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The Experience and Consequences of Weight Stigma During Pregnancy and Postpartum

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The Experience and Consequences of Weight Stigma During Pregnancy and Postpartum

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

by

Angela Corinne Rodriguez

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ABSTRACT OF THE DISSERTATION

The Experience and Consequences of Weight Stigma

During Pregnancy and Postpartum

by

Angela Corinne Rodriguez

Doctor of Philosophy in Psychology

University of California, Los Angeles, 2018

Professor Ayako Janet Tomiyama, Co-Chair

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A mounting scientific literature demonstrates that weight stigma is a threat to physical and mental health. However, very little research has examined weight stigma in the context of pregnancy. This is surprising considering that weight gain is necessary for practically all healthy pregnancies. Moreover, a large percentage of women begin pregnancy already with a Body mass Index (BMI) in the overweight or obese range. This lack of attention is also concerning because weight stigma's known adverse effects on mental, physical, and behavioral health could be particularly detrimental to maternal health, both immediately and over time. Across two studies, this work aimed: (a) to document and describe the phenomenon of weight stigma during pregnancy and postpartum and (b) to investigate possible correlates and consequences of experiencing weight stigma during pregnancy and postpartum for mental, physical, and behavioral health.

Results of the first study indicated that the majority of pregnant and postpartum women in the sample experienced weight stigma in some form, even those who began their pregnancies with a "normal weight" BMI. They experienced weight stigma from multiple sources, including immediate family, healthcare providers, and strangers, as well as from messages in the media and overarching sentiments or expectations from society in general. Additionally, experiences of weight stigma were cross-sectionally associated with negative consequences such as depression, maladaptive dieting behavior, emotional eating behavior, perceived stress, and postpartum weight retention. Results of the second study revealed that weight-related everyday discrimination was associated with more total gestational weight gain and medically defined excess gestational weight gain, in particular. Weight-related everyday discrimination was also associated with postpartum depressive symptomatology at one month postpartum, and prospectively predicted postpartum depressive symptomatology and postpartum weight retention at one year postpartum. Weight-related everyday discrimination was not, however, associated with physiological stress measures.

These findings together provide proof-of-concept that pregnant and postpartum women do, in fact, experience weight stigma and that this stigma comes from multiple sources. Further, these weight stigmatizing experiences are implicated in unfavorable mental, physical, and behavioral health consequences for pregnant and postpartum women. Therefore, this work sets the foundation for future research to continue investigating weight stigma's connection to maternal health and to identify how to provide the best treatment possible for pregnant women.

The dissertation of Angela Corinne Rodriguez is approved.

Molly Mauer Fox

Jessica D Gipson

Darby Saxbe

Ayako Janet Tomiyama, Committee Co-Chair

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2018

This dissertation is dedicated to my husband Anthony (the first Dr. Rodriguez in the family), our daughter Petrizia (the future Dr. Rodriguez, should she so choose), and my beloved late grandfather Robert R. Incollingo.

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VITA

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Topic Introduction and Literature Review

Weight stigma is defined as bias or discriminatory behaviors directed toward individuals perceived to be overweight or obese or to carry too much body weight (Puhl & Brownell, 2003; Puhl & Heuer, 2009). This form of stigma has become pervasive, especially in the United States, as a burgeoning literature now documents that weight stigma is present in multiple contexts. Moreover, a host of negative consequences accompany being a target of weight stigma. However, very little research has investigated weight stigma in the context of pregnancy and postpartum. This lack of evidence is problematic considering that virtually all women must gain weight over gestation. Therefore, as weight gain is inherent to pregnancy, perhaps weight stigma is common as well. Accordingly, during pregnancy and postpartum, experiencing weight stigma may have adverse consequences for the mother and perhaps for her child as well. Considering this lack of knowledge, the dual purpose of the two studies reported here was to identify when, how, for whom, from whom, and how often weight stigma occurs during pregnancy and postpartum and to investigate negative maternal health consequences that may be related to experiencing weight stigma during this important time.

To set the stage for the studies included in this dissertation, the existing literature on weight stigma outside the context of pregnancy is reviewed first. This review includes unique aspects of weight stigma; the overall prevalence of weight stigma, particularly in the United States; specific domains in which weight stigma manifests; adverse behavioral, physical, and mental health consequences for the targets of weight stigma; and how weight stigma is addressed at the policy level. This review is followed by a discussion of reasons why weight may be stigmatized in pregnancy and postpartum and the primary reasons why studying weight stigma during pregnancy and postpartum should be a top priority as a new direction for research in the

fields of weight stigma, pregnancy, and maternal-child health. Finally, the current – but very limited – evidence describing the occurrence of weight stigma in the context of pregnancy and postpartum is reviewed.

Uniqueness of Weight Stigma Compared to Other Forms of Stigma

Weight stigma is unique from other forms of stigma in several regards. First while many stigmatized individuals belong to minority groups, overweight and obesity actually represent a two-thirds majority in the United States (Ogden, Carroll, Kit, & Flegal, 2014). Second, as will be reviewed below (see "Consequences of Experiencing Weight Stigma in Non-Pregnancy Contexts), weight stigma can affect individuals of all weights, provided that they perceive themselves as heavy or carrying excess body weight. Third, while many stigmatized groups receive in-group protection from discrimination, this is not the case for heavy individuals. In fact, research has shown that individuals of higher BMIs do not demonstrate lower weight bias (Latner, O'Brien, Durso, Brinkman, & MacDonald, 2008). Additionally, heavy individuals demonstrate an automatic preference for thin individuals, thus devaluing their own group (Rudman, Feinberg, & Fairchild, 2002). Fourth, among other stigmatized groups, it is often the case that members of these groups cannot control their stigmatized identity (e.g., racial and ethnic minorities, women etc.). Weight, though, is viewed as controllable, and individuals with overweight and obesity are therefore blamed for their weight status (Puhl & Heuer, 2010). Fifth, and finally, as will be discussed later (see "Consequences of Experiencing Weight Stigma in Non-Pregnancy Contexts"), experiencing weight stigma may have downstream consequences for weight gain, which puts its victims at risk for more weight stigmatization. This makes weight stigma itself obesogenic.

Prevalence of Weight Stigma in Non-Pregnancy Contexts

Weight stigma is a highly prevalent form of social stigma. In fact, recent daily diary research suggests that both men and women, even those with normal weight BMIs, report experiencing weight stigma almost daily (Vartanian, Pinkus, & Smyth, 2016). Other similar research has demonstrated that women with overweight and obesity, in particular, report on average three weight stigmatizing experiences each day (Seacat, Dougal, & Roy, 2016). Moreover, there is empirical evidence indicating that weight stigma may be increasing in the United States. For example, longitudinal research comparing rates of reported weight-based discrimination in the mid-1990s to the mid-2000s found that the prevalence increased 66%, from 7% to 12% (Andreyeva, Puhl, & Brownell, 2008). Additionally, other research findings suggest that rates of experiences with weight-based discrimination are comparable to race-based discrimination (Puhl, Andreyeva, & Brownell, 2008). This study also found that weight-based discrimination is the third most commonly reported type of discrimination among women, making it even more prevalent than race-based discrimination. Weight stigma is also significantly stronger than stigma directed at sexual minority individuals and religious minorities (Latner et al., 2008), as measured by relative strength of bias. Similar research has reported that perceivers rate individuals with overweight and obesity more negatively than individuals representing other stigmatized groups, which includes, for example, sexual minorities and individuals suffering from mental illnesses (Vartanian & Smyth, 2013).

Prevalence in specific contexts. The following is a review of empirical evidence demonstrating that weight stigma is pervasive across social contexts. Further, weight stigma manifests in bias and discrimination in various societal domains including media, healthcare, education, and employment.

Media. Weight stigma can be found in all forms of media, including entertainment, news, and marketing. For example, news reports have placed blame on individuals with overweight and obesity for causing weight gain among peers and even for issues such as high fuel prices and the progression of global warming (Puhl & Heuer, 2009). Additionally, individuals with overweight and obesity typically occupy lesser roles in scripted television programs and are often the targets of teasing and derogation from other characters. Heavy characters are also frequently portrayed displaying stereotypical eating behaviors of heavy people, thus perpetuating these negative stereotypes in the United States (Puhl & Heuer, 2009).

There are also various media campaigns that draw attention specifically to the issue of obesity, and many of these use weight stigmatizing messages and stimuli. For example, one study conducted a content analysis of images from over 500 articles related to obesity published on five major news websites over a two-week period in 2009. The results revealed that among images depicting a heavy individual, 72% of them were negative or stigmatizing (Heuer, McClure, & Puhl, 2011). Sometimes, weight stigmatizing messages are incorporated into media as an obesity-reduction or prevention strategy. However, weight stigmatizing media has been found to in fact undermine motivations for healthy eating and exercise behaviors among individuals with overweight and obesity (Puhl & Suh, 2015a), and rates of overweight and obesity in the United States remain high (Ogden et al., 2014). Additionally, public health scholars have criticized anti-childhood obesity campaigns for potentially reinforcing societal prejudice (Washington, 2011). This notion has been borne out in experimental research, for example, in a study that randomly assigned participants to read a news story accompanied by either a negative or positive image of a heavy individual. This study found that those viewing the

negative image subsequently reported significantly more negative attitudes toward individuals with obesity than those viewing the positive image (McClure, Puhl, & Heuer, 2011).

Healthcare. Considering that obesity is now popularly framed as an "epidemic," the realm of healthcare is understandably concerned with the issue of obesity. However, healthcare is also a setting in which weight stigma is particularly common. Healthcare professionals, in fact, tend to harbor strong anti-fat bias, with doctors, nurses, fitness professionals, and dieticians all consistently endorsing negative stereotypes about their clients and patients with overweight and obesity. In particular, healthcare providers typically blame their patients for their weight status (Puhl & Heuer, 2009). Previous research on which I collaborated found that obesity researchers and healthcare professionals specializing in obesity all demonstrated implicit and explicit pro-thin, anti-fat bias (Tomiyama et al., 2015). Moreover, these professionals, assessed in 2013, actually reported higher levels of explicit bias than a similar sample of professionals assessed over a decade earlier. Along with this, weight stigma may continue to be a prevalent issue among future cohorts of healthcare professionals. For instance, a study assessing implicit and explicit anti-fat bias among medical students in the United States found that 74% of them harbored implicit weight bias and 67% reported explicit weight bias (Phelan et al., 2014). Furthermore, this study reported that these future healthcare providers held stronger negative attitudes toward individuals with overweight and obesity than toward racial minorities, sexual minorities, and individuals of low socioeconomic status (SES).

This high prevalence of weight stigma in the healthcare domain is particularly troublesome as it may be detrimental for treatment and subsequent health outcomes. Namely, experiencing weight stigma from a healthcare provider impairs patient-provider communication and relationships, which results in poorer medical care and treatment. For instance, a recent

study in a racially diverse and low-SES sample of women with obesity found that more experiences with weight stigma in the healthcare context, but not objective BMI, was associated with a doubled odds of patients negatively perceiving the quality of their care and their physician's empathy (Ferrante et al., 2016). Such negative experiences in the healthcare system can promote more "doctor shopping" (i.e., frequently changing primary care providers), which often undermines continuity of healthcare. For example, one study examining over 20,000 patients found that patients with overweight and obese BMIs had much higher odds of engaging in doctor shopping (23% and 52%, respectively), compared to patients with normal weight BMIs (Gudzune et al., 2013).

Outcomes such as these, in turn, can prevent these patients from seeking and receiving necessary medical advice and care (Puhl & Heuer, 2009), which has been demonstrated in particular in the realm of women's health. One study of 291 women revealed that heavier women were more reluctant to get pelvic cancer screens (Adams, Smith, Wilbur, & Grady, 1993). In addition to patients, this study also assessed 1316 physicians, the majority of whom indicated that they were reluctant to do such pelvic screens on patients with obesity. A similar study of nearly 500 White and Black women found that heavier women reported delaying important pelvic cancer screening and mammograms because their providers disrespected them, embarrassed them, and generally had negative attitudes toward them (Amy, Aalborg, Lyons, & Keranen, 2006). This study also surveyed 129 healthcare providers, who reported that they had not received specific education regarding treating heavier women.

Education. Weight stigma is present at all levels of education and may underlie observed weight-based educational disparities. In fact, a comprehensive review concluded that students with overweight and obesity struggle to achieve educational success throughout the course of

schooling (Puhl & Heuer, 2009). This review also revealed that Physical Education instructors, in particular, hold strong antifat attitudes and prejudice toward their students with overweight and obese BMIs. Moreover, in schools where students with overweight and obesity are underrepresented, there is a pronounced disparity in educational achievement between these students and their thinner counterparts. For example, students with overweight and obesity are less likely to attend college, particularly if they are female. This notion is borne out over decades of empirical research examining weight disparities in higher education. For example, in the 1990s, one study found that heavier college females, compared to thinner college females, were less likely to be receiving financial support for their education from their parents (Crandall, 1995). This study also found that compared to the general population, students with thin BMIs were overrepresented and students with overweight BMIs were underrepresented on the college campus. My recent work updated and replicated these results in two ethnically diverse samples, finding that in 2015, females who rely on wages from a job or financial aid to fund their college education are heavier than those who receive funding from their parents (Incollingo Rodriguez et al., in press). In one sample, this was also the case for males. This funding disparity is meaningful as it could translate into less time to study or pursue internships and could carry with it a long-term burden of debt in repaying student loans. Additionally, college students in these samples were found to be much thinner than their same age-group in the general population, regardless of gender or ethnic identity. One explanation of this could be that heavier individuals struggle to get to college in the first place. Weight-based disparities in higher education may also extend into graduate studies. One study found that having a higher BMI predicted fewer admissions offers to graduate programs in psychology after students had already participated in an interview, during which they were probably seen in person for the first time (Burmeister,

Kiefner, Carels, & Musher-Eizenman, 2013). Again, women may be most vulnerable to these weight-based graduate education disparities, as this reported relationship was strongest among female applicants.

Employment. Employment is another domain where weight stigma is common, as, according to one review, individuals with overweight and obesity report more difficulty obtaining jobs, worse job placement, lower wages and compensation, and harsher discipline than their thinner colleagues. Additionally, they report unjustified denial of promotions, and they are frequently victims of both coworkers and supervisors making derogatory jokes and remarks about them. Finally, many employees with overweight or obesity report unfair job termination and indicate that their weight was the most influential factor underlying their termination (Puhl & Heuer, 2009). Another review of weight stigma in employment found that employers and managers have a tendency to harbor negative stereotypes about their employees with overweight and obesity (Giel, Thiel, Teufel, Mayer, & Zipfel, 2010). These include beliefs that their job performance is poorer than that of thin employees and that they are lacking in terms of their interpersonal skills, self-motivation, and self-control. These trends are also reflected in empirical research examining weight bias in hiring decisions. For example, in one experimental study, participants reviewed and evaluated ostensibly real job applications for various open positions. The findings revealed that heavier applicants were rated as significantly less employable than thinner applicants regardless of the type of job for which the applicant was supposedly applying (Grant & Mizzi, 2014).

In sum, the above reviewed body of evidence demonstrates that weight stigma has woven itself into the fabric of society, making its victims vulnerable to stigmatization across various everyday interactions and experiences and, often, from unavoidable sources.

Consequences of Experiencing Weight Stigma in Non-Pregnancy Contexts

The fact that weight stigma is so pervasive across societal domains is problematic in light of the many serious implications it carries for the targets of weight stigma. Experiencing weight-based stigma is associated with various negative consequences for behavioral health and weight, physiological health, and mental health, as will be reviewed below. Moreover, these relationships emerge over and above weight status itself or BMI.

Behavioral health and weight-related consequences. A recent review of the literature reported that among adults attempting to lose weight, experiencing weight stigma was associated with more difficulty with said weight loss (Papadopoulos & Brennan, 2015). This review also found that experiencing weight stigma is associated with non-adherence to medication regimens. Furthermore, across three recent review papers, experiencing weight stigma was reported to be associated with reduced motivation to exercise and reduced actual exercise behavior as well as increased food cravings and increased overeating behavior (Papadopoulos & Brennan, 2015; Puhl & Suh, 2015a; Vartanian et al., 2016; Vartanian & Smyth, 2013). For example, in a sample of college students, experiences of weight stigma were related to motivation to avoid exercise, which was then related to decreased actual exercise behavior (Vartanian & Shaprow, 2008). Similarly, a recent study examining weight stigma in a sample of over 300 gym members with overweight and obesity found that weight stigmatizing experiences at the gym were associated with more maladaptive coping behaviors, weight bias internalization, unhealthy weight management endeavors, poorer self-reported physical and mental health, and more negative attitudes toward the gym in general (Schvey et al., 2017). Additionally, weight stigma may potentially undermine important weight regulatory behaviors among individuals who just perceive themselves as heavy, regardless of BMI. For example, one study found that, after

viewing weight stigmatizing material, women who perceived themselves as overweight ate more calories and felt less able to regulate their consumption than those who did not perceive themselves as heavy (Major, Hunger, Bunyan, & Miller, 2014). On top of that, even once weight is successfully lost, recent evidence from a diverse sample of over 2000 adults revealed that internalized weight stigma predicted decreased odds of maintaining that weight loss (Puhl, Quinn, Weisz, & Suh, 2017)

Weight stigma also has direct implications not only for weight loss but also for weight gain. For example, one study of almost 3000 adult men and women in Great Britain found that experiencing weight discrimination predicted subsequent weight gain over a five-year period (Jackson, Beeken, & Wardle, 2014). This study also reported that experiencing weight stigma and discrimination predicted increased odds of becoming obese over time. In another study, this time examining over 6000 adults in the United States, those who experienced weight discrimination had a 2.5 times increased likelihood of becoming obese between the first assessment and the follow-up four years later (Sutin & Terracciano, 2013). Additionally, participants in this study with an obese BMI at baseline had a threefold increased likelihood of remaining in the obese BMI classification at follow-up. This relationship between weight stigma and later weight gain may also hold for childhood weight stigma experiences. Multiple studies have demonstrated that experiencing weight stigma as a child predicts excess weight gain and obesity into adulthood (e.g., Hunger & Tomiyama, 2014; Sutin, Robinson, Daly, & Terracciano, 2016). Overall, these behavioral health consequences are all especially troubling as they implicate weight stigma itself as a potential barrier to successful healthy weight management. Moreover, weight stigma may actually promote added weight gain and increase the risk of obesity. As mentioned above, this makes weight stigma a unique type of social stigma, wherein

experiencing it may actually exacerbate the stigmatized condition of weight itself, thus making its victims increasingly vulnerable to further stigmatization.

Physiological health consequences. A review of physiological health outcomes associated with experiencing weight stigma, outside the effect of weight itself, revealed that the negative consequences are indeed numerous, including increased blood pressure, cortisol reactivity, inflammation, and oxidative stress as well as impaired glycemic control (Puhl & Suh, 2015a). Furthermore, a recent study found that experiences of weight stigma and weight-based discrimination predicted a doubled risk of having high allostatic load (defined by the presence of three out of seven dysregulated allostatic systems) over ten years (Vadiveloo & Mattei, 2017). This study also found that weight stigma was associated with dysregulation in lipids, general metabolism, and glucose metabolism, as well as increased inflammation. Additionally, weight stigma may exacerbate the established relationship between adiposity and glycemic control, where one study found that individuals who had high adiposity and who also had experienced weight stigma had the highest HbA(1c) levels, an indicator of poor glycemic control (Tsenkova, Carr, Schoeller, & Ryff, 2011). On top of these health consequences observed in specific physiological systems, there is even longitudinal evidence from two large datasets (over 13,000 respondents from the nationally representative Health and Retirement Study and over 5000 respondents from the Midlife in the United States Study) indicating that experiencing weight stigma is associated with a markedly increased risk for mortality (Sutin, Stephan, & Terracciano, 2015). In terms of self-reported health, there is evidence from two studies that perceiving weight discrimination mediates the relationship between BMI and self-reported health (Hunger & Major, 2015). Further, this paper reported that being concerned about encountering weight stigma mediates the relationship between previous weight-based discrimination and future

health. These relationships also emerged for psychological health, which will be discussed further in the following section.

Importantly, even subtle or indirect weight stigma can produce negative physiological effects. For instance, in one study, BMI was related to increased blood pressure among women who merely knew their weight was visible while performing a speech task (Major, Eliezer, & Rieck, 2012). Moreover, similar to some of the abovementioned behavioral health consequences, these physiological consequences can emerge in individuals who are not objectively overweight or obese. For example, my past research has found that merely perceiving one's body as heavy, even among individuals with normal weight BMIs, is sufficient to result in cortisol reactivity after a weight stigmatizing experience (Himmelstein, Incollingo Belsky, & Tomiyama, 2015). A similar study found that after viewing weight stigmatizing material, all the women in the sample, regardless of BMI, were equally likely to display increased cortisol reactivity (Schvey, Puhl, & Brownell, 2014).

Mental health consequences. The literature generally reports relationships between weight stigma and some form of psychological distress, both in community samples and among individuals attempting to lose weight. These include symptoms and diagnoses of anxiety and depression and lowered self-esteem (Papadopoulos & Brennan, 2015). Again, consistent with the abovementioned findings, my previous research indicates that even objectively thin individuals may experience these psychological consequences when they are artificially made to feel heavy via a fat suit prosthesis. In one study, participants wearing the fat suit prosthesis reported greater anxiety, anger, depressed mood, and hurt feelings than control participants (Incollingo Rodriguez, Heldreth, & Tomiyama, 2016). Weight stigma is also particularly damaging for clinical populations that are already suffering from eating and weight disorders, as several

empirical reviews report that weight stigma perpetuates disordered eating symptomatology and psychopathology, over and above other common risk factors (Papadopoulos & Brennan, 2015; Puhl & Suh, 2015b, 2015a).

In sum, weight stigma is associated with negative health consequences affecting the entire person – physiologically, psychologically, and behaviorally. This makes it a potent and damaging form of stigma.

