levels of comfort seeking formal avenues of mental health support, and would likely impact the acceptability of exposure therapy.

With regard to ensuring that women engaged with the video vignette and written/audio material, we obtained verbal confirmation of engagement and were able to examine the time spent with presented materials using metrics provided by SurveyMonkey. Data capturing the time spent on the survey indicated that women did not skip through any of our procedures. However, a more rigorous method for ensuring engagement would have included an attentional check (e.g., quiz questions) to ensure an accurate assessment of baseline understanding of the material presented. Finally, women who agreed to participate in this study were open to discussing mental health during pregnancy, and there are likely effects of self-selection favoring acceptability of exposure therapy and less mental health stigma.

Conclusions

Pregnant Latinas reported themes related to the acceptability of exposure therapy that ought to be addressed in clinical practice with women who may benefit from this treatment approach. On one hand, women were enthusiastic about starting exposure therapy during pregnancy, and generally felt that learning to face their fears would have positive effects on their mental health and

that of their families. However, they also expressed concerns about the potentially stressful effects of exposure on their babies and how best to manage familial and cultural messages that discouraged managing anxiety via therapy. There is substantial utility in examining the acceptability of an intervention before its delivery. Insights from these interviews suggest a need to proactively explore women's concerns regarding a therapy's effect on her baby and family and reinforce preferences for prenatal (as opposed to postpartum) intervention. Assessing intervention acceptability in research and clinical contexts has the capacity to improve engagement in prenatal care, especially for ethnic minority women who encounter disproportionate structural barriers (Katz et al., 2018) that limit their time and trust of health care systems. Talk therapies are the mental health intervention of choice for pregnant women (Dennis & Chung-Lee, 2006); assessing their acceptability stands to provide guidance on adaptations best suited to engage women with prenatal anxiety.

Dissertation Discussion

This dissertation is a series of three studies that use quantitative and qualitative methods to describe the state of the field as it relates to treating pregnant ethnic and racial minorities with anxiety. Currently, there are no evidence based treatment guidelines for treating prenatal anxiety with psychotherapy despite the many adverse and cascading effects on maternal, neonatal and infant psychology and physiology (Field, 2017). In study 1, we systematically review the psychological intervention literature in Latina and Black majority samples to describe the intervention modalities that have been tested to reduce prenatal depression and anxiety and comment on their efficacy. In study 2, we test the efficacy of the first cognitive behavioral intervention to be delivered to a sample of primarily Latinas and Black women with regard to two manifestations of prenatal anxiety (i.e., state and pregnancy-specific). We also examine whether intervention effects are explained by hypothesized mediators of symptom change. In study 3, we use a theoretically driven, deductive qualitative analysis to explore pregnant Latinas' acceptability of exposure therapy to reduce prenatal avoidance and anxiety.

The results of the systematic review carried out in study 1 indicate that prenatal depression has been efficaciously treated in Latina and Black women using CBT, IPT and behavioral activation. However, each of these modalities has been supported by just one randomized study, pointing to the need for additional RCTs testing each psychotherapy with pregnant ethnic and racial minorities before we can designate these interventions as evidence based. With respect to anxiety, the findings are even more limited. No interventions aimed to reduce prenatal anxiety among Latinas or Black women have been published except for two IPT trials where the intervention conditions did not outperform control conditions. Cultural adaptations were infrequently reported and were present in one efficacious IPT intervention for depression. This

systematic review identified that for Latinas and Black women with prenatal anxiety, there is currently no evidence available regarding efficacious psychotherapy treatment, and that CBT—the intervention with most support in the general population (Hofmann et al., 2012)—has yet to be tested.

Study 2 responded to the gap addressed by the first study by testing the efficacy of a culturally adapted CBSM program on two forms of prenatal anxiety among pregnant Black women and Latinas. We hypothesized that women randomized to the CBSM would report less state and pregnancy-specific anxiety post-treatment than those in the control condition after controlling for baseline depressive symptoms, intervention language and financial hardship. While these hypotheses were not supported, post-hoc analyses showed that women who completed the intervention reported significantly less state anxiety immediately post-treatment than did women who did not complete the intervention or those in the control condition; effects that did not last into follow-up time points. Finally, mediational analyses revealed that neither relaxation efficacy, negative cognitions or CAR helped to explain symptom changes based on intervention group assignment. The null findings regarding the hypothesized mediators of the intervention are likely due to issues of power and study design including the timepoints selected to examine symptom change (i.e., post-treatment to follow-up), when intervention effects and skills practice often decline (Foxx, 2013; Powers et al., 2008). Still, regression analyses showed that relaxation efficacy was improved for the intervention group from baseline to post-treatment, signaling that the intervention differentially engaged treatment targets.

Study 3 examined the prospective acceptability of exposure therapy, a common and widely efficacious behavioral intervention for anxiety—absent from the CBSM and all other randomized trials for prenatal anxiety in the United States. We used the TFA to inform a qualitative interview

and deductive analysis of seven domains (i.e., affective attitude towards the intervention, perceived burden, ethicality of the intervention, coherence, opportunity costs, perceived effectiveness, and self-efficacy related to participation) that impacted Latinas' acceptability of using exposure therapy to treat anxiety and avoidance during pregnancy. While we identified several themes that supported Latinas' acceptability of exposure therapy including affective attitude (i.e., hopefulness), ethicality (i.e., exposure as aligned with values of prioritizing family), coherence (i.e., understanding of exposure), and self-efficacy (i.e., social support, receipt during pregnancy), we also identified themes that limited women's acceptability of the intervention. Women noted that burdens (e.g., managing family reactions), opportunity costs (i.e., challenging cultural conceptions of the maternal role, fear of being labeled unfit), and concerns with self-efficacy (e.g., lack of confidence in their ability to confront avoidance related to their prenatal health) might complicate the palatability of exposure therapy. These narrative data provide clinicians and intervention researchers with guidance regarding factors to highlight and concerns to address during initial phases of recruitment or engagement in programs delivering exposure therapy.

A strength of this dissertation is the use of multiple study designs (i.e., systematic review, intervention efficacy study, deductive qualitative study) to characterize and extend existing knowledge about prenatal anxiety—an understudied clinical problem. Further, the examination of general anxiety as well as pregnancy specific anxiety profiles in the context of clinical care bridge literatures in clinical and health psychology. Continued attention to both prenatal anxiety manifestations can increase the precision of our treatment recommendations for women with distinct prenatal anxiety profiles and obstetric risk factors (e.g., prior miscarriage). Direct comparisons of cognitive behavioral or other evidence-based interventions for adults (e.g.,

mindfulness) with prenatal health education is an area of future research and will be an important contribution to the treatment of prenatal anxiety.

Future Directions in Prenatal Anxiety Intervention

Collectively these results have implications for intervention development for prenatal anxiety among ethnic and racial minorities. Our studies show that retaining pregnant ethnic and racial minorities in intervention trials is a challenge, and that poor engagement (as defined by attendance) is associated with worse clinical outcomes. All intervention trials examined as part of this dissertation (studies 1 and 2) were conducted with low-income ethnic and racial minority women, and yet, adaptations to address financial concerns were relatively limited (e.g., providing childcare, assisting with travel costs). This is troubling given that poverty creates logistical barriers that are reliably related to worse intervention engagement and retention (Santiago et al., 2013), and perceptions that the care provided lacks relevance in the context of financial stress. Going forward, studies may benefit from onboarding engagement sessions that aim to address poverty related barriers among low income ethnic and racial minority women. For example, Perinatal Child-Parent Psychotherapy (Narayan et al., 2016) and IPT (Grote, et al., 2009) protocols delivered to low-income ethnic and racial minority women with perinatal depression and anxiety use the first session to help women connect to various social services that assist with basic needs (e.g., food, housing, baby supplies, job training). While these adaptations address some important barriers to treatment, women with fewer economic resources are still more likely to drop out (Narayan et al., 2016), suggesting that engagement efforts must go beyond addressing practical barriers to service use.

To this end, results from our qualitative acceptability study point to the importance of providing clear psychoeducation about an available therapy and proactively assessing women's

attitudes and concerns about it. Specifically, assessing whether the intervention activates or alleviates concerns related to the health of their fetus, their identity as a mother, and values associated with ethnic or racial identity may improve acceptability and therefore sustained participation in the intervention. Active discussion of cultural factors identified by ethnic minority women as impacting engagement will help to elicit parts of a woman's worldview she may not share spontaneously, and may improve their motivation to participate in treatment (Levy & O'Hara, 2010).

Including a woman's family members as part of perinatal anxiety intervention may also increase her comfort with participation. Despite pregnant women's significant interest in receiving family support during their prenatal health care (O'Mahen et al., 2012), no intervention identified in our systematic review involved partner or extended family participation. The lack of family engagement is at odds with our narrative data from pregnant Latinas regarding intervention acceptability—where discussions about the importance of considering family members in their decisions to seek and sustain treatment were common. Though family relationships were often indirectly addressed in the reviewed prenatal interventions for depression and anxiety using skills like assertive communication, they placed the burden on pregnant women to learn and implement skills aimed at improving the family interaction. This approach is limiting in that it can reinforce ineffective beliefs that the pregnant woman is solely responsible for alleviating family conflict and fails model effective support for partners or families—a potent buffer against perinatal depression and anxiety (Letourneau et al., 2012).

Excluding partners or other caregivers from perinatal interventions remains the norm despite the well documented interrelationship between paternal and maternal symptoms of depression (Paulson & Bazemore, 2010) and anxiety (Majdandžić et al., 2012) and the adverse

effect of relationship distress on internalizing symptoms during the perinatal period (Rosan & Grimas, 2016). A recent systematic review shows that the few (n=9) studies that have incorporated partners or family members in interventions for pregnant women at risk for depression and anxiety have successfully reduced these symptoms in both women and their family members (Noonan et al., 2021). The benefits of family engagement may be even stronger for pregnant ethnic and racial minorities who are more likely than non-Latinx white women to live in multi-family households (Tamis-LeMonda & Kahana-Kalman, 2009) and experience disproportionately high levels of family conflict in pregnancy (Golden et al., 2013). Further, it is possible that familial participation may reduce concerns reported by the mothers in our qualitative study—that seeking help for anxiety might be negatively perceived as prioritizing themselves over their families.

Finally, addressing pregnancy specific worries in prenatal anxiety interventions stands to increase intervention relevance and may improve birth outcomes for women's offspring. Prenatal anxiety interventions often fall into one of two categories— 1) treating fear of childbirth or pregnancy specific anxiety via prenatal education (Stoll et al., 2018), or 2) treating state or general anxiety using psychotherapy (Ponting et al., 2020). We advocate for an integration of the two approaches to better serve pregnant women. In both quantitative (study 2) and qualitative (study 3) studies of this dissertation, pregnancy specific anxiety (PRAS scores >17) was common –even among non-clinical samples. In fact, it is estimated that 29% of women in high income countries experience pregnancy specific anxiety (Chandra & Nanjundaswamy, 2020). Yet, intervention protocols for prenatal anxiety often leave out content about labor and delivery, or about common prenatal medical conditions (e.g., gestational diabetes), frequent sources of worry in pregnancy anxiety. Though the CBSM tested in this dissertation included content tailored to common negative cognitions during pregnancy, it did not provide psychoeducation about physiological changes that

occur during pregnancy, trajectories of prenatal care or discussions of labor and delivery. We hypothesize that there may have been greater intervention effects on pregnancy specific anxiety outcomes had these topics been a part of the intervention.

MUMentum (Loughnan et al., 2019), an internet delivered CBT protocol for perinatal depression and anxiety provides a useful example of integrating psychotherapy and prenatal education. MUMentum supplies extra prenatal education resources for women each session, covering topics like attachment during pregnancy and intrusive thoughts about the baby's development or childbirth. Efficacy data among Australian women show that randomization to the MUMentum intervention resulted in medium to large reductions in anxiety (Loughnan et al., 2019). Though these results are promising, examining how MUMentum and other interventions might impact pregnancy specific anxiety is a worthy next step. Pregnancy specific anxiety is not considered a disorder and fails to capture functional impairment resulting from pregnancy related worries (O'Connor et al., in press). Yet detecting reductions in the frequency of these thoughts certainly has clinical implications as pregnancy specific anxiety is linked to length of gestation, low-birthweight and adverse physical and mental health outcomes for offspring (Dunkel Schetter et al., 2011). Psychological intervention trials moving forward can better tailor their content to fit specific and prevalent pregnancy related worries and measure any resulting changes in their frequency to improve maternal and child outcomes. This stand to have particular impact on ethnic and racial minority women who are disproportionately likely to report high pregnancy specific anxiety (Dunkel Schetter & Ponting, in press) and encounter adverse birth outcomes (Almeida et al., 2020).

