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Bodyweight Perceptions Among Texas Women: The Effects of Religion, Race/Ethnicity, and Citizenship Status

**Aida I. Ramos¹ · Gabriel A. Acevedo¹ ·
Andrea L. Ruiz²**

Abstract Despite previous work exploring linkages between religious participation and health, little research has looked at the role of religion in affecting bodyweight perceptions. Using the theoretical model developed by Levin et al. (*Sociol Q* 36(1):157–173, 1995) on the multidimensionality of religious participation, we develop several hypotheses and test them by using data from the 2004 Survey of Texas Adults. We estimate multinomial logistic regression models to determine the relative risk of women perceiving themselves as overweight. Results indicate that religious attendance lowers risk of women perceiving themselves as very overweight. Citizenship status was an important factor for Latinas, with non-citizens being less likely to see themselves as overweight. We also test interaction effects between religion and race. Religious attendance and prayer have a moderating effect among Latina non-citizens so that among these women, attendance and prayer intensify perceptions of feeling less overweight when compared to their white counterparts. Among African American women, the effect of increased church attendance leads to perceptions of being overweight. Prayer is also a correlate of overweight perceptions but only among African American women. We close with a discussion that highlights key implications from our findings, note study limitations, and several promising avenues for future research.

Keywords Weight perceptions · Health · Obesity · Race/ethnicity · Latinos · African Americans

Introduction

The dramatic increase in obesity in the United States and related concerns about weight stigma and mental health have made weight perceptions an important topic of research among health scholars. A vast amount of research seeks to identify factors that influence weight perceptions; however, many of these studies overwhelmingly focus on specific socio-demographic factors—namely gender, race/ethnicity, age, and socioeconomic status (Klos and Sobal 2013; Lemon et al. 2009; Schieman et al. 2007; Yaemsiri et al. 2010). Despite the consistent empirical association between religious participation and health, little research has investigated the role of religious factors on perceptions of bodyweight (Kim 2007; Ruiz and Acevedo 2015).

Because of its multidimensional nature, religion can influence weight perceptions in several notable ways (Ellison and Levin 1998; Levin et al. 1995). First, increased levels of religiosity, as measured by religious participation and attendance, may be associated with beneficial health behaviors which may result in a lower risk of obesity and therefore a lower likelihood of perceiving oneself as overweight (Ayers et al. 2010; Gillum 2006; Horton 2015; Kim et al. 2003; Koenig et al. 2012). Second, personal devotional practices strengthen meta-narratives within faith traditions which may promote greater body acceptance (Boyatzis et al. 2007; Jacobs-Pilipski et al. 2005; Kim 2007). For instance, Christian doctrine states that the body is “a temple of the Holy Spirit” (1 Corinthians 6:19–20) and the place where an all-loving and all-accepting divine entity resides. Such a belief may motivate individuals to maintain a healthy bodyweight. Moreover, the link between scripture and the body can serve as a protective mechanism against overly stringent body standards and eating disturbance behaviors (e.g., anorexia nervosa, bingeing, and purging) (Henderson and Ellison 2014). Lastly, religious salience, or the importance placed on religion as an influential force in one’s life, may strengthen the association between religion and bodyweight perceptions (Kim 2007).

We build on previous research (Ruiz and Acevedo 2015) that similarly examines the role of religion on weight perceptions of men and women, but extend this work in three ways. First, we base our theoretical framework on a model developed by Levin et al. (1995). Because of its specificity in identifying the potential mechanisms in which religious practice affects individuals’ interpretations of their bodies and weight, we feel this model is well suited to explain the connection between religion and weight perceptions; an approach to theory testing we find lacking in Ruiz and Acevedo’s contribution. Next, we estimate multinomial regression models to assess nuances of overweight perceptions not captured by Ruiz and Acevedo’s analytical approach (which centered on modeling only two categories of weight). Last, and most importantly, we include interactions to uncover how race/ethnicity and citizenship status moderates the relationship between religion and weight perceptions. This adds to the discussion on weight perceptions by empirically testing the relationship between weight perceptions and religion through two important social identities (race/ethnicity and citizenship status), an area of inquiry which has not been explored in the literature to date.

After a review of relevant literature, we propose a series of hypotheses that are tested using data from the 2004 Survey of Texas Adults (SoTA)—a large, representative sample of adults in Texas that has distinctive advantages when studying weight perceptions. First, it is one of the few data sets to have both extensive health and religion measures. Moreover, it contains information from a sizable number of Latina respondents as well as those who categorize themselves as non-citizens. We estimate effects of relevant predictors using multinomial logistic regression models to predict weight perceptions among women by using a series of religious measures. We close by highlighting key implications from our findings, note study limitations and avenues for future research.

Background

Weight Perceptions, Religion, and Health

Bodyweight perception has been a central focus of health research in the last decade. Findings have largely pointed to perceptions of bodyweight as a significant factor in the maintenance of healthy weight (Dixon 2010; Schieman et al. 2007). The theoretical premise motivating much of this literature maintains that an accurate perception of weight, particularly for overweight or obese individuals, results in more favorable health outcomes (Brenner et al. 2004; Chang and Christakis 2003; Duncan et al. 2011; Yaemsiri et al. 2010). While only a handful of studies have thus far investigated the association between religious factors and bodyweight perceptions (Kim 2007; Ruiz and Acevedo 2015), multiple studies have explored religiously motivated behaviors that promote health and prohibit high-risk behaviors (e.g., alcohol abstinence, dietary restrictions, etc.) (Dodor 2012; Ellison and Hummer 2010; Ellison and Levin 1998; Horton 2015; Reeves et al. 2012). Findings suggest positive correlations between religious participation and obesity prevention, which in turn fosters enhanced physical well-being (Horton 2015).