Policy-Level Consideration of Weight Stigma

Many forms of stigma, such as race, gender, and sexual orientation, have been the topic of destigmatization policies. Weight stigma, however, is essentially ignored in both federal and state protective policy in the United States. For example, unlike other characteristics and identities subject to stigma such as sex and race, weight is not a protected domain under Title VII of the Civil Rights Act of 1964, which prohibits discrimination based on domains such as race and gender. As of January 2009, though, Congress's new amendment to the Americans with Disabilities Act (ADA) went into effect. This amendment allowed for severe obesity – defined as body weight more than 100% over the norm – to be considered a disability and therefore qualify for certain disability-related services and compensation (Pomeranz & Puhl, 2013). This means that a woman of average height would have to weigh nearly 300 pounds to qualify. Although this amendment to the ADA does represent progress and may potentially lead to protection for specifically disability-related weight discrimination, it does not provide for those with overweight or non-severe obesity, who nevertheless experience weight stigma. Moreover, despite offering compensation, it does not offer protection against other types of discrimination and harassment that individuals with overweight and obesity experience in many settings. On the other hand, even in light of the above reviewed evidence of the negative consequences of

experiencing weight stigma, some public health scholars actually recommend promoting weight stigma to reduce obesity (Callahan, 2013). Similarly, public health campaigns in both the United States and the United Kingdom incorporate weight stigmatizing and fat-shaming messages in anti-obesity endeavors, such as the Georgia Strong4Life campaign (Vartanian & Smyth, 2013). The combination of a general lack of protective policy for the weight domain and misguided attempts to promote weight stigma so as to reduce obesity is likely a key reason underlying the high prevalence of weight stigma.

Despite this, there does appear to be some support among the general public in certain countries for instantiating anti-weight discrimination policy. For example, a recent study of almost 3000 adults across the United States, Canada, Australia, and Iceland revealed that the majority of respondents indicated that they would support the implementation of governmental policy that would prohibit weight-based discrimination (Puhl et al., 2015). Of these respondents, women and individuals with higher BMIs were the strongest supporters of such antidiscrimination legislation. Additionally, another recent study of more than 1800 parents in the United States revealed over 80% support for legislation requiring that weight-based bullying be included in the purview of state anti-bullying laws and that federal laws be established to address weight-based bullying in school settings (Puhl, Suh, & Li, 2017). This study also found that this parental support had significantly increased between 2014 and 2015.

Weight Stigma in the Context of Pregnancy

Despite the considerable evidence of the prevalence of weight stigma, especially in the United States, and its many adverse effects, very little research to date has extended the study of weight stigma and its consequences into the context of pregnancy. Pregnancy, though, is an area of interest to the study of weight stigma because weight gain is inherent to pregnancy, making

pregnancy a likely context for weight stigma to pervade. In my theorizing, I have observed certain phenomena that may underlie this lack of attention. For instance, lay perceptions may exist that characterize pregnancy as a context in which women receive immunity from weight stigma, owing to the fact that weight gain is natural during pregnancy. Additionally, over the past several decades, societies around the globe have come view the pregnant body as beautiful, glorifying it in art, fashion, and media (Trakas, 2009). Because of this, it may be difficult for some to believe that weight stigma would be directed at pregnant women at all. The following sections will discuss reasons why weight may nonetheless be stigmatized in pregnancy, why it is important to study weight stigma in the context of pregnancy, and the limited existing evidence of how weight manifests during pregnancy.

Why is obesity stigmatized in pregnancy and postpartum? It is argued here that within the context of pregnancy, higher weight is still subject to stigmatization. First, although the pregnant body, in general, is seen as beautiful, a heavy pregnant body is not typically viewed this way (Trakas, 2009). Second, obesity is, in fact, associated with increased risk of health complications during pregnancy, such as gestational hypertension, gestational diabetes, and cesarean (C-section) delivery (for a review see Catalano & Ehrenberg, 2006). In addition, there are negative health consequences associated with gaining too much weight over gestation, for instance an increased risk of hypertensive disorders and C-section delivery (Johnson et al., 2013). As such, healthcare providers may stigmatize their pregnant patients when attempting to counsel them about their weight. Additionally, at an international level, there is a prevailing belief that everyone is responsible for protecting children's welfare, an issue that even the United Nations agreed upon in the 1989 Convention on the Rights of the Child (Deb, 2016). Therefore, if a pregnant woman is judged to be putting her child at risk because of her weight or weight

gain, society at large may feel justified in not only openly mentioning her weight, but also admonishing her for it. Finally, pregnant women often face pressure not only to avoid gaining too much weight, but also to lose the weight quickly after birth (Trakas, 2009), which leaves them vulnerable to stigma during the postpartum period as well.

It is important to note that the relationships among maternal obesity, weight gain, and health are not always negatively valenced. For instance, maternal obesity is actually associated with some positive health outcomes, such as the lowest incidence of preterm birth compared to lower BMI categories (Hendler et al., 2005). Additionally, on the other end of the spectrum, inadequate weight gain is associated with preterm birth and low birth weight (Ehrenberg, Dierker, Milluzzi, & Mercer, 2003; Marsoosi, Jamal, & Eslamian, 2004). As such, laypeople's perceptions of women's weight or weight gain in pregnancy may often be incorrect, and pressuring women to avoid gaining too much weight could paradoxically promote inadequate weight gain, which is also detrimental. Therefore, even if weight stigma directed at a pregnant woman comes from a place of concern for her and her child's health, this concern may nonetheless result in misguided pressure about weight and weight gain and, consequently, deleterious outcomes.

Why study weight stigma in pregnancy and postpartum? As argued here, pregnancy is, in fact, a critically important context in which to study weight stigma for five key reasons. First, women are the sex that must get pregnant, and even outside the context of pregnancy, women already face higher rates of weight stigma than men (Puhl & Heuer, 2009). Additionally, they tend to perceive themselves as overweight even when their objective BMI is below the lower bound for overweight of 25 (Crawford & Campbell, 1999).

Second, recent estimates indicate that roughly 22% of women in the United States are obese before becoming pregnant (Kim, Dietz, England, Morrow, & Callaghan, 2007), and rates of pre-pregnancy obesity have steadily increased over the past several decades (Kim et al., 2007). Regardless of pre-pregnancy obesity status, virtually all women gain some amount of weight over the course of pregnancy, making them extra vulnerable to being targets of weight stigma. This occurs during a time when commenting on a woman's figure may be more socially acceptable among family, peers, colleagues, and even strangers. Therefore, weight stigma may potentially affect all pregnant women as they gain weight over gestation, regardless of their pre-pregnancy weight.

Third, many of the consequences of experiencing weight stigma are especially deleterious for pregnant women and can compromise the health of the pregnancy (e.g., elevated blood pressure, cortisol reactivity, inflammation). Along with this, weight stigma may potentially promote unhealthy and excessive gestational weight gain. As mentioned above, there is evidence that experiencing weight stigma in general is associated with an increased risk of obesity longitudinally (Sutin & Terracciano, 2015). As such, weight stigma may be a contributor to the current high incidence of excess weight gain over pregnancy, which is the Institute of Medicine defines as weight gain beyond 35 pounds for underweight and normal BMI, 25 pounds for overweight BMI, and 20 pounds for obese BMI (Institute of Medicine & National Research Council, 2009). A recent study of a population-based sample in the United States reported incidence of excess gestational weight gain at 47% (Deputy, Sharma, Kim, & Hinkle, 2015). Other reports, though, demonstrates much higher rates of excess weight gain in the United States, even as high as 73% (Johnson et al., 2013).

Fourth, while weight stigma manifests in practically all domains (e.g., employment, education), it is particularly prevalent among healthcare providers (Puhl & Heuer, 2009), and has been shown to undermine important preventive care in women's health contexts (e.g., Adams et al., 1993; Amy et al., 2006). This again puts pregnant women at risk for being frequent targets of weight stigma given the regular occurrence of maternity healthcare visits over the nine-month gestation period, the increased frequency of these visits during the last trimester when cumulative weight gain is greatest, and the continued occurrence of visits in the postpartum period. Considering that roughly half of women in the United States gain too much weight over pregnancy (Deputy et al., 2015) and that this excess weight gain is associated with various negative maternal health consequences and birth outcomes (Johnson et al., 2013), pregnant women may face added pressure from healthcare providers to avoid gaining too much weight. This pressure may in turn be presented in a stigmatizing fashion and could lead to nonadherence or avoidance of necessary prenatal and postpartum healthcare all together.

Finally, and of paramount importance, current theoretical models describing weight stigma and its negative consequences focus exclusively on its impact on the individual target (e.g., Hunger, Major, Blodorn, & Miller, 2015; Tomiyama, 2014). Within the context of pregnancy, however, weight stigma may also have downstream consequences for the child as well. For instance, evidence from the broader literature demonstrates that weight stigma is indeed both psychologically and physiologically stressful. Pregnant women who are victims of weight stigma may therefore experience heightened stress responding during a time when increased stress and cortisol, in particular, can harm the unborn child (e.g., Sandman, Wadhwa, Chicz-DeMet, Dunkel Schetter, & Porto, 1997). Additionally, outside the context of pregnancy, weight stigma is associated with depression and depressive symptomatology. Weight stigma

could therefore affect maternal postpartum depression, which is also implicated in adverse child health and well-being outcomes. Among them, postpartum depression is associated with impaired quality of mother-infant bonding (Moehler, Brunner, Wiebel, Reck, & Resch, 2006). Additionally, postpartum depression can undermine healthy weight gain, sleep, and physical health in infancy (Gress-Smith, Luecken, Lemery-Chalfant, & Howe, 2012), and recent meta-analytic evidence suggests having a mother who experienced postpartum depression may put children at risk for lower IQs (Sui, Pan, Liu, Liu, & Wang, 2016).

Review of existing research on weight stigma during pregnancy. Despite these justifications for investigating weight stigma during pregnancy, only a few studies have documented pregnant or postpartum women's experiences being targets of weight stigma. Most of these are focused on experiences in the healthcare domain. In one such study, 19 British mothers with pre-pregnancy obesity reported a high prevalence of feelings of humiliation associated with being obese during pregnancy (Furber & McGowan, 2011). They further reported feeling an increased medicalization of their pregnancy (e.g., being labeled "high-risk," undergoing extra tests and screenings); distressing and embarrassing ultrasound experiences; and worse interactions with doctors, other healthcare professionals, and even the general public. A similar study examined a larger sample, with 627 pregnant Australian women responding to a survey about their experiences with maternity healthcare and 248 maternity healthcare providers reporting on their perceptions of patients of different body sizes. This study found that women with higher BMIs were more likely than those with lower BMIs to report negative experiences with maternity healthcare over pregnancy and the postpartum period (Mulherin, Miller, Barlow, Diedrichs, & Thompson, 2013). These included not being treated with care, understanding, honesty, or respect. Perhaps of the greatest concern, this study also reported that maternity

healthcare providers held more negative beliefs about their patients with overweight and obesity. In particular, they reported perceiving these women to have poorer self-management, and they were thus less enthusiastic about caring for them. This suggests that heavy pregnant women are not only viewed through a prejudicial lens but are also targets of discriminatory treatment. As a result, they may receive lower quality maternity healthcare or be subject to more invasive treatment. Finally, a recent qualitative study of 24 Canadian women with overweight and obesity examined weight stigmatizing experiences in pre-conception and maternity healthcare. Two papers coming from this study reported that some women actually equated their pre-conception medical care with eugenics, referencing how it seemed their physicians wanted to prevent them from conceiving (Bombak, McPhail, & Ward, 2016; McPhail, Bombak, Ward, & Allison, 2016). Furthermore, they were often made to feel vilified, being told they were putting their unborn child at risk for serious developmental conditions because of their weight.

Overall, this preliminary evidence suggests that pregnant women do experience weight stigma, especially from maternity healthcare providers. However, thus far, no empirical research of any kind has investigated the consequences of experiencing weight stigma in the context of pregnancy. There are, however, clues in the broader discrimination literature suggesting that weight stigma may have adverse consequences for pregnant women. For example, a study examining all forms of discrimination in general found that a higher frequency of experiences with discrimination during the second trimester predicted lower infant birth weight among Latina and Black women (Earnshaw et al., 2013). Another study of Black and Latina women found 71% increased odds of gaining excessive weight over pregnancy among women who reported ever experiencing any type of discrimination, including due to race or sex. Interestingly, this effect was strongest among those who attributed their discrimination to being a minority or to being

overweight (Reid et al., 2016). These results therefore provide some evidence that perhaps weight-based discrimination, in particular, can actually promote unhealthy or excessive weight gain trajectories over pregnancy, which could have implications as well for postpartum weight loss and health.

Summary and Focus of the Dissertation

In summary, pregnancy and the ensuing postpartum period are life contexts in which weight stigma is highly relevant. Pregnancy is not only a time when weight gain is common and typically necessary, but many of the known consequences of weight stigma may be particularly damaging for maternal health. However, pregnancy and postpartum remain almost entirely unexplored in both weight stigma and pregnancy research. Through two studies, this dissertation addressed this lack of knowledge. Study 1 implemented a cross-sectional survey in a large convenience sample to collect detailed information on how weight stigma manifests in pregnancy and postpartum. This study additionally investigated potential psychological and weight-related consequences that may be associated with weight stigmatizing experiences during this time. Study 2 used existing longitudinal data from a United States national, diverse sample to examine whether experiences of weight stigma during pregnancy were associated with gestational weight gain and prospectively predicted negative consequences during the postpartum period. As such, the findings reported herein offer valuable evidence necessary for understanding the phenomenon of weight stigma during pregnancy and the negative consequences it may carry for a particularly vulnerable population.

Study 1: The Phenomenon of Weight Stigma During Pregnancy and Postpartum

Introduction

Despite the large body of evidence demonstrating the prevalence and consequences of weight stigma in non-pregnancy samples, the phenomenon of weight stigma in the context of pregnancy and postpartum has yet to be documented empirically. A limited body of qualitative evidence suggests that weight stigma is pervasive in maternity healthcare, but detailed empirical information is still needed to understand more broadly how, when, where, for whom, from whom, and how often pregnant and postpartum women experience weight stigma. As such, several pressing questions remain unanswered. For instance, in what contexts other than healthcare does weight stigma appear during pregnancy and postpartum, and who are the perpetrators of weight stigma throughout this time period? Additionally, does weight stigma manifest differently for women of varying pre-pregnancy BMIs or across different stages of pregnancy? Further, are there racial/ethnic or socioeconomic differences in the experience of weight stigma during this time?

Randomly assigning women to pregnancy is infeasible, and randomly assigning pregnant women to experience weight stigma in a laboratory setting may pose too serious a risk. Therefore, this study employed a survey research design to begin answering these questions while maximizing feasibility and minimizing risk. The overarching goal of this cross-sectional survey study was to provide detailed empirical data on the phenomenon of weight stigma experienced by pregnant and postpartum women. This included investigating how weight stigma manifests during pregnancy and postpartum and whether certain negative consequences may be associated with weight stigmatizing experiences. Such information could make an essential

contribution to identifying those mothers most at risk for weight stigmatization and thus reducing such stigma.

Specific Aims and Hypotheses

All aims and hypotheses are summarized in brief in Appendix A.

Aim 1: Describe weight stigma during pregnancy and postpartum. To identify sources of weight stigma, obtain examples of how it manifests in specific situations, and assess the frequency of weight stigmatizing experiences during pregnancy and postpartum.

Hypothesis 1A: Sources. The most commonly endorsed sources of weight stigma will be family members and healthcare providers. This hypothesis is based on findings from the broader literature demonstrating that these are generally the most frequently reported sources (Puhl & Brownell, 2006), and findings discussed above demonstrating that weight stigmatizing experiences commonly occur in maternity healthcare (e.g., Bombak et al., 2016; Furber & McGowan, 2011; McPhail et al., 2016; Mulherin et al., 2013).

Hypothesis 1B: Frequency of stigma. Participants will report experiencing up to one weight stigmatizing experience each day on average. This hypothesis is based on recent research findings among adults who reported, on average, almost daily experiences of weight stigma (Vartanian et al., 2016). It is also predicted that participants with overweight or obese pre-pregnancy BMIs will report experiencing weight stigma multiple times a day. This hypothesis is based on research findings that women with overweight and obese BMIs report on average three experiences of weight stigma each day (Seacat, et al., 2016).

Aim 2: Coping with weight stigma. To investigate how women cope with experiences of weight stigma during pregnancy and postpartum.

Hypothesis 2. Based on past research on weight stigma in non-pregnant samples, the most common coping strategies will be "heading off " negative comments, positive self-talk, and eating more food/comfort eating (Puhl & Brownell, 2006). Accentuating the pregnancy (e.g., with physical gestures or clothing) will also be commonly reported. This is hypothesized because such behavior may ensure that gestational weight gain is not confused with weight gain in general and, therefore, could shield women from being targets of weight stigma.

Aim 3: Actual and self-perceived weight status. To investigate whether the experience of weight stigma during pregnancy and postpartum differs by women's objective pre-pregnancy BMI and by how women perceive their weight.

Hypotheses 3A: Pre-pregnancy BMI. Because previous research shows that women who are overweight and obese experience more weight stigma than normal weight individuals (i.e., Seacat et al., 2016; Vartanian et al., 2016), pre-pregnancy BMI will be associated with:

Hypothesis 3A.1. more sources of weight stigmatizing experiences.

Hypothesis 3A.2. greater average frequency of weight stigmatizing experiences.

Hypotheses 3B: Self-perceived weight. In line with findings discussed above, which demonstrate that merely perceiving one's body as heavy can increase vulnerability to perceiving weight stigma (Himmelstein et al., 2015; Incollingo Rodriguez et al., 2016), it is hypothesized that regardless of objective BMI, participants' perception of their body size will be associated with the following:

Hypothesis 3B.1. more sources of weight stigmatizing experiences.

Hypothesis 3B.2. greater average frequency of weight stigmatizing experiences.

Hypothesis 3B.3. more concerns about weight stigmatizing experiences, as measured by the Weight Stigma Concerns Scale (see Measures section below).

Hypothesis 3B.4. reports of weight stigmatizing experiences as distressing.

Hypotheses 3C: Normal weight pre-pregnancy BMI and reactions to stigma. Because participants with a normal pre-pregnancy BMI, compared to those with an overweight or obese pre-pregnancy BMI, may not have experienced as much weight stigma prior to becoming pregnant, the following is predicted:

Hypothesis 3AC.1. Participants with lower pre-pregnancy BMIs will report their experiences with weight stigma as more distressing than those with higher pre-pregnancy BMIs. This is hypothesized because the former are more likely to be experiencing weight stigma for the first time.

Hypothesis 3C.2. There will be a positive relationship between pre-pregnancy BMI and number of coping behaviors. This is hypothesized because individuals with lower pre-pregnancy BMIs may be less likely to have learned how to cope with weight stigma previously.

Hypothesis 3D: Overweight/obese pre-pregnancy BMI and healthcare. There will be a positive relationship between pre-pregnancy BMI and the frequency of weight stigmatizing experiences in healthcare settings (i.e., Bombak et al., 2016; Furber & McGowan, 2011; McPhail et al., 2016; Mulherin et al., 2013).

Aim 4: Gestational weight gain and postpartum weight retention. To investigate whether the experience of weight stigma depends on the amount of gestational weight gain or postpartum weight retention.

Hypotheses 4A: Perception of weight gain. Similar to how perceiving the self as heavy is often sufficient to activate the experience of weight stigma, it is hypothesized that at all stages of pregnancy, participants who perceive themselves to have gained too much weight compared to those who perceive their weight gain to be appropriate, or too little, will exhibit the following:

Hypothesis 4A.1. more sources of stigma.

Hypothesis 4A.2. greater average frequency of weight stigmatizing experiences.

Hypothesis 4A.3. more concerns about weight stigmatizing experiences, as measured by the Weight Stigma Concerns Scale (see Measures section below).

Hypothesis 4A.4. reports of experiences of weight stigma as distressing.

Hypotheses 4B: Appearance of pregnancy. When pregnancy is not yet apparent compared to when it is – and therefore potentially could be confused with general weight gain – participants will exhibit the following:

Hypothesis 4B.1. more sources of stigma.

Hypothesis 4B.2. greater average frequency of weight stigmatizing experiences.

Hypothesis 4B.3. more concerns about weight stigmatizing experiences, as measured by the Weight Stigma Concerns Scale (see Measures section below).

Hypothesis 4B.4. reports of experiences of weight stigma as distressing.

Hypotheses 4C: Postpartum weight retention. Because postpartum participants may feel societal pressure to lose weight gained over pregnancy and return to their pre-pregnancy weight (Trakas, 2009), postpartum weight retention will be associated with the following:

Hypothesis 4C.1. more sources of weight stigmatizing experiences.

Hypothesis 4C.2. greater average frequency of weight stigmatizing experiences.

Hypothesis 4C.3. more concerns about weight stigmatizing experiences, as measured by the Weight Stigma Concerns Scale (see Measures section below).

Hypothesis 4C.4. reports of experiences of weight stigma as distressing.

Aim 5: Race/ethnicity and SES. To investigate whether the experience of weight stigma during pregnancy and postpartum differs by target race/ethnicity and SES.

Hypothesis 5A: Race/ethnicity and close relations. White participants will experience more frequent pregnancy-related weight stigma from family, friends, and romantic partners, in particular compared to Black and Latina participants. This is hypothesized because there are potentially protective cultural norms about weight and pregnancy that exist among the latter two racial/ethnic groups (e.g., Allan, Mayo, & Michel, 1993; Campos et al., 2008; Kernper, Sargent, Drane, Valois, & Hussey, 1994).

Hypothesis 5B: Race/ethnicity, SES, and healthcare. In part because low-SES and ethnic/racial minority participants are more likely to begin pregnancy with overweight or obese BMIs and these groups tend to gain excess weight over pregnancy (Endres et al., 2015), and therefore, healthcare providers may harbor preexisting biases about weight in these groups, the following is predicted:

Hypothesis 5B.1. Ethnic/racial minority participants will experience more frequent weight stigma in healthcare settings.

Hypothesis 5B.2. Income will be inversely associated with the frequency of weight stigmatizing experiences in healthcare settings.

Hypothesis 5B.3 (exploratory). There will be an interaction between race/ethnicity and income such that racial/ethnic minority participants of lower incomes will experience weight stigma in healthcare settings most frequently.

Aim 6: Consequences. To investigate the psychological consequences of experiencing weight stigma during pregnancy and postpartum.

Hypotheses 6A.

Hypothesis 6A.1. More experiences of weight stigma will be associated with higher levels of depressive symptoms, given that weight stigma is generally associated with more depressive symptoms (Papadopoulos & Brennan, 2015).

Hypothesis 6A.2. More experiences of weight stigma will be associated with more frequent maladaptive dieting behavior and more emotional eating behavior, given that experiencing weight stigma is generally associated with weight and eating disorders (Puhl & Suh, 2015b).

Hypothesis 6A.3. More experiences of weight stigma will be associated with higher levels of perceived stress, given that weight stigma is generally associated with stress-related emotions (e.g., Major et al., 2012; Tomiyama, 2014).

Hypothesis 6A.4. More experiences of weight stigma will be associated with more gestational weight gain, given that experiencing weight stigma is generally associated with weight gain (Sutin & Terracciano, 2013). This relationship will be modified by race/ethnicity, wherein it will be most pronounced among Black and Latina participants, because everyday discrimination in general has been shown to be related to excess weight gain in these racial/ethnic groups (e.g., Reid et al., 2016).