Conclusion

Findings from this dissertation suggest that treatment engagement for pregnant ethnic and racial minorities with prenatal depressive and anxiety symptoms is lacking at two levels. First there are a dearth of published interventions studies that include a significant number of pregnant Latinas or Black women, limiting the field's understanding of their engagement and clinical outcomes with available interventions. Second, we find that when ethnic and racial minorities *are* enrolled in intervention trials, low engagement (i.e., attendance) adversely impacts prenatal anxiety outcomes. Importantly, attending to the acceptability of the interventions we test can serve to improve recruitment and retention in randomized studies, and has the added benefit of elucidating factors important to address in clinical care with benefits to treatment satisfaction, completion rates and clinical outcomes (Lindhiem et al., 2014). For the field of prenatal mental health to move forward equitably, it will be essential to continue testing approaches considered evidence-based in the general population among samples of pregnant women. Ethnic and racial minority women continue to be underrepresented in these efforts even as structural inequities continue to contribute to mental health disadvantages during pregnancy and subsequent adverse outcomes for their infants. Intervention approaches that attend to economic, cultural, and attitudinal factors specific to pregnant Latinas and Black women are well positioned to reduce transgenerational mental health disparities.

Table1.1
Sociodemographic Characteristics of Study Samples

Publication	Study Sample	Nativity	Age M (SD)	Language	Weeks Gestation	Socioeconomic status
Crockett et al, 2008	*n*= 36 AA/B	100% U.S. born	23.4 (4.98)	English	24-31	All participants received public assistance
El-Mohandes, et al., 2008	*n*= 913 AA/B	100% U.S. born	24.6*	English	≤ 28	75% of sample was on Medicaid
Field et al., 2013	*n*= 38 AA/B *n*= 5 L/H *n*= 1 W	Not Reported	24.90 (5.40)	English	20-24	State low income, no additional data provided
Grote et al., 2009	*n*= 33 AA/B *n*= 2 L/H *n*=15 W *n*= 3 Biracial	Not Reported	24.6 (5.46)	English	10-32	Annual income: 58.5% < $10,000, 26.4% $10,000-$20,000, 15.1% >$20,000
Jesse et al., 2010	*n*=21 AA/B *n*= 5 W	100% US born	24.69 (5.33)	English	6-30	State low income, no additional data provided
Jesse et al., 2015	*n*=99 AA/B *n*=47 W	Not Reported	25.05 (5.49)	English, Spanish	6-30	38.4% Employed, 61.6% Unemployed, 82.2% Medicaid recipient, 4.8% Medicare recipient
Kieffer et al., 2013	*n*= 275 L/H	97% foreign born	34% over 30 years	Spanish	<20	State low income, no additional data provided
Le et al., 2011	*n*= 217 L/H	100% foreign born	25.41 (4.59)	Spanish	≤ 24	90% of the households had an annual income under $30,000
Lenze & Potts, 2017	*n*= 33 AA/B *n*=7 W *n*= 2 Other	Not Reported	26.64 (5.89)	English	12-30	Annual income: 40% <$10,000; 20% $10,001- $20,000; 5% $20,001- $30,000; 12.5% $30,001- $60,000; 2.5% >$60,001

McKee et al., 2006	*n*= 43 AA/B *n*= 57 L/H	23% foreign born	24.7 (5.6)	English, Spanish	<32 weeks	State low income, no additional data provided
Muñoz et al., 2007	*n*= 41 L/H	76% foreign born	24.9 (4.54)	English, Spanish	12-32	Mean annual income $19,773.2
Sampson et al., 2016	*n*= 13 AA/B	Not Reported	24.0 (5.0)	English	≥ 12	100% unemployed, mean monthly income $1,153
Zhang & Emory, 2015	*n*= 65 AA/B	100% U.S. born	25.3 (4.6)	English	6-30	Monthly income: 32.3% <$249, 30.8% $250-499, 29.2% $500-$999, 7.7%>$999

Note. AA/B=African American/Black, L/H= Latina /Hispanic, W= Non-Hispanic/Latina white. NR=not reported. * Indicates that the standard error, and not the SD was reported

Table 1.2.
Design, Measurement and Results of Reviewed Studies

Publication	Intervention a) format, b) treatment modality, c) # sessions, *M* session attendance, d) provider (and provider education), e) setting	Control Group	Results Main Effects	Cultural Factors
		Randomized Controlled Trials (RCT)		
Crockett, et al., 2008	a) group, + 1 in home one-on-one booster session postpartum b) IPT c) 4 90-minute sessions + 1 50-min booster, (*M*=4.58) session d) community therapists (Ph.D. or M.Ed. in counseling) e) not reported, not at participant home	prenatal TAU	Women in the intervention and control groups showed no significant differences in depression scores (EPDS) 4 weeks post-intake (during pregnancy), 2 weeks after delivery, or 3 months postpartum.	No
El-Mohandes, et al., 2008	a) group, (2 optional individual booster sessions) b) CBT c) 8 sessions, (*M*=4) d) master's level counselors e) clinic-based	prenatal TAU	Women in the intervention group were more likely to resolve their depression (e.g. no longer show clinical elevations; Hopkins Symptom Checklist) in the postpartum period as compared to women in control group	Not reported
Field, et al., 2013	a) group b) IPT c) 12 60-minute sessions, (*M*=11.7) d) therapist (education not known) e) not reported	Peer Support: 20-minute group session 1/week for 12 weeks	Women in both the intervention and active control group showed significant reductions in depression (CES-D) and anxiety symptoms (STAI) from first to last session of treatment (during pregnancy). IPT did not outperform the active control condition.	Not reported

Grote, et al., 2009	a) individual b) IPT c) 8 sessions d) master's and doctoral level therapists e) OBGYN office	Enhanced Prenatal Care (with referrals for mental health services)	Women in the intervention group showed significantly greater reductions in depressive symptoms (EPDS) between baseline and post-intervention, and between baseline and 6-months postpartum, as compared to women in the control group.	Yes: Use of therapists trained in cultural competence with experience working with poor racial-ethnic minority groups, culturally relevant pictures, stories from the participants' cultural background to reinforce treatment goals, culturally sensitive psychoeducation about depression and use of cultural resources (e.g., spirituality, familism).
Kieffer et al., 2013	a) individual and group (2 individual home visits, 9 meetings during pregnancy; 2 individual home visits 1 group meeting postpartum) b) "healthy lifestyle intervention"- pre and postnatal care, behavioral activation, psychoeducation c) 14 sessions, (*M*=10.5) d) community health workers/"women's health advocates", education not reported	Healthy Pregnancy Education--four group meetings; 3 during pregnancy and 1 postpartum.	Women in the intervention group, but not in the control group showed significant reductions in depressive symptoms (CES-D) between baseline and follow-up (during pregnancy). The significant intervention effect did not extend into the early postpartum period.	No

	e) community partner settings (e.g., Community Health and Social Services)			
Le et al., 2011	a) group b) CBT c) 8 weeks 2-hour sessions, 3 individual booster sessions postpartum, (*M*=4) d) Bachelor's level study staff e) clinic	prenatal TAU	Women in both the intervention and control groups showed significant decreases in depressive symptoms (BDI-II) from pre to post-treatment. The cumulative incidence of major depressive episodes was not significantly different between the intervention (7.8%) and control (9.6%) groups.	Yes: incorporation of healthy management of reality and developmental/parenting issues for the unique needs of the predominantly Central American families such as immigration stressors.
Lenz & Potts, 2017	a) individual b) IPT c) 9 sessions (1 ethnographic introductory session + 8 IPT sessions); plus maintenance treatment session if participant finish all 9 sessions d) Clinical Psychologists, master's level clinicians e) research clinic, participant homes, or other community locations	Enhanced Prenatal Care (with referrals for mental health services and brief case management)	Women in both the intervention and enhanced prenatal care group showed significant decreases in depressive symptoms (EDS) from baseline to 37-39 weeks gestation. 58% of women assigned to brief-IPT and 67% of the women in enhanced prenatal care reported clinically significant improvement in depressive symptoms. There were no differences in improvement between groups. Additionally, women in both the intervention and enhanced prenatal care groups did not show significant reductions in anxiety symptoms (STAI-Brief).	Not reported
McKee et al., 2006	a) individual b) multicomponent psychosocial	prenatal TAU	Women in both the intervention and control group showed significant	Not reported

	intervention (CBT/psychoeducation/social support building) c) Total possible of 8 CBT sessions, 3 psychoeducation sessions and 14 social support sessions (*M*=5) d) therapists (education not reported) e) home or health centers		reductions in depressive symptoms (BDI-II) from third trimester to three months postpartum. There was no significant difference depressive symptom reduction for women in the control compared with the intervention group.	
Muñoz et al., 2007	a) group, 4 individual postpartum b) mood management course (CBT, attachment, psychoeducation, relaxation) c) 12 sessions, 4 booster, (*M*=6.7) d) group facilitators (faculty, postdoctoral fellows, and advanced doctoral graduate students in clinical psychology) e) medical (prenatal care) setting	prenatal TAU	Women in the intervention and controls groups showed no significant differences in major depressive episode incidence (Maternal Mood Screener) from pre to post intervention.	Yes: reinforced values (e.g., collectivism, familism), fostered new outlets of support in a foreign context, validated cultural values and beliefs regarding pregnancy and motherhood, validated the role of religion and spirituality healing, discussions of discrimination and racism.
Zhang & Emory, 2015	a) group b) mindfulness (components of mindfulness, ACT, DBT) c) 8 sessions over 4 weeks, (*M*=1.6) d) advanced PhD student in clinical	prenatal TAU	Women receiving the intervention did not show significant reductions in depressive symptoms (BDI-II) from pre to immediate post intervention. 4 weeks post intervention, participating in more	Not reported

	psychology e) not reported		intervention sessions was associated with fewer depressive symptoms.	
Non-Randomized Trials				
Jesse et al., 2010	a) individual OR group b) CBT c) 6 2-hour sessions, (*M*=6) d) Principal Investigator (PI), a nurse- midwife, and facilitators with master's training in mental health and rehabilitation e) not reported	Not applicable	Women who received intervention showed a 65% rate of "recovery" in the sixth intervention week and an 81% rate of "recovery" at one-month post-intervention (13/16 EPDS < 10). Women had significantly lower depressive symptoms post-treatment, and maintained their improvement over time	Yes: Use of colorful and attractive graphics, real-world examples. Culturally relevant guided visualization and inspirational literature/affirmations
Jesse et al., 2015	a) group b) CBT c) 6 weeks 2-hour session, (*M*=6) d) master's and doctoral trained mental health professionals, resource mom (co-facilitated the group, offered weekly booster session telephone calls and provided case management services) e) prenatal clinic	TAU	African-American women at high-risk for depression in the intervention group showed significantly greater decreases in their mean depressive symptom scores at post- intervention and follow-up compared to TAU. African American women at low-moderate risk for depression in the intervention showed mean reductions in depressive symptom scores at post- intervention and follow-up equivalent to those in to TAU.	Yes: First chapter of manual addressed depression in women of color, translated into Spanish for Spanish speaking participants. Inclusion of non-denominational spiritual related resources, use of personal check-ins, and emphasis on confidentiality

Sampson, et al., 2016	a) individual b) CBT (problem solving therapy + 1 session motivational interviewing) c) 5 sessions ,1-2 hours d) community caseworkers, 1 with an associate's degree and 1 who was a licensed professional counselor e) home based	Not applicable	Women receiving the intervention showed significant reduction in depressive symptoms pre to post intervention (EPDS and PHQ-9).	No

Table 1.3
Assessment of Study Bias

Study	RSC	AC	BP	BO	IO	SR	Other	Overall Bias
Crocket et al., 2008	⊕	∅	⊗	⊗	⊕	∅	⊕	**Medium**
El-Mohandes et al., 2008	⊕	⊕	⊗	⊕	∅	⊕	⊕	**Low**
Field et al., 2013	⊕	∅	⊕	⊕	⊕	∅	⊗	**Low**
Grote et al., 2009	⊗	⊗	⊗	⊗	∅	∅	∅	**High**
Jesse et al., 2010	⊗	⊗	⊗	∅	∅	⊕	⊕	**Medium**
Jesse et al., 2015	⊕	∅	⊗	⊗	⊗	⊕	⊕	**Medium**
Keiffer et al., 2013	⊕	⊕	⊗	⊕	⊕	∅	⊕	**Low**
Le et al., 2011	⊕	⊕	⊕	⊗	∅	∅	⊕	**Low**
Lenze & Potts, 2017	⊕	⊕	⊕	∅	⊕	⊕	⊕	**Low**
McKee et al., 2006	⊕	∅	∅	⊕	⊗	∅	∅	**Medium**
Muñoz et al., 2007	⊕	⊕	⊗	∅	⊕	∅	⊕	**Low**
Sampson et al, 2016	⊗	⊗	⊗	∅	⊕	⊕	⊕	**Medium**
Zhang & Emory, 2015	⊕	∅	⊗	∅	⊗	∅	⊗	**High**

Note. ⊕ indicates low risk of bias, ∅ indicates unclear risk of bias, and ⊗ indicates high risk of bias. RSC= Random Sequence Generation, AC= Allocation Concealment, BP= Blinding of Personnel and Participants, BO= Blinding of Outcome Assessment, IO= Incomplete Outcome Assessment, SR= Selective Reporting.