A competing line of inquiry points to deleterious effects of religion on issues related to bodyweight. For instance, some researchers have found a relationship between increased church attendance and increased weight, particularly among Baptist women (Abraído-Lanza et al. 2005; Kim et al. 2003; Williams and Sternthal 2007). Also, women who identify with Latter-day Saints, as well as women who report high levels of religious media consumption have an increased risk of obesity (Cline and Ferraro 2006; Mason et al. 2013). Lastly, high levels of religious attendance and religious salience increase the odds of underestimating bodyweight among women who are overweight (Kim 2007).

The importance of weight perceptions goes beyond physical health and matters for mental health as well. Studies find that women who perceive their weight to be unsatisfactory are more prone to psychological distress—often leading to anxiety, depression, and eating disturbances (Lovejoy 2001; Rauscher et al. 2013). Previous work has also highlighted the importance of social support in overcoming negative perceptions of weight that could lead to harmful behaviors (Brausch and Decker 2014). Religion can provide the type of social support that women may draw on in

order to resist negative bodyweight perceptions. Indeed, recent research has found that religious commitment buffered the negative effects of unrealistic body images among women (Reutter and Bigatti 2014). Likewise, religious practice was found to moderate the effects of eating disturbances on mental health in a positive direction (Henderson and Ellison 2014). Such discordant findings indicate the need for more focused attention on the relationship between religious factors and perceptions of weight.

Theorizing Religion and Weight Perceptions

Levin et al. (1995) proposed a theoretical framework to identify mechanisms that may explain the effects of religious factors on perceptions of bodyweight (see also Henderson and Ellison 2014). Briefly, the model outlines three distinct elements related to religious engagement. First, organizational involvement is associated with institutional activity such as attendance and participation in religious services and activities. Non-organizational involvement refers to private devotional practices, such as personal prayer, meditation, and reading of sacred text. Finally, subjective religiosity refers to the personal importance one attributes to religion in their lives (e.g., religious salience) and how much one's self-identity is shaped by religious factors.

We ask how these multidimensional aspects of religious participation might influence perceptions of bodyweight and suggest three plausible mechanisms. First, attending religious worship services reinforces social bonds between adherents and may lead to greater acceptance of core doctrinal beliefs. Consequently, if a religious congregation espouses beliefs related to weight, and these teachings are subsequently internalized, such benefits may filter down to adherents and result in positive health behaviors. Part of this may involve developing a greater awareness and thus a more realistic view about one's bodyweight. Similarly, religious communities may provide a contrasting narrative to "worldly" expectations that place an emphasis on physical attractiveness through thinness, therefore promoting body acceptance (Kim 2007). This awareness may, in turn, prevent individuals from overestimating their bodyweight, acting as a protective factor against fears of being stigmatized as overweight.

Second, individual religious expression, such as prayer and other everyday devotional activities, may cultivate greater body acceptance. Personal devotional practices are seen as integral components in developing a personal relationship with God, particularly in the Judeo-Christian and Islamic traditions. Such religious expressions may reinforce a belief by the adherent in a divine being that loves them unconditionally and provides them a sense of self-worth regardless of bodyweight (Ellison and Levin 1998; Kim 2007). Consequently, religious adherents who engage in personal devotional practices may be less likely to categorize themselves as overweight and this may be particularly salient for women, who have both higher rates of religiosity and who tend to report being overweight even when they are not (Chang and Christakis 2003). Additionally, research suggests that private devotional practices like prayer and reading of scripture may serve as effective strategies in

cultivating body acceptance among women with eating disturbances (Boyatzis et al. 2007; Jacobs-Pilipski et al. 2005).

Finally, the theoretical model we apply here suggests that religious salience would make the influence of both organizational and non-organizational aspects of religiosity all the more significant in influencing perceptions of bodyweight. For example, studies have found that women with higher levels of religious salience had a greater likelihood of underestimating their bodyweight and were less likely to perceive themselves as overweight (Kim 2007; Miller and Hoffmann 1995). A parallel study found strong links between religious salience, perceptions of a “warm, secure” attachment to a loving God, and positive body image (Homan and Cavanaugh 2013).

Thus far we have suggested that Levin et al. (1995) offer an elegant theoretical model from which to consider potential associations between religious factors and bodyweight perceptions. By constructing a multidimensional scheme that accounts for distinct aspects of religiosity, Levin and his colleagues provide a conceptual avenue from which to address empirical questions. Our discussion now moves to consideration of additional factors that previous research has indicated may foster specific bodyweight and body image perceptions.