Hypothesis 6A.5. More experiences of weight stigma will be associated with more weight retention, because experiencing weight stigma is generally associated with difficulty losing weight (e.g., Papadopoulos & Brennan, 2015). Again, this will be modified by race/ethnicity with effects being most pronounced among Black and Latina participants in part because racial/ethnic minority participants may have gained too much weight to begin with and, therefore, have more to lose, and healthcare providers may, therefore, be biased toward Black and Latina patients (Earnshaw et al., 2013).

Hypothesis 6B: Exploratory consequences. Because there is a less established literature to rely on for these hypotheses, they were considered exploratory. In addition, because these were not the primary questions of interest, these variables and concepts were measured using less extensive items.

Hypothesis 6B.1. More experiences of weight stigma will be associated with less physical activity, because experiencing weight stigma in general is associated with less exercise behavior (e.g., Papadopoulos & Brennan, 2015; Vartanian & Smyth, 2013).

Hypothesis 6B.2. More experiences of weight stigma will be associated with earlier delivery, because stress in general is associated with length of gestation (e.g., Glynn, Dunkel Schetter, Hobel, & Sandman, 2008), and weight stigma can function as a stressor (e.g., Tomiyama, 2014).

Hypothesis 6B.3. More experiences of weight stigma will be associated with lower birth weight, because discrimination in general has been negatively associated with birth weight (Earnshaw et al., 2013).

Hypothesis 6B.4. More experiences of weight stigma will be associated with less intention to breastfeed, and shorter intended/actual duration of breastfeeding, because postpartum depression symptoms have been associated with decreased breastfeeding behavior (Dennis & McQueen, 2009), and depressive symptomatology is hypothesized as one focal outcome of experiencing weight stigma during pregnancy and postpartum. If there is a negative relationship between weight stigma and breastfeeding intentions, it is hypothesized that beliefs about breastfeeding and weight loss will moderate this relationship. Specifically, those who believe breastfeeding will aid weight loss will breastfeed longer in response to weight stigma.

Method

Pilot interviews. During the development of the study protocol, semi-structured pilot interviews were conducted with two pregnant and four postpartum women. These interviews aimed to gather qualitative information about the experience of weight stigma during pregnancy and postpartum to aid in developing the survey. Participants were asked open-ended questions regarding whether they had been treated differently from before they were pregnant, particularly regarding appearance, weight, or weight gain. Follow-up questions, when necessary, probed specific situations in which such experiences had occurred and participants' reactions to said experiences. Participants were free to talk for as long as they liked, and the interviews lasted between 15 and 40 minutes. Notes from interview sessions were then reviewed for recurring themes, and these themes were used to modify existing items or create new items in the survey.

Participants. Women 18 years of age or older and in their second or third trimester of pregnancy (at least 13 weeks pregnant) or within one year postpartum were recruited for this study. Participants also had to be fluent in English. Women in their first trimester were excluded because most women do not gain weight during this time. Potential participants were also excluded if they were living outside the United States or if they were pregnant with or had delivered multiples (e.g., twins, triplets).

A total of 699 women consented online to participate. Of those, 147 were disqualified because they did not meet the specified eligibility criteria, including 87 for not meeting the inclusion criteria for pregnancy or postpartum status, 20 for being pregnant with or having been pregnant with multiples, 32 for living outside in the United States, and 10 for not continuing beyond the consent.

Of the 550 remaining participants, data were included if a participant completed the questions on the frequency of their experiences with weight stigma. This excluded 49 women who did not complete those items, which resulted in a final sample of 501. A comparison of these 49 excluded women to the remaining 501 showed that they were similar on percentages of pregnancy and postpartum status and on pre-pregnancy BMI. The final sample of women came from 48 states around the United States, with the greatest representation coming from California (16.8%). See Table 1.1 for demographic and descriptive characteristics of the overall study sample and of the pregnant and postpartum participants separately.

Procedure. The University of California, Los Angeles IRB approved all procedures for this study. Participants were recruited via flyers posted in doctors' offices, coffee shops, childcare centers, and baby retail locations, such as Babies R Us. Flyers and study information were also shared on Internet forums for pregnant women and new mothers, such as those hosted by Facebook, Instagram, and Yahoo!. Recruitment materials contained verbiage directed toward pregnant and postpartum women and advertised the opportunity to complete a survey about their experiences while being pregnant or since having a baby. See Appendix B for recruitment flyer. Participation was incentivized with entry into a raffle for five prizes of $100. Participants were given a link to complete the survey online, and all participation was anonymous. They had the option of providing their email addresses strictly for the purposes of entry into the raffle.

Measures. The measures were selected to include existing measures of weight stigma and its consequences. New measures were also designed to assess weight stigma specifically during pregnancy and postpartum. Importantly, in piloting for completion, care was taken to limit subject burden to no more than 20-25 minutes on average so as to enhance participation and completion rates. Demographic and pregnancy-related items were adapted from the Community

Child Health Network, which is the data source for Study 2. See Appendix C for the complete battery of scales and questions used in the current study (described below).

Pregnancy- and postpartum-related information. Pregnant participants reported whether the pregnancy was their first, how many weeks of gestation they were at time when they completed the survey, and whether they thought they would deliver via C-section. Postpartum participants reported whether the birth had been their first, the gestational age of the child at delivery, whether the child was pre-term or low birth weight, whether the delivery was vaginal or C-section, and the age of the child at the time when they completed the survey.

Weight information. Participants reported their height in inches, pre-pregnancy weight in pounds, current weight in pounds, and whether they had been diagnosed with gestational diabetes. They also indicated their perception of their pregnancy weight gain, how apparent they perceived their pregnancy to be, and what recommendations and feedback their healthcare provider had given them about their weight gain. All these items were developed for this study. Finally, participants indicated their perception of their body size and how they perceived the baby's father's body size. The former was taken from the author's previous research (Himmelstein et al., 2015) and adapted to assess the latter. Pre-pregnancy weight and current weight were used to calculate pregnancy weight gain for pregnant women and weight retention for postpartum women. Pre-pregnancy and current BMI were calculated according to the standard formula: weight(lb)/[height(in)]^2*703. BMI values were categorized according to the Institute of Medicine's cutoffs for underweight (< 18.5), normal weight (18.5 – 24.9), overweight (25.0 – 29.9), and obese (≥ 30.0).

Sources and frequency of weight stigmatizing experiences. Participants selected from a 12-item list any and all people or situations in which they had experienced weight stigma since

becoming pregnant. Response options included work, family (immediate and extended), friends, community members, partners, healthcare providers, strangers, media, other mothers, and society. They also had the option to fill in the blank if they had experienced weight stigma from a source not on the list or to indicate that they had not experienced weight stigma at all. Then for each item endorsed, they provided an example and indicated how frequently they generally experience weight stigma from this source. The number of sources endorsed and the average overall frequency of experiences were weakly but significantly correlated, $r(500) = .23$, $p < .001$. Participants were also asked to indicate generally how distressing they found their cumulative or aggregated experiences of weight stigma to be. These items were developed for this study.

Healthcare experiences. To assess participants' experiences in healthcare settings, they responded to items asking about each of the following: their overall experiences in prenatal, labor and delivery, and postpartum healthcare settings; feelings they had when interacting with healthcare providers; which healthcare providers they had interacted with; the type of practice they were in during these interactions; whether they had ever changed providers because of their experiences; how much attention had been paid to their weight during their healthcare experience; and whether they felt they could trust their doctor. These items were developed based on the semi-structured pilot interviews conducted with pregnant and postpartum women during the development of the Study 1 protocol, described above.

Coping strategies. Participants selected from a 12-item list which coping strategies they had engaged in to deal with their experiences of weight stigma. Response options were chosen from commonly-endorsed coping strategies for experiencing weight stigma in general (Miller & Kaiser, 2001; Puhl & Brownell, 2006), along with coping behaviors specific to pregnancy. The list included hiding their pregnancy with clothes; accentuating their pregnancy or showing it off;

heading off negative comments; using positive self-talk; using faith, religion or prayer; eating more; seeking emotional support from others; ignoring the experience; and seeking other information and opinions about weight and health during pregnancy. The final option was included based on the semi-structured pilot interviews.

Concerns about weight stigma. In order to assess how concerned participants were about weight stigma directed at themselves, in particular, they completed the five-item Weight Stigma Concerns Scale (Hunger & Major, 2015). A sample item is, "I am concerned that other people's opinion of me will be based on my weight." In prior research, this measure has demonstrated good reliability (Cronbach's alpha = .94) and has been validated against other measures of rejection (Hunger & Major, 2015).

Psychological consequence variables. In order to investigate associations between experiencing weight stigma during pregnancy and postpartum and potential negative psychological consequences, participants completed the following measures:

Depressive symptoms. Participants completed a modified nine-item version of the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987), where they indicated how frequently each of a list of common depressive symptoms had occurred over the previous seven days. A sample item is, "I have been so unhappy that I have been crying." This survey was administered on the internet anonymously, which made any follow-up of women at risk of self-harm infeasible. Therefore, a tenth item about self-harm was removed, leaving nine items in total. The original 10-item EPDS has demonstrated good psychometric properties (e.g., Cox et al., 1987), including reliability (Cronbach's alpha = .87), validity, and sensitivity to fluctuations in depressive symptoms.

Perceived stress. Participants completed the four-item brief version of the Perceived Stress Scale (PSS; Cohen & Williamson, 1988), which assessed the frequency of participants' perception of stress over the previous month. A sample item is, "How often have you felt that you were unable to control the important things in your life?" This short version of the PSS has been validated as a measure of maternal stress in a sample of pregnant women, where it demonstrated acceptable reliability (Cronbach's alpha = .79; Karam et al., 2012).

Diet and exercise behavior. Because the broader weight stigma literature has shown that experiencing weight stigma is associated with unhealthy compensatory eating and disordered eating behavior (e.g., Puhl & Suh, 2015b), participants completed a 13-item measure of maladaptive dieting behavior from the Eating Attitudes Test (EAT; Garner, Olmsted, Bohr, & Garfinkel, 1982). A sample item is, "I feel extremely guilty after eating." In prior research, the EAT has demonstrated good reliability (Cronbach's alpha = .90) and has been validated against other measures of disordered eating symptoms (Garner et al., 1982). Participants also completed a 9-item measure of emotional eating from the Dutch Eating Behavior Questionnaire (DEBQ; van Strien, Frijters, Bergers, & Defares, 1986). A sample item is, "Do you feel a desire to eat when you are depressed or discouraged?" The DEBQ has also demonstrated good validity and reliability (Cronbach's alpha = .93; van Strien, Frijters, Bergers, & Defares, 1986).

Finally, because weight stigma is related to decreased exercise behavior and physical activity (e..g, Papadopoulos & Brennan, 2015; Vartanian & Smyth, 2013), participants responded to the updated one-item Stanford Leisure-Time Activity Categorical Item (L-CAT 2.2), which asked about the types and frequencies of various physical activities participants engaged in over the previous month. Participants selected one out of five options describing typical activity from minimal to vigorous. An example response option is, "About three times a

week, I did vigorous activities such as running or riding hard on a bike for 30 minutes or more each time." The L-CAT has demonstrated excellent psychometric properties, including test-retest reliability and concurrent validity with other measures of physical activity as well as weight loss over time (Kiernan et al., 2013).

Breastfeeding expectations and experiences. In order to further understand feelings toward and experiences with breastfeeding, participants responded to a series of items designed or adapted specifically for this study. Pregnant women indicated whether and how long they planned to breastfeed. They also indicated whether they thought they would be uncomfortable breastfeeding in public or seeking help with breastfeeding from healthcare professionals and, in either case, if this was due to their weight. Lastly, they indicated whether they thought breastfeeding would affect their weight loss. Postpartum women reported whether they had breastfed the baby and, if still breastfeeding, how long they planned to breastfeed. They also indicated whether they had ever felt uncomfortable breastfeeding in public or seeking help with breastfeeding from a healthcare professional and, in either case, if this was due to their weight. Lastly, they indicated whether breastfeeding had affected their weight loss.

Final open-ended question. Participants were given the opportunity to share any other information relevant to the questions in the survey.

Demographic information. Participants reported their age, highest level of completed education, employment status, race/ethnicity, status of their relationship with the child's father (married, in a relationship, neither), household size (i.e. number of people living in their household), zip code, and household income. Household size and income were used to calculate household income per capita and federal poverty status based on the federal poverty line, which

is $12,060 for one person plus $4180 for each additional person in the household according to the United States Department of Health and Human Services.

Data Analytic Plan

Hypotheses 1A. Descriptive statistics were used to evaluate the percentage of participants who endorsed each source of weight stigma overall as well as separately for participants with normal weight and overweight/obese BMIs. A chi-square goodness of fit test was then used to evaluate whether sources of stigma were endorsed at different rates. A chi-square test of independence probed whether participants with overweight or obese BMIs had a different endorsement rate from the overall sample. Participant-generated examples of stigma from each of these sources were reviewed and a representative example of each source was selected. Finally, descriptive statistics were conducted to summarize participants' responses to specific questions about their experiences in healthcare.

Hypotheses 1B. Descriptive statistics were used to evaluate how frequently, on average, participants reported experiencing weight stigma, both overall and specifically among women with pre-pregnancy overweight/obesity.

Hypothesis 2. Descriptive statistics were used to report what percentage of women who had experienced weight stigma endorsed engaging in each coping strategy. A chi-square goodness of fit test evaluated whether coping strategies were endorsed at different rates.

Hypotheses 3A. Correlation analyses tested the relationship between pre-pregnancy BMI and both the number of sources participants endorsed and the average frequency of weight stigmatizing experiences.

Hypotheses 3B. Separate linear regression analyses, controlling for pre-pregnancy BMI, tested self-perceived weight as a continuous predictor of the total number of sources endorsed,

average frequency of weight stigma, and weight stigma concerns. A one-way ANCOVA tested whether the average self-perceived weight of participants differed based on how distressing they reported their experiences of weight stigma to be (not at all distressing, somewhat distressing, very distressing), controlling for pre-pregnancy BMI.

Hypotheses 3C. A one-way ANOVA tested whether the average BMI of participants differed based on how distressing they reported their experiences of weight stigma to be (not at all distressing, somewhat distressing, very distressing). A correlation analysis was conducted to test the relationship between pre-pregnancy BMI and the number of coping strategies participants reported engaging in.

Hypotheses 3D. A correlation analysis tested the relationship between pre-pregnancy BMI and the frequency of weight stigmatizing experiences specifically in healthcare settings. Further correlation analyses tested the relationships between pre-pregnancy BMI and participants' overall evaluation of their experiences in prenatal, labor and delivery, and postpartum healthcare.

Hypotheses 4A. Separate one-way ANOVAs by perception of pregnancy weight gain (too little, about right, too much) tested group differences on the number of sources endorsed, average frequency of weight stigma, and weight stigma concerns. Significant results were followed up with post-hoc analyses. A chi-square test of independence evaluated whether reports of how distressing experiences of weight stigma were (not at all distressing, somewhat distressing, very distressing) depended on participants' perception of pregnancy weight gain.

Hypotheses 4B. Among pregnant participants, separate one-way ANOVAs by perception of how apparent they perceived their pregnancy to be (not at all obvious, somewhat obvious, very obvious) tested group differences on the number of sources endorsed, average frequency of

weight stigma, and weight stigma concerns. A chi-square test of independence evaluated if reports of how distressing experiences of weight stigma were (not at all distressing, somewhat distressing, very distressing) depended on the perception of how apparent the pregnancy was.

Hypotheses 4C. Among postpartum participants, separate linear regression analyses tested weight retention as a continuous predictor of the following outcomes, controlling for pre-pregnancy BMI and months postpartum: number of sources endorsed, average frequency of weight stigma, and weight stigma concerns. A one-way ANCOVA tested whether the average weight retention of postpartum participants differed based on how distressing they reported their experiences of weight stigma to be (not at all distressing, somewhat distressing, very distressing), controlling for pre-pregnancy BMI and months postpartum.

Hypothesis 5A. Because the majority of the sample identified race/ethnicity as White (67.3%) and the other racial/ethnic groups were underrepresented, there was insufficient power among non-White participants to test racial/ethnic differences on the frequency of weight stigmatizing experiences from immediate family (n = 15), extended family (n = 10), friends (n = 11), or partners (n = 7).

Hypothesis 5B. There was insufficient power in non-White participants (n = 9) to test differences by race/ethnicity on the frequency of weight stigmatizing experiences in healthcare. A linear regression analysis, controlling for pre-pregnancy BMI, tested household income per capita as a continuous predictor of the average frequency of weight stigmatizing experiences in healthcare settings. Additionally, a one-way ANCOVA, controlling for pre-pregnancy BMI, tested differences on the average frequency of weight stigmatizing experiences in healthcare based on federal poverty level (below FPL, 100%-200% of FPL, and above 200% of FPL).

Again, due to insufficient power in non-White participants, the interaction between race/ethnicity and income was not tested.

Hypotheses 6A. A series of separate linear regression analyses (controlling for pre-pregnancy BMI, parity, and weeks pregnant or months postpartum) tested the total number of sources endorsed and the average frequency of stigmatizing experiences, separately, as continuous predictors of depressive symptoms, maladaptive dieting behavior, emotional eating, perceived stress, gestational weight gain, and weight retention. These analyses were run separately in pregnant and postpartum participants. Race/ethnicity was not included in any models due to low power in non-White groups.

Hypotheses 6B. Exploratory linear regression analyses tested the total number of sources endorsed and the average frequency of stigmatizing experiences, separately, as continuous predictors of physical activity, gestational age at delivery (for postpartum participants), birth weight (for postpartum participants), and intended or actual duration of breastfeeding. These analyses were run separately for pregnant and postpartum participant groups. Descriptive statistics were conducted to summarize participants' responses to specific questions about their expectations and experiences with breastfeeding.

False discovery rate analyses. For each aim, a false discovery rate analysis (Benjamini & Hochberg, 1995) was conducted to account for alpha accumulation across all hypotheses tested within the aim.

Results

The full survey took, on average, 22 minutes to complete based on timing from the survey software, with completion times ranging from about six minutes to nearly three hours.

Hypothesis 1A. Participants endorsed an average of 1.9 sources of weight stigma (*SD* = 2.15) overall, and 64.9% of participants (*n* = 325) endorsed at least one source. Participants with an overweight or obese pre-pregnancy BMI endorsed on average 2.14 sources (*SD* = 2.23), and 69.7% (*n* = 249) of these participants endorsed at least one source. In comparison, participants with a normal weight pre-pregnancy BMI endorsed on average 1.31 sources (*SD* = 1.71), and 54.6% (*n* = 71) of these participants endorsed at least one source.

Chi-square goodness of fit tests revealed that individual sources were not endorsed at equal rates across the sample. Examining the patterns of endorsement overall, the most frequently endorsed sources were "society," "media," "strangers," and "immediate family," and the least frequently endorsed were "church" and "partner." For participants with overweight or obese pre-pregnancy BMIs, the most frequently endorsed sources were "society in general," "media," "healthcare provider," "strangers," and "immediate family." "Church" and "partner" were again least frequently endorsed. A chi-square test of independence revealed that these distributions were not significantly different from each other, $\chi^2(12) = 11.78$, $p = .463$. See Table 1.2 for endorsement percentages and a representative example of each source.

Regarding experiences in healthcare, 23.4% of participants endorsed being made to feel judged, 15.8% shamed, 14.4% guilty, 12.8% less worthy, 11.6% negatively compared to others, 11.4% stupid or unintelligent, 11% unimportant, 9.6% disrespected, 9.4% disliked, and 3.2% invisible. However, 28.3% of participants also endorsed being made to feel valued, 26.5% important, and 54.9% accepted. The most frequently endorsed healthcare providers with whom these experiences occurred were physicians (60.9%), nurses (47.9%), and ultrasound technicians (27.7%). These experiences occurred most commonly in hospital-affiliated OBGYN offices (51.7%) and private practice OBGYN offices (30.9%). Additionally, 11.2% of participants

indicated that they believed too much attention had been paid to their weight in healthcare settings, and 7.7% indicated they had changed healthcare providers because of how they had been treated regarding their weight. Finally, 11.2% of participants indicated they felt they could not trust their doctor or had to advocate for themselves because the doctor focused too much on their weight.

Hypothesis 1B. On average, participants experienced weight stigma between "a few times a month" and "at least once a week." Among participants with pre-pregnancy overweight or obese BMIs, the average frequency of weight stigma was slightly higher, but within the same range as the full sample. The most frequently occurring sources of weight stigma were "media, such as television, news, internet, social media" and "society and social expectations in general." On average, participants reported these as occurring, between "at least once a week" and "a few times a week," both overall and specifically among participants with overweight or obese pre-pregnancy BMIs.

Hypothesis 2. Among the 325 women (out of the total 501) who reported experiencing weight stigma, the average number of coping strategies they endorsed was 2.21 out of the 12 available options (SD = 2.23), and 63.3% of these women endorsed at least one strategy. Regarding specific strategies, 55.7% of participants endorsed accentuating their pregnancy as a coping strategy, 51.1% heading off negative comments, 50.8% ignoring the experience, 34.8% seeking emotional support, 30.5% eating, 29.9% doing research about how weight affects health in pregnancy, 28.6% using positive self-talk, 23.7% exercising, 17.5% hiding the pregnancy, 10.8% using faith or prayer, 7.1% other, and 7.1% none at all. A chi-square goodness of fit test revealed that the rates of endorsement for these various coping strategies were indeed significantly different, $\chi^2(11) = 401.45$, $p < .001$.

Hypothesis 3A.1. There was a significant positive, though small, correlation between pre-pregnancy BMI and the number of sources endorsed, $r(500) = .21$, $p < .001$.

Hypothesis 3A.2. The correlation between pre-pregnancy BMI and average frequency of stigma was non-significant $r(500) = .02$, $p = .736$.

Hypothesis 3B.1. A linear regression analysis revealed that, over and above pre-pregnancy BMI, self-perceived weight was significantly associated with the number of sources participants endorsed, wherein heavier self-perceived weight predicted more reported sources. See Table 1.3 for results.

Hypothesis 3B.2. A linear regression analysis revealed that, over and above pre-pregnancy BMI, self-perceived weight was marginally significantly associated with the average frequency of weight stigmatizing experiences. See Table 1.3 for results.

Hypothesis 3B.3. A linear regression analysis revealed that, over and above pre-pregnancy BMI, self-perceived weight was significantly associated with weight stigma concerns. See Table 1.3 for results.

Hypothesis 3B.4. A one-way ANCOVA revealed that participants' average self-perceived weight did not differ based on how distressing they reported their stigmatizing experiences to be, controlling for pre-pregnancy BMI, $F(2, 319) = 1.93$, $p = .146$. In other words, women of all self-perceived weights appeared to find their experiences equally as distressing.