Table 2.1
Sample Characteristics (n=100)

Sociodemographic Variables	Mean (SD) or n (%)	
	CBSM (*n*=55)	Control (*n*=45)
Age	26.3 (.9)	26.8 (.9)
Married/Cohabitating with Baby's Father at T1	26 (47.3)	23 (51.1)
Number of Prior Births		
0	21 (38.2)	16 (35.6)
1	12 (21.8)	10 (22.2)
2 or more	22 (40.0)	19 (42.2)
Race/Ethnicity		
Latina	38 (69.1)	33 (73.3)
Black	9 (16.4)	9 (20.0)
Nativity		
U.S. Born	23 (41.8)	20 (44.4)
Foreign Born*	32 (58.2)	25 (55.6)
Language Preference		
Spanish	24 (43.6)	18 (40.0)
English	31 (56.4)	27 (60.0)
Total Family Income before taxes		
Less than $10,000	26 (47.3)	14 (31.1)
$10,000-19,999	17 (30.9)	18 (40.0)
$20,000 or more	11 (20.4)	13 (28.9)
Education		
Less than high school	16 (29.1)	20 (44.4)
High school graduate/GED	21 (38.2)	14 (31.1)
College courses or college degree	18 (32.8)	11 (24.4)
Internalizing Symptoms at Baseline		
State Anxiety Symptoms	16.4 (6.2)	17.2 (6.1)
Pregnancy Specific Anxiety Symptoms	16.3 (3.9)	16.8 (5.3)
Depressive Symptoms	7.5 (4.8)	8.6 (6.1)
Possible Depression (EPDS= >10)	19 (34.5)	14 (31.1)

Note. *Foreign born mothers where primarily from Mexico (87.7%)

Table 2.2.
CBSM treatment aims and accompanying relaxation skills

Class	Aim	Relaxation Skill Taught
1) Stress Awareness	- Increase awareness of personal stress responses -Learn to self-monitor stress responses and antecedents	Diaphragmatic breathing
2) Thought Awareness	- Recognition that thoughts affect emotions - Identification of thinking errors	Mindfulness Meditations
3) Thought Replacement	- Catch, check, and change ineffective cognitions - Balance overly negative or overly positive self-talk by looking at the facts	Guided Imagery
4) Coping Awareness	- Define and identify passive and active coping strategies	Progressive Muscle Relaxation
5) Matching Coping	- Identify how to effectively match coping (active vs. passive) to specific stressors -Cope ahead for upcoming stressors	Progressive Muscle Relaxation
6) Social Support	- Recognition that social interactions affect emotions -Identifying sources of instrumental and emotional support	Supportive Imagery
7) Communication	-Define different styles of communication -Learn assertive communication	Therapeutic Touch Relaxation Meditation
8) Review of Coping and Relaxation Skills	-Review coping and relaxation skills learned	Imagining Being a Positive Role Model for Baby

Note. Table adapted from Urizar, Caliboso, Gearhart, Yim & Dunkel Schetter, 2019

Table 2.3

Tests of Fixed Effects for Linear Mixed Models for and State and Pregnancy-Specific Anxiety in Intent-to-treat and Completer Group Analyses

Variable	Model 1: ITT State Anxiety		Model 2: ITT Pregnancy-Specific Anxiety		Model 3: Completers State Anxiety		Model 4: Completers Pregnancy-Specific Anxiety	
	$F_{(df\ num,\ df\ denom.)}$	p value	$F_{(df\ num,\ df\ denom.)}$	p value	$F_{(df\ num,\ df\ denom.)}$	p value	$F_{(df\ num,\ df\ denom.)}$	p value
Intercept Predictors								
Intercept	694.68 (1, 361)	<.001	519.98 (1, 94.99)	<.001	397.76 (1, 93.10)	<.001	527.64 (1, 94.47)	<.001
Time	.72 (3, 361)	.539	1.69 (2, 184.66)	.189	1.86 (3, 270.73)	.137	1.59 (2, 182.32)	.205
Intervention Group	.32 (1, 361)	.569	..13 (1, 95.13)	.725	---	---	---	---
Completer Group	---	---	---	---	.39 (2, 92.56)	.681	.19 (2, 94.74)	.827
Language	.075 (1, 356)	.491	.05 (1, 110.59)	.871	.286 (1, 119.05)	.594	.05 (1, 108.87)	.923
Financial Hardship	2.98 (1, 361)	.085	.61 (1, 119.06)	.394	2.39 (1, 95.10)	.126	.55 (1, 117.34)	.415
Baseline Depression	154.79 (1, 361)	<.001	29.80 (1, 95.54 1)	<.001	89.92 (1, 92.42)	<.001	29.88 (1, 94.10)	<.001
Parity	---	---	15.99 (1, 94.27)	<.001	---	---	16.11 (1, 94.07)	<.001
Intervention Group x Time	.51 (3, 356)	.674	.76 (2, 184.50)	.471	---	---	.---	---
Completer Group x Time	---	---	---	---	2.35 (6, 270.52)	.032	.57 (4, 183.50)	.687
Information Criteria								
AIC	2220.81		1539.03		2176.58		1515.91	
BIC	2224.70		1546.26		2184.34		1523.09	
L1 Residual (σ2)	23.87		8.42		17.66		8.55	

Table 2.4

Estimated Means for State and Pregnancy-Specific Anxiety by Intervention Group

	Baseline		Post-treatment		3rd trimester follow-up		3 months postpartum	
Measure	M(SE)	95% CI [LL, UL]	M(SE)	95% CI ([LL, UL]	M(SE)	95% CI [LL, UL]	M(SE)	95% CI [LL, UL]
STPI-S								
CBSM	16.61 (.66)	[15.31, 17.91]	16.02 (.70)	[14.65, 17.38]	17.70 (.72)	[16.28, 19.12]	16.23 (.72)	[14.86, 17.67]
Control	16.90 (.73)	[15.46, 18.34]	17.23 (.74)	[15.76, 18.69]	17.12 (.74)	[15.66, 18.59]	16.50 (.77)	[14.99, 18.02]
PRA								
CBSM	16.68 (.57)	[15.55, 17.81]	17.43 (.60)	[16.26, 18.61]	17.93 (.61)	[16.73, 19.14]	---	---
Control	17.03 (.64)	[15.77, 18.30]	16.92 (.65)	[15.64, 18.20]	17.35 (.65)	[16.07, 18.63]	---	---

Note. STPI-S= State and Trait Personality Inventory-state, CBSM=Cognitive Behavioral Stress Management, PRA= Pregnancy Related Anxiety scale.

Table 2.5.

Estimated Means for State and Pregnancy-Specific Anxiety by Completion Group

Measure	Baseline		Post-treatment		3rd trimester follow-up		3 months postpartum	
	M(SE)	95% CI [LL, UL]	M (SE)	95% CI [LL, UL]	M (SE)	95% CI [LL, UL]	M (SE)	95% CI [LL, UL]
				STPI-S				
CBSM completers	18.01 (1.16)	[15.72, 20.30]	13.26 (1.23)	[10.84, 15.67]	17.13 (1.23)	[14.71, 19.55]	16.01 (1.23)	[13.59, 18.42]
CBSM non-completers	15.91 (.81)	[14.31, 17.51]	17.27 (.84)	[15.61, 18.93]	17.91 (.89)	[16.16, 19.66]	16.43 (.88)	[14.32, 17.51]
Control	16.89 (.73)	[15.44, 18.33]	17.19 (.74)	[15.72, 18.65]	17.08 (.74)	[15.62, 18.54]	16.50 (.77)	[14.99, 18.01]
				PRA				
CBSM completers	17.51 (1.01)	[15.53, 19.50]	17.65 (1.07)	[15.54, 19.76]	18.10 (1.07)	[15.99, 20.22]	---	---
CBSM non-completers	16.31 (.74)	[14.86, 17.77]	17.23 (.74)	[15.76, 18.70]	17.75 (.78)	[16.22, 19.28]	---	---
Control	17.03 (.66)	[15.73, 18.33]	16.93 (.66)	[15.62, 18.24]	17.36 (.66)	[16.05, 18.67]	---	---

Note. STPI-S= State and Trait Personality Inventory-state, CBSM=Cognitive Behavioral Stress Management, PRA= Pregnancy Related Anxiety scale.

Table 3.1.
Sample Characteristics (n=25)

Sociodemographic Variables	Mean (SD) or n (%)
Age	29.68 (5.27)
Relationship Status	
Married	11 (44)
Living with a Partner	6 (24%)
In a Relationship Living Alone	2 (8%)
Single	5 (20%)
Divorced	1 (4%)
Number of Prior Births	
0	12 (48%)
1	6 (24%)
2 or more	7 (28%)
Nativity	
U.S. Born	23 (88%)
Foreign Born*	3 (12%)
Employment Status	
Employed Full Time	12 (48%)
Employed Part Time	3 (12%)
Unemployed	7 (28%)
Homemaker	3 (12%)
Total Family Income before taxes	
Less than $20,000	4 (16%)
$20,000- $34,999	4 (16%)
$35,000- $49,000	3 (12%)
$50,000- $74,999	6 (24%)
$75,000- $99,999	4 (16%)
$100,000 or more	3 (12%)
Education	
High School Graduate/GED	4 (16%)
Some College	10 (40%)
Bachelor's Degree	9 (36%)
Graduate Degree	2 (8%)
Anxiety Measures	
Generalized Anxiety Symptoms (GAD-7)	16.4 (6.2)
Pregnancy Specific Anxiety Symptoms (PRA)	16.3 (3.9)
Prior use of mental health services	15 (60%)

Note. *Foreign born women had lived in the United States for 24-30 years, *M*=26.7 years.

Table 3.2.
Themes and Definitions for each TFA Subdomain

TFA Subdomain	Theme	Description
Affective Attitude	Hopefulness	Participant expresses that receiving exposure therapy would feel hopeful or relieving.
Affective Attitude	Fear	Participant notes that they would be fearful about using exposure therapy
Burden	Managing Family Reactions	Participant expresses that participating in exposure therapy would require a difficult or conflictual discussion, including psychoeducation with family members
Burden	Sensitivity of Pregnancy	Participant notes that pregnancy is a difficult developmental time period on its own, and that adding exposure therapy would further complicate a 'fragile' time
Burden	Time	Participant discusses a lack of time as a barrier to receiving exposure therapy
Ethicality	Aligned with Valuing Family	Participant notes that engaging with exposure therapy is in line with their values related to family.
Ethicality	Exposure is Stressful for Baby	Participant expresses that participating in exposure therapy would be difficult due to concerns about causing the baby stress.
Intervention Coherence	Understands Intervention	Participant notes that they understand the rationale for exposure therapy broadly, or in their specific case.
Intervention Coherence	Does not Understand Intervention	Participant describes confusion or a lack of understanding about the rationale for exposure therapy broadly, or in their specific case.
Opportunity Costs	Cultural Conceptions of the Maternal Role	Participant notes that being a Hispanic/Latina woman has expectations associated with it (e.g., self-sacrifice) that might make it hard for her to prioritize exposure therapy.
Opportunity Costs	Mental Health Care Stigma	Participant notes that participating in exposure therapy would expose them to community or familial stigma
Opportunity Costs	Getting Help from an Outsider	Participant notes that culturally, receiving help for emotional problems outside of the family would be difficult.

Perceived Effectiveness	Effective	Participant believes exposure therapy would effectively reduce their anxiety.
Perceived Effectiveness	Unsure	Participant notes being unsure about the effectiveness about exposure therapy.
Perceived Effectiveness	Ineffective	Participant believes exposure therapy would not effectively reduce their anxiety.
Self-Efficacy	Preference for Delivery During Pregnancy	Participant expresses that practicing exposure therapy during the pregnancy would be preferential to the postpartum.
Self-Efficacy	Social Support Increases Confidence	Participant expresses confidence in being able to participate in exposure therapy if they have social support
Self-Efficacy	Preference for Individual Therapy	Participant expresses a preference for individual therapy.
Self-Efficacy	Resistance to Confronting Pregnancy Specific Fears	Participant notes that they do not think they would be able to follow through with exposure exercises if they had to do with pregnancy or baby specific concerns, or if there were pregnancy complications.