Gender and Weight Perceptions

Gender is identified by researchers as a leading predictor in explaining weight perceptions. Overwhelmingly, the literature confirms that women are more likely to view themselves as overweight compared to men (Brener et al. 2004; Chang and Christakis 2003; Reeves et al. 2012; Robinson et al. 2012; Schieman et al. 2007; Yaemsiri et al. 2010). For instance, women are more likely than men to report being dissatisfied with their weight and are more likely to classify themselves as overweight when they are not, even after controlling for body mass index (BMI) (Chang and Christakis 2003; Paeratakul et al. 2002; Schieman et al. 2007). Social and normative standards of beauty frequently pressure women to conform to a rigid, often impossible, weight ideal and body type (O’Dea and Abraham 2000; Overstreet et al. 2010; Pesa et al. 2000; Schieman et al. 2007). What is less explored is the role religious participation, race/ethnicity, and citizenship status may play among women and their perceptions of weight.

Race/Ethnicity and Bodyweight Perceptions

An additional factor influencing weight perceptions is race/ethnicity. A consistent finding in that strand of research indicates that white women tend to have lower body satisfaction and are more likely to see themselves as overweight than Latina and African American women (Martin et al. 2010; Martinez et al. 2012; Robinson et al. 2012; Schieman et al. 2007). Moreover, results of comparable studies suggest that African American and Mexican Americans are less likely to perceive themselves as overweight compared to whites (Chang and Christakis 2003; Dorsey et al. 2009; Paeratakul et al. 2002). Robinson and her colleagues (Robinson et al. 2012), however, present results indicating that it is African American females who are least

likely to see themselves as overweight compared to all other groups. These findings are striking when considering that Latinos and African Americans tend to have higher BMI levels than their white counterparts (Chang and Christakis 2003; Dorsey et al. 2009, 2010; Duncan et al. 2011; Fitzgibbon et al. 2000).

To explain these patterns, one line of argument maintains that the association between race/ethnicity and SES may result in particular social norms regarding preferred weight or body size. Consequently, because people of color tend to be disadvantaged socioeconomically compared to whites, and also are disproportionately employed in hourly wage, low status occupations, they will be less able to engage in healthy weight promoting behaviors like exercise and healthy eating (Martinez et al. 2012; Robinson et al. 2012). Other researchers argue that internalized social norms regarding ideal body type serve as protective factors against unrealistic bodyweight expectations and eating disturbance behaviors, particularly in conditions of persistent economic distress (Fitzgibbon et al. 2000; Flynn and Fitzgibbon 1998). Certainly, research has suggested that the ultra-thin ideal is seen as unrealistic and not relatable to African American women (Fitzgibbon et al. 2000; Flynn and Fitzgibbon 1998; Overstreet et al. 2010).

While a substantial body of empirical research suggests that Latinos are less likely to see themselves as overweight than whites (Duncan et al. 2011; Martinez et al. 2012), less is known about the influence of citizenship status on weight perceptions. The Hispanic paradox—or the consistent pattern of Latinos experiencing similar or better health outcomes compared to non-Latino Whites—indicates that more recently immigrated Latinos tend to have enhanced mortality and health outcomes compared to their later generation counterparts (Ruiz et al. 2013). Additionally, length of residence in the U.S. among foreign born Latinos has been shown to be positively correlated with higher risk of obesity, higher BMI scores, and inversely correlated with positive health outcomes (Abraido-Lanza et al. 2005; Bates et al. 2008; Goel et al. 2004; Kaplan et al. 2004). Moreover, there is a slight association with being a U.S.-born Latino and higher weight dissatisfaction (New et al. 2013). Therefore, it is reasonable to conclude that non-citizens will be less likely to see themselves as overweight.

Intersection of Race/Ethnicity and Religion on Weight Perceptions

A substantial body of research has reported significant linkages between race/ethnicity and weight perceptions. Less explored are the potential interactions between race/ethnicity and religiosity when explaining bodyweight. This is significant for several reasons. First, African American and Latinos (particularly Protestants) have higher rates of religious involvement and are less likely to be disaffiliated compared to their white counterparts (Brown et al. 2013). Additionally, health researchers have identified Black and Latino churches as significant points of intervention in reducing health disparities (Abara et al. 2015; DeHaven et al. 2004; Garcia et al. 2013; Rowland and Isaac-Savage 2014; Yeary et al. 2012), particularly in regards to weight management (Lancaster et al. 2014; Thompson et al. 2013). Therefore, the impact of religiosity on weight perceptions for religious African Americans and Latinos should be all the more salient, given their higher rates of

participation. Recalling the discussion above, both organizational and personal religiosity have been shown to protect against negative body image and overweight perceptions among women (Henderson-Platt and Ellison 2014). Considering Latino and African Americans have both higher religious attendance rates and lower likelihoods of overweight perceptions, we propose that those who attend religious services or pray regularly will be less likely to see themselves as overweight.

Drawing from this discussion and review of previous literature, we formulate a series of testable hypotheses:

H1a: Increased religious attendance lowers the relative risk of overweight perceptions.

H1b: Increased religious salience lowers the relative risk of overweight perceptions.

H1c: Increased prayer frequency lowers the relative risk of overweight perceptions.

H2a: Latina non-citizens will have a lower relative risk of overweight perceptions than whites.

H2b: Latina U.S. citizens will have lower relative risk of overweight perceptions than whites.

H2c: African Americans will have a lower relative risk of overweight perceptions than whites.