Hypothesis 3C.1. A one-way ANOVA revealed no difference in average pre-pregnancy BMI based on how distressing participants reported their experiences with weight stigma to be (not at all distressing, somewhat distressing, very distressing), $F(2, 320) = 1.79$, $p = .169$. Similar to the prior results, distress about weight stigma was not related to pre-pregnancy BMI.

Hypothesis 3C.2. There was a significant, though small, positive correlation between pre-pregnancy BMI and the number of coping strategies participants endorsed, $r(500) = .18$, $p < .001$. That is, the higher a person's pre-pregnancy BMI, the more strategies they reported using to cope with weight stigma.

Hypothesis 3D. The correlation between pre-pregnancy BMI and the frequency of weight stigmatizing experiences in healthcare was not significant, $r(91) = .16$, $p = .126$. Pre-pregnancy BMI was also not significantly correlated with how positive participants reported their overall experience in prenatal healthcare ($r(490) = -.06$, $p = .206$), labor and delivery healthcare, ($r(348) = -.05$, $p = .365$), or postpartum healthcare ($r(348) = -.06$, $p = .299$) to be.

Hypothesis 4A.1. A one-way ANOVA revealed a significant difference in the average number of sources endorsed based on participants' perception of their pregnancy weight gain. Post-hoc analyses revealed one significant contrast where those who perceived their weight gain to be "about right" endorsed significantly fewer sources than those who perceived their weight gain to be "too much." See Table 1.4 for results.

Hypothesis 4A.2. A one-way ANOVA revealed a marginally significant difference in the average frequency of weight stigmatizing experiences based on participants' perception of their pregnancy weight gain. Specifically, those who perceived their weight gain as "about right" experienced weight stigma less frequently than those who perceived their it as "too little" or "too much," but these post-hoc comparisons were not significant. See Table 1.4 for results.

Hypothesis 4A.3. A one-way ANOVA revealed a significant difference in weight stigma concerns based on participants' perception of their pregnancy weight gain. Post-hoc analyses revealed that those participants who perceived their weight gain to be "about right" had

significantly lower weight stigma concerns than those who perceived their weight gain to be "too much." See Table 1.4 for results.

Hypothesis 4A.4. A chi-square test of independence probing whether rates of endorsement for the three categories of how distressing experiences were reported to be (not at all distressing, somewhat distressing, very distressing) were associated with perception of weight gain category (too little, about right, too much) was not significant. Examining the distributions, it appeared that at every level of perceived weight gain, the majority of participants reported their experiences of weight stigma to be "somewhat distressing." See Table 1.5 for results.

Hypothesis 4B.1. A one-way ANOVA revealed a marginally significant difference in the average number of sources endorsed based on participants' perception of how apparent their pregnancy was. Specifically, those who perceived their pregnancy as "not at all apparent" reported more sources than those who perceived their pregnancy as "somewhat" or "very apparent," but these post-hoc comparisons were not significant. See Table 1.4 for results.

Hypotheses 4B.2-3. One-way ANOVAs revealed no significant difference in the average frequency of weight stigmatizing experiences (4B.2) or weight stigma concerns (4B.3) based on participants' perception of how apparent their pregnancy was. See Table 1.4 for results.

Hypothesis 4B.4. A chi-square test of independence probing whether rates of endorsement for the three categories of how distressing experiences were reported to be (not at all distressing, somewhat distressing, very distressing) were associated with perceptions of how apparent the pregnancy was (not at all obvious, somewhat obvious, very obvious) revealed a significant relationship. Examining the distributions, it appeared that participants who believed their pregnancy was "not at all obvious" tended to report weight stigmatizing experiences as "not at all distressing" or "very distressing." On the other hand, participants who believed their

pregnancy was “somewhat obvious” or “very obvious” tended to report weight stigmatizing experiences as “somewhat distressing.” See Table 1.5 for results.

Hypothesis 4C.1. A linear regression analysis revealed that, over and above pre-pregnancy BMI and months postpartum, weight retention was significantly associated with the number of sources participants endorsed. See Table 1.6 for results.

Hypothesis 4C.2. A linear regression analysis revealed that, over and above pre-pregnancy BMI and months postpartum, weight retention was not associated with the average frequency of weight stigmatizing experiences. See Table 1.6 for results.

Hypothesis 4C.3. A linear regression analysis revealed that, over and above pre-pregnancy BMI and months postpartum, weight retention was significantly associated with weight stigma concerns. See Table 1.6 for results.

Hypothesis 4C.4. A one-way ANCOVA revealed that postpartum participants’ average weight retention did not differ based on how distressing they reported their weight stigmatizing experiences to be, controlling for pre-pregnancy BMI and months postpartum, $F(2, 223) = 0.93$, $p = .395$.

Hypotheses 5A, 5B.1, and 5B.3. These hypotheses were not tested due to low power to detect an effect, that is too few non-White participants.

Hypothesis 5B.2. A linear regression analysis revealed that household income per capita was not significantly associated with the average frequency of weight stigmatizing experiences in healthcare. A one-way ANCOVA revealed that the average frequency of weight stigmatizing experiences in healthcare did not differ significantly by federal poverty status, controlling for pre-pregnancy BMI. See Table 1.7 for results.

Hypothesis 6A.1. Linear regression analyses controlling for pre-pregnancy BMI, parity, and weeks of pregnancy or months postpartum revealed the following: Among pregnant participants, the number of sources endorsed was significantly associated with depressive symptoms, but the average frequency of weight stigmatizing experiences was not. Among postpartum participants, the number of sources endorsed was significantly associated with depressive symptoms, and the average frequency of weight stigmatizing experiences was marginally significantly associated with depressive symptoms. See Table 1.8 for results.

Hypothesis 6A.2. Linear regression analyses controlling for pre-pregnancy BMI, parity, and weeks of pregnancy or months postpartum revealed the following: Among pregnant participants, the number of sources endorsed was significantly associated with both maladaptive dieting behavior and emotional eating behavior. The average frequency of weight stigmatizing experiences was not associated with either outcome. Among postpartum participants the number of sources endorsed and the average frequency of weight stigmatizing experiences were both significantly associated with both maladaptive dieting behavior and emotional eating behavior. See Table 1.8 for results. It is noted that the *p*-value for the relationship between number of sources and emotional eating behavior neared, but did not surpass, the corrected threshold in the false discovery rate analysis.

Hypothesis 6A.3. Linear regression analyses controlling for pre-pregnancy BMI, parity, and weeks of pregnancy or months postpartum revealed the following: Among pregnant participants, the number of sources endorsed was significantly associated with perceived stress, but the average frequency of weight stigmatizing experiences was not. Among postpartum participants, the number of sources endorsed and the average frequency of weight stigmatizing experiences were both significantly associated with perceived stress. See Table 1.8 for results.

Hypothesis 6A.4. Among pregnant participants, linear regression analyses controlling for pre-pregnancy BMI, parity, and weeks of pregnancy revealed that neither the number of sources endorsed nor the average frequency of weight stigmatizing experiences were associated with gestational weight gain. See Table 1.8 for results.

Hypothesis 6A.5. Among postpartum participants, linear regression analyses controlling for pre-pregnancy BMI, parity, and months postpartum revealed that the number of sources endorsed was significantly associated with postpartum weight retention, but the average frequency of weight stigmatizing experiences was not. See Table 1.8 for results.

Hypotheses 6B.1-4. Among both pregnant and postpartum participants, linear regression analyses revealed that neither the number of sources endorsed nor the average frequency of weight stigmatizing experiences were associated with physical activity, gestational age at delivery, birthweight, or intended/actual duration of breastfeeding behavior. Because of the null relationship between weight stigma and breastfeeding, no follow-up moderation analyses were conducted. See Table 1.9 for results.

Breastfeeding. Descriptive statistics summarizing responses to items about expectations and experiences with breastfeeding revealed the following: Half of the pregnant participants indicated they believed they would feel uncomfortable breastfeeding in public, and 43.1% of these participants indicated that this was because of their weight. Additionally, 21.5% indicated they would feel uncomfortable seeking help with breastfeeding from a healthcare professional, and 48.1% of these participants indicated this was because of their weight. Many pregnant participants (54.3%) believed that breastfeeding would help them to lose weight. Only 10.9% indicated they believed breastfeeding would make weight loss harder; 11.6% indicated they believed it would not affect their weight; and 23.3% indicated they were unsure.

Among postpartum participants, 34.2% of participants indicated they had ever felt uncomfortable breastfeeding in public, and 34.8% of these participants indicated this was because of their weight. Roughly a quarter (25.7%) of postpartum participants indicated they had ever felt uncomfortable seeking help with breastfeeding from a healthcare professional, and 41.1% of these participants indicated this was because of their weight. In terms of breastfeeding's effect on weight loss, 31.3% of postpartum participants indicated that breastfeeding helped them to lose weight; 23.2% indicated it made it harder to lose weight; 20.8% indicated it did not affect their weight; and 24.6% indicated that they were unsure. In the final open-ended question, several participants indicated that they believed it was a "myth" that breastfeeding helps with postpartum weight loss.

False discovery rate analyses. In summary, *p*-values for all previously significant findings surpassed the corrected thresholds with the exception of hypothesis 6A.2, which tested the relationship between the number of sources endorsed and emotional eating behavior among postpartum participants, which neared the threshold ($p = .030$; threshold = .022). See Table 1.10 for false discovery rate analyses for all aims that included multiple inferential statistical tests.

Discussion

Common sources and frequency of weight stigma. Overall, Study 1 provides detailed quantitative and qualitative information on pregnant and postpartum women's experiences with weight stigma. In particular, the results of Aim 1 revealed that the most common sources from which these participants experienced weight stigma were society, media, strangers, and immediate family. Healthcare providers were another common source for women with overweight and obesity. Although not hypothesized, society and media emerged as the most pervasive sources of weight stigma for these pregnant and postpartum women. In fact, roughly a

third of all participants and nearly half of those with pre-pregnancy overweight or obesity reported experiencing weight stigma from society in general.

The frequency of weight stigmatizing experiences, on the other hand, was lower than hypothesized. Frequency of experiences, though, is partly determined by the particular source of weight stigma. For instance, pregnant women interact with healthcare providers typically biweekly or monthly throughout the majority of pregnancy, which is consistent with the reported frequency of weight stigma from healthcare providers. Messages from media, though, may be much more pervasive, and women may often feel overarching pressure from their society. Consistent with this, media and society in general were, in fact, reported as the most frequent sources of weight stigma, with experiences occurring, on average, more than once a week.

These findings, if replicated in larger studies, provide possible clues for targeting weight stigma reduction initiatives. First, healthcare providers can be trained to avoid stigmatizing their heavy patients when counseling them on their weight and gestational weight gain, especially those beginning pregnancy already heavy. This is important, especially considering that 8% of this sample reported changing healthcare providers as a result of how they had been treated because of their weight, which can undermine continuity of care and potentially receipt of necessary treatment. Second, even before pregnancy begins, preconception counseling can help women prepare for how their society or the media may make them feel about their weight or weight gain during pregnancy so as to build resilience. Third, efforts to raise public awareness of weight stigma in pregnancy and postpartum might aim to avoid the victimization of women during this important time of life.

Coping with weight stigma. The findings from Aim 2 demonstrated that the most common coping strategies for dealing with weight stigma were "accentuating the pregnancy" and

"heading off negative comments," as well as ignoring the experience. These were consistent with expectations. Additionally, nearly one third of participants also endorsed eating as a coping strategy. While these results can inform us about how women cope with weight stigma, they do not tell us whether these strategies are in fact helpful or adaptive. Coping through eating, for example, could have negative ramifications for health if it promotes excess gestational weight gain or undermines postpartum weight loss. Although such relationships cannot be tested rigorously given the cross-sectional design employed here, the general weight stigma literature does indicate that coping may be an important link between weight stigma and health. For instance, recent findings revealed that coping via maladaptive eating mediated weight stigma's association with depressive symptoms and worse physical health outcomes (Himmelstein, Puhl, & Quinn, 2018). Future research should therefore investigate these coping strategies in more detail. Such studies might investigate prospectively whether certain strategies mediate relationships between weight stigmatizing experiences and health consequences over time, as demonstrated in the broader weight stigma literature. Additionally, future studies might identify circumstances in which various coping strategies are common. Perhaps when in public, women might choose to accentuate the pregnancy. When they are with family, though, they might be more direct in heading off negative comments.

Actual and self-perceived weight. Aim 3 provided evidence that both actual and self-perceived weight play a role in the experience of weight stigma during pregnancy and postpartum. On the one hand, as hypothesized, pre-pregnancy BMI was associated with more sources of weight stigma, albeit weakly, but not with the frequency of experiences. On the other hand, self-perceived weight also appeared to be particularly influential in the experience of weight stigma. As hypothesized, participants with greater self-perceived weight experienced

weight stigma from more sources and were more concerned about weight stigma (and they experienced weight stigma marginally more frequently). As such, these findings indicate that how women perceive their weight may be just as important as objective BMI for identifying who may be at risk for experiencing weight stigma, which is consistent with my prior research (e.g., Himmelstein et al., 2015). In fact, self-perceived weight may be a more accurate predictor of weight stigma, as women of higher self-perceived weights are probably more sensitive to experiencing weight stigma than those with lower self-perceived weights. This potentially makes a very meaningful addition to the current understanding of weight during and following pregnancy. For instance, healthcare providers may not understand that how a woman perceives her weight and body is not perfectly correlated with her actual weight. Helping providers to recognize this fact may contribute to more sensitive care.

Results from Aim 3 also revealed that, contrary to the hypothesis, thinner women did not report their experiences of weight stigma to be more distressing than heavier women. There also appeared to be no difference in how distressing experiences were based on self-perceived weight. In fact, the majority of participants indicated their experiences were "somewhat distressing." However, as hypothesized, thinner participants did report fewer coping strategies than heavier participants. This perhaps indicates that thinner women may be relatively unprepared to cope with weight stigma they experience during pregnancy and postpartum. These women could therefore benefit from pre-conception counseling about weight stigma they might encounter and strategies they might use to cope. Finally, there was no relationship between pre-pregnancy BMI and how frequently participants experienced weight stigma in healthcare or how positive they reported their experiences in healthcare to be. This again suggests that women of all pre-pregnancy weights may be vulnerable to experiencing weight stigma in healthcare settings.

Gestational weight gain and postpartum weight retention. The results of Aim 4 indicated that in addition to how women perceive their own weight, how they perceive their weight gain is tied to the experience of weight stigma, as hypothesized. For instance, participants who perceived their weight gain to be "too much" as opposed to "about right" endorsed more sources of weight stigma and were more concerned about weight stigma (and experienced weight stigma marginally more frequently). Therefore, it appears that if a woman perceives her pregnancy weight gain in a negative light, she may also be more likely to perceive instances of weight stigma. Most participants, though, found their weight stigmatizing experiences to be "somewhat distressing" regardless of how they perceived their weight gain.

Contrary to hypotheses, how "apparent" participants thought their pregnancy was did not seem to affect how much or how frequently they experienced weight stigma. However, while most participants tended to report their experiences as "somewhat distressing," participants who believed their pregnancy was not yet at all obvious tended to report experiences as "not at all distressing" or "very distressing." This finding may tie into the previous findings on coping. Perhaps before a woman's weight gain is clearly attributable to pregnancy, she may be particularly upset by weight stigmatization because it is more difficult to engage in certain common coping strategies such as accentuating her pregnancy.

Aim 4 also considered the role of weight retention among postpartum women. Participants who had retained more of the weight they had gained during pregnancy endorsed more sources of stigma and were more concerned about weight stigma, as hypothesized. They did not experience weight stigma more frequently though. Similar to other findings, how distressing participants reported their experiences to be did not seem to differ based on the amount of weight they had retained.

Taken together, the findings from Aims 3 and 4 suggest that both objective weight measures as well as self-perceived weight measures are likely related to the number of situations in which pregnant and postpartum women experience weight stigma. It is also possible that the recruitment strategy for this study may have biased the sample toward greater numbers of those having experienced weight stigma, as the recruitment flyer specifically indicated that participants would be asked about weight concerns. As such, the women responding to this flyer may have been more likely to report weight stigma. This could have obscured differences between objective weight groups. Nonetheless, it is important to consider that even a woman who is "normal weight" by BMI standards could still experience weight stigma, depending on how she perceives her body. Based on this, women of all weights could benefit from family and network sensitivity and informed healthcare to help build resilience toward weight stigma. For example, family, friends, and providers alike might endeavor to help women maintain a positive body image regardless of their objective weight, which could potentially make them less susceptible to experiencing weight stigma in the first place. However, it seems that regardless of how women perceive their body, weight stigma is nonetheless at least somewhat distressing. Therefore, it may still be necessary for women to learn to stand up against weight stigma and to cope with its emotional impact.

Race/ethnicity and SES. Unfortunately, many of the hypotheses in Aim 5 were untestable due to low power among non-White participants. Findings from this Aim did reveal though that SES was not related to the frequency of weight stigmatizing experiences in healthcare. However, it is noted that this was a fairly high-SES sample, as half the participants were living at more than 200% of the federal poverty line. This lack of racial/ethnic and socioeconomic diversity in the sample is certainly a limitation – one that is addressed in Study 2.

Interestingly, while racial/ethnic minority groups generally have the highest rates of overweight and obesity (Ogden et al., 2014), in this sample, there was no difference in pre-pregnancy BMI between White participants and Black and Latina participants ($F(1, 400) < .001$, $p = .991$). As such, this sample is not necessarily representative of the general population. The fact that this study consisted of women in the United States who were predominantly White and heavy is a caveat that should be considered when interpreting and generalizing any finding. Future research should expand upon the evidence provided here by recruiting samples from various racial/ethnic minority groups, socioeconomic backgrounds, and nationalities so as to better understand the breadth of this phenomenon and any meaningful group differences that might exist.

Associations with psychological and weight-related consequences. Lastly, the first set of analyses in Aim 6 revealed that, largely consistent with hypotheses, the number of sources participants endorsed was associated with more depressive symptoms, more maladaptive dieting behavior, more emotional eating behavior, and higher perceived stress, in both pregnant and postpartum women. These results emerged controlling for pre-pregnancy BMI, whether it was the first pregnancy, and weeks of gestation in pregnancy or months postpartum. The number of sources participants endorsed was also related to greater postpartum weight retention, controlling for those same variables. The frequency of weight stigmatizing experiences, though, was less consistently related to these outcomes in postpartum participants and was not related to them at all in pregnancy. Because all the significant findings emerged when controlling for BMI, this suggests that a woman's actual weight is unlikely to be a third variable explaining the observed results. However, the cross-sectional nature of these data makes it impossible to rule out other third variables or reverse causation, whereby perhaps depressed participants were more likely to endorse more sources of stigma. These findings, though, are consistent with the broader weight

stigma literature demonstrating that experiencing weight stigma is associated with more depressive symptoms (Papadopoulos & Brennan, 2015), disordered eating (Puhl & Suh, 2015b), stress (Major et al., 2012), and difficulty losing weight (Papadopoulos & Brennan, 2015). Indeed, some of this existing literature addresses causality through experimental and longitudinal designs. These previous findings therefore bolster the interpretation that weight stigma may precipitate the outcomes reported in the present study. Nevertheless, future research on weight stigma in pregnancy should employ longitudinal designs to better capture the direction of causality underlying the effects found here.

Exploratory consequences. On the other hand, the exploratory analyses from Aim 6 all returned null results, both in pregnant and postpartum participants. Regarding physical activity, it may be that in the context of pregnancy, weight stigma is not associated with less physical activity. Additionally, it is possible that pregnancy and postpartum may be generally be periods of relative physical inactivity; in fact, the majority participants reported fairly low levels of physical activity. Weight stigma also may not affect birth outcomes, but this design was not ideal to assess any potential effects. In particular, participants reported on weight stigma experienced in the postpartum period, which did not allow for a prospective test of the effect of weight stigma in pregnancy on birth outcomes. If weight stigma does affect birth outcomes, these relationships should be tested using prospective longitudinal designs.

In terms of breastfeeding behavior, pregnant participants were reporting on their intended breastfeeding behavior, but these data cannot inform on their actual behavior. However, among postpartum participants, there was similarly no relationship between weight stigma and duration of breastfeeding behavior. Despite these null findings, other items about breastfeeding do provide preliminary evidence that weight stigma might influence women's breastfeeding

behavior. For instance, roughly a quarter of pregnant participants believed they would feel uncomfortable breastfeeding in public because of their weight. This may be another area in which helping women to maintain a positive body image could allow them to feel more confident breastfeeding. As such, the relationship between weight stigma and both intended and actual breastfeeding behavior warrants further study.

Unique dimensions of weight stigma? A strength of this study's design lies in its ability to inform on different aspects of the experience of weight stigma. Namely, it elucidates the differential contributions of the number of sources from which weight stigma is experienced versus the frequency of these experiences. Although these two variables are significantly related, the correlation is weak. Across all the findings discussed here, the number of sources reported was more consistently associated with participant characteristics and the consequences tested in Aim 6 than was the frequency of weight stigmatizing experiences. Given this relative importance of the number of sources endorsed, it is likely that intervening to reduce weight stigma in just one sector would be ineffective. In fact, it appears that it is actually the totality of experiences across societal domains that may matter most. Importantly, the sources that participants could endorse belonged to a variety of societal domains (e.g., interpersonal relations, employment, media). Weight stigma present in these different domains may produce different types of experiences, specifically, enacted versus felt stigma, which is an area of current research (e.g., Major, Tomiyama, & Hunger, 2017). On the one hand, concrete weight stigmatizing interactions with family or healthcare providers is a form of enacted stigma. On the other hand, weight stigma that is experienced from messages in the media or society at large produces felt stigma. Future research should therefore continue to consider the apparently distinct dimensions of

sources versus frequency and whether these relate to enacted versus felt manifestations of weight stigma, both in the context of pregnancy and in all weight stigma research more generally.

Conclusions. Overall, the results of Study 1 address a lack of requisite knowledge regarding how weight stigma manifests in pregnancy and postpartum, including where, when, how often, for whom, and from whom weight stigma occurs. In particular, these results point toward both specific sources, such as family and healthcare providers, as well as overarching societal norms and influences from the media as common sources of weight stigma. While many sources were experienced several times a month, some were more frequent, arising multiple times each week. Importantly, women of all weights reported experiencing weight stigma, and it appears that how a woman perceives her weight and weight gain strongly influence her susceptibility to experiencing weight stigma. This study also provides evidence that weight stigma is associated with deleterious psychological outcomes for pregnant and postpartum women, namely depressive symptoms, stress, and unhealthy eating behavior, all of which can be detrimental for maternal health during pregnancy and postpartum. In light of these findings, future research should continue to investigate these relationships using prospective longitudinal designs where weight stigma and its potential consequences are measured at multiple time points throughout pregnancy and postpartum so that causality might be better inferred. The findings reported here contribute to the rationale and foundation for such longitudinal research, which is a necessary next step stemming from this work.