Table A1.
Exploratory Factor Analysis Factor Loading Matrix

	Factors							
(Scale) Item	1	2	3	4	5	6	7	8
(STPI-S) calm	**0.661**	-0.07	0.018	-0.016	-0.265	-0.316	0.12	-0.182
(STPI-S) tense	**0.612**	-0.029	-0.264	-0.209	-0.196	-0.091	0.115	-0.143
(STPI-S) at ease	0.559	-0.201	0.287	-0.209	-0.055	-0.399	-0.113	-0.018
(STPI-S) worried over possible misfortunes	**0.68**	0.038	-0.277	-0.023	0.013	0.066	-0.182	-0.23
(STPI-S) nervous	**0.676**	0.185	-0.395	-0.264	-0.045	-0.072	-0.081	0.212
(STPI-S) jittery	0.514	0.01	-0.436	-0.136	-0.223	0.216	-0.175	0.088
(STPI-S) relaxed	0.572	-0.187	0.2	-0.046	-0.485	-0.156	0.123	0.051
(STPI-S) worried	**0.741**	0.092	-0.332	-0.152	-0.103	-0.052	-0.011	0.05
(STPI-S) steady	**0.613**	-0.099	0.364	0.037	0.001	-0.315	0.2	-0.002
(STPI-S) frightened	**0.688**	0.175	-0.257	-0.077	0.065	0.013	-0.347	0.139
(PAS-10) having a normal childbirth	0.35	0.169	-0.267	**0.722**	-0.127	-0.104	-0.087	0.039
(PAS-10) normal labor and delivery	0.27	0.205	-0.188	**0.802**	-0.125	-0.027	-0.093	0.108
(PAS-10) fear regarding the health of baby	0.441	0.387	0.145	-0.129	-0.099	0.47	0.097	-0.233
(PAS-10) worried baby could be abnormal	0.296	0.504	0.148	-0.056	0.024	0.448	0.406	0.127
(PAS-10) fear of harm during delivery	0.268	0.476	0.061	-0.081	-0.127	0.056	0.178	0.34
(PAS-10) worried about how baby is developing	0.514	0.342	0.475	0.052	0.242	0.053	-0.017	-0.237
(PAS-10) worried about losing baby	0.372	0.399	0.443	0.024	0.257	-0.172	-0.391	-0.059
(PAS-10) worried about hard/difficult labor and delivery	0.431	0.425	0.18	0.148	-0.08	0.03	0.319	0.115
(PAS-10) worried taking care of a new baby	0.264	-0.097	0.01	0.356	**0.662**	-0.048	0.054	0.252
(PAS-10) worried developing medical problems during pregnancy	0.368	0.423	0.259	-0.192	0.131	-0.225	-0.27	-0.116
(EPDS) laugh and see the funny side of things	0.294	-0.276	0.478	0.24	-0.474	0.275	-0.067	0.069
(EPDS) looked forward with enjoyment to things	0.339	-0.464	0.454	0.185	-0.271	0.177	-0.188	0.207
(EPDS) blamed yourself unnecessarily	0.404	-0.371	-0.207	-0.007	0.23	0.005	0.421	-0.024
(EPDS) anxious and worried for no good reason	**0.619**	-0.187	0.096	-0.105	0.202	-0.01	0.252	-0.029
(EPDS) scared or panicky for no very good reason	**0.743**	0.054	-0.138	0.034	-0.015	-0.162	0.059	-0.004
(EPDS) things have been getting on top of you	**0.603**	-0.147	-0.042	0.284	0.218	-0.171	0.215	-0.041

(EPDS) been so unhappy that you had difficulty sleeping	0.529	-0.195	0.016	0.039	0.089	0.394	-0.337	-0.038
(EPDS) sad or miserable	**0.661**	-0.423	-0.008	-0.04	0.242	0.231	0.025	-0.024
(EPDS) so unhappy that you have cried	**0.625**	-0.332	-0.011	0.055	0.221	0.347	-0.059	-0.277
(EPDS) thought of harming yourself	0.31	-0.185	0.166	-0.321	0.185	0.031	-0.113	**0.651**

Note: Extraction Method was Principal Axis Factoring. Bolded loadings were greater than .3 and exceeded other loadings by at least .2

Table A2.
Factor Loading for Anxious Misery Items

(Scale) Item	Factor Loading
(STPI-S) calm	.661
(STPI-S) tense	.612
(STPI-S) worried over possible misfortunes	.680
(STPI-S) nervous	.676
(STPI-S) worried	.741
(STPI-S) steady	.613
(STPI-S) frightened	.688
(EPDS) anxious and worried for no good reason	.619
(EPDS) scared or panicky for no very good reason	.743
(EPDS) things have been getting on top of you	.603
(EPDS) sad or miserable	.661
(EPDS) been so unhappy that you've been crying	.625

Note. The anxious misery factor was the only one retained following an exploratory factor analysis. Items were included if they had a factor loading of at least .3 and exceeded other loadings by at least .2.

Table A3.
Tests of Fixed Effects for Linear Mixed Models for and State Anxiety Considering Baseline State Anxiety Severity

Variable	$F_{(df\ num,\ df\ denom.)}$	p value
Intercept	516.19 (1, 353)	<.001
Time	4.75 (3, 353)	.003
Intervention Group	3.14 (1, 353)	.077
Language	.94 (1, 353)	.334
Financial Hardship	.874 (1, 353)	.351
Baseline Depression	74.80 (1, 353)	<.001
Elevated Baseline Anxiety	7.90 (1, 353)	.005<.001
Intervention Group x Time	.51 (3, 356)	.069
Intervention Group x Elevated Baseline Anxiety	7.90 (1, 353)	.005
Time x Elevated Baseline Anxiety	12.85 (3, 353)	<.001
Intervention Group x Time x Elevated Baseline Anxiety	2.61 (3, 353)	.051
Information Criteria		
AIC	2134.27	
BIC	2140.14	
L1 Residual (σ2)	20.56	