H3a: Being Latina or a Latina non-citizen will interact with church attendance to lower the relative risk of overweight perceptions.

H3b: Being African American will interact with church attendance to lower the relative risk of overweight perceptions.

H3c: Being Latina or a Latina non-citizen will interact with prayer to lower the relative risk of overweight perceptions.

H3d: Being African American will interact with prayer to lower the relative risk of overweight perceptions.

H3e: Being Latina or a Latina non-citizen will interact with religious salience to lower the relative risk of overweight perceptions.

H3f: Being African American will interact with religious salience to lower the relative risk of overweight perceptions.

Methods

Sample

Data for this study come from the Survey of Texas Adults, (SoTA) a statewide random probability sample of adult Texas residents conducted via random-digit dialing. The resulting unweighted sample ($n = 925$) is representative of the Texas female adult population. The SoTA overall response rate was 37 %, a level that is consistent with that of a number of respected telephone surveys conducted in recent years (e.g., Edgell et al. 2006; Ellison et al. 2010). All estimates of multinomial

logistic regression models reported below are based on weighted data, allowing us to generalize our findings to the larger Texas population.¹ Approximately 35 % of the data for the income variable is missing as well as 10.5 % for BMI. We conclude that the sensitive nature of these particular variables indicates that these missing cases are not missing completely at random (MCAR), a general expectation for the use of multiple imputation (MI). Therefore, following recommendations from Allison (2012), our strategy for dealing with missing data is to apply maximum likelihood estimation for imputing missing data, yielding a final study sample of 743.²

Measures

The dependent variable for this study is a measure of self-reported perceived bodyweight. The prompt reads, “How would you rate your weight? Would you say you are?” (0) very underweight, (1) somewhat underweight, (2) just about right, (3) somewhat overweight, and (4) very overweight. We collapsed the original five item response categories into a three item scale where (0) somewhat overweight; (1) very overweight; and (2) just about right, serving as the omitted/comparison category in multinomial regression models. Due to the low percentage of women self-reporting as either “very” or “somewhat” *underweight* (4 %), these cases were dropped from the analysis (see footnote number 2).

We include three ordinal level religious predictors in our models that were treated as continuous variables. Religious attendance is measured by including an item that asks, “How often do you attend religious services?” Possible responses include (0) never, (1) less than once a month, (2) 1–3 times a month, (3) once a week, and (4) several times a week. Second, we measure religious salience with an item that queries the respondent with the following prompt: “on a scale from 1 to 7, where 1 is not at all religious and 7 is very religious, how religious would you say you are?” We recoded original responses so that (0) not at all religious through (6) very religious. Finally, respondents were asked “how often do you pray?” Possible responses include (0) never, (1) less than once a week, (2) once or more a week, (3) once a day, and (4) several times a day.

We are also interested in the effects of race/ethnicity and citizenship status on perceptions of bodyweight. The SoTA allows us to construct a dummy coded variable that not only accounts for racial/ethnic identity but also for citizenship status. Keeping in mind that the overwhelming majority of non-citizens in the sample are of Latina descent (93 %), race/ethnicity and citizenship status is self-reported and dummy coded into Latina non-citizen, Latina citizen, African American, other, and whites, serving as the omitted/reference category.

There is ample evidence suggesting that physiological characteristics play a decisive role in predicting perceptions of and overall body image such as BMI and

¹ Ancillary analysis using stereotype regression showed consistent results with multinomial models. Results were provided to anonymous reviewers and are available upon request.

² We removed 32 (weighted) observations that reported feeling “very” or “somewhat” underweight, as well as one outlying observation with an exceedingly high BMI score of 89.77, indicating a potential data entry error.

self-rated health (Herman et al. 2014; Okosun et al. 2001; Yaemsiri et al. 2010). Our main interest is in exploring the effects of our primary variables of interest—namely religion, gender, and race/ethnicity—net of these consistently influential physiological predictors of overweight perceptions. We therefore include two indicators of physiological status in our models. The SoTA includes measures of bodyweight and height in kilograms and centimeters respectively, as well as an item for subjective physical health. From the bodyweight and height measures, we calculate and estimate BMI by using the standard formula: $(\text{weight (kg)} / [\text{height (m)}]^2)$. We also control for self-reported physical health by including a subjective physical health prompt which asks, “How would you rate your physical health at present time?” Due to the low percentages of women reporting poor health (6 %), we collapse the original five-item Likert scale and dummy code physical health where (1) very good, good, or excellent, (0) fair or poor as the omitted/reference category. Realizing personal behaviors may mediate predicted religion effects, we include the following measures as controls for physical activity and exercise (Fogelholm and Kukkonen-Harjula 2000). The first asks, “On how many days in a typical week do you take part in strenuous activities like running, swimming, chopping wood, bicycling, lifting weights, playing tennis, or doing aerobics?” The second, “In a typical week, on how many days do you engage in moderate exercise like playing golf, bowling, dancing, working in the yard, or gardening, but not including walking for exercise?” The final item asks, “In a typical week, on how many days do you take walks, including walking to work, for exercise or for pleasure?” For all three items we retain the original ordinal response categories that range from 0 to 7 days.