Study 2: Weight Discrimination During Pregnancy: Concurrent and Longitudinal Associations with Maternal Postpartum Health

This study is written in a manuscript format for publication (Incollingo Rodriguez, et al., under review) and, as such, shares introductory material with earlier sections of the dissertation.

Introduction

Pregnancy is a time of tremendous physical and psychological change. During this period, a variety of social factors can influence maternal health, both positively and negatively. One such factor that may have a meaningful impact yet has received very little attention is weight stigma. Weight stigma is defined as bias or discrimination targeted toward individuals who are perceived to be heavy (Puhl & Brownell, 2001). This form of stigma is highly prevalent, where, for example, heavy women report experiencing weight stigma on average three times each day (Seacat et al., 2016).

The literature on the consequences of experiencing weight stigma in non-pregnant individuals is rapidly growing. There is mounting evidence from nationally representative samples that experiencing weight stigma is longitudinally associated with adverse health outcomes and mortality in adult women and men (Sutin et al., 2015). Many of these health outcomes are particularly relevant for pregnancy; for instance, weight stigma is associated with depressive symptomatology and clinical diagnoses of depression (Papadopoulos & Brennan, 2015). Moreover, weight stigma has been shown to undermine attempts to lose weight (Papadopoulos & Brennan, 2015) and, paradoxically, drives weight gain instead (Jackson et al., 2014; Sutin & Terracciano, 2013). Finally, there is evidence that weight stigma elicits physiological reactivity via increased cortisol and blood pressure (Himmelstein et al., 2015; Major et al., 2012; Puhl & Suh, 2015a; Schvey et al., 2014).

These outcomes in the context of pregnancy – postpartum depression, high gestational weight gain and retention, and physiological stress reactivity – are pertinent to healthy pregnancies because they all pose risks to maternal health, not only during pregnancy but during the postpartum (Davis & Sandman, 2010; Endres et al., 2015; Gress-Smith, Luecken, Lemery-Chalfant, & Howe, 2012; Hobel, Dunkel-Schetter, Roesch, Castro, & Arora, 1999; Johnson et al., 2013; Moehler, Brunner, Wiebel, Reck, & Resch, 2006). Evidence of whether weight stigma elicits these consequences in the context of pregnancy though is limited. One study from the broader discrimination literature did find that discrimination attributed to race or weight was related to a heightened risk of gaining excess weight over the course of pregnancy (Reid et al., 2016). With the exception of Study 1 – which found evidence that weight stigma is associated with prenatal and postpartum psychological well-being and postpartum weight retention – no other current research has addressed *a priori* whether weight stigma in particular might be associated with the abovementioned maternal health consequences. This gap in research is notable because all pregnant women must gain weight, and roughly 22% of women begin pregnancy already obese by current BMI standards (Kim et al., 2007). Moreover, weight stigma can affect any woman who perceives herself to be heavy, regardless of her objective BMI (e.g., Himmelstein et al., 2015; Incollingo Rodriguez, Heldreth, & Tomiyama, 2016; Major, Tomiyama, & Hunger, 2017), which suggests that all pregnant women may be vulnerable to weight stigma and its consequences.

The current study aimed to address this lack of knowledge on weight stigma in maternal health by testing *a priori* hypotheses using data collected by the Community Child Health Network (CCHN) study. This multi-site community-based project investigated factors contributing to disparities in maternal-child health. Based on the existing literature linking

weight stigma to the abovementioned outcomes in non-pregnant populations, the present study tested the following hypotheses: (1) More frequent experiences of weight stigma would be associated with greater symptoms of postpartum depression throughout the first year postpartum; (2) More frequent experiences of weight stigma would be associated with greater gestational weight gain and excess gestational weight gain as well as postpartum weight retention; and (3) More frequent experiences of weight stigma would be associated with greater cortisol and blood pressure over the postpartum period.

Method

CCHN study design. CCHN is a five-site research network funded by the NIH to conduct a collaborative, community participatory study with the goal of reducing racial, ethnic, and socioeconomic disparities in maternal-child health. The sites were Baltimore, Maryland; Los Angeles, California; Washington, DC; Lake County, Illinois; and several counties in Eastern North Carolina, each of which were funded with designated catchment areas serving low-income and diverse pregnant populations. Extensive information on recruitment, enrollment, and data collection procedures in the CCHN study along with detailed demographic and descriptive information about the full study sample are published elsewhere (see Dunkel Schetter et al., 2013; O'Campo et al., 2016; Ramey et al., 2015). In brief, this longitudinal study followed White, Black, and Latina women through home visits from one month after the birth of a child for two years and, for a subset who conceived again, throughout the subsequent pregnancy, birth, and postpartum. The CCHN data include information abstracted from medical records, biospecimens and biophysical measures, and psychosocial interview measures (including measures of discrimination) obtained at one month, six months, and one year postpartum.

Participants. The CCHN sample was composed of 2510 women between the ages of 18 and 40 who delivered a live infant at 20 or more weeks of gestation. Most participants were enrolled while still in the hospital soon after delivering their child, with the exception of one site that enrolled participants during their pregnancy.

The present study used a subsample of 214 participants who completed the everyday discrimination measure (see below) and selected "height or weight" as the reason to which they attributed their everyday experiences of discrimination. This represents approximately 12.7% of the full study sample. Overall, demographic characteristics in this subsample closely paralleled the full sample with no statistically significant differences on age, ethnicity, education, or poverty status (all p's > .16). See Table 2.1 for full and subsample comparisons.

Measures.

Predictor variable.

Weight-related discrimination. Experiences of weight stigma were assessed at one month postpartum using an expanded 10-item version of the Everyday Discrimination Scale (Williams et al., 2008). However, because the tenth item ("You are followed around in stores") was added later specifically to assess racial discrimination (Williams et al., 2008), this item was dropped in the present analyses. This measure was therefore scored using only the original nine items in the Everyday Discrimination Scale (Williams, Yan, Jackson, & Anderson, 1997). Participants responded indicating how frequently discriminatory experiences had occurred over the previous year, from "almost every day" to "never." As such, this measure captured the frequency of discrimination experienced over the recent pregnancy period. A sample item is "you are threatened or harassed." They also indicated what they attributed as the cause of these discriminatory experiences, selecting from a nine-item list of reasons for their experiences. One

option on this list was "your height or weight." Any participant who completed the scale and then endorsed her height or weight as the reason for her experiences of discrimination (even if she also selected additional reasons) was categorized as having experienced weight stigma during pregnancy. This measure was used as the predictor in all analyses. Cronbach's alpha reliability for the nine-item version of the scale in this sample = .88. See Appendix D for complete questionnaire.

Outcome variables.

Postpartum depression. Postpartum depression symptoms were assessed at one month, six months, and one year postpartum using the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987). Participants indicated how frequently 10 common postpartum depression symptoms had occurred over the previous seven days. A sample item is, "I have been so unhappy that I have been crying." In the sample of participants used in this study, Cronbach's alpha reliability = .77 at one month postpartum, .79 at six months postpartum, and .79 at one year postpartum. See Appendix D for complete questionnaire.

Pre-pregnancy and postpartum BMI. Pre-pregnancy weight and height were abstracted from medical records, when available. Weight and height were measured by study staff during home visits at six months and one year postpartum. Weight in kilograms was measured using a UC-321 Precision Person Health digital scale. Height in centimeters was measured using a rigid measuring tape as participants stood against a wall without shoes. BMI at each time point was then calculated according to the standard formula of weight[kg]/height^2[m]. The average pre-pregnancy BMI for participants was 30.34 (*SD* = 8.31). At six months postpartum, the average BMI was 32.06 (*SD* = 9.07), and at one year postpartum, the average BMI was 32.21, (*SD* = 9.23). BMI values were categorized according to the Institute of Medicine cutoffs for

underweight (< 18.5), normal weight (18.5 – 24.9), overweight (25.0 – 29.9), and obese (≥ 30.0). As such, at all time points, the average BMI was in the obese range.

Pregnancy weight gain. Pregnancy weight gain was calculated as the difference between the participant's weight at delivery and pre-pregnancy weight. Among participants with complete data to compute this variable (n = 149), the average pregnancy weight gain was 29.77 pounds (SD = 16.83).

Pregnancy weight gain (excess). Excess gestational weight gain was calculated as the amount of weight gain beyond the Institute of Medicine's maximum recommendation based on pre-pregnancy BMI classification (Institute of Medicine & National Research Council, 2009), which is 35 pounds for underweight and normal BMI, 25 pounds for overweight BMI, and 20 pounds for obese BMI. Among those participants with complete data to compute excess weight gain (n = 148), 49% had gained within the recommended range, and 51% had excessive weight gain. The average amount of excess weight gain was 3.63 pounds (SD = 17.39). This is similar to the larger CCHN dataset, where 53.7% were reported to have excess weight gain (Endres et al., 2015). These values are also roughly comparable to the national average rate of excess weight gain, which has been reported at 47% in population-based samples (Deputy et al., 2015).

Weight retention. Weight retention was assessed during home interviews at six months and one year postpartum and calculated as the difference between a participant's weight at each interview time point and her pre-pregnancy weight, when pre-pregnancy weight was available. Among participants with complete data to compute these variables (n = 86 and 98 respectively), the average weight retention at six months postpartum was 10.47 pounds (SD = 20.19) and at one year postpartum was 10.21 pounds (SD = 20.27).

Blood pressure. Systolic and diastolic blood pressure were measured three times over the course of the study visits held at six months and one year postpartum. Averages of the three measures were computed for each time point and used in analyses.

Cortisol. At both six months and one year postpartum, participants completed one day of diurnal salivary cortisol sampling. They provided saliva samples upon waking, 30 minutes after waking, and at bedtime. Cortisol awakening response (computed as the difference between the morning values), cortisol slope (computed from the morning and evening values), and total daily cortisol output (computed as the area under the curve; AUC) were calculated at each time point.

Covariates.

Demographic covariates. Demographic measures included mother's age at enrollment, years of education, household income per capita adjusted for cost of living, race/ethnicity, and study site.

Pregnancy- and health-related covariates. Pregnancy- and health-related measures included pre-pregnancy BMI, parity (dichotomous), type of delivery (vaginal versus C-section), inter-pregnancy interval, whether they were breastfeeding at each time point, hormonal contraception use, and steroid medication use.

Note. See Table 2.2 for descriptive statistics and comparisons by race/ethnicity on all variables of interest.

Data analytic plan. Hierarchical linear regression analyses were employed to evaluate everyday discrimination as a continuous predictor of outcomes of interest in each hypothesis. Potential covariates were first tested to ensure they did not interact with everyday discrimination (the predictor). The following potential covariates were then tested for statistical relationships with outcomes of interest: age at enrollment, years of education, income, cohabitation status, pre-

pregnancy BMI, breastfeeding status at the analytic time point, type of delivery, parity at time of delivery, inter-pregnancy interval, and study site. In the event that any covariate was significantly related to any outcome for a certain hypothesis, this covariate was then entered into all models in that set. Finally, for each set of tests, a false discovery rate analysis (Benjamini & Hochberg, 1995) was conducted to account for alpha accumulation across multiple tests.

Results

Participant race (Black/Latina/White) was related to everyday discrimination, $F(2, 209) = 3.22$, $p = .042$, with post-hoc analyses revealing that Black participants scored marginally significantly higher on everyday discrimination than White participants, $p = .070$. However, the interaction between everyday discrimination and participant race did not have a significant effect on any outcome (all p's > .211). Therefore, dummy vectors coding race with "White" as the reference group were included as covariates in the first step of all models. Additionally, because some women attributed their discrimination to other sources in addition to weight, a dichotomous variable coding whether they had multiple attributions was also entered as a covariate for all analyses. Although the weight attribution includes "height," everyday discrimination values were not significantly related to participants' height, $p = .767$, and participant height was therefore not included in any models. In sum, all models included race and whether multiple attributions were made along with unique covariates that emerged as significant per individual hypothesis.[1]

[1] Although pre-pregnancy BMI was not determined as statistically appropriate to include as a covariate in any models, separate analyses were also conducted controlling for this variable. Including this covariate did not affect the statistical significance for any outcome with the exception of weight retention at one year postpartum, where the relationship was reduced to marginal statistical significance, $p = .096$.

Hypothesis 1: Postpartum depressive symptoms. The following covariates were additionally included in the analyses for this hypothesis: mother's age and previous postpartum depressive symptoms (for analyses on measures at six months and one year postpartum).

Results of the hierarchical regressions analyses for each outcome are reported in Table 2.3. Overall, weight-related everyday discrimination predicted more postpartum depressive symptoms at both one month and one year postpartum, controlling for the specified covariates. Weight-related everyday discrimination was not significantly associated with postpartum depressive symptoms at six months postpartum.

Hypothesis 2: Weight-related outcomes. The following covariates were additionally included in the analyses for this hypothesis: mother's age and parity. There were differences in weight retention based on study site. Namely, participants from Baltimore had greater weight retention than those from Los Angeles or Washington, D.C. at six months postpartum ($p = .005$, .024, respectively) and than those from Los Angeles at one year postpartum ($p = .037$). These comparisons, though, were underpowered ($n < 18$ for all sites except Chicago). Additionally, weight retention was the only outcome for which there were differences by site. Site was therefore excluded as a covariate, although results remain significant when controlling for site.

Results of hierarchical regression analyses for each outcome are reported in Table 2.4. Weight-related everyday discrimination was associated with greater gestational weight gain and excess gestational weight gain and predicted more weight retention at one year postpartum, controlling for the specified covariates. It was not a significantly associated with weight retention at six months postpartum.

Hypothesis 3: Physiological outcomes. The following covariates were additionally included in the analyses for this hypothesis: mother's age, mother's education, and whether

delivery was via C-section (dichotomous). Hormonal contraception and steroid medication use were examined as potential covariates as these can influence cortisol, but neither was significant. These were therefore excluded as covariates.

Results of hierarchical regression analyses for each outcome are reported in Table 2.5. Weight-related everyday discrimination was not significantly associated with any parameter of blood pressure (systolic and diastolic) or cortisol (awakening response, slope, and total daily output) at any time point.

False discovery rate analyses. In summary, *p*-values for all previously significant findings neared or surpassed the corrected thresholds. See Table 2.6 for false discovery rate analyses for all hypotheses.

Discussion

The results of this study provide the first evidence of adverse psychological and physical health outcomes associated with experiencing weight stigma during pregnancy for postpartum women. This evidence emerged across multiple outcomes in a diverse sample of over 200 postpartum women. In particular, everyday discrimination attributed to weight was associated with overall and excess weight gain over pregnancy and depressive symptoms at one month postpartum. Weight discrimination also predicted greater postpartum weight retention and depressive symptoms at one year postpartum. This is particularly concerning given that postpartum depression and excess gestational weight gain are each associated with adverse maternal mental and physical health outcomes, such as difficulty bonding with the infant (Moehler et al., 2006) and long-term obesity risk (Rooney & Schauberger, 2002), respectively. However, this report of weight-related discrimination experienced over pregnancy did not predict physiological measures of blood pressure or cortisol over the postpartum period.

In terms of the significant effects observed, it is important to note that the findings were not merely driven by objective BMI. It is generally the case that overweight and obesity are associated with depressive symptomatology (Luppino et al., 2010) and that heavier women tend to gain more weight over pregnancy (Deputy et al., 2015). In this sample, though, pre-pregnancy BMI was not related to everyday discrimination scores or any of the outcomes of interest. Moreover, our results were consistent even when controlling for pre-pregnancy BMI (with the exception of weight retention at one year postpartum, where the relationship became marginally statistically significant). Therefore, it is likely not the case here that BMI was a third variable driving both the experience of weight stigma and the observed patterns of depressive symptomatology, gestational weight gain, and postpartum weight retention. This is not entirely surprising, though, considering that weight stigma can affect any individual who merely perceives him- or herself to be heavy (Himmelstein et al., 2015; Incollingo Rodriguez et al., 2016; Major et al., 2017). Accordingly, future research might consider the role that women's perception of their weight could play in the relationships reported here.

Interestingly, while weight-related discrimination predicted postpartum depressive symptoms and weight retention at one year postpartum, it did not predict these outcomes at six months postpartum. Although it is unclear as to why this pattern of findings emerged across the first two hypotheses, it is possible that this is not coincidental. The first year postpartum is a time of great physical and emotional changes for the mother. Perhaps, at the six-months postpartum mark, these outcomes of interest were still fluctuating too much for the potential influence of weight-related discrimination to emerge. By the one-year postpartum assessment, though, the mothers' physical and psychological states may have stabilized, allowing for this potential long-term relationship to be revealed. Future research can verify this pattern of results, particularly

through measuring weight stigma throughout the postpartum period to analyze both immediate and long-term influences.

One important caveat to note is that the direction of causality for outcomes measured at one month postpartum is not entirely certain given that everyday discrimination was measured concurrently. Therefore, it is possible that weight gain precipitated the weight-related discrimination. However, the nature of the Everyday Discrimination scale stem asks for a retrospective report over the previous year, meaning that the experiences ostensibly occurred within the timeframe of the pregnancy. This bolsters the interpretation that weight stigma may in fact have been driving the observed results, and not the reverse. This is also consistent with the broader weight stigma literature, which demonstrates that experiencing weight stigma promotes depressive symptomatology (Papadopoulos & Brennan, 2015) and even weight gain itself (Jackson et al., 2014). Nonetheless, future research should continue to investigate these relationships prospectively through obtaining detailed measures of experiences of weight stigma during pregnancy, which would improve upon this retrospective measure.

In terms of the null results observed for blood pressure and cortisol parameters, it is possible that this one-time measure of weight stigma, which was not designed specifically for this purpose, was simply not sensitive enough to predict long-term trajectories in these physiological measures. While the broader weight stigma literature demonstrates blood pressure and cortisol reactivity as a result of weight stigma, these findings come from experimental paradigms where blood pressure and cortisol reactivity were measured immediately after a stigmatizing experience (e.g., Himmelstein et al., 2015; Major et al., 2012; Schvey et al., 2014). Therefore, it is perhaps reasonable that a one-time retrospective measure of weight stigma would not relate to blood pressure or cortisol six months or one year later. Future research could

improve upon the analyses conducted here by measuring daily experiences of weight stigma and daily blood pressure and cortisol during selected weeks of pregnancy and postpartum to test whether weight stigma may have a more proximal effect on these relevant health markers.

In conclusion, although the original study from which these data were drawn did not have an *a priori* focus on weight stigma, the variables in the dataset provided a novel opportunity to investigate potential adverse effects of weight stigma in pregnancy. The results reported here suggest that, indeed, experiencing weight stigma during pregnancy may have deleterious long-term consequences. Moreover, the present study's hypotheses were tested in a diverse sample of mothers, suggesting that weight stigma in pregnancy may be problematic for women from a variety of racial and ethnic backgrounds and may affect low-SES women as well. Therefore, these findings make a meaningful contribution to our understanding of how social factors may affect maternal health over the postpartum period. This sets the foundation for future prospective longitudinal research to further investigate these relationships using more detailed and frequent measurements. Such data is necessary to identify the role that weight stigma may play in maternal health and perhaps ultimately inform on maternal mental and physical health initiatives.

General Conclusions

Overall, the findings from the two studies reported here demonstrate that pregnancy and postpartum are highly relevant contexts in which to investigate weight stigma. These studies provide novel and necessary information to address the concerning lack of knowledge on both the phenomenon and potential consequences of experiencing weight stigma in the context of pregnancy. In particular, in a large sample of predominantly heavy pregnant and postpartum women, Study 1 documented how, when, for whom, from whom, and how often weight stigma occurs during pregnancy and postpartum. In particular, this study highlighted family members, healthcare providers, media, and overall societal sentiments as prevalent sources of weight stigma directed at pregnant and postpartum women. This study also provided cross-sectional evidence of consequences that may be associated with experiencing weight stigma during this time, such as depressive symptoms, maladaptive dieting behavior, emotional eating behavior, psychological stress, and weight retention. Study 2 used a rich, longitudinal dataset to provide the first evidence that experiencing weight stigma during pregnancy may be prospectively associated with negative postpartum mental and physical health outcomes in a unique sample. These outcomes included gestational weight gain itself as well as postpartum health consequences, namely postpartum depressive symptoms and weight retention.

The downstream health implications of these findings for the mother, and perhaps even her child, are multifold. For instance, if experiencing weight stigma during pregnancy and postpartum is in fact associated with emotional eating behavior, gestational weight gain, and weight retention, then weight stigma may itself contribute to or exacerbate maternal obesity. Weight stigma may even be an underlying factor in the current rates of excess gestational weight gain, which are already high at 47% (Deputy et al., 2015). Maternal overweight/obesity and

excess gestational weight gain are serious, as they are associated with negative health outcomes such as increased risk of C-section delivery, macrosomia, and maternal hypertension (Johnson et al., 2013). Additionally, both studies found evidence that weight stigma experienced during pregnancy and postpartum is associated with postpartum depressive symptoms, which is a known health risk that affects not only the mother's well-being, but her child's as well. For instance, postpartum depression is associated with mother-infant bonding and breastfeeding difficulties (Dennis & McQueen, 2009; Moehler et al., 2006); impaired healthy weight gain, sleep, and physical health in infancy (Gress-Smith et al., 2012); and even risk for lower IQ in children (Sui et al., 2016). As such, the results reported here implicate weight stigma as a potential maternal-child health threat that may carry both immediate and long-term implications.

As discussed previously, the results of these studies should be considered in light of certain limitations. Namely, Study 1 used a cross-sectional design, and therefore, the direction of causality in all the findings is uncertain. For instance, it may be that women suffering from depression or those who tend to eat in maladaptive ways are more sensitive to weight stigma. Nonetheless, all significant results are consistent with both theoretical frameworks describing weight stigma and empirical evidence demonstrating its consequences in the broader literature. Study 1, however, lacked diversity in its sample and did not allow for the phenomenon to be examined in non-White women alone. Despite these limitations, Study 1 offered novel, detailed qualitative and quantitative data informing on how weight stigma manifests in pregnancy and postpartum. Regarding Study 2, because the CCHN data were collected for purposes unrelated to weight stigma, this study relied on a single retrospective report of weight stigma. However, a notable strength of Study 2 is that its results were found in a diverse sample of mothers, which suggests that weight stigma may affect a wide range of women during pregnancy and

postpartum. Future research can improve upon these limitations through implementing prospective longitudinal designs to collect multiple measures of experiences of weight stigma throughout pregnancy and postpartum as well as measures of mental, physical, and behavioral health consequences. Moreover, future studies can target various diverse groups of mothers to better examine how weight stigma affects pregnant and postpartum women of various races, ages, and weight statuses.