Figure 1.1
Prisma Flow Diagram of Study Inclusion

PRISMA 2009 Flow Diagram

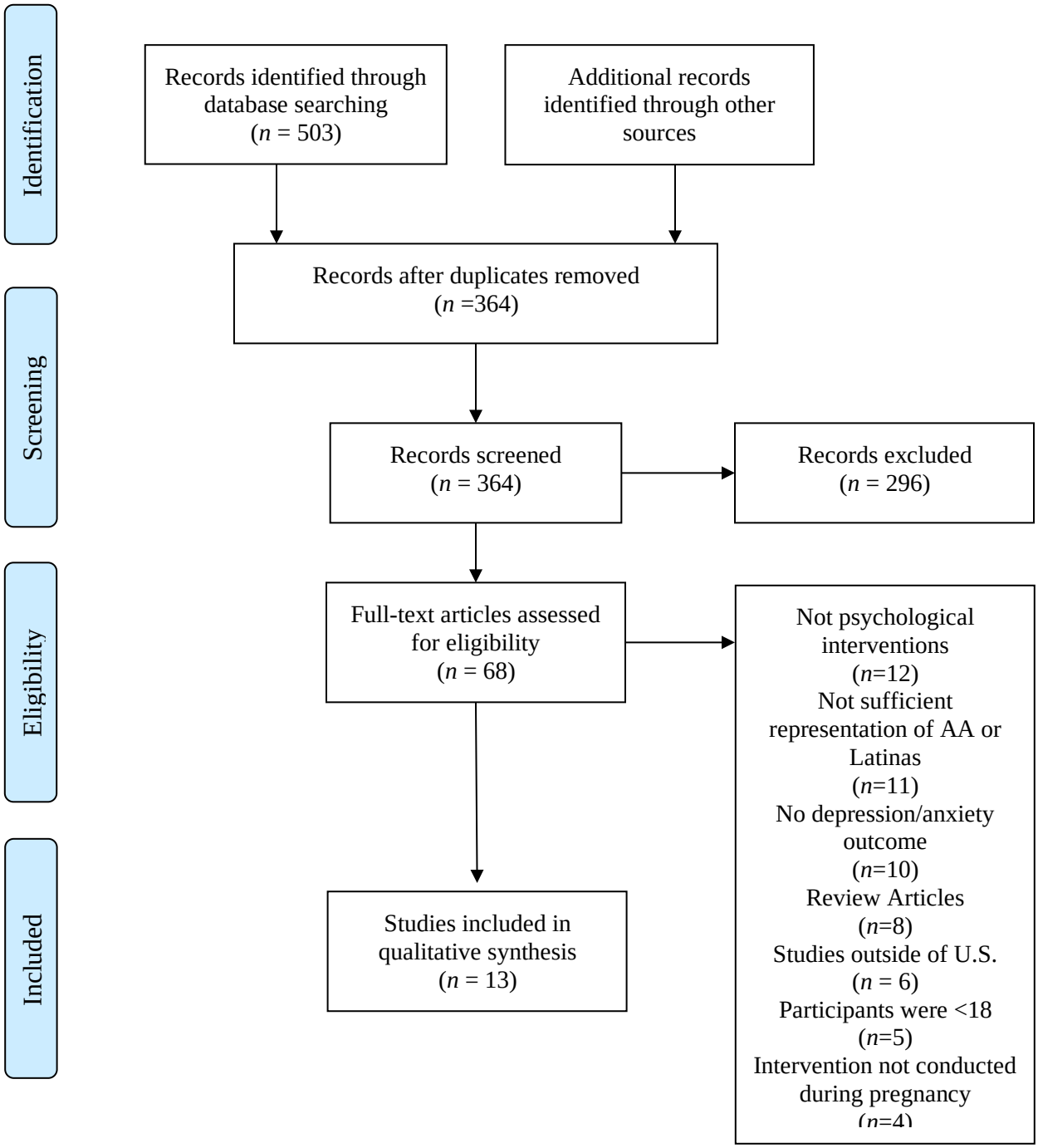


Figure 2.1.
CONSORT Flow Diagram

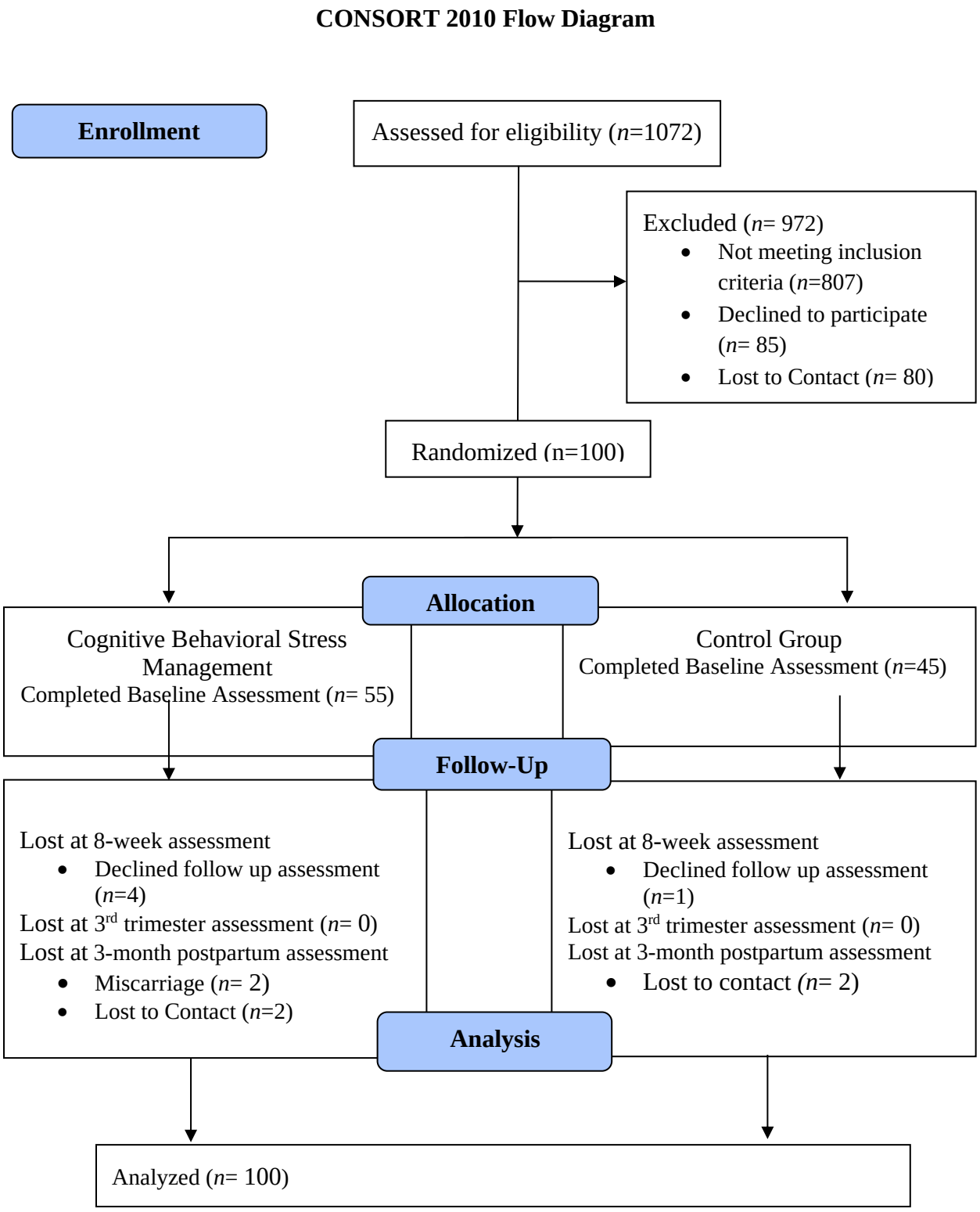
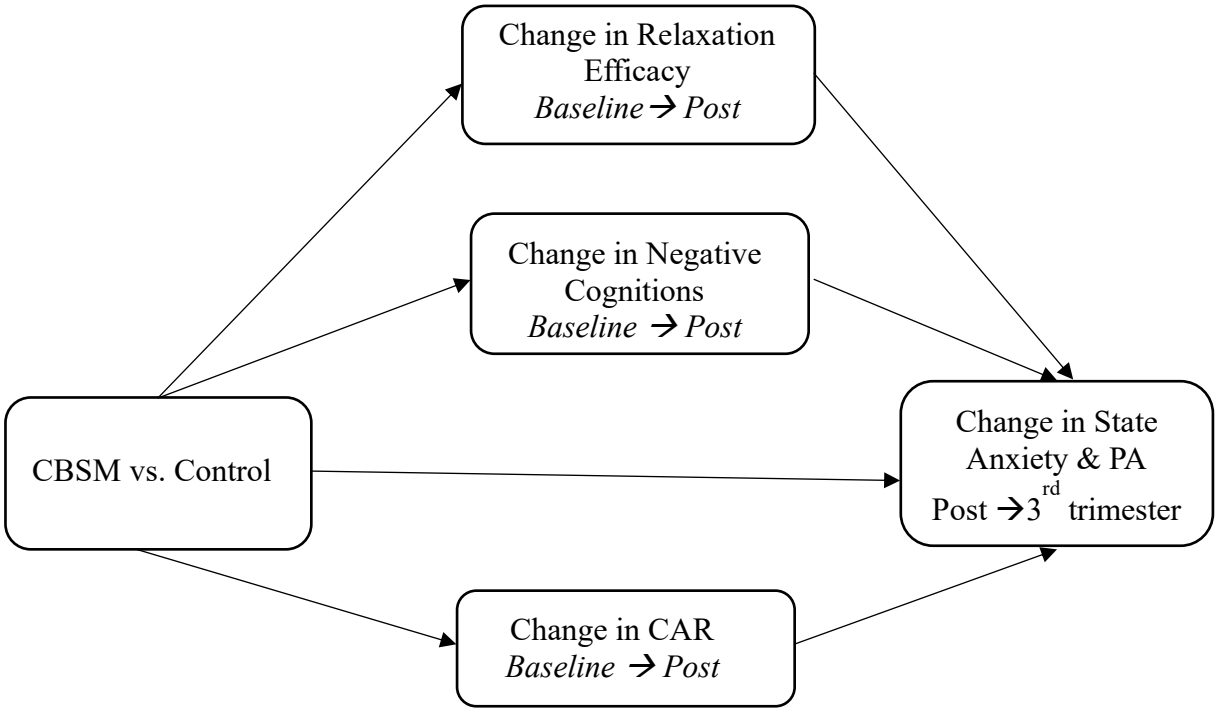
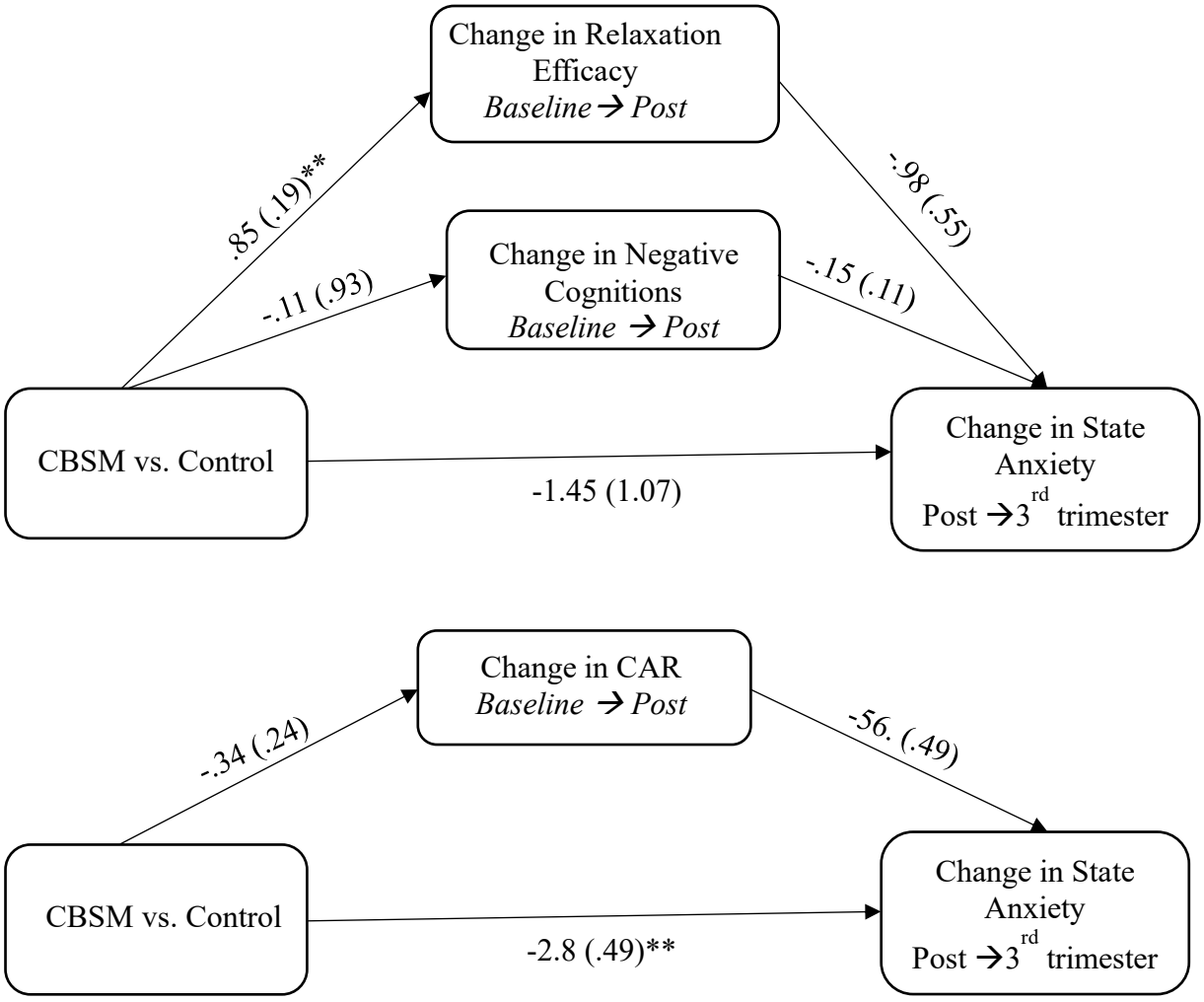


Figure 2.2.
Conceptual Diagram of Planned Mediation Models



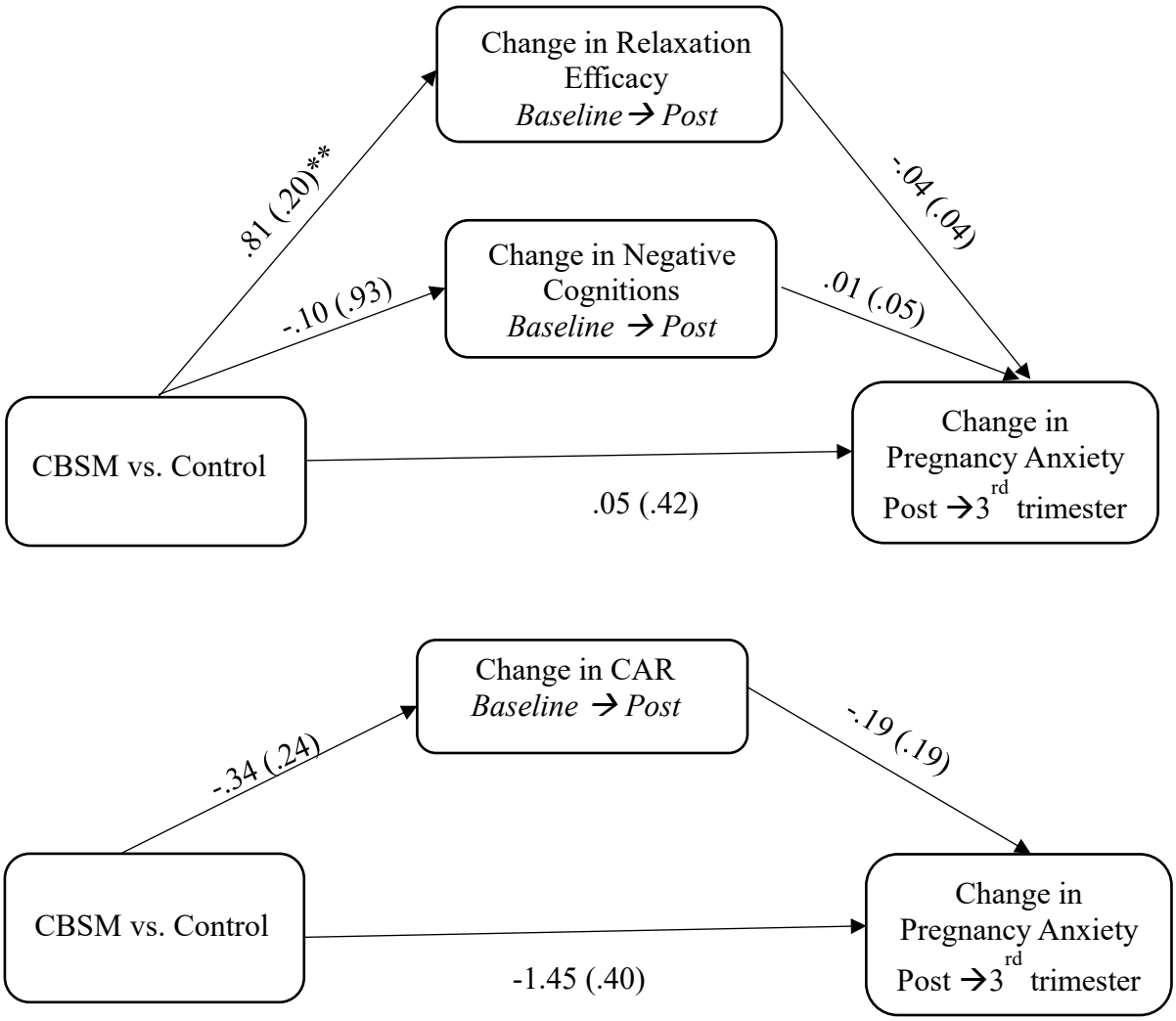
Note. Change in relaxation self-efficacy and change in negative cognitions were tested in the same model as parallel mediators, while change in CAR was tested as a single mediator in a separate regression model.

