ABSTRACT

Judge Not Lest Ye Be Judged: Relationships between Body Mass Index and Engagement in a Religious Community

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According to the Center for Disease Control, obesity is currently at epidemic proportions in the United States. Approximately a third of American adults are obese. With the prevalence of obesity in the United States has come scholarly interest into how obesity is related to health, psychological, and social outcomes. The purpose of this study is to discover if there is a positive or negative relationship between obesity and engagement in a religious community. Results are gendered and mixed; obese women are more likely than women of a healthy weight to be members of a religious community, but attend less often. This suggests that while religious beliefs are strong enough to overcome fear of stigmatization in joining a social community, they are not strong enough to prompt obese women to actually socialize within the religious community, perhaps because of expected stigmatization.

Judge Not Lest Ye Be Judged: Relationships Between Body Mass Index and Engagement in a Religious Community

by

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CHAPTER ONE

Introduction

Obesity in America is an issue at the forefront of the public consciousness as evidenced by legislators considering policy measures to reduce it (Moore 2009), institutions like Lincoln University requiring obese students to take additional health classes to graduate (McBride 2006), and academic conferences devoted to finding solutions to curb the growing obesity problem. Obesity has been found to have numerous physical health and psychological drawbacks. As it continues to be an issue that affects a wide swath of the American community, religious communities have had to sit up and take notice, particularly since it has been found that for some denominations such as Baptist, religion may actually increase the risk of obesity (Cline and Ferraro 2006). However, previous studies have found that the obese are less likely to engage in social situations (Eisenberg et al. 2006; McLaren and Kuh 2004). The purpose of this study is to determine if this decline in social engagement of the obese extends to the religious community.

Previous research indicated that the relationship between engagement in a religious community for the obese could be either negative (Swami et al. 2008; Eisenberg et al. 2006; McLaren and Kuh 2004; Maddox, Back, and Liederman 1968) or positive (Cline and Ferraro 2006; Lapane et al. 1997; Hayward and Elliott 2009). This study asked first, if there was a relationship between obesity and engagement in a religious community; second, whether that relationship was positive or negative; and

third, if the relationship was gendered. To answer these questions, religious engagement measures of church affiliation, attendance, and participation in church activities were regressed upon body mass index (BMI). Results showed a positive relationship between obesity and church affiliation, a negative relationship between obesity and attendance, and no relationship between obesity and participation in church activities. Analysis of a subset of the data including only female respondents revealed that these relationships exist only for obese women; there are no statistically significant relationships between obesity and religious engagement for men. These results indicate that relationships between body weight and engagement in a religious social forum are more complex than such relationships between body weight and other, non-religious social activities. The religious beliefs of obese women may be strong enough to prompt them to belong to a religious community and religion may serve as a comforting place for them in a judgmental world. However, this is not enough to prompt increased attendance or further engagement in a religious community.

CHAPTER TWO

Literature Review and Hypotheses

For Christian traditions gluttony, or overeating, is considered a sin. Proverbs 23:20-21 of the New Revised Standard Version of the Bible states: "Do not join those who drink too much wine or gorge themselves on meat for drunkards and gluttons become poor, and drowsiness clothes them in rags." Despite this condemnation of gluttony, Cline and Ferraro (2006) point out that it may be a more "acceptable vice" than other sins such as those covered in the Ten Commandments or sins such as pre-marital sex or gambling that receive more pastoral and congregational attention. Additionally, many churches use food, such as in church dinners and potlucks or the after-sermon refreshment hour to celebrate (Sack 2001) indicating an acceptance of consuming together and possibly providing a comfortable atmosphere for all, including those who may consume to excess.

Then again, other studies have found that individuals who are overweight or obese tend to shy away from social interactions and activities (Eisenberg et al. 2006) because they do not feel comfortable with themselves or are shunned as deviant or outsiders (Maddox, Back, and Liederman 1968, Swami et al 2008). Research into the relationship between religion and body weight has, so far, been limited. Previous studies that have looked into the relationship are either old enough to come before the widespread obesity problem in the United States (Maddox, Back, and Liederman 1968),

have been ecological in nature (Ferraro 1998), or have had a focus on issues other than engagement in a religious community (Cline and Ferraro 2006).

The Centers for Disease Control and Prevention currently characterizes the problem of obesity in the United States as an epidemic. Currently one third of adults in the United States—approximately 72 million people and 16 percent of US children are obese (CDC 2009). Defining what weight is underweight, healthy, overweight, or obese is usually calculated using the body mass index, or BMI. One's BMI is derived using