We also include an array of demographic and socioeconomic controls in our multivariate models. Age is dummy coded into three categories: 18–35, over 55, and 36–55, serving as the omitted/reference group. We dummy code marital status where married, all others, and never married, serving as the omitted category. We retain actual number of birthed children in the models as a continuous variable. SES is measured by introducing household income (logged), educational attainment, and employment status into the models. Educational attainment is dummy coded into three categories: less than a bachelor’s degree,³ a bachelor’s degree, and higher than a bachelor’s degree, serving as the omitted category. Employment status is dummy coded into homemaker, not employed, and employed full-time, serving as the reference/omitted category.

Results

We estimate multinomial logistic regression models, calculating the effects of religious factors, race/ethnicity, and citizenship status, on the odds of overweight perceptions among Texas women, net of physiological, demographic, and socioeconomic controls. We limit our discussion of results to variables of interest. Results are based on weighted data with several key sample characteristics shown as Table 1. First, we can see that a majority of women see themselves as overweight.

³ This category also includes respondents who reported completing some “some college” but did not earn a bachelor’s degree.

Table 1 Descriptive statistics
(weighted $n = 743$)

	%	\bar{x}	SD	Min	Max
<i>Dependent variable</i>					
Somewhat overweight	0.46	–	–	–	–
Very overweight	0.16	–	–	–	–
Just about right	0.38	–	–	–	–
<i>Religious predictors</i>					
Religious attendance	–	2.15	1.35	0	4
Religious salience	–	4.01	1.62	0	6
Prayer frequency	–	3.08	1.01	0	4
<i>Race/ethnicity</i>					
Other	0.03	–	–	–	–
Latina non-citizen	0.15	–	–	–	–
Latina citizen	0.21	–	–	–	–
African American	0.12	–	–	–	–
White	0.49	–	–	–	–
<i>Health indicators</i>					
BMI	–	27.18	5.75	15.03	58.65
Good physical health	0.45	–	–	–	–
Health (all others)	0.54	–	–	–	–
Strenuous activity	–	1.55	2.11	0	7
Moderate activity	–	1.94	2.11	0	7
Light activity	–	2.98	2.49	0	7
<i>Demographic controls</i>					
Age 18–35	0.39	–	–	–	–
Age 36–55	0.38	–	–	–	–
Age > 55	0.23	–	–	–	–
Married	0.55	–	–	–	–
“Other” marital status	0.27	–	–	–	–
Never married	0.17	–	–	–	–
Birthed children	–	1.15	1.33	0	10
<i>SES controls</i>					
Household income (log)	–	7.63	4.30	0	13.35
Education < B.A.	0.82	–	–	–	–
Education B.A.	0.13	–	–	–	–
Education > B.A.	0.05	–	–	–	–
Homemaker	0.27	–	–	–	–
Employment (all others)	0.30	–	–	–	–
Employed	0.43	–	–	–	–

In our view, the distribution for women warrants comparisons between women who perceive themselves “somewhat overweight” contrasted to those who see themselves as “very overweight”. The increased pressure placed on women to conform to normative standards of body image (O’Dea and Abraham 2000; Pesa et al. 2000)

leads us to conclude that our female respondents make a distinction between partial and excessive levels of being overweight. For this reason, multinomial regression will allow us to include three nominal, discrete outcomes in the dependent variable. Second, measures of religiosity indicate generally high levels of religiosity among females in our sample. Third, BMI in our sample is consistent with general trends in the U.S. population and the population of Texas as a whole. Finally, we draw attention to the generally low levels of education in our sample, a finding generally consistent with overall trends in the state of Texas.

Table 2 is an abbreviated means differences table by race/ethnicity categories on the central measures used in the study. Whites have the lowest mean score for overweight perceptions, while Latina citizens have the highest; however, as shown by Table 3 below, this difference is not statistically significant in multivariate models that include statistical controls. We see expected patterns of religious participation among African Americans, who score higher on two out of three measures of religiosity compared to their white counterparts.

Table 3 presents results of multinomial regression models predicting self-reported bodyweight among women. Models 1–4 assess the odds of feeling very or somewhat overweight compared to the reference category, self-reported optimal bodyweight (i.e., weight perceived as “just about right”). Model 1 includes only religious predictors along with dummy coded race/ethnicity variables. Model 2 adds health indicators (BMI and subjective physical health) and demographic controls. Model 3 is the full model with interaction terms between church attendance and race/ethnicity and citizenship, while Model 4 introduces interaction terms between prayer frequency and race/ethnicity and citizenship status.

Looking at models 1–2, what initially stands out is the significant effect of religious attendance on self-reported bodyweight. Among the women in our sample, higher religious attendance is associated with significantly lower risk of self-reporting being overweight. Specifically in Model 2, the full model that includes all statistical controls (without interactions), religious attendance is associated with approximately 31 % lower risk of feeling very overweight compared to feeling just about right ($RRR = 0.69$; $p < .05$). When comparing women who see themselves as somewhat overweight, compared to just about right, the effect of religious attendance is not significant ($RRR = 0.95$; n.s.). Nonetheless, when comparing odds ratios of multinomial models, the overall contrast between categories indicates substantial support for H1a, which states that increased religious attendance lowers the relative risk of overweight perceptions. The effects of religious salience on bodyweight perception are mixed but overall insignificant when control variables are introduced into the equation, leading us to reject H1b. Similarly, prayer frequency has no effect on predicting self-perceived bodyweight which suggests no support for H1c.