Figure 2.3
Statistical Models for Mediation Analyses with State Anxiety Outcome



Note. ** indicates p<.005

Figure 2.4.
Statistical Models for Mediation Analyses with Pregnancy Anxiety Outcome



Note. ** indicates p<.005

Figure A2

Plotted Marginal Means for Three-way Interaction Between Baseline State Anxiety Severity, Timepoint and Intervention Group

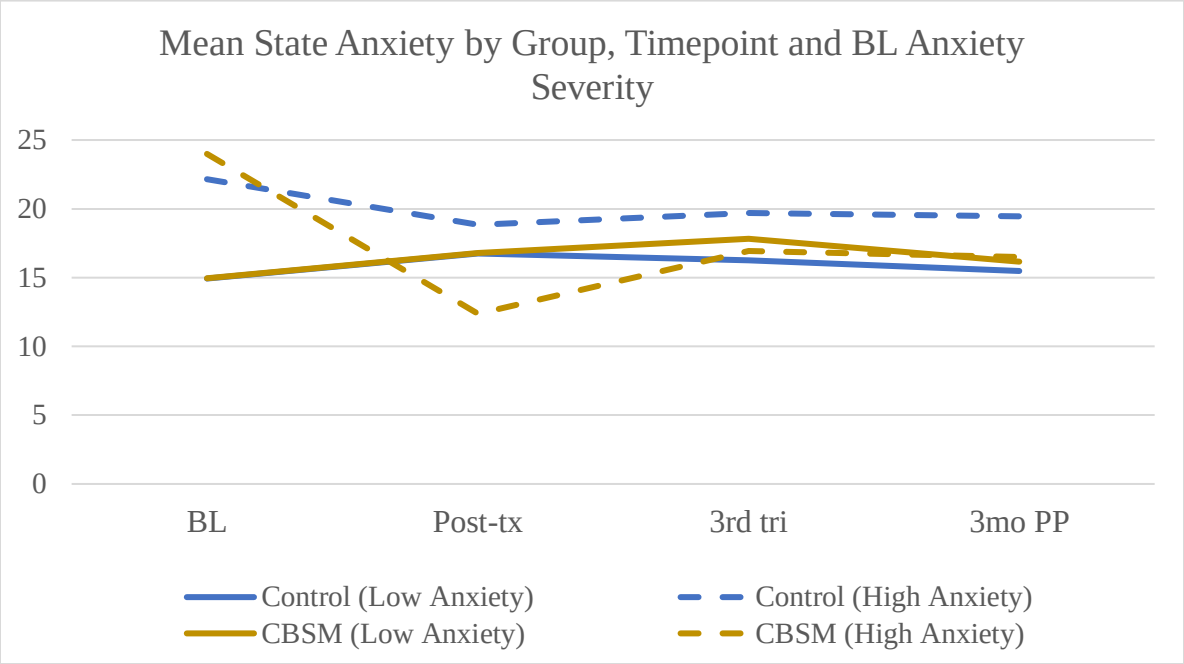
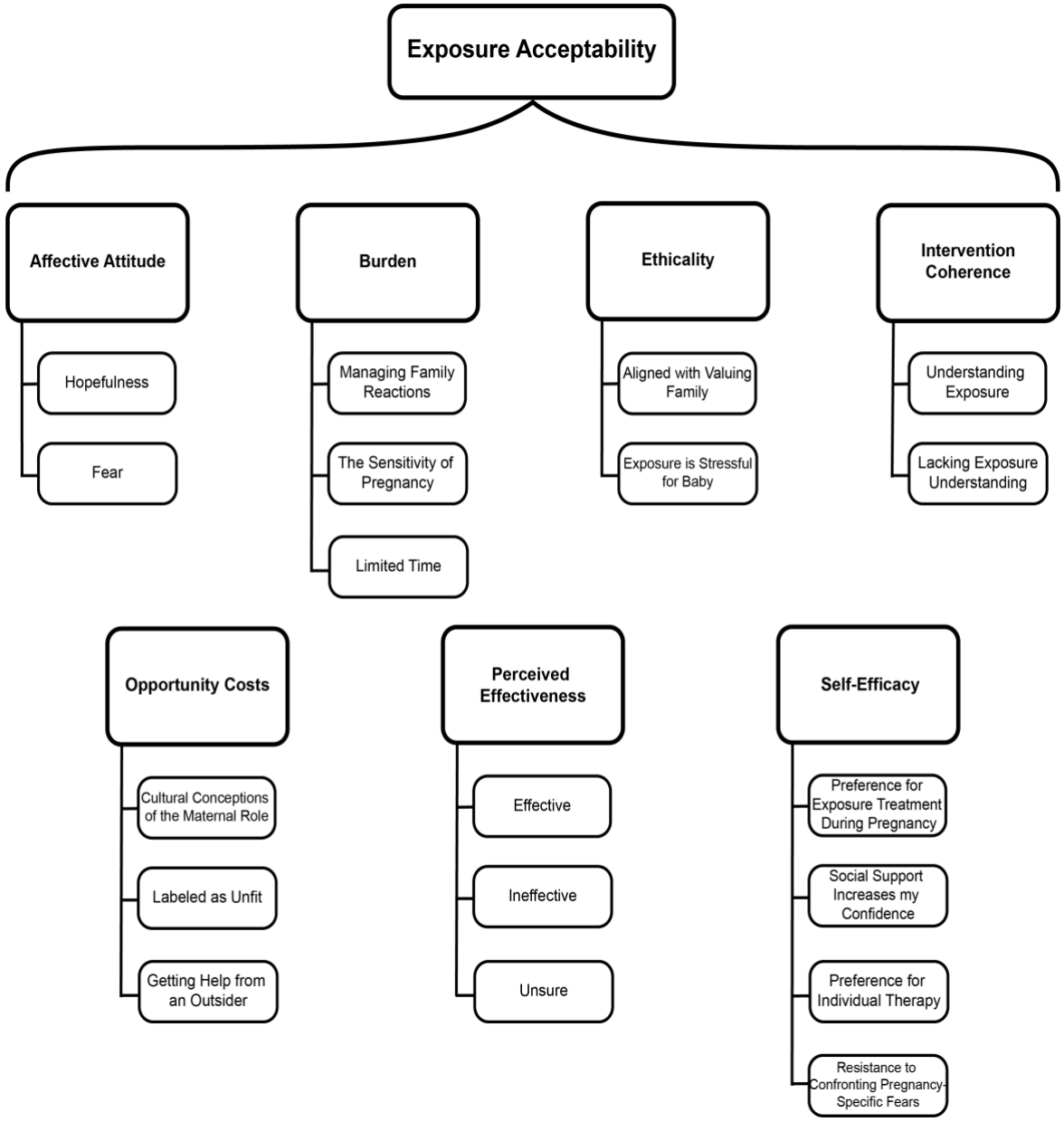


Figure 3.1.
Theoretical Framework of Intervention Acceptability for Exposure Therapy



Note. Deductive themes are organized by each conceptual domain of the Treatment Acceptability Framework (TFA; Sekhon et al., 2017).

Appendix

Study 2: Measures

STPI- State

Instructions: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel *right now*, that is, at *this* moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

		Not at all	Somewhat	Moderately So	Very Much So
1.	I feel calm	1	2	3	4
2.	I am tense	1	2	3	4
3.	I feel at ease	1	2	3	4
4.	I am presently worrying over possible misfortunes	1	2	3	4
5.	I feel frightened	1	2	3	4
6.	I feel nervous	1	2	3	4
7.	I am jittery	1	2	3	4
8.	I am relaxed	1	2	3	4
9.	I am worried	1	2	3	4
10.	I feel steady	1	2	3	4

Pregnancy Related Anxiety Scale

		Not at all	Somewhat	Moderately	Very Much
1.	I am confident of having a normal childbirth.	1	2	3	4
2.	I think my labor and delivery will go normally.	1	2	3	4
3.	I am fearful regarding the health of my baby.	1	2	3	4
4.	I am worried that the baby might not be normal.	1	2	3	4
5.	I am afraid that I will be harmed during delivery.	1	2	3	4
		Never	Sometimes	Most of the time	All of the time
6.	I am concerned or worried about how the baby is growing and developing inside me.	1	2	3	4
7.	I am concerned or worried about losing the baby.	1	2	3	4
8.	I am concerned or worried about having a hard or difficult labor and delivery.	1	2	3	4
9.	I am concerned or worried about taking care of a new baby.	1	2	3	4
10.	I am concerned or worried about developing medical problems during my pregnancy	1	2	3	4

Dysfunctional Attitudes Scale-Short Form

The sentences below describe people's attitudes. Circle the number which best describes how much each sentence describes your attitude. Your answer should describe the way you think most of the time.

		Totally Agree	Agree	Disagree	Totally Disagree
1.	If I don't set the highest standards for myself, I am likely to end up a second rate person.	1	2	3	4
2.	My value as a person depends greatly on what others think of me	1	2	3	4
3.	People will probably think less of me if I make a mistake.	1	2	3	4
4.	I am nothing if a person I love doesn't love me.	1	2	3	4
5.	If other people know what you're really like they'll think less of you.	1	2	3	4
6.	If I fail at my work, then I am a failure as a person.	1	2	3	4
7.	My happiness depends more on other people than it does me.	1	2	3	4
8.	I cannot be happy unless most people I know admire me	1	2	3	4
9.	It is best to give up on your own interests in order to please other people.	1	2	3	4

Measure of Current Status

	I cannot do this at all	I can do this just a little bit	I can do this a medium amount	I can do this pretty well	I can do this extremely well
1. I am able to use muscle relaxation techniques to reduce any tension I experience	0	1	2	3	4
2. I become aware of any tightness in my body as soon as it develops	0	1	2	3	4
3. I can clearly express my needs to other people who are important to me	0	1	2	3	4
4. I can easily stop and re-examine my thoughts to gain a new perspective	0	1	2	3	4
5. It's easy for me to decide how to cope with whatever problems arise	0	1	2	3	4
6. I can easily recognize situations that make me feel stressed or upset	0	1	2	3	4
7. When problems arise I know how to cope with them	0	1	2	3	4
8. I notice right away whenever my body is becoming tense	0	1	2	3	4
9. It's easy for me to go to people in my life for help or support when I need it	0	1	2	3	4
10. I am able to use mental imagery to reduce any tension I experience	0	1	2	3	4
11. I am confident about being able to choose the best coping responses for hard situations	0	1	2	3	4
12. I can come up with emotionally balanced thoughts even during negative times	0	1	2	3	4
13. I can ask people in my life for support or assistance whenever I need it	0	1	2	3	4

Note. Bolded Items are part of the Relaxation Subscale of the MOCS.

Carver, C. S. (2006). Measure of Current Status.
http://www.psy.miami.edu/faculty/ccarver/sclMOCS.html

Study 2: Post-hoc Severity Analyses

Severity Analyses

Once the three-way interaction for baseline anxiety severity, timepoint and intervention group were entered into the linear mixed model, a main effect of time emerged $F(3, 353)=4.75$, $p=.003$, revealing that mean state anxiety was highest across all women at baseline. There was no main effect of intervention group on state anxiety, indicating that there were no differences in average state anxiety between CBSM and control conditions. Further, the interaction between intervention group and time was not significant, indicating no between group (i.e., intervention vs. control) differences in mean state anxiety over time from baseline to third trimester follow-up. However, the two-way interactions between intervention group and baseline anxiety severity $F(3, 353)=7.90$, $p=.005$ and timepoint by baseline anxiety severity $F(3, 353)=12.85$, $p<.001$ were significant. Examination of the simple effects indicated that on average, women with high baseline anxiety reported overall greater symptoms when they were assigned to the control condition as opposed to CBSM ($\beta = .58$, $SE=.05$, p=<.001, 95% CI [.49-.67]). Further, at baseline (irrespective of randomization) women in the high anxiety group reported overall greater state anxiety than women in the low anxiety group ($\beta = .5.12$, $SE=2.11$, p=.016, 95% CI [.49-.67]).

The three way interaction between baseline severity, time and intervention group was also significant $F(1, 95.55)=29.80$, $p=.05$. Examination of the simple effects, and plotting the marginal means revealed that at post-treatment, women randomized to CBSM had lower mean state anxiety than those with low baseline anxiety severity and then women in the control condition. Regarding covariates, there was a significant main effect of baseline depression, $F(1, 95.55)=29.80$, $p<.001$ and baseline anxiety severity $F(1,95.08)=15.99$, $p<.001$. Examination of

the simple effects indicated that on average, women with high baseline anxiety (β =7.22, *SE*=1.56, p=<.001, 95% CI [4.15, 10.28]) endorsed greater depression symptoms at baseline (β =.46, *SE*=.05, p=<.001, 95% CI [.22, .47]) reported greater state anxiety. See Table A3 for the tests of fixed effects for linear mixed models for and state and pregnancy-specific anxiety. See Figure A3 for the plotted estimated marginal mean values of state anxiety from baseline to third trimester follow-up separated based on intervention group and baseline anxiety severity.

Study 3: Materials

Phone Screening:

REMOVE THIS PAGE BEFORE FINAL STORING OF DOCUMENTS

Participant ID: _____ Interviewer Initials: _____

Participant Name: _____

Cell Phone: (_____) _____Email: _____

State: _____ Zip: _____

OTHER CONTACT INFORMATION: _____

SCREENING RESULTS:

1 = Completed Eligible
2 = Refused → Explain below
3 = Ineligible → Explain:_____
4 = Unable to reach (phone works but could not contact)
5 = No phone, disconnected, wrong number

Reason for Refusal:

_____

_____

****

CONTACT LOG

Date (Day)	*Time*	*Results*	*Comments*

Hello, my name is **(interviewer's name)**. *I'm calling from the "Improving our Pregnancies" project at UCLA. May I speak with* **(woman's name)***?*

We're so glad to hear that you're interested in the "Improving our Pregnancies" project. What I'd like to do today is tell you a little bit about our project Do you have a time now to talk a little bit more about our project?