Together, the studies contribute to the broader theoretical framework on weight stigma. The results of these studies elucidate a new context in which weight stigma is present and demonstrate adverse consequences of experiencing weight stigma that are specific to maternal health. These studies are therefore highly relevant to both weight stigma and maternal health researchers and have the potential to inform on maternal healthcare practice and public policy. For instance, these results point to weight stigma, in addition to maternal obesity, as a maternal-child health concern. They also set the foundation for future research to use sophisticated prospective longitudinal designs to continue investigating weight stigma in the context of pregnancy so as to replicate and extend the results reported here. Such future research could ultimately support the instantiation of stigma-reduction efforts to improve maternal healthcare experiences, pregnancy outcomes, and long-term maternal-child health.

Table 1.1. Characteristics of the Study 1 Sample

Variable	Overall (*N* = 501)	Pregnant (*N* = 143)	Postpartum (*N* = 358)
Status			
Pregnant	28.5%	-	-
Postpartum	71.5%	-	-
Age (years)	28.31 (5.15)	28.86 (5.03)	28.07 (5.19)
Education			
None	0.3%	-	0.6%
Middle school or less	0.8%	-	1.1%
High school or GED	25.7%	25.2%	26%
Technical or vocational school	10%	5.6%	11.7%
Associate's degree	12.4%	14%	11.7%
Bachelor's degree	22.2%	23.8%	21.5%
Graduate degree	15%	20.3%	12.8%
Other or not reported	13.6%	11.2%	14.5%
Employment status			
On paid/maternity leave	6.8%	1.4%	8.9%
On unpaid leave	3.8%	1.4%	4.7%
Working part time	12.6%	12.6%	12.6%
Working full time	25.5%	32.9%	22.6%
Unemployed	6.2%	8.4%	5.3%
Full time homemaker	25.9%	26.6%	25.7%
Student	3%	3.5%	2.8%
On disability	0.4%	0.7%	0.3%
Other or not reported	15.8%	12.6%	17%
Race/Ethnicity			
White	67.3%	65.7%	67.9%
Black	2.8%	2.8%	2.8%
Latina	10.2%	11.2%	9.8%
Asian/Pacific Islander	2.8%	4.9%	2.0%
Other or multiracial	2.2%	2.8%	2.0%
Not reported	14.8	12.6%	15.6%
Income per capita (in thousands of dollars)	70.53 (61.92)	75.17 (73.62)	68.54 (56.18)
Household size	3.67 (1.34)	2.84 (1.03)	4.01 (1.31)
Poverty status			
At or below federal poverty line	12%	9.8%	12.8%
100%-200% of the federal poverty line	19.2%	18.9%	19.3%
> 200% of the federal poverty line	50.5%	57.3%	47.8%
Not reported	18.4%	14%	20.1%
Relationship with baby's father			
Married	60.3%	69.2%	56.7%
Not married but in a relationship	22.6%	17.5%	24.6%
Not in a relationship	3.8%	2.8%	4.2%
Not reported	13.4%	10.5%	14.5%
Pregnant with/delivered first child	52.9%	55.3%	46.9%
Weeks of gestation	-	25.75 (8.56)	-
Age of baby (months)	-	-	5.59 (3.69)
C-section delivery	-	-	32.4%
Gestational age at delivery (weeks)	-	-	38.97 (1.90)
Infant birthweight (grams)	-	-	3420.94 (554.94)
Pre-pregnancy BMI	33.66 (11.19)	36.11 (12.21)	32.68 (10.61)
Pre-pregnancy BMI categories			
Underweight	2.6%	2.8%	2.5%
Normal weight	26.1%	22.4%	27.7%

Overweight	17.2%	11.2%	19.6%
Obese	54.1%	63.6%	50.3%
Positive gestational diabetes status	11.2%	9.1%	12%
Provider recommended to limit weight gain	37.3%	-	-
Provider said gest. weight gain was too much	-	6.3%	10.6%

Note. Numbers in parentheses are standard deviations

Table 1.2. Aim 1: Descriptive Information on Sources and Frequency of Weight Stigmatizing Experiences

Source	Overall *n* = 501		Overweight/Obese *n* = 357		Example
	Percent endorsed[1]	Average Frequency[2]	Percent endorsed[3]	Average Frequency[2]	
Overall		2.37 (1.17)		2.41 (1.13)	
Work	13.8%	2.41 (1.55)	13.7%	2.27 (1.46)	“A coworker said I didn’t look pregnant, just fat.”
Immediate family	21%	1.90 (0.99)	20.7%	2.04 (1.08)	“A good number of my family told me that I shouldn't ‘trying’ to get pregnant because I'm too heavy after they found out I was expecting.”
Extended family	12.2%	1.67 (1.01)	13.4%	1.69 (1.10)	"People at your size shouldn't have kids."
Friends	14%	1.94 (1.14)	14.6%	1.94 (1.16)	"You’re going to kill your baby.”
Church	4%	1.80 (1.00)	4.2%	1.73 (1.03)	"You should put it up for adoption, you are going to make it fat"
Partner	11%	2.51 (1.45)	10.4%	2.57 (1.61)	“He’s said he prefers me skinnier and he hopes I can lose all this weight shortly after delivering.”
Healthcare provider	18.4%	1.54 (0.58)	24.4%	1.56 (0.59)	“One doctor told me I was terrible for getting pregnant at my weight… I was setting up my baby to fail... I was in tears and he told me I was being too sensitive.”
Strangers	21.2%	2.26 (1.26)	23.2%	2.28 (1.28)	“Just being told I shouldn’t be pregnant.”
Media	24.6%	3.67 (1.76)	31.1%	3.66 (1.73)	“Heavier pregnant women are never represented in media.”
Other moms	14.2%	2.51 (1.41)	15.1%	2.35 (1.29)	"I don't get how women can gain so much weight during pregnancy."
Society in general	33.9%	3.56 (1.78)	41.7%	3.65 (1.82)	“It is thought to be true that fat=lazy and an unhealthy pregnancy.”
Other	2.6%	3.50 (2.61)	2.2%	3.50 (2.62)	“I just get upset about my weight.”
None	35.1%	-	13.7%	-	

Note. Numbers in parentheses are standard deviations

[1]Chi-square goodness of fit test revealed that sources were not endorsed at equal rates, $\chi^2(11) = 264.41$, $p < .001$.

[2]1 = less than once a month; 2 = a few times a month; 3 = at least once a week; 4 = a few times a week; 5 = almost every day; 6 = one or two times a day; 7 = three or more times a day

[3]Chi-square goodness of fit test revealed that sources were not endorsed at equal rates, $\chi^2(11) = 272.46$, $p < .001$.

Table 1.3. Regression Analyses for Variables Predicting Outcomes in Hypotheses 3B.1-3

Number of Sources Endorsed (*n* = 501)				
Variable	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	< .001	0.01	-.001	.990
Perceived weight	0.45	0.10	.29	< .001
Average Frequency of Weight Stigma[1] (*n* = 325)				
Variable	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-0.01	0.01	-.08	.332
Perceived weight	0.12	0.07	.13	.088
Weight Stigma Concerns (*n* = 451)				
Variable	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.18	0.05	.21	< .001
Perceived weight	2.69	0.40	.38	< .001

[1]1 = less than once a month; 2 = a few times a month; 3 = at least once a week; 4 = a few times a week; 5 = almost every day; 6 = one or two times a day; 7 = three or more times a day

Table 1.4. ANOVA Results for Hypotheses 4A.1-3 and 4B.1-3

Perception of Pregnancy Weight Gain							
Outcome	"Too little" *n* = 40, 27, 37	"About right" *n* = 337, 201 307	"Too much" *n* = 113, 90 100	*df*	*F*	*p*-value	Post-hoc
Number of sources	2.18 (2.06)	1.63 (2.05)	2.62 (2.37)	2, 487	9.48	< .001	b < c***
Average frequency[1]	2.62 (0.89)	2.25 (1.19)	2.53 (1.18)	2, 315	2.55	.079	-
Stigma concerns	23.67 (10.47)	21.27 (9.82)	24.33 (8.68)	2, 441	4.29	.014	b < c*
Perception of How Apparent the Pregnancy Is/Was							
Outcome	"Not at all" *n* = 28, 42, 55	"Somewhat apparent" *n* = 62, 85, 114	"Very apparent" *n* = 53, 104, 148	*df*	*F*	*p*-value	Post-hoc
Number of sources	2.54 (2.52)	1.65 (1.70)	1.49 (1.85)	2, 140	2.87	.060	-
Average frequency[1]	2.56 (1.32)	2.25 (0.97)	2.46 (1.23)	2, 228	1.28	.281	-
Stigma concerns	20.20 (10.79)	23.11 (9.51)	20.93 (9,65)	2, 314	2.27	.105	-

Note. Numbers in parentheses are standard deviations; *df* = degrees of freedom
[1]1 = less than once a month; 2 = a few times a month; 3 = at least once a week; 4 = a few times a week; 5 = almost every day; 6 = one or two times a day; 7 = three or more times a day
*p < .05, **p < .01, ***p < .001

Table 1.5. Chi-square Frequency Tables for Hypotheses 4A.4 and 4B.4

Perceived Weight Gain						
Category	Not at all distressing	Somewhat distressing	Very distressing	χ^2	*df*	*p*-value
Too little	1	20	5			
About right	18	142	41	6.52	4	.164
Too much	5	55	29			
Perception of How Apparent the Pregnancy Is						
Category	Not at all distressing	Somewhat distressing	Very distressing	χ^2	*df*	*p*-value
Not at all	16	6	22			
Somewhat	2	33	4	43.22	4	<.001
Very	23	58	34			

Note. *df* = degrees of freedom

Table 1.6. Regression Analyses for Variables Predicting Outcomes in Hypotheses 4C.1-3

Number of Sources Endorsed (n = 355)				
Variable	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.06	0.01	.31	< .001
Months postpartum	0.08	0.03	.14	.007
Weight retention	0.02	0.01	.20	< .001
Average Frequency of Weight Stigma[1] (n = 230)				
Variable	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.004	0.007	.04	.599
Months postpartum	0.01	0.02	.04	.604
Weight retention	0.003	0.003	.07	.354
Weight Stigma Concerns (n = 316)				
Variable	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.50	0.05	.55	< .001
Months postpartum	0.44	0.13	.17	.001
Weight retention	0.08	0.02	.17	.001

[1]1 = less than once a month; 2 = a few times a month; 3 = at least once a week; 4 = a few times a week; 5 = almost every day; 6 = one or two times a day; 7 = three or more times a day

Table 1.7. Regression and ANOVA Analyses Examining Outcomes in Aim 5B.2

Average Frequency of Weight Stigmatizing Experiences in Healthcare[1] (*n* = 79)				
Variable	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.35	0.01	.15	.197
Household income per capita	< .001	< .001	-.15	.193

ANCOVA Results for Frequency in Healthcare by Federal Poverty Status						
Variable	< 100% FPL *n* = 7	100-200% FPL *n* = 17	> 200% FPL *n* = 55	*df*	*F*	*p*-value
Frequency in healthcare[1]	1.71 (0.76)	1.47 (0.51)	1.53 (0.57)	2, 75	0.53	.588
Pre-pregnancy BMI	-	-	-	1, 75	2.18	.144

Note. Numbers in parentheses are standard deviations; FPL = federal poverty line; *df* = degrees of freedom

[1]1 = less than once a month; 2 = a few times a month; 3 = at least once a week; 4 = a few times a week; 5 = almost every day; 6 = one or two times a day; 7 = three or more times a day

Table 1.8. Regression Analyses for Variables Predicting Outcomes in Hypotheses 6A

DEPRESSIVE SYMPTOMS								
	Pregnant Participants (*n* = 138)				Postpartum Participants (*n* = 337)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.02	0.03	.06	.509	0.06	0.03	.12	.030
Multiparous	-0.99	0.80	-.10	.216	-0.02	0.59	-.002	.975
Weeks pregnant OR months postpartum	0.04	0.05	.08	.366	0.26	0.08	.17	.001
Number of sources	0.71	0.20	.30	.001	0.49	0.13	.20	< .001
	Pregnant Participants (*n* = 89)				Postpartum Participants (*n* = 215)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.02	0.04	.06	.589	0.07	0.03	.14	.040
Multiparous	-0.68	1.01	-.07	.500	-0.75	0.72	-.07	.301
Weeks pregnant OR months postpartum	0.02	0.06	.04	.726	0.23	0.10	.17	.015
Average frequency[1]	0.65	0.42	.16	.132	0.56	0.31	.12	.073
MALADAPTIVE DIETING BEHAVIOR								
	Pregnant Participants (*n* = 131)				Postpartum Participants (*n* = 310)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.04	0.08	.04	.636	0.14	0.06	.13	.025
Multiparous	-1.01	1.92	-.05	.602	0.98	1.38	.04	.478
Weeks pregnant OR months postpartum	-0.16	0.11	-.12	.165	0.26	0.19	.08	.167
Number of sources	1.70	0.48	.30	.001	1.55	0.31	.29	< .001
	Pregnant Participants (*n* = 87)				Postpartum Participants (*n* = 200)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.06	0.10	.06	.566	0.17	0.08	.15	.029
Multiparous	-0.64	2.51	-.03	.800	-1.50	1.70	-.06	.377
Weeks pregnant OR months postpartum	-0.26	0.14	-.20	.077	0.24	0.22	.08	.286
Average frequency[1]	-0.04	1.07	-.004	.974	2.46	0.73	.23	.001
EMOTIONAL EATING BEHAVIOR								
	Pregnant Participants (*n* = 130)				Postpartum Participants (*n* = 305)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.15	0.06	.20	.024	0.16	0.05	.19	.002
Multiparous	0.75	1.58	.04	.638	-1.25	1.11	-.07	.262
Weeks pregnant OR months postpartum	0.09	0.09	.08	.333	0.20	0.15	.08	.187
Number of sources	1.06	0.40	.23	.009	0.54	0.25	.13	.030
	Pregnant Participants (*n* = 88)				Postpartum Participants (*n* = 197)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	0.22	0.08	.30	0.04	0.15	0.06	.17	.017
Multiparous	4.51	1.89	.24	.019	0.14	1.38	.01	.918
Weeks pregnant OR months postpartum	-0.01	0.11	-.01	.907	0.24	0.18	.10	.181
Average frequency[1]	0.07	0.79	.01	.927	1.52	0.61	.18	.013

Note. Parity was coded dichotomously.

[1]1 = less than once a month; 2 = a few times a month; 3 = at least once a week; 4 = a few times a week; 5 = almost every day; 6 = one or two times a day; 7 = three or more times a day

Table 1.8 continued

PERCEIVED STRESS								
	Pregnant Participants (*n* = 130)				Postpartum Participants (*n* = 313)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-0.01	0.02	-.03	.764	0.02	0.02	.06	.306
Multiparous	-0.37	0.60	-.05	.542	0.40	0.40	.05	.325
Weeks pregnant OR months postpartum	0.04	0.04	.09	.295	0.24	0.05	.24	< .001
Number of sources	0.41	0.15	.24	.007	0.39	0.09	.24	< .001
	Pregnant Participants (*n* = 88)				Postpartum Participants (*n* = 200)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-0.01	0.03	-.02	.849	0.02	0.02	.07	.331
Multiparous	0.04	0.74	.01	.962	0.10	0.51	.01	.841
Weeks pregnant OR months postpartum	0.01	0.04	.03	.758	0.23	0.07	.24	.001
Average frequency[1]	0.54	0.31	.19	.086	0.69	0.22	.21	.002
GESTATIONAL WEIGHT GAIN or POSTPARTUM WEIGHT RETENTION								
	Pregnant Participants (*n* = 143)				Postpartum Participants (*n* = 355)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-0.54	0.10	-.36	< .001	-0.73	0.12	-.33	< .001
Multiparous	-0.28	2.40	-.01	.909	0.73	2.48	.02	.769
Weeks pregnant OR months postpartum	1.05	0.14	.49	< .001	0.33	0.34	.04	.320
Number of sources	-0.59	0.61	-.06	.341	2.09	0.56	.20	< .001
	Pregnant Participants (*n* = 93)				Postpartum Participants (*n* = 230)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*B*	*p*-value
Pre-pregnancy BMI	-0.60	0.12	-.39	< .001	-0.72	0.16	-.29	< .001
Multiparous	-0.50	3.01	-.01	.870	-0.28	3.51	-.01	.937
Weeks pregnant OR months postpartum	1.06	0.17	.51	< .001	0.45	0.46	.06	.328
Average frequency[1]	0.27	1.27	.02	.833	1.34	1.45	.06	.356

Note. Parity was coded dichotomously.

[1]1 = less than once a month; 2 = a few times a month; 3 = at least once a week; 4 = a few times a week; 5 = almost every day; 6 = one or two times a day; 7 = three or more times a day

Table 1.9. Regression Analyses for Variables Predicting Outcomes in Exploratory Hypotheses 6B

PHYSICAL ACTIVITY								
	Pregnant Participants (n = 130)				Postpartum Participants (n = 307)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-0.01	0.01	-.16	.076	-0.01	0.01	-.10	.105
Multiparous	-0.002	0.18	-.001	.991	-0.13	0.11	-.07	.256
Weeks pregnant OR months postpartum	-0.01	0.01	-.10	.255	-0.002	0.02	.01	.903
Number of sources	0.004	0.04	.01	.925	0.02	0.03	.05	.417
	Pregnant Participants (n = 88)				Postpartum Participants (n = 198)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-0.01	0.01	-.09	.395	-0.01	0.01	-.14	.057
Multiparous	0.01	0.23	.004	.970	-0.01	0.14	-.004	.953
Weeks pregnant OR months postpartum	-0.02	0.01	-.14	.213	-0.001	0.02	-.004	.961
Average frequency[1]	0.03	0.10	.04	.734	0.02	0.06	.02	.796
GESTATIONAL AGE AT DELIVERY (IN WEEKS)								
	Pregnant Participants				Postpartum Participants (n = 357)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-	-	-	-	-0.02	0.01	-.09	.125
Multiparous	-	-	-	-	-0.34	0.21	-.09	.104
Weeks pregnant OR months postpartum	-	-	-	-	< .001	0.03	-.001	.990
Number of sources	-	-	-	-	-0.03	0.05	-.04	.514
	Pregnant Participants				Postpartum Participants (n = 232)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-	-	-	-	-0.02	0.01	-.09	.205
Multiparous	-	-	-	-	-0.18	0.28	-.04	.521
Weeks pregnant OR months postpartum	-	-	-	-	0.01	0.04	.01	.869
Average frequency[1]	-	-	-	-	-0.03	0.12	-.02	.817
BIRTHWEIGHT (IN GRAMS)								
	Pregnant Participants				Postpartum Participants (n = 354)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-	-	-	-	5.22	2.88	.10	.071
Multiparous	-	-	-	-	87.31	61.69	.08	.158
Weeks pregnant OR months postpartum	-	-	-	-	11.35	8.31	.08	.173
Number of sources	-	-	-	-	6.01	14.01	.02	.668
	Pregnant Participants				Postpartum Participants (n = 230)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-	-	-	-	7.13	3.61	.13	.050
Multiparous	-	-	-	-	107.48	80.56	.09	.183
Weeks pregnant OR months postpartum	-	-	-	-	10.46	10.44	.07	.317
Average frequency[1]	-	-	-	-	-8.93	33.20	-.02	.788

Note. Parity was coded dichotomously.

[1]1 = less than once a month; 2 = a few times a month; 3 = at least once a week; 4 = a few times a week; 5 = almost every day; 6 = one or two times a day; 7 = three or more times a day

Table 1.9 continued

INTENDED/ACTUAL DURATION OF BREASTFEEDING (IN MONTHS)								
	Pregnant Participants (*n* = 121)				Postpartum Participants (*n* = 291)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-0.01	0.03	-0.02	.854	-2.22	1.20	-.11	.065
Multiparous	-0.59	0.73	-0.08	.420	-2.90	25.75	-.01	.910
Weeks pregnant OR months postpartum	-0.06	0.04	-0.12	.201	0.39	3.51	.01	.911
Number of sources	-0.29	0.18	-0.15	.114	-7.53	5.64	-.08	.183
	Pregnant Participants (*n* = 82)				Postpartum Participants (*n* = 188)			
Variable	*B*	*SE B*	*β*	*p*-value	*B*	*SE B*	*β*	*p*-value
Pre-pregnancy BMI	-0.004	0.04	-.01	.911	-2.62	1.28	-.15	.043
Multiparous	-0.38	0.89	-.05	.675	9.64	28.28	.03	.733
Weeks pregnant OR months postpartum	-0.08	0.05	-.19	.104	4.72	3.79	.09	.215
Average frequency[1]	-0.07	0.37	-.02	.840	-8.17	12.52	-.05	.515

Note. Parity was coded dichotomously.