Next, we turn to effects of race/ethnicity and nativity on perceptions of perceived bodyweight. Again, referring to Table 3, there is a discernible association between race/ethnicity, citizenship status, and bodyweight perceptions. Compared to white females, Latina non-citizens have significantly lower likelihood of perceiving themselves as either very or somewhat overweight, as opposed to just about right. In the full model (Model 2), Latina non-citizens have a 97 % lower risk of feeling very

Table 3 Multinomial logistic regression predicting risk of self-reported bodyweight

	Model 1		Model 2		Model 3		Model 4	
	Very	Some	Very	Some	Very	Some	Very	Some
	Over wt.	Over wt.	Over wt.	Over wt.	Over wt.	Over wt.	Over wt.	Over wt.
<i>Religious predictors</i>								
Religious attendance	0.76***	0.99	0.69*	0.95	0.70 [†]	0.96	0.68*	0.96
Religious salience	1.22*	1.14 [†]	0.94	0.99	0.94	1.01	0.94	1.02
Prayer frequency	0.81	0.85	1.36	1.15	1.36	1.10	1.43	1.06
<i>Race/ethnicity</i>								
Other	0.58	0.21***	0.45	0.22*	0.65	0.15**	0.14*	0.24
Latina non-citizen	0.63	1.30	0.03***	0.27*	0.02***	0.26*	0.02***	0.32*
Latina citizen	2.17*	1.42	0.56	0.65	0.65	0.63	0.62	0.64
African American	1.66	0.59	0.22*	0.11***	0.19**	0.09***	0.19*	0.08***
<i>Health indicators</i>								
BMI	–	–	2.49***	2.02***	2.53***	2.03***	2.48***	2.01***
Good physical health	–	–	0.59	1.38	0.54	1.30	0.54	1.32
Strenuous activity	–	–	0.76*	0.96	0.77*	0.96	0.76*	0.95
Moderate activity	–	–	0.79	0.96	0.80*	0.97	0.80*	0.97
Light activity	–	–	0.86*	0.96	0.84*	0.95	0.85* [†]	0.96
<i>Demographic controls</i>								
Age 18–35	–	–	2.78*	1.59	2.42 [†]	1.50	2.54 [†]	1.53
Age > 55	–	–	0.20**	0.34**	0.18***	0.32**	0.17***	0.33**
Married	–	–	2.42	1.09	2.04	0.96	2.35	1.04
“Other” marital status	–	–	1.24	0.91	1.12	0.79	1.12	0.82
Birthed children	–	–	1.33 [†]	1.09	1.30 [†]	1.06	1.24	1.04
<i>SES controls</i>								
HH income (log)	–	–	1.06	1.14***	1.07	1.14**	1.06	1.13**

Table 3 continued

	Model 1		Model 2		Model 3		Model 4	
	Very Over wt.	Some Over wt.	Very Over wt.	Some Over wt.	Very Over wt.	Some Over wt.	Very Over wt.	Some Over wt.
Education < B.A.	-	-	0.28*	1.27	0.35 [†]	1.39	0.33 [†]	1.38
Education B.A.	-	-	0.33 [†]	1.07	0.33	1.00	0.32 [†]	0.99
Homemaker	-	-	0.76	0.42*	0.71	0.45*	0.79	0.45*
Not employed	-	-	2.03	0.96	1.75	0.88	2.00	0.81
<i>Interactions</i>								
Latina non-Citizen × Attendance	-	-	-	-	0.29*	0.68	-	-
African American × Attendance	-	-	-	-	2.10	2.63*	-	-
Latina non-Citizen × Prayer	-	-	-	-	-	-	0.17*	0.31
African American × Prayer	-	-	-	-	-	-	2.21	3.18*
Weighted <i>n</i>	743	743	743	743				
Degrees of freedom	14	44	52	52				

[†] $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ (note: only significant interaction terms are included in the Table 3)

overweight when compared to whites (RRR = 0.03; $p < .001$). Likewise, Latina non-citizen females have a 73 % lower risk of feeling somewhat overweight when compared to whites (RRR = 0.27; $p < .05$). These significant and sizable results across models lend substantial support for H2a. Overall, there is little evidence of a consistent degree of variation between Latina U.S. citizens and whites leading us to reject H2b. Across all models, African American females have significantly lower relative risk of perceiving themselves as either very or somewhat overweight. Once again, turning to Model 2, among African American women, relative risk ratios indicate a 78 % lower likelihood (RRR = 0.22; $p < .05$) of feeling very overweight and approximately an 89 % lower likelihood (RRR = 0.11; $p < .001$) of feeling somewhat overweight when compared to whites. Consequently, this pronounced effect for African American women leads us to accept H2c.