Great! First, may I ask how you heard about our project?

_____

And what is your understanding of our project so far? **[ALLOW RESPONDENT TO ANSWER, THEN FILL IN MISSING INFORMATION AS NECESSARY PER SCRIPT BELOW]**

> *The "Improving our Pregnancies" project is being conducted by the team at the CALMA. Our team studies the many ways in which culture impacts the way we manage mental health, and we are located in the psychology department at UCLA. The purpose of our project is to better understand the opinions of Latina/Hispanic and Black/African American women about the management of sadness, stress and anxiety during pregnancy. As you may know, even though Latina/Hispanic women make up a large proportion of the population in the United States, we know very little about how we can help these groups when they are having emotional difficulties during their pregnancy. We want to get more information about your opinions on various ways of managing stress, anxiety and sadness, with the intent of improving mental health programs for pregnant women.*

I'd like to ask you a few questions by phone that should take between 5 and 15 minutes. This information will help us determine if you are eligible to participate in our project. Then, if you're interested, I will tell you more about the project.

Before I ask any questions, I want to assure you that what you tell me is kept strictly confidential. You also have the right to refuse to answer any question that feels too personal, or to stop your participation at any moment without consequence.

1. *Are you currently pregnant?*
    a. ☐ Yes
        i. How many weeks along are you? _____
    ☐ No: *I'm sorry – our study is only looking for pregnant women. Thank you so much for your interest in our project. I appreciate you taking the time to speak with me. If you know of any other pregnant women who might be interested in our project please tell them to give us a call!* **[END]**

1. *¿Can you confirm that you identify as Latina/Hispanic?*
    a. ☐ Yes: **Latina/Hispanic**.
    ☐ No *I'm sorry – our study requires that women identify as Latina/Hispanic. Thank you so much for your interest in our project. I appreciate you taking the time to*

speak with me. If you know of any other pregnant women who might be interested in our project, please tell them to give us a call! **[END]**

Now I am going to ask you about the last two weeks. Over the last 2 weeks, how often have you been bothered by the following problems?

1. *Feeling nervous, anxious or on edge*
   - ☐ Not at all sure (0)
   - ☐ Several days (1)
   - ☐ Over half the days (2)
   - ☐ Nearly every day (3)

2. *Not being able to stop or control worrying*
   - ☐ Not at all sure (0)
   - ☐ Several days (1)
   - ☐ Over half the days (2)
   - ☐ Nearly every day (3)

3. *Worrying too much about different things*
   - ☐ Not at all sure (0)
   - ☐ Several days (1)
   - ☐ Over half the days (2)
   - ☐ Nearly every day (3)

4. *Trouble relaxing*
   - ☐ Not at all sure (0)
   - ☐ Several days (1)
   - ☐ Over half the days (2)
   - ☐ Nearly every day (3)

5. *Being so restless that it's hard to sit still.*
   - ☐ Not at all sure (0)
   - ☐ Several days (1)
   - ☐ Over half the days (2)
   - ☐ Nearly every day (3)

6. *Becoming easily annoyed or irritable.*
   - ☐ Not at all sure (0)
   - ☐ Several days (1)
   - ☐ Over half the days (2)
   - ☐ Nearly every day (3)

7. *Feeling afraid as if something awful might happen.*
   - ☐ Not at all sure (0)
   - ☐ Several days (1)
   - ☐ Over half the days (2)

☐ Nearly every day (3)

(Add participant's total score _____)

MEET ANXIETY CRITERIA (> 5)?

a. ☐ Yes, score > 5
b. ☐ No, score < 5

Finally, in these last questions will ask you about how you've been feeling about your pregnancy.

1. *I am confident of having a normal childbirth.*
   ☐ Not at all (4)
   ☐ Somewhat (3)
   ☐ Moderately (2)
   ☐ Very much (1)

2. *I think my labor and delivery will go normally.*
   ☐ Not at all (4)
   ☐ Somewhat (3)
   ☐ Moderately (2)
   ☐ Very much (1)

3. *I am fearful regarding the health of my baby*
   ☐ Not at all (1)
   ☐ Somewhat (2)
   ☐ Moderately (3)
   ☐ Very much (4)

4. *I am worried that my baby might not be normal.*
   ☐ Not at all (1)
   ☐ Somewhat (2)
   ☐ Moderately (3)
   ☐ Very much (4)

5. *I am afraid that I will be harmed during delivery.*
   ☐ Not at all (1)
   ☐ Somewhat (2)
   ☐ Moderately (3)
   ☐ Very much (4)

6. *I am concerned or worried about how the baby is growing and developing inside of me.*
   ☐ Not at all (1)
   ☐ Somewhat (2)
   ☐ Moderately (3)

☐ Very much (4)

7. *I am concerned or worried about losing the baby.*
   - ☐ Not at all (1)
   - ☐ Somewhat (2)
   - ☐ Moderately (3)
   - ☐ Very much (4)

8. *I am concerned or worried about having a hard or difficult labor and delivery*
   - ☐ Not at all (1)
   - ☐ Somewhat (2)
   - ☐ Moderately (3)
   - ☐ Very much (4)

9. *I am concerned (worried) about taking care of my new baby.*
   - ☐ Not at all (1)
   - ☐ Somewhat (2)
   - ☐ Moderately (3)
   - ☐ Very much (4)

10. *I am concerned (worried) about developing medical problems during my pregnancy.*
    - ☐ Not at all (1)
    - ☐ Somewhat (2)
    - ☐ Moderately (3)
    - ☐ Very much (4)

(Add participant's total score _____)

MEET PREGNANCY ANXIETY CRITERIA (> 17)?

a. ☐ Yes, score > 17
b. ☐ No, score < 17

DOES PARTICIPANT MEET ANY OF THE ABOVE CRITERIA (FOR ANXIETY OR PREGNANCY ANXIETY)?

a. ☐ No: *I'm sorry –but based on your responses it looks like you don't qualify to participate in our project. For the moment, we are looking for women who are experiencing specific levels of stress or anxiety. Thank you so much for your interest in our project and I appreciate you taking the time to speak with me. If you know of any pregnant women who might be interested in our project please tell them to give us a call! Finally, if you would like to be considered for another one of our team's projects, you can let me know now and I will save your information so that we can call you at a future time.* **[END]**

b. *Great! From the information you've provided so far, it looks like you are eligible to participate in our project. Now let me tell you a bit more about it and you can decide whether or not you want to participate.*

If you choose to participate in our project, you will participate in a one-and-a-half-hour long interview with our team remotely, via Zoom. During your visit, you will be asked some questions and will be asked your opinion about on a program that intents to improve the emotional health of pregnant women.

Just to let you know, part of your visit will be audio-recorded. The recordings will only be used by our research team make sure we have your complete responses and opinions. The recordings will be stored in a locked file cabinet and labeled with your project ID number. No name, birth date, or other identifiable information will appear in the recording.

At the end of your visit, you will receive $50.00.

Do you have any questions about the requirements of this project? **[Answer questions]**

2. *Are you still interested in participating?*

   1 = YES **[GO TO SCHEDULING SECTION]**
   2 = NO: *May I ask why you no longer want to participate?*
   _____
   _____
   _____
   _____

   [END CALL & RECORD REASON FOR REFUSAL ON COVER PAGE]

<u>Part 2: Scheduling Information</u>
Great! Now I'd like to ask you for some more information that will help us to arrange our first interview.

1. *Could you please spell your name?* _____
2. *What is your telephone number?* _____
3. *Some people find email contact to be more convenient. Would you like to give us an email address?* _____

What days and times would be most convenient for you to complete the interview? The interview can be done any day of the week including the weekends. **[Notate preference and send confirmation email].**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Before we finish **(today/tonight)**, *do you have any other questions about the project?* **[Answer questions]**

Please feel free to contact us at 310-825-7796 with any additional questions or concerns. Thank you for taking the time to talk with me **(today/tonight)**! We appreciate your help with our project and look forward to seeing you soon. **[END**

Exposure Description and Video Script

TEXT BEFORE VIDEO

Today we'll be telling you about a treatment for these problems that has been shown to help many people. We'll also show you how this treatment might be done with someone pregnant. So, let's start from the beginning…

Exposure therapy is a treatment that helps people deal with their worries or fears. When people are fearful of something, they tend to avoid it. Avoiding objects, activities or situations might help lower feelings of fear in the short term, over the long term it can make the fear become even worse. In these situations, exposure therapy can help to break the pattern of avoidance and fear.

Fear is designed to protect us and keep us safe and to motivates us. But, when we feel fear and anxiety in response things that are not actually dangerous (e.g., people, emotions, bodily sensations, memories) our bodies are setting off a false alarm. While it is completely natural to avoid things that make us uncomfortable, false alarms can make us avoid too much, and can get in way of living. In exposure therapy we work to knock out false alarms that keep us in a cycle of feeling worried and fearful.

In this form of therapy, therapists create a safe environment to help people figure out the reasons behind their fear and avoidance. You and your therapist will work to carefully plan a way of facing your fears, so that you are able to learn that what you are avoiding is not actually dangerous and that you can handle it. Treatment typically lasts for 8-16 weeks.

Research shows that exposure therapy can be useful for many types of problems, including Specific Fears—like fears of heights, small places, or specific animals--, Panic Attacks, Social Fears, Trauma, and Worries or fears about the future.

Let's take a look at how we might figure out if exposure could help reduce stress and worry with CARMEN, who is wondering if this therapy is a good fit for her….

Cut to a scene of THERAPIST and PATIENT sitting together in a warmly decorated office

THERAPIST: Okay, so CARMEN, we've been talking about how the exposure approach focuses on the parts of anxiety and worry that make us avoid things.

CARMEN: That makes sense. I'm just having a hard time thinking of the things that I avoid.

THERAPIST: Okay, let's think. When you came in last week you were telling me that this pregnancy has been a bit harder than your first. Do you remember some of the reasons why you felt that way?

CARMEN: Yeah. Well first, I've been worrying a lot about this baby's health since diabetes runs in my family. Plus, there was the car accident that happened right before I got pregnant that was really scary, so I try not to think about it. I guess there's also my new job—I get so nervous

when I need to talk to my boss or co-workers, and I feel like I'm just more worried about being judged now that I'm pregnant.

THERAPIST: So there's a lot going on right now. If we were to think about how this stress might be making you avoid things what comes to mind? For example, is there anything you are staying away from or that you're not doing because of fear of baby's health?

CARMEN: Yeah. I haven't been letting my boyfriend watch any scary movies with me because I'm nervous that I'll get all scared and freaked out and that will affect the baby. And... I avoid eating anything sugary to because I don't want to get gestational diabetes—sugar has to stay out of the house too.

THERAPIST: Okay and what about avoidance with the robbery?

CARMEN: I don't know I just try not to think about it keep busy. If I think about it, I break down, and feel scared and…yeah, I just don't think I'd be able to deal with being so upset.

THERAPIST: The memories sound really hard to deal with. It seems like in this case there isn't a situation you're avoiding—instead it's a memory of a scary and difficult event.

CARMEN: Yeah, I guess so.

THERAPIST: Okay, and let's look at your third example. What kinds of things have you avoided at work because of your feelings of nervousness about talking with co-workers?

CARMEN: Well I avoid small talk any chance I can. I get to work right on time so that I don't have to chit-chat before my shift, and I always offer to skip lunch to help with the registers, so that it's clear I'm busy and don't want others to talk with me.

Cut back to THERAPIST alone.

THERAPIST: So we can see that avoidance can take many forms. CARMEN was avoiding certain **situations**, like having lunch with co-workers, but she was also avoiding certain **things**, like having any sugar in the house. She also talked about avoiding **memories** of a really scary event. Let's see how we would figure out what CARMEN is really afraid of, and why she avoids these things. That will help us to figure out how exposure therapy will look for her.

Cut to a scene of THERAPIST and PATIENT in a telehealth visit.

THERAPIST: Okay, so we've been talking about your avoidance of several different things. For now, let's focus on one of them. What would you say is the thing you're currently avoiding that would be hard to do, but manageable? We're looking for something middle of the road.

CARMEN: I guess that would be talking to my co-workers. The hardest right now is anything having to do with the baby.

THERAPIST: Okay. We'll focus on your avoidance of talking to co-workers at work, since working with avoidance related to baby feels like too much right now. It sounds like you avoid being social at work in a couple of ways: by making sure you are never at work early, and by staying busy during lunch.

CARMEN: Yeah, that's right. And even the few times someone has tried to invite me somewhere with the rest of the group after our shift, I make up an excuse so that I can get right home.

THERAPIST: What do you think you're most afraid of? I mean, if you *had* to talk to your co-workers or hang out, what is your greatest worry?