[1]1 = less than once a month; 2 = a few times a month; 3 = at least once a week; 4 = a few times a week; 5 = almost every day; 6 = one or two times a day; 7 = three or more times a day

Table 1.10. False Discovery Rate Analyses for Study 1 Aims

Rank of *p*-value	Test	Original *p*-value	Corrected threshold
	AIM 3		
1	Pre-pregnancy BMI and number of coping strategies (3C.2)	< .001	.004
2	Perceived weight and number of sources endorsed (3B.1)	< .001	.008
3	Perceived weight and stigma concerns (3B.3)	< .001	.013
4	Pre-pregnancy BMI and number of sources endorsed (3A.1)	< .001	.046
5	Perceived weight and average frequency of weight stigma (3B.2)	.088	.017
6	Pre-pregnancy BMI and frequency of stigma in healthcare (3D)	.126	.021
7	Perceived weight by distressing category (3B.4)	.146	.025
8	Pre-pregnancy BMI by distressing category (3C.1)	.169	.029
9	Pre-pregnancy BMI and positivity of prenatal healthcare (3D)	.206	.033
10	Pre-pregnancy BMI and positivity of postpartum healthcare (3D)	.299	.038
11	Pre-pregnancy BMI and positivity of labor & delivery healthcare (3D)	.365	.042
12	Pre-pregnancy BMI and frequency of weight stigma (3A.2)	.736	.050
	AIM 4		
1	Number of sources by perception of weight gain (4A.1)	< .001	.006
2	Distressing category and appearance of pregnancy (4C.4)	< .001	.013
3	Stigma concerns by perception of weight gain (4A.3)	.014	.019
4	Number of sources by appearance of pregnancy (4B.1)	.060	.025
5	Average frequency of weight stigma and perception of weight gain (4A.2)	.079	.031
6	Stigma concerns by appearance of pregnancy (4B.3)	.105	.038
7	Distressing category and perception of weight gain (4A.4)	.164	.044
8	Average frequency of weight stigma by appearance of pregnancy (4B.2)	.281	.050
	AIM 5		
1	Frequency in healthcare by federal poverty status (5B.2)	.144	.025
2	Household income per capita and frequency in healthcare (5B.2)	.193	.05
	AIM 6 (PREGNANT PARTICIPANTS)		
1	Number of sources and depressive symptoms (6A.1)	.001	.004
2	Number of sources and maladaptive dieting (6A.2)	.001	.007
3	Number of sources and perceived stress (6A.3)	.007	.011
4	Number of sources and emotional eating (6A.2)	.009	.014
5	Average frequency of weight stigma and perceived stress (6A.3)	.086	.018
6	Number of sources and intended breastfeeding (6B.4)	.114	.021
7	Average frequency of weight stigma and depressive symptoms (6A.1)	.132	.025
8	Number of sources and weight gain (6A.4)	.341	.029
9	Average frequency of stigma and physical activity (6B.1)	.734	.032
10	Average frequency of weight stigma and weight gain (6A.4)	.833	.036
11	Average frequency of weight stigma and intended breastfeeding (6B.4)	.840	.039
12	Number of sources and physical activity (6B.1)	.925	.043
13	Average frequency of weight stigma and emotional eating (6A.2)	.927	.046
14	Average frequency of weight stigma and maladaptive dieting (6A.2)	.974	.05

Note. For this false discovery rate analysis, outcomes from each aim are listed in rank-order of their *p*-values. Each rank is multiplied by 0.05 and divided by the number of tests in the analyses to produce a corrected threshold for determining significance (Benjamini & Hochberg, 1995).

Table 1.10 continued

Rank of *p*-value	Test	Original *p*-value	Corrected threshold
	AIM 6 (POSTPARTUM WOMEN)		
1	Number of sources and depressive symptoms (6A.1)	< .001	.003
2	Number of sources and maladaptive dieting (6A.2)	< .001	.006
3	Number of sources and perceived stress (6A.3)	< .001	.008
4	Number of sources and weight retention (6A.5)	< .001	.011
5	Average frequency of weight stigma and maladaptive dieting (6A.2)	.001	.014
6	Average frequency of weight stigma and perceived stress (6A.3)	.002	.017
7	Average frequency of weight stigma and emotional eating (6A.2)	.013	.019
8	Number of sources and emotional eating (6A.2)	.030	.022
9	Average frequency of weight stigma and depressive symptoms (6A.1)	.073	.025
10	Number of sources and breastfeeding duration (6B.4)	.183	.028
11	Average frequency of weight stigma and weight retention (6A.5)	.356	.031
12	Number of sources and physical activity (6B.1)	.417	.033
13	Number of sources and delivery gestational age (6B.2)	.514	.036
14	Average frequency of weight stigma and breastfeeding duration (6B.4)	.515	.039
15	Number of sources and birthweight (6B.3)	.668	.042
16	Average frequency of weight stigma and birthweight (6B.3)	.788	.044
17	Average frequency of weight stigma and physical activity (6B.1)	.796	.047
18	Average frequency of weight stigma and delivery gestational age (6B.2)	.817	.050

Note. For this false discovery rate analysis, outcomes from each aim are listed in rank-order of their *p*-values. Each rank is multiplied by 0.05 and divided by the number of tests in the analyses to produce a corrected threshold for determining significance (Benjamini & Hochberg, 1995).

Table 2.1. Comparison of Demographic Characteristics Between the Study 2 Full and Sub Samples

Variable	Full Sample N = 2510	Subsample n = 214	χ^2 or t	p-value
Age	25.68 (5.67)	25.24 (5.55)	1.15	.251
Ethnicity			0.31	.86
Black	53.7%	50.5%		
Latina	22.1%	23.4%		
White	24.2%	26.2%		
Education			1.80	.772
Less than high school	18.7%	20.6%		
High school or equivalent	42.8%	47.2%		
Some college	22.5%	19.2%		
Bachelor's degree or equivalent	14.8%	12.1%		
Other	1.2%	0.9%		
Poverty status			3.61	.165
At or below the federal poverty line	43.0%	52.3%		
100%-200% of the federal poverty line	27.4%	21.1%		
> 200% of the federal poverty line	29.6%	26.6%		

Note. Unless displayed with a % symbol, values refer to means, and standard deviations are in parentheses.

Table 2.2. Descriptive statistics and comparison by race on variables of interest

Variable	Overall N_{total} = 214	Black n = 108	Latina n = 50	White n = 56	Test statistic	p-value	Tukey post-hoc
PREDICTOR VARIABLE							
Everyday Discrimination	14.24 (7.20)	15.47 (7.56)	13.14 (8.19)	12.86 (4.95)	F = 3.22	.042	a > c
Endorsed multiple attributions	82.2%	79.6%	90%	80.4%	χ^2 = .80	.670	
HYPOTHESIS 1							
Postpartum depressive symptoms							
One month postpartum	6.11 (4.43)	6.50 (4.86)	5.90 (4.09)	5.56 (3.84)	F = 0.86	.423	
Six months postpartum	5.71 (4.41)	6.44 (4.58)	5.59 (5.03)	4.67 (3.54)	F = 2.29	.105	
One year postpartum	5.14 (4.41)	4.94 (4.77)	5.94 (3.77)	4.88 (4.19)	F = 0.70	.500	
HYPOTHESIS 2							
Pregnancy weight gain (pounds)	29.77 (16.83)	31.82 (19.65)	28.28 (14.78)	28.16 (13.89)	F = 0.83	.437	
Excess weight gain (pounds)	3.63 (17.39)	5.93 (19.95)	1.73 (15.89)	2.16 (14.41)	F = 0.96	.384	
Weight retention							
Six months postpartum	10.47 (20.19)	14.20 (23.72)	8.66 (16.21)	7.81 (18.53)	F = 0.92	.401	
One year postpartum	10.21 (20.27)	12.69 (19.35)	12.16 (22.38)	5.52 (19.40)	F = 1.28	.282	
HYPOTHESIS 3							
Systolic blood pressure							
Six months postpartum	112.33 (13.63)	115.54 (14.75)	107.27 (12.25)	110.80 (11.71)	F = 3.99	.021	a > b*
One year postpartum	112.03 (12.87)	113.50 (15.09)	108.98 (10.84)	111.64 (9.40)	F = 1.31	.274	
Diastolic blood pressure							
Six months postpartum	75.83 (12.09)	78.53 (14.02)	70.96 (9.82)	75.04 (9.27)	F = 3.84	.024	a > b*
One year postpartum	74.28 (10.11)	75.72 (11.21)	70.39 (9.81)	74.53 (7.46)	F = 2.96	.055	a > b*
Total cortisol output (μg/dL)							
Six months postpartum	5.23 (2.68)	5.54 (3.67)	4.30 (2.16)	5.47 (1.89)	F = 1.34	.269	a < c
One year postpartum	4.97 (3.62)	4.09 (2.19)	4.20 (2.37)	6.34 (4.90)	F = 3.30	.043	
Cortisol awakening response (μg/dL)							
Six months postpartum	0.03 (0.32)	-0.04 (0.40)	-0.01 (0.31)	0.09 (0.27)	F = 1.14	.325	
One year postpartum	0.02 (0.29)	-0.08 (0.27)	0.03 (0.21)	0.13 (0.33)	F = 2.93	.062	a < c*
Cortisol slope							
Six months postpartum	-0.02 (0.03)	-0.02 (0.04)	-0.03 (0.02)	-0.03 (0.02)	F = 0.47	.625	
One year postpartum	-0.02 (0.2)	-0.02 (0.02)	-0.02 (0.02)	-0.03 (0.02)	F = 0.25	.782	
COVARIATES							
Age at enrollment (years)	25.24 (5.55)	23.70 (4.58)	24.18 (4.68)	29.17 (6.14)	F = 23.05	< .001	a<c*** b<c***
Education (years)	12.69 (2.60)	12.44 (1.90)	11.02 (2.37)	14.66 (2.75)	F = 35.56	< .001	a>b*** a<c**

Household income per capita (in thousands of dollars)	12.14 (18.95)	8.52 (12.42)	5.92 (7.09)	24.55 (28.72)	F = 19.88	< .001	b<c*** a<c*** b<c ***
Cohabiting with father 1-year postpartum	53.7%	32.4%	70%	80.4%	χ^2 = 21.14	< .001	
Study site					χ^2 = 135.66	< .001	
Baltimore, MD	14%	24.1%	-	7.1%			
Chicago, IL	25.2%	8.3%	46%	39.3%			
Los Angeles, CA	18.7%	9.3%	40%	17.9%			
Eastern NC	18.5%	21.3%	-	30.4%			
Washington, DC	23.4%	37%	14%	5.4%			
Pre-pregnancy BMI	30.34 (8.31)	30.66 (9.08)	29.78 (7.02)	30.43 (8.53)	F = 0.10	.906	
Pre-pregnancy BMI categories							
Under/normal weight	33.3%	35.4%	31.1%	32.5%			
Overweight	23.3%	13.8%	37.8%	22.5%	χ^2 = 9.11	.058	
Obese	43.3%	50.8%	31.1%	45%			
Multiparous	55.4%	58%	59.2%	47.2%	χ^2 = 1.62	.444	
C-section delivery	45.9%	46.1%	34.0%	56.6%	χ^2 = 5.80	.055	
Inter-pregnancy interval (months)	18.87 (10.67)	14.91 (3.34)	22.78 (18.64)	19.89 (9.81)	F = 0.69	.516	
Ever breastfed	67.1%	57.1%	88.9%	69.6%	χ^2 = 7.19	.027	
Hormonal contraception use	33.8%	42.2%	15.4%	32.6%	χ^2 = 12.60	.002	
Steroid medication use	0.7%	1.4%	0%	0%			

Note. Unless displayed with a % symbol, values refer to means, and standard deviations are in parentheses.
a = Black, b = Latina, c = White
$^{\square}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table 2.3. Hierarchical Regression Analyses for Variables Predicting Outcomes in Hypothesis 1

ONE MONTH POSTPARTUM DEPRESSIVE SYMPTOMS (N = 206)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	1.14	0.82	.13	0.90	0.82	.10
Latina Versus White	0.56	0.94	.05	0.57	0.93	.06
Multiple attributions	-0.23	0.83	-.02	-0.28	0.82	-.02
Age	0.04	0.06	.05	0.05	0.06	.06
Everyday discrimination				0.12**	0.04**	.19**
R^2		.01			.05	
ΔR^2					.04**	
SIX MONTHS POSTPARTUM DEPRESSIVE SYMPTOMS (N = 137)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	1.77*	0.88*	.21*	1.80*	0.89*	.21*
Latina Versus White	1.21	1.08	.11	1.22	1.08	.11
Multiple attributions	1.10	0.97	.10	1.17	0.98	.10
Age	0.04	0.07	.06	0.04	0.07	.10
Previous PPD	0.29***	0.08***	.29***	.31***	0.09***	.30***
Everyday discrimination				-0.05	.06	-.07
R^2		.12			.13	
ΔR^2					.01	
ONE YEAR POSTPARTUM DEPRESSIVE SYMPTOMS (N = 123)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	0.07	0.87	.01	-0.01	0.86	-.001
Latina Versus White	1.78	1.07	.16	1.75	1.06	.15
Multiple attributions	1.47	0.90	.13	1.39	0.89	.12
Age	0.13□	0.07□	.18□	0.13*	0.07*	.18*
Previous PPD	0.48***	0.08***	.46***	0.46***	0.08***	.46***
Everyday discrimination				0.11*	0.05*	.16*
R^2		.29			.31	
ΔR^2					.02*	

□p < .10; *p < .05; **p < .01; ***p < .001

Table 2.4. Hierarchical Regression Analyses for Variables Predicting Outcomes in Hypothesis 2

GESTATIONAL WEIGHT GAIN (*N* = 146)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	2.49	3.70	.07	0.87	3.71	.03
Latina Versus White	-2.13	3.99	-.06	-2.55	3.93	-.07
Multiple attributions	6.85□	3.72□	.15□	6.77□	3.66□	.15□
Age	-0.55□	0.28□	-.18□	-0.52□	0.28□	-.17□
Parity	-7.23*	2.85*	-.21*	-7.16□	2.80□	-.21□
Everyday discrimination				0.42*	0.18*	.19*
R^2		.12			.15	
ΔR^2					.03*	
EXCESS GESTATIONAL WEIGHT GAIN (*N* = 145)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	2.70	3.93	.08	0.83	3.91	.02
Latina Versus White	-2.44	4.23	-.06	-2.96	4.14	-.08
Multiple attributions	4.83	4.01	.10	4.42	3.93	.09
Age	-0.44	0.30	-.14	-0.41	0.30	-.13
Parity	-6.32*	3.02*	-.18*	-6.15*	2.96*	-.18*
Everyday discrimination				0.51**	0.19**	.22**
R^2		.08			.13	
ΔR^2					.04**	
SIX MONTHS POSTPARTUM WEIGHT RETENTION (*N* = 81)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	4.08	5.69	.10	2.96	5.81	.07
Latina Versus White	-2.65	6.75	-.06	-3.30	6.79	-.07
Multiple attributions	7.88	6.82	.13	6.99	6.89	.12
Age	-0.75□	0.44□	-.23□	-0.72	0.44	-.22
Parity	-4.09	4.74	-.10	-4.00	4.74	-.10
Everyday discrimination				0.33	0.34	.11
R^2		.09			.10	
ΔR^2					.01	
ONE YEAR POSTPARTUM WEIGHT RETENTION (*N* = 93)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	4.79	5.12	.12	1.86	5.29	.05
Latina Versus White	6.18	5.88	.14	5.03	5.79	0.11
Multiple attributions	9.05	5.53	.17	8.91	5.43	.17
Age	-0.56	0.41	-.17	-0.59	0.40	-.18
Parity	-5.06	4.16	-.13	-5.10	4.09	-.13
Everyday discrimination				0.59*	0.28*	.21*
R^2		.11			.15	
ΔR^2					.04*	

□$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Table 2.5. Hierarchical Regression Analyses for Variables Predicting Outcomes in Hypothesis 3

SIX MONTHS SYSTOLIC BLOOD PRESSURE (N = 118)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	11.44***	2.93***	.42***	11.67***	2.97***	.43***
Latina Versus White	4.87	3.70	.15	5.00	3.72	.15
Multiple attributions	-4.28	3.16	-.12	-4.09	3.19	-.11
Age	0.90***	0.24***	.40***	0.89***	0.24***	.40***
Education	0.65	0.51	.14	0.67	0.52	.14
C-section	1.00	2.30	.04	0.85	2.32	.03
Everyday discrimination				-0.11	0.18	-.05
R^2		.23			.23	
ΔR^2					.002	
SIX MONTHS DIASTOLIC BLOOD PRESSURE (N = 118)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	8.86**	2.60**	.37**	8.68**	2.63**	.36**
Latina Versus White	2.00	3.28	.07	1.90	3.30	.07
Multiple attributions	-4.97†	2.80†	-.15†	-5.12†	2.82†	-.16†
Age	0.83***	0.22***	.41***	0.83***	0.22***	.41***
Education	0.25	0.46	.06	0.23	0.46	.06
C-section	1.85	2.04	.08	1.97	2.06	.08
Everyday discrimination				0.09	0.16	.05
R^2		.23			.23	
ΔR^2					.002	
ONE YEAR SYSTOLIC BLOOD PRESSURE (N = 132)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	5.28†	2.99†	.21†	5.65†	3.04†	.22†
Latina Versus White	1.35	3.72	.04	1.37	3.73	.04
Multiple attributions	0.34	3.05	.01	0.39	3.06	.01
Age	0.58*	0.23*	.26*	0.59*	0.23*	.27*
Education	0.20	0.50	.05	0.17	0.50	.04
C-section	0.17	2.26	.01	0.29	2.27	.01
Everyday discrimination				-0.13	0.17	-.07
R^2		.08			.08	
ΔR^2					.004	
ONE YEAR DIASTOLIC BLOOD PRESSURE (N = 132)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	4.66*	2.31*	.23*	4.71*	2.35*	.23*
Latina Versus White	0.34	2.88	.01	0.35	2.89	.01
Multiple attributions	-2.48	2.36	-.09	-2.47	2.37	-.09
Age	0.41*	0.18*	.24*	0.42*	0.18*	.24*
Education	0.25	0.39	.07	.243	.388	.067
C-section	3.89*	1.75*	.19*	3.91*	1.76*	.190*
Everyday discrimination				-0.02	0.13	-.01
R^2		.13			.13	
ΔR^2					0.00	

† $p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Table 2.5 continued

SIX MONTHS TOTAL DAILY CORTISOL (N = 71)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	-0.55	0.89	-.10	-0.54	0.90	-.10
Latina Versus White	-1.70	1.03	-.27	-1.69	1.04	-.27
Multiple attributions	-0.02	0.98	.00	0.00	0.99	.00
Age	-0.02	0.07	-.05	-0.02	0.07	-.05
Education	-0.10	0.13	-.12	-0.10	0.13	-.12
C-section	0.57	0.70	.11	0.54	0.72	.10
Everyday discrimination				-0.01	0.05	-.02
R^2		.06			.06	
ΔR^2					0.00	
SIX MONTHS CORTISOL AWAKENING RESPONSE (N = 71)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	-0.11	0.11	-.15	-0.10	0.11	-.14
Latina Versus White	-0.05	0.13	-.06	-0.04	0.13	-.05
Multiple attributions	-0.19	0.13	-.18	-0.19	0.14	-.18
Age	0.01	0.01	.13	0.01	0.01	.13
Education	-0.02	0.02	-.18	-0.02	0.02	-.17
C-section	0.17	0.09	.26	0.16	0.09	.25
Everyday discrimination				0.00	0.01	-.07
R^2		.13			.13	
ΔR^2					.005	
SIX MONTHS CORTISOL SLOPE (N = 71)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	0.01	0.01	.10	0.01	0.01	.11
Latina Versus White	0.00	0.01	.06	0.00	0.01	.06
Multiple attributions	-0.02*	0.01*	-.32*	-0.02*	0.01*	-.31*
Age	0.00	0.00	-.10	0.00	0.00	-.09
Education	0.00	0.00	.00	0.00	0.00	.01
C-section	0.01	0.01	.19	0.01	0.01	.16
Everyday discrimination				0.00	0.00	-.14
R^2		.14			.16	
ΔR^2					.02	
ONE YEAR TOTAL DAILY CORTISOL (N = 70)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	-2.18†	1.10†	-.30†	-1.84	1.11	-.25
Latina Versus White	-2.14	1.33	-.25	-2.16	1.31	-.25
Multiple attributions	0.29	1.23	.03	0.44	1.22	.05
Age	0.03	0.09	.04	0.04	0.09	.07
Education	-0.04	0.18	-.03	-0.08	0.18	-.06
C-section	0.94	0.88	.13	0.94	0.86	.13
Everyday discrimination				-0.12	0.07	-.20
R^2		.12			.16	
ΔR^2					.04	

† $p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Table 2.5 continued

ONE YEAR CORTISOL AWAKENING RESPONSE (N = 146)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	-0.23*	0.10*	-.39*	-0.22*	0.10*	-.37*
Latina Versus White	-0.12	0.12	-.19	-0.13	0.12	-.19
Multiple attributions	0.02	0.12	.02	0.03	0.12	.03
Age	0.00	0.01	-.05	0.00	0.01	-.04
Education	0.00	0.02	.01	0.00	0.02	.01
C-section	-0.02	0.08	-.03	-0.02	0.08	-.03
Everyday discrimination				0.00	0.01	-.05
R^2		.11			.11	
ΔR^2					.002	
ONE YEAR CORTISOL SLOPE (N = 72)						
	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Race						
Black versus White	0.00	0.01	.05	0.00	0.01	.04
Latina Versus White	0.00	0.01	.08	0.00	0.01	.08
Multiple attributions	-0.01	0.01	-.11	-0.01	0.01	-.12
Age	0.00	0.00	.08	0.00	0.00	.08
Education	0.00	0.00	-.15	0.00	0.00	-.14
C-section	0.00	0.01	-.01	0.00	0.01	-.01
Everyday discrimination				0.00	0.00	.05
R^2		.04			.04	
ΔR^2					.002	

† $p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Table 2.6. False Discovery Rate Analyses for Each Hypothesis

Rank of *p*-value	Outcome	Original *p*-value	Corrected threshold
	HYPOTHESIS 1		
1	One month postpartum depressive symptoms	.008	.017
2	One year postpartum depressive symptoms	.049	.033
3	Six months postpartum depressive symptoms	.400	.05
	HYPOTHESIS 2		
1	Excess gestational weight gain	.009	.013
2	Gestational weight gain	.020	.025
3	One year weight retention	.041	.038
4	Six months weight retention	.339	.05
	HYPOTHESIS 3		
1	One year total daily cortisol	.112	.005
2	Six months cortisol slope	.255	.010
3	One year systolic blood pressure	.455	.015
4	Six months systolic blood pressure	.556	.020
5	Six months cortisol awakening response	.580	.025
6	Six months diastolic blood pressure	.600	.030
7	One year cortisol slope	.723	.035
8	One year cortisol awakening response	.755	.040
9	Six months total daily cortisol	.856	.045
10	One year diastolic blood pressure	.881	.050

Note. For this false discovery rate analysis, outcomes from each hypothesis are listed in rank-order of their *p*-values. Each rank is multiplied by 0.05 and divided by the number of variables in the analyses to produce a corrected threshold for determining significance (Benjamini & Hochberg, 1995).

Appendix A: Brief Summary of Study 1 Hypotheses

Aim 1: Describe weight stigma during pregnancy and postpartum. To identify sources from which weight stigma arises, obtain examples of how stigma manifests in each of these situations, assess how frequently weight stigmatizing experiences occur in each of these situations during both pregnancy and postpartum, and characterize the relationship between pre-pregnancy BMI and overall experiences of weight stigma.

Hypothesis 1A: Number of sources. The most commonly reported sources of weight stigma will be family members and maternity healthcare providers. Pre-pregnancy BMI and overall experiences of weight stigma will be positively associated.

Hypothesis 1B: Frequency of weight stigma. Participants will report experiencing, on average, at least one weight stigmatizing experience each day. Those with overweight or obese pre-pregnancy BMIs will report multiple experiences each day. Pre-pregnancy BMI and average frequency of stigmatizing experience will be positively associated.