As part of our analysis we tested for interaction effects between race/ethnicity and religious variables. We report only statistically significant interaction terms shown as Models 3 and 4.⁴ All ordinal religious variables are mean centered. The significant interaction between Latina non-citizen and religious attendance suggests a moderating effect whereby the direct, negative effect of being a Latina non-citizen reported in Model 2 is enhanced for those women who attend church regularly. So while religious attendance lowers risks of overweight perceptions across racial/ethnic groups, that effect is greater for high attending Latina non-citizens when compared to high attending whites (RRR = 0.29; $p < .05$). Since we find no significant interaction for Latina citizens and religious attendance there is only partial support for H3a. For African American women however, the moderating effect of race/ethnicity works in the opposite direction than we originally hypothesized. In other words, the main effect of lowering risks of overweight perceptions across racial/ethnic lines is reversed for African American women who are also high church attendees. When compared to whites, African American women who attend church frequently have a higher risk of perceiving themselves as somewhat overweight (RRR = 2.63; $p < .05$). This unexpected finding leads us to reject H3b and will be discussed in greater detail below.

Interactions between race/ethnicity and prayer indicate a similar pattern. Latina non-citizens who pray often have a lower likelihood of seeing themselves as very overweight when compared to whites, suggesting that prayer enhances the negative effect of Latina non-citizen identification on perceptions of bodyweight (RRR = 0.17; $p < .05$). Again, this suggests only partial support for H3c. When compared to whites, African American women who pray more regularly actually have a higher risk of perceiving themselves as somewhat overweight (RRR = 3.18; $p < .05$). Once again, the moderating effect of race/ethnicity works in the direction opposite to what we hypothesized i.e., the original effect of lowering risks of overweight perceptions across racial/ethnic lines is reversed for African American women who pray often. This unexpected finding leads us to reject H3d and will be discussed in greater detail below. Last, all interaction terms with religious salience

⁴ The only exception is a significant effect for Other \times Prayer. However, since the data do not allow for greater specificity in terms of the “other” category, we neither hypothesize nor make inferences related to this category but retain these respondents to avoid a loss of cases. The results for insignificant interaction terms were provided to anonymous reviewers and are available upon request.

are not statistically significant and lead us to reject H3e-f. In sum, results of significant interactions suggest that religious factors enhance main effects of race/ethnicity among Latina non-citizens, while reversing main effects among African American women.

Discussion

Health and obesity researchers have given extensive attention to factors that influence weight perceptions. However, despite the well-documented relationship between religion and health, few studies have investigated the role of religion in shaping these perceptions. Moreover, while much research has explored the role of race/ethnicity in affecting weight perceptions, few have looked at intra-group differences among Latinas by citizenship status or explored how race/ethnicity interacts with religiosity to impact weight perceptions. Our study addresses these significant gaps in the literature by developing hypotheses predicting the relationships between religion and perceptions of bodyweight that are based on the multidimensional aspects of religious participation posited by Levin et al. (1995).

Previous studies have shown an association between religious factors and bodyweight perceptions with several studies indicating similar associations between religious attendance and feelings of being overweight (Kim 2007; Ruiz and Acevedo 2015). In our study, religious attendance appeared to affect bodyweight perceptions in the hypothesized direction, while the effects of increased prayer frequency and religious salience were largely insignificant.

Interestingly, our use of multinomial models allowed us to ascertain that the greatest effect of church attendance on feeling overweight is among women who perceive themselves as being exceptionally heavy. This implies that it is women who perceive themselves as the most overweight who may experience the most salutary effects from church attendance. What might it be about religious attendance that attenuates overweight perceptions and leads to an increased sense of optimal bodyweight, net of BMI and self-reported mental health? The model proposed by Levin et al. 1995 suggests that the organizational aspects of religiosity solidify community ties. Therefore, if the religious community is one in which acceptance is emphasized, women may be less likely to see themselves as overweight. A congregation that stresses body acceptance based on the unconditional love of a benevolent deity may reinforce feelings of comfort and acceptance of one's own body type and weight among its members (Boyatzis et al. 2007; Kim 2007). This would imply that adherents may be deterred from having a "worldly" obsession with vanity, choosing instead to focus on the spiritual dimensions of personal identity and are thus less likely to view themselves as overweight.

We find support for several of our hypotheses related to race/ethnicity and citizenship. As confirmed in previous research, African American women are less likely to see themselves as overweight compared to white women. Contrary to the literature and to our hypothesis (H2b), Latinas did not differ significantly from white women net of statistical controls. However, Table 2 demonstrates that Latina citizens in our sample do have a higher mean score for overweight perceptions than

whites. This suggests that the introduction of control variables moderates the effect between citizenship and weight perceptions, i.e., there is less variation between Latina and white women's overweight perceptions when they have equal levels of SES and physiological characteristics.

In contrast, Latina non-citizens in Texas were less likely to categorize themselves as overweight compared to white women. This finding is in line with the evidence that confirms recent Latino immigrants are less likely to be obese than U.S. born Latinos (Antecol and Bedard 2006). Similarly, first-generation Mexican immigrants have healthier diets than later generations (Martin et al. 2015; Van Hook et al. 2015). The largest Latino national origin group in Texas is Mexican, so this may explain why Latino non-citizens would be less likely to perceive themselves as overweight in our sample. Another reason for this finding could be that Latina non-citizens may not be as influenced by the ultra-thin ideal in American culture and/or have a cultural preference for a "curvy" body. Such cultural norms may foster distinct self-perceptions where these women are less likely to see themselves as overweight (Nieri et al. 2005; Schooler and Daniels 2014). This finding demonstrates the need to consider nativity and acculturation factors when considering weight perceptions.