CARMEN: That we'll start talking and I'll say something stupid and they'll realize how awkward I am. They'll see how nervous I am, and so will my customers, and they'll all probably just pretend not to notice because they feel bad for me.

THERAPIST: And if they judged you, if the people at work thought you were awkward… ?

CARMEN: I'll feel mad or embarrassed. They will avoid me, and they'll realize I don't fit in… that I'm not good enough.

THERAPIST: Okay, now we're really getting at what you're most worried about: That you'll be rejected.

CARMEN: Yeah, and if they reject me, why won't other people? I have an aunt who lives alone, and after her husband died, she never leaves her house. Honestly, there are a lot of times I wonder if that's what will happen to me. I don't want to end up without any friends.

THERAPIST: That's really important, CARMEN. It makes a lot of sense that you don't want to be around the people at work when you're feeling sure they'll reject you, and that it would mean you'll end up alone.

The good news is that by facing situations people avoid have avoided, they learn that what they are most worried about is unlikely, or that they can handle it better than they thought. You've done a good job to this point of trying to protect yourself by avoiding social situations because they felt overwhelming and scary. But now you have support and if you're able to deal directly with the things you avoid, you will start to feel more comfortable, and you can stop living with these intense worries.

CARMEN: I hope so, it feels weird needing support from a stranger to get past all my worries. And honestly, I can't imagine myself feeling comfortable hanging out with co-workers now, but it would be so nice not to be on edge at work.
Cut back to THERAPIST alone.

THERAPIST: Okay, so we saw that CARMEN's avoidance of talking to her co-workers was deeper than not wanting to make small talk. It was connected to a scarier belief, the expectation

that she'd be rejected, which would mean that she'd end up alone. Now that we know her greatest worry, let's see how exposure might be able work towards testing out if she will get rejected and be alone…

Cut to a scene of THERAPIST and PATIENT in a telehealth visit.

THERAPIST: We're focusing on your avoidance of talking to co-workers at your job. We've talked about getting to work early and keeping busy during your lunch break. The first thing I'd like you to do to deal directly with the social situations you've avoided. Your first assignment is to get to work 10 minutes early and have a short, 5-minute- conversation with your coworker.

CARMEN: That's one of those things I know I could probably do, but I'm really going to hate it. The lady who always tries to talk to me during our break also gets there early. I probably won't be able to stop thinking about how dumb I'm going to sound trying to talk with her.

THERAPIST: Well, it sounds like we've chosen a good first activity. Let's get a little more specific. What is your greatest worry in this situation?

CARMEN: That I'll be so anxious that my voice will start to shake, she'll see that I'm nervous and think I'm weird. Then she'll tell our co-workers and they'll stay away from me or even talk badly about me.

THERAPIST: How will you know if your co-worker thinks your weird?

CARMEN: I guess she might ask me what's wrong with me…she tends to say what's on her mind. She might also stay away from me the rest of the day, and not say bye to me like she normally does.

THERAPIST: Nice work. So, looks like you'll be testing whether you're able to have a conversation with your co-worker, for about 5 minutes before your shift starts. We'll know you weren't rejected if your coworker talks to you or stops by your work station at least once during the rest of the day.

I know doing this might be difficult and feel uncomfortable, but remember, the reason you are doing this is to see if what you expect actually happens. Even if the conversation doesn't feel good, we'll look to see if it's bad as you had imagined or if it can be handled. I'll be looking forward to hearing how things went when I see you next.

CARMEN: Okay. Sounds like a plan.

Cut back to THERAPIST alone.

THERAPIST: These 'exposure activities' are designed to help people learn that their worst fears are not likely to happen or can be handled. In CARMEN's case, she will learn that her co-worker probably won't ask her if there is something wrong with her and avoid her the rest of the day because of their morning conversation. But even if they do end up avoiding her, CARMEN

will see that she is more able to handle it than she thought. She'll probably finish her shift, go home to her boyfriend, and even though she may have felt uncomfortable, she'll be able to go on about her day. If CARMEN is able to do this exercise a couple of times, and slowly start to test out other things, like what happens if she has lunch with her co-workers instead of making herself busy, she will learn that she is unlikely to be rejected by those around her. This will reduce her anxiety.

Note: 7th grade reading level per Flesch-Kincaid Readability Test.

Adapted from: Email correspondence with M.G. Craske (10/27/19), APA Division 12 (https://www.div12.org/sites/default/files/WhatIsExposureTherapy.pdf); Smits, J. A., Powers, M. B., & Otto, M. W. (2019). *Personalized Exposure Therapy: A Person-Centered Transdiagnostic Approach*. Oxford University Press.

Improving Our Pregnancies: Interview Guide

Section 1: Treatment Acceptability

Before we get started, would you say you've felt worried, anxious, nervous or stressed at all throughout your pregnancy?

Have you avoided anything because of worries or anxiety?

Note. Use the term the participant uses for the rest of the interview. For example, if she says, yes I've felt stressed, all subsequent questions will center around her stress, NOT anxiety.

Before I ask more questions about your opinion about the therapy strategy you learned about, would you mind telling me what you remember about exposure based on what you just saw?

Note. Provide corrective feedback if description of skill is incorrect

1. **Intervention Coherence**:
    a. Is it clear to you how these exercises would reduce your feelings of worry?
        i. Are there parts of these exercises that seem like they might be confusing?

2. **Affective Attitude**:
    a. How would you feel about receiving this type of help in order to reduce your worry?

3. **Burden**:
    a. Do you think completing the exercises we showed you would be difficult for you?
        i. Why or why not?
        ii. Would it be more or less difficult to participate in this type of therapy while you're pregnant?
4. **Ethicality**:
    a. What are things that you find to be most important in your life? What is most valuable to you?
    b. Do you think learning and practicing exposure strategies makes sense given what you find to be important in life?

5. **Opportunity Costs:**
    a. Is there anything you would need to set aside, or give up in order to participate in these exercises? This can relate to a belief system, or to something concrete.
    b. What are your concerns about engaging in this practice?
    c. What do you think other people you know would be concerned about?
    d. Do you have any reservations based on your cultural identity?
    e. What do you think other people in your life would think of you participating in therapy during your pregnancy?

6. **Perceived Effectiveness**:

    a. Do you think that these exercises would be effective in reducing avoidance or feelings of worry for *you*?
        i. How likely do you think it is that engaging in this practice would improve these feelings?
7. **Self-Efficacy**:
    a. How confident are you that you would be able to complete these exercises as part of a short-term intervention (a few months)?
        i. How confident are you that you would be able to complete these exercises throughout your pregnancy?
        ii. What about after the birth of your baby?
        iii. Do you think there's any benefit to completing this type of intervention during pregnancy vs after?

8. Would you prefer to be taught and practice exposure strategies one-on-one, or in a group setting?
    a. Why?

<u>Section 2: Managing Stress/Anxiety</u>

1. After looking over the types of exercises that might be available for you to reduce feelings of sadness and worry, do you think there are things we're missing?
    a. What kinds of things might we consider addressing that would be of help to you?
    b. What have you been doing to this point to reduce worry/anxiety?
    c. Do your strategies to manage anxiety/worry look different during pregnancy than during other times in your life?
    d. Do you think it's easier or harder to deal with your worries/stress when you're pregnant? Why?

Study 3: Measures

DEMOGRAPHIC SURVEY

Please respond to the following questions about yourself.

1. **What is your gender?**
_____ Male _____ Female _____Non-binary _____Other

2. **What is your age?**
_____ years old

3. **Do you identify as Hispanic/Latina?**
_____ No, not Hispanic or Latina
_____ Yes, Mexican, Mexican American, Chicana
_____ Yes, Puerto Rican
_____ Yes, Cuban
_____ Yes, Salvadoran
_____ Yes, Honduran
_____ Yes, Guatemalan
_____ Yes, Chilean
_____ Yes, Argentinian
_____ Yes, Peruvian
_____ Yes, Other _____

4. **What racial group(s) best describe you** (check all that apply)?

____ No, I do not identify as any other race
____ White or Caucasian
____ Black, African-American, or Afro-Latina/o
____ Mestizo/a (i.e. European and indigenous mixed)
____ Asian
____ Native Hawaiian or Pacific Islander
____ Native American
____ Middle Eastern or Northern African
____ Other: _____

5. **Where were you born (city, state, province, country)?**
_____

4a. If you were not born in the United States, how long have you lived in the United States (in years)? _____

6. **What languages do you speak?**

__ English
__ Spanish
__ Other _____

5a. If you speak more than one language, which do you feel most fluent in?
_____

7. Currently, what is your employment status? (check all that apply)
___ Employed full time
___ Employed part time
___ Unemployed
___ Student
___ Homemaker
___ Receiving government assistance
___ Other: _____

8. Including yourself, how many people currently live in your house?
_____ people

9. What is the combined annual income of everyone in your current household?
$_____

10. What is the farthest educational milestone you met?
____ Elementary school
____ Middle school
____ Partial High School
____ High School Graduate / High School Equivalency
____ Partial College
____ Associates or other 2-year college degree
____ Bachelor's or other 4-year college degree
____ Master's degree
____ Doctoral degree

11. What is your current marital status?
___ Single, not living with a partner
___ Single, living with a partner
___ Separated, living with a partner
___ Separated, not living with a partner
___ Married
___ Divorced
___ Widowed
___ Other: _____

12. Besides the baby you're currently carrying in this pregnancy, how many other children do you have?
__ None

__ One
__ Two
__ Three
__ Four or more

13. Are you currently receiving mental health care?
__ Yes
__ No

14. Have you received mental health care in the past?
__ Yes
__ No

12a. If you have received mental health care, when did you receive this care?

12b. If you have received mental health care, what kind of care (i.e., medication, therapy)

12c. Were you satisfied with the care you received
__Yes
__No

Please briefly explain the reason that you were or weren't satisfied.
_____
_____
_____
_____

Edinburgh Postnatal Depression Scale

As you are pregnant or have recently had a baby, we would like to know how you are feeling. Please check the answer that comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today

1. *I have been able to laugh and see the funny side of things*
   - ☐ As much as I always could
   - ☐ Several days
   - ☐ Over half the days
   - ☐ Nearly every day

2. *I have looked forward with enjoyment to things*
   - ☐ As much as I ever did
   - ☐ Rather less than I used to
   - ☐ Definitely less than I used to
   - ☐ Hardly at all

3. *I have blamed myself unnecessarily when things went wrong*
   - ☐ Yes, most of the time
   - ☐ Yes, some of the time
   - ☐ Not very often
   - ☐ No, never

4. *I have been anxious or worried for no good reason*
   - ☐ No, not at all
   - ☐ Hardly Ever
   - ☐ Yes, sometimes
   - ☐ Yes, very often

5. *I have felt scared or panicky for no very good reason*
   - ☐ Yes, quite a lot
   - ☐ Yes, sometimes
   - ☐ No, not much
   - ☐ No, not at all

6. *Things have been getting on top of me*
   - ☐ Yes, most of the time I haven't been able to cope
   - ☐ Yes, sometimes I haven't been coping as well as usual
   - ☐ No, most of the time I have coped quite well
   - ☐ No, I have been coping as well as ever

7. *I have been so unhappy that I have had difficulty sleeping:*
   - ☐ Yes, most of the time
   - ☐ Yes, sometimes
   - ☐ Not very often
   - ☐ No, not at all

8. *I have felt sad or miserable*
   - ☐ Yes, most of the time
   - ☐ Yes, quite often
   - ☐ Not very often
   - ☐ No, not at all

9. *I have been so unhappy that I have been crying*
   - ☐ Yes, most of the time
   - ☐ Yes, quite often
   - ☐ Only occasionally
   - ☐ No, never

10. *The thought of harming myself has occurred to me*
    - ☐ Yes, quite often
    - ☐ Sometimes
    - ☐ Hardly ever
    - ☐ Never

Generalized Anxiety Disorder-7 (GAD-7) Scale

Over the last 2 weeks, how often have you been bothered by the following problems?

		Not at all sure	Several Days	Over half the days	Nearly every day
1.	Feeling nervous, anxious or on edge	0	2	3	4
2.	Not being able to stop or control worrying	1	2	3	4
3.	Worrying too much about different things	1	2	3	4
4.	Trouble relaxing	1	2	3	4
5.	Being so restless it's hard to sit still	1	2	3	4
6.	Becoming easily annoyed or irritable	1	2	3	4
7.	Feeling afraid as if something awful might happen	1	2	3	4

Short Acculturation Scale for Hispanics (SASH)

	Only English	English better than Spanish	Both Equally	Spanish better than English	Only Spanish
1. In general, what languages do you read and speak?					
2. What languages do you usually speak at home?					
3. In what language do you usually think?					
4. What language do you usually speak with friends?					

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