Aim 2: Coping with weight stigma. To investigate how women cope with experiences of weight stigma during pregnancy and postpartum.

Hypothesis 2. The most common coping strategies will be heading off negative comments, positive self-talk, eating more food/comfort eating, and accentuating the pregnancy.

Aim 3: Actual and self-perceived weight. To investigate whether the experience of weight stigma during pregnancy and postpartum differs by pre-pregnancy BMI or self-perceived weight.

Hypotheses 3A: Pre-pregnancy BMI. Pre-pregnancy BMI will be associated with more experiences of weight stigma overall.

Hypotheses 3B: Self-perceived weight. Regardless of objective BMI, participants' perception of their body size will be associated with more experiences of weight stigma, more concerns about stigma, and reports of stigma as being more distressing.

Hypotheses 3C: Normal weight pre-pregnancy BMI and reactions. Participants with lower pre-pregnancy BMIs will report their experiences of weight stigma as more distressing and engage in fewer coping behaviors than participants with higher pre-pregnancy BMIs.

Hypothesis 3D: Overweight/obese pre-pregnancy BMI and healthcare. Pre-pregnancy BMI will be associated with more frequent weight stigmatizing experiences in healthcare settings.

Aim 4: Gestational weight gain and postpartum weight retention. To investigate whether the experience of weight stigma depends on the progression of weight gain during pregnancy or the amount of weight retention postpartum.

Hypotheses 4A: Perception of weight gain. Participants who perceive themselves to have gained too much weight compared to those who perceive their weight gain to be appropriate or too little will report more experiences of weight stigma, be more concerned about weight stigma, and more frequently report their experiences with weight stigma as distressing.

Hypotheses 4B: Appearance of pregnancy. When pregnancy is not yet apparent compared to when it is apparent, participants will report more experiences of weight stigma, be more concerned about weight stigma, and more frequently report their experiences with weight stigma as distressing.

Hypotheses 4C: Postpartum weight retention. Postpartum weight retention will be associated with more experiences of weight stigma, more concerns about weight stigma, and reports of experiences of weight stigma as being more distressing.

Aim 5: Race/ethnicity and SES. To investigate whether the experience of weight stigma during pregnancy and postpartum differs by target race/ethnicity and SES.

Hypothesis 5A: Race/ethnicity and close relations. White participants will experience more frequent weight stigma from family, friends, and partners compared to Black and Latina participants.

Hypothesis 5B: Race/ethnicity, SES, and healthcare. Ethnic/racial minority and Low-SES participants will report more frequent weight stigma in healthcare.

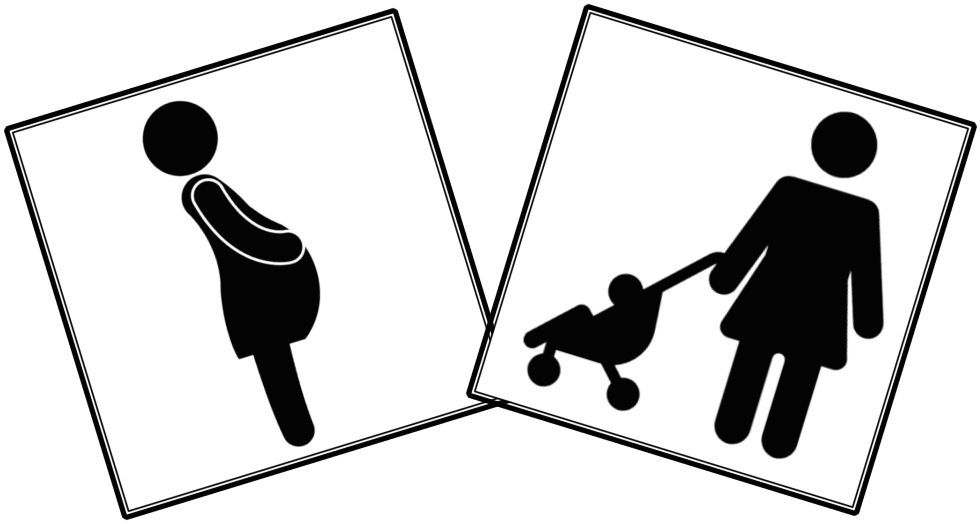
Aim 6: Consequences. To investigate the psychological consequences of experiencing weight stigma during pregnancy and postpartum.

Hypotheses 6A. Experiencing weight stigma during pregnancy and postpartum will be associated with greater depressive symptoms, more maladaptive dieting behavior, more emotional eating behavior, greater perceived stress, more gestational weight gain, and more weight retention. The latter two relationships will be most pronounced in Black and Latina participants.

Hypotheses 6B: Exploratory consequences. Experiencing weight stigma during pregnancy and the postpartum period will be associated with less physical activity, earlier delivery, lower birth weight, less intention to breastfeed, shorter intended or actual duration of breastfeeding, and/or shorter actual duration of breastfeeding. Beliefs about the effects of breastfeeding on weight loss will moderate the relationship between weight stigma and breastfeeding intentions.

Appendix B: Study 1 Recruitment Flyer

Are you pregnant?
or
Did you recently have a baby?



Complete this research survey to help us understand your experiences while being pregnant or since having your baby!

You will be asked about weight concerns and how you cope. Participation should take about 25 minutes.

All participants will be entered into a raffle – You could win one of five $100 cash prizes!

Participation in this research study is not required to enter in the raffle. Odds of winning are approximately 1 in 100.

To participate, please visit

https://tinyurl.com/UCLAPregnancyStudy

Questions? Email UCLAPregnancyStudy@gmail.com

Protocol ID: IRB#17-000645 UCLA IRB Approved Approval Date: 8/8/2017 Through: 5/22/2018 Committee: North General IRB

Appendix C: Study 1 Questionnaires

Questions About the Pregnancy

1. Which of the following applies to you?
    a. I am at least 13 weeks pregnant
    b. I gave birth to a child within the last 12 months
    c. neither

Please answer all questions regarding your current pregnancy/your child who you delivered within the last 12 months.

IF PREGNANT

2. Are you pregnant with more than one baby (e.g., twins, triplets)?
    a. Yes
    b. No
3. Is this your first pregnancy?
    a. Yes
    b. No
4. How many weeks pregnant are you?
    a. Select number of weeks
    b. If unsure, enter due date
5. Has your doctor suggested or have you decided that you will deliver your baby via Cesarean section (C-section)?
    a. Yes
    b. No
6. Are you planning to breastfeed at all?
    a. Yes
    b. No
7. If yes: Approximately how old do you think your baby will be when you completely stop breastfeeding?
    a. Select number of months

IF POSTPARTUM

2. In this pregnancy, were you pregnant with more than one baby (e.g., twins, triplets)?
    a. Yes
    b. No
3. Was this the first time you gave birth?
    a. Yes
    b. No
4. How many weeks old is your baby today?
    a. Select number of weeks or months
5. Approximately how many weeks pregnant were you when you delivered your baby?
    a. Select number of weeks
6. How much did your baby weigh at delivery?
    a. Select pounds and ounces
7. Was your baby pre-term or low birth weight?
    a. Pre-term
    b. Low birth weight
    c. Both
    d. Neither
8. How did you deliver your baby?
    a. Vaginally
    b. Cesarean section (C-section)
9. Did you breastfeed this baby at all?
    a. Yes
    b. No
10. If yes: are you still breastfeeding this baby at all?
    a. Yes
    b. No

11. If yes: How old do you think your baby will be when you completely stop breastfeeding?
    a. Select number of months
12. If no: Approximately how old was your baby when you stopped breastfeeding?
    a. Select number of weeks

Questions About Weight

1. Please select your height in feet and inches.
2. What was your weight (in pounds) right before you got pregnant?
    a. Enter number of pounds
3. How much do you weigh (in pounds) right now?
    a. Enter number of pounds
4. How do you perceive your body size right now?
    a. Very thin
    b. Somewhat thin
    c. Slightly thin
    d. Average
    e. Slightly heavy
    f. Moderately heavy
    g. Very heavy
5. How do you perceive your pregnancy weight gain at this point in your pregnancy?
    a. Too little
    b. About right
    c. Too much
6. How obvious is it that you are pregnant based on how you look? OR How obvious is it that you were pregnant based on how you look?
    a. Not at all obvious
    b. Somewhat obvious
    c. Very obvious
7. Has a healthcare provider told you that you have or have had gestational diabetes?
    a. Yes
    b. No
8. This question is about the maternity healthcare provider you have seen the most. This could be your general practitioner, OB/GYN, midwife etc. Has this healthcare provider suggested that your pregnancy weight gain is/was...?
    a. Too little
    b. About right
    c. Too much
    d. He/she has not mentioned it
9. Did this maternity healthcare provider tell you to limit your weight gain?
    a. Yes
    b. No
10. How do you perceive your partner/spouse's body size?
    a. Very thin
    b. Somewhat thin
    c. Slightly thin
    d. Average
    e. Slightly heavy
    f. Moderately heavy
    g. Very heavy

Sources and frequency of weight stigma

1. Some people are made to feel good or bad about how they look. **Since becoming pregnant**, have you ever been treated differently because of your weight or has something or someone made you feel bad or uncomfortable because of your weight? Please indicate who or what the source of this experience was. Select all that apply.
    a. Work/employers/coworkers
    b. Immediate family
    c. Extended family
    d. Friends and acquaintances
    e. Members of your church or faith community
    f. Partner/spouse
    g. Healthcare providers, such as physician, nurse, midwife, office staff
    h. Strangers in public places
    i. Media, such as television, news, internet, social media
    j. Other pregnant women or new mothers
    k. Society and social expectations in general
    l. Fill in the blank
    m. This has not happened to me at all.
2. So that we can fully understand what happened, for each of the people or situations you selected above, please provide an example of one of these experiences. Make sure to describe who/what made you feel bad or treated you differently and how it happened.
3. For each of the people or situations you selected above: How often have you been treated differently or been made you feel bad or uncomfortable about your weight since you became pregnant?
    a. Less than once a month
    b. A few times a month
    c. At least once a week
    d. A few times a week
    e. Almost every day
    f. 1 or 2 times a day
    g. 3 or more times a day
4. Thinking about **all** the people or situations in which you were made to feel bad or uncomfortable about your weight or treated different because of your weight all together, how distressing or upsetting did you find these experiences to be overall?
    a. Not at all upsetting or distressing
    b. Somewhat upsetting or distressing
    c. Very upsetting or distressing

Specific Questions about Healthcare

The next set of questions will ask you about your experiences in healthcare.

1. How would you describe your overall experiences with prenatal care?
    a. Very negative
    b. Somewhat negative
    c. Neutral
    d. Somewhat positive
    e. Very positive
2. How would you describe your overall experiences with labor and delivery healthcare?
    a. Very negative
    b. Somewhat negative
    c. Neutral
    d. Somewhat positive
    e. Very positive
3. How would you describe your overall experiences with postpartum healthcare?
    a. Very negative
    b. Somewhat negative
    c. Neutral
    d. Somewhat positive
    e. Very positive
4. Have you ever felt or thought any of the following while interacting with pregnancy or post-partum healthcare providers (such as physicians, nurses, etc.) **because of your weight**? Select all that apply.
    a. Judged
    b. Shamed or ashamed
    c. Guilty
    d. Less worthy
    e. Invisible
    f. Unimportant
    g. Disrespected
    h. Negatively compared to other patients
    i. As though the healthcare provider did not like you
    j. As though the healthcare provider thought you were stupid or unintelligent
    k. Valued
    l. Important
    m. Accepted
5. Which healthcare providers made you feel this way? Select all that apply.
    a. Physician
    b. Nurse or Nurse Assistant
    c. Physician's assistant
    d. Midwife or doula
    e. Ultrasound technician
    f. Office staff
    g. Other – fill in the blank

6. What kind of practice were you in when these experiences occurred? Select all that apply.
    a. Hospital-affiliated OBGYN office
    b. Private practice OBGYN office
    c. Birthing center
    d. Public Clinic
    e. Urgent care
    f. Hospital emergency room or other specialist
    g. Other – fill in the blank
7. At any point during your pregnancy, did you change healthcare providers because of how you were treated related to your weight or weight gain?
    a. Yes
    b. No
8. Which of the following is true of your experiences with healthcare during pregnancy or postpartum?
    a. Too little attention was paid to my weight/weight gain
    b. About the right amount of attention was paid to my weight/weight gain
    c. Too much attention was paid to my weight/weight gain
9. During your pregnancy or in the first year after giving birth, did you ever feel that you could not trust your doctor or that you had to advocate or stand up for yourself because your doctor focused too much on weight?
    a. Yes
    b. No

Coping Strategies

1. The following are some strategies people sometimes use in order to deal with negative situations related to their weight. Again, thinking overall about all your experiences you described before, please indicate whether you have used each of the following strategies to cope with being made to feel bad because of your weight Select all that apply.
    a. Hiding your pregnancy with your clothes
    b. Accentuating your pregnancy or showing it off
    c. Heading off negative comments for example by acting happy, sociable, and self-confident so that no one thinks to bother you
    d. Using positive self-talk, for example by thinking, "it's who I am on the inside that matters and no one has the right to judge me"
    e. Faith, religion, prayer, for example by thinking, "God is on my side"
    f. Seeking emotional support from others
    g. Eating more food
    h. Exercising (including walking, running, swimming, yoga)
    i. Ignoring it
    j. Seeking other information and opinions about how weight affects health during pregnancy
    k. None of these
    l. Other – Fill in the blank

Weight Stigma Concerns (Hunger & Major, 2015)

For this next set of questions, please indicate your agreement with each of the following statements.

1 = Strongly disagree
2 = Somewhat disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Somewhat agree
7 = Strongly agree

1. I am concerned that other people's opinion of me will be based on my weight.
2. I am worried that most people will judge me on the basis of my weight.
3. I am concerned that I will not be treated fairly by others because of my weight.
4. I am afraid that other people will reject me because of my weight.
5. I am concerned that others will not respect me because of my weight.

Edinburgh Postnatal Depression Inventory (Cox et al., 1987)

The next set of questions is about how you are feeling. We are interested in how you have been feeling in the past **7 days**, not just how you feel today. **In the past 7 days**:

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

a. Yes, most of the time
b. Yes, quite often
c. Only occasionally
d. No, never

Perceived Stress Scale, 4-Item Version (Cohen, Kamarck, & Mermelstein, 1983)

Now we are interested in your feelings in general, not just about pregnancy. The following questions ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate how often you felt or thought a certain way.

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

1. In the last month, how often have you felt that you were unable to control the important things in your life?
2. In the last month, how often have you felt confident about your ability to handle your personal problems?
3. In the last month, how often have you felt that things were going your way?
4. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Eating Attitudes Test – Maladaptive Dieting Subscale (Garner et al., 1982)

For this set of questions, please choose a response to each of the following statements:

1 = Always
2 = Usually
3 = Often
4 = Sometimes
5 = Rarely
6 = Never

1. I am terrified of being overweight.
2. I am aware of the calorie content of foods that I eat.
3. I particularly avoid food with a high carbohydrate content (i.e., bread, rice potatoes, etc.)
4. I feel extremely guilty after eating.
5. I am preoccupied with a desire to be thinner.
6. I think about burning up calories when I exercise.
7. I am preoccupied with the thought of having fat on my body.
8. I avoid foods with sugar in them.
9. I eat "diet" foods.
10. I feel uncomfortable after eating sweets.
11. I engage in dieting behavior.
12. I like my stomach to be empty.
13. I enjoy trying new rich foods.

Dutch Eating Behavior Questionnaire – 9-item Emotional Eating Subscale (van Strien et al., 1986)

Now please answer these questions to reflect how you usually feel about eating.

1 = Never
2 = Rarely
3 = Sometimes
4 = Often
5 = Very Often

1. Do you feel the desire to eat when you are irritated?
2. Do you feel a desire to eat when you are depressed or discouraged?
3. Do you feel a desire to eat when you are cross or angry?
4. Do you feel a desire to eat when you are expecting something unpleasant or stressful to happen?
5. Do you have a desire to eat when you are anxious, worried, or tense?
6. Do you feel a desire to eat when things are going against you or when things have gone wrong?
7. Do you feel a desire to eat when you are frightened or scared about something?
8. Do you have a desire to eat when you are disappointed?
9. Do you have a desire to eat when you are emotionally upset?

Stanford Leisure-Time Activity Categorical Item Version 2.2 (Kiernan et al., 2013)

During the past month, which statement best describes the kinds of physical activity you usually did? Do not include the time you spent working at a job. Please read all six statements before selecting one.

1. I did not do much physical activity. I mostly did things like watching television, reading, playing cards, or playing computer games. Only occasionally, no more than once or twice a month, did I do anything more active such as going for a walk or playing tennis.
2. Once or twice a week, I did light activities such as getting outdoors on the weekends for an easy walk or stroll. Or once or twice a week, I did chores around the house such as sweeping or vacuuming.
3. About three times a week, I did moderate activities such as brisk walking, swimming, or riding a bike for about 15-20 minutes each time. Or about once a week I did moderately difficult chores such as raking or mowing the lawn for about 45-60 minutes. Or about once a week, I played sports such as softball, basketball, or soccer for about 45-60 minutes.
4. Almost daily, that is five or more times a week, I did moderate activities such as brisk walking, swimming, or riding a bike for 30 minutes or more each time. Or about once a week, I did moderately difficult chores or played sports for 2 hours or more.
5. About three times a week, I did vigorous activities such as running or riding hard on a bike for 30 minutes or more each time.

Specific Questions about Breastfeeding

The next set of questions will ask you about breastfeeding.

IF PREGNANT

1. Do you think that you will feel uncomfortable breastfeeding in public?
    a. Yes
    b. No
2. If yes, is one of the reasons for this due to your weight?
    a. Yes
    b. No
3. Do you think you will feel uncomfortable seeking help with breastfeeding from a healthcare professional?
    a. Yes
    b. No
4. If yes, is one of the reasons for this due to your weight?
5. Do you think that whether or not you breastfeed and/or how long you breastfeed will affect your weight loss?
    a. Yes, it will help me lose weight.
    b. Yes, it will make it harder for me to lose weight.
    c. No, it won't affect my weight.
    d. I don't know.

IF POSTPARTUM and IF BREASTFED

1. Have you ever felt uncomfortable breastfeeding in public?
    a. Yes
    b. No
2. If yes, is one of the reasons for this due to your weight?
    a. Yes
    b. No
3. Have you ever felt uncomfortable seeking help with breastfeeding from a healthcare professional?
    a. Yes
    b. No
4. If yes, is one of the reasons for this due to your weight?
    a. Yes
    b. No
    c.
5. Has breastfeeding affected your weight loss?
    a. Yes, it helped me lose weight.
    b. Yes, it made it harder for me to lose weight.
    c. No, it did not affect my weight.
    d. I don't know.

Final Open-ended Question:

Please share anything else you would like to tell us related to the questions in this survey and your experiences.

Demographic Questions

These questions will ask for general information about you.

1. What was your age at your last birthday?
2. What is the highest degree you have completed?
    a. None
    b. Primary, elementary, or middle school
    c. High school or GED
    d. Technical or vocational school
    e. Associates degree
    f. Bachelor's degree
    g. Graduate degree (master's, doctorate, medical, law)
    h. Other – fill in the blank
3. Which of the following best describes your employment status right now?
    a. On paid/maternity leave from job
    b. On unpaid leave from job
    c. Working part time
    d. Working full time
    e. Unemployed
    f. Full time homemaker
    g. Student
    h. On disability
    i. Other – fill in the blank
4. With which of the following racial/ethnic groups do you most identify?
    a. Black/African-American
    b. White
    c. Latina/Hispanic
    d. Asian or Pacific Islander
    e. Other – fill in the blank
    f. I do not wish to respond
5. What is the current status of your relationship with the baby's father?
    a. Married
    b. Not married but in a relationship
    c. Not married and not currently in a relationship
6. How many people, including yourself, currently live in your household? This includes children, family members, and non-family members.
7. What is the zip code where you currently live?
8. Thinking about you and your household's total income from all sources, what is the total income you and your household had in the previous calendar year before taxes? This can include your salary, worker's compensation, the salaries of everyone in your household, educational assistance, child support, veteran's payments, alimony, survivor benefits, unemployment compensation, and cash benefits. This DOES NOT include public housing, Medicaid, food stamps, or other non-cash benefits.

Appendix D: Study 2 Psychological Questionnaires

Edinburgh Postnatal Depression Inventory (Cox et al., 1987)

The next set of questions is about how you are feeling. We are interested in how you have been feeling in the past **7 days**, not just how you feel today. **In the past 7 days**:

1. I have been able to laugh and see the funny side of things.
    a. As much as I always could
    b. Not quite so much now
    c. Definitely not so much now
    d. Not at all as usual
2. I have looked forward to enjoyment to things.
    a. As much as I ever did
    b. Rather less than I used to
    c. Definitely less than I used to
    d. Hardly at all
3. I have blamed myself unnecessarily when things went wrong.
    a. Yes, most of the time
    b. Yes, some of the time
    c. Not very often
    d. No, not at all
4. I have been anxious or worried for no good reason.
    a. No, not at all
    b. Hardly ever
    c. Yes, sometimes
    d. Yes, very often
5. I have felt scared or panicked for no very good reason.
    a. Yes, quite a lot
    b. Yes, sometimes
    c. No, not much
    d. No, not at all
6. Thing have been getting "on top of me" ("overwhelming" me or "getting the bet of me")
    a. Yes, most of the time I haven't been able to cope at all
    b. Yes, sometimes I haven't been coping as well
    c. No, most of the time I have coped quite well
    d. No, I haven't been coping as well as ever
7. I have been so unhappy I have had difficulty sleeping
    a. Yes, most of the time
    b. Yes, sometimes
    c. Not very often
    d. No, not at all
8. I have felt sad or miserable
    a. Yes, most of the time
    b. Yes, quite often
    c. Not very often

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

Everyday Discrimination Scale (Williams et al., 1997)

In your day-to-day life, how often do any of the following things happen to you?

1 = Almost every day
2 = At least once a week
3 = A few times a month
4 = A few times a year
5 = Less than one a year
6 = Never

1. You are treated with less courtesy than other people
2. You are treated with less respect than other people.
3. You receive poorer service than other people at restaurants or stores.
4. People act as if they think you are not smart.
5. People act as if they think you are dishonest.
6. People act as if they are afraid of you.
7. People act as if they're better than you are.
8. You are called names or insulted.
9. You are threatened or harassed.

Thinking about the everyday experiences you just mentioned, what do you think were the reasons for them (in total)? Select all that apply.

1. Your ancestry or national origins
2. Your gender
3. Your race
4. Your shade of skin color
5. Your language or accent
6. Your sexual orientation
7. Your age
8. Your height or weight
9. Other: (specify)

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