We use interaction terms to untangle the relationship between religion and race/ethnicity on weight perceptions. While religious factors generally lower the risk of overweight perceptions, the opposite is the case for African American women. African Americans who attend more often and pray more often were *more* likely to see themselves as somewhat overweight. In other words, the well-known "protective" effect of race on weight perceptions is reversed by attendance and personal prayer. This finding is contrary to what research has overwhelmingly found among African Americans, who have greater benefits from religious participation (both organization and personal) than whites (Chatters et al. 2009; Krause 2002, 2010; Taylor et al. 1999).

Why might this be the case for our sample of African American women in Texas? In the last several years, there has been increased attention on obesity concerns in the state (Burdette and Hill 2008). As mentioned above, public health programs aimed at reducing obesity have targeted communities of color and their churches, particularly in the African American community. It could be that some churches have started to emphasize weight loss, which could cause women in these churches to be more critical of their bodyweight. This line of questioning demonstrates the need for research at the congregational level to understand churches' orientations towards health issues like weight (Krause and Wulff 2005). Indeed, evangelical pastor Rick Warren of Saddleback Church challenged his congregation to a widely publicized diet with a goal of collectively losing 260,000 pounds—a poignant example of how congregation context may affect health and weight perceptions (Kluger 2012). More than likely, congregations do not address issues of health and weight perceptions in monolithic manner, with some churches emphasizing body acceptance and others not. Quantitative congregational data and ethnographic research could further shed light on how churches help dissipate or reify normative attitudes about bodyweight in African American churches.

One possible explanation for the significant interaction effect of prayer among African American women has to do with the distinction between private and organizational religiosity. As previously noted, research has found that individual religious practices like prayer may be associated with negative mental health outcomes compared to collective religious practices (Acevedo 2010). Likewise, literature on the “dark side” of religion notes that personal prayer with a god that seems judgmental, unresponsive, or punitive would result in negative mental health outcomes (Ellision and Lee 2010). It could be for African American women, prayer makes them more critical of their bodies or more aware of their perceived flaws, resulting in greater overweight perceptions.

On the other hand, we find evidence for the hypothesized effects regarding interaction terms for Latina non-citizens and religious factors. Latina non-citizens who attend religious services and pray often are less likely than whites to view themselves as very overweight. In short, for Latina non-citizens, both main and interaction effects give rise to higher levels of body acceptance. We propose two plausible explanations for this consistent finding. First, as we have discussed above, it is possible that cultural expectations among Latina women who are more closely tied to their country of origin may deviate from the often stringent body ideal that characterizes American popular culture. As such, we can expect Latina non-citizens to deemphasize thinness as the ideal body type. Second, as research has shown, ethnic churches often attract new immigrants who seek out opportunities to worship in proximity to ethnic enclaves and among fellow congregants who share the same language, nationality and cultural heritage (Hunt 1999; Yang and Ebaugh 2001). Regular immersion in congregations of like-minded parishioners may reinforce already existing cultural norms and we can expect body standards to work alongside other aspects of social identity fostered in religious settings.

As with other research using cross-sectional data, we are aware of the limitations in our study. One issue is that our data is cross sectional, making causal claims less persuasive than studies using longitudinal data. Data that follow women’s perceptions of weight and changes in their religious practice over time could better elucidate the ways by which religion affects weight perceptions. Another limitation was our inability to compare women to men in overweight perceptions in the nuanced manner we desired (very overweight vs. somewhat overweight). This was due to limitations in the data described at the onset, whereby males are concentrated in fewer weight perception categories—making statistical results of the men in our sample unreliable when using a multinomial model. Also, this data is only representative of Texas and because it is considered a “bible belt” state (Wuthnow 2014), various forms of religious participation may be elevated compared to other parts of the country. However, Texas has a significant and costly obesity problem (Burdette and Hill 2008; Finkelstein et al. 2004), making Texas an ideal state to test the influence of religion on weight perceptions. Similarly, Texas is home to one of the largest Latino populations in the country (Passel et al. 2011), allowing for adequate representation of Latina non-citizens not readily available in most nationally representative samples. Unfortunately, due to data limitations we do not have information on the racial or country of origin identities for the Latinas in our sample, making it impossible to ascertain how these

relationships vary according to how Latinas racially identify. We also lack an indicator that measures length of residence in the U.S., which would have allowed for partial consideration of processes of acculturation over time. Future research related to weight perceptions should pay attention to the complex racial identity of Latinos in the U.S. as well as length of residence.

Despite these limitations, this study contributes to the scant but growing literature on the role of religion, race/ethnicity, and nativity in affecting weight perceptions. Even when physiological factors like BMI, self-rated health, and physical activity are taken into account, the effects of religion, race/ethnicity, and citizenship status are prominent. Our findings suggest that women do indeed formulate nuanced views of their bodyweight and these perceptions are in turn impacted by religious and demographic factors. In light of continued discussions over the health and well-being of the U.S. population, research understanding the multiple dimensions of bodyweight perceptions is vital. Furthermore, debates over health care access will intensify discussions and policy debates over obesity, eating behaviors, and the role that weight perceptions play in overall well-being. We hope our study contributes to further discussions related to these important issues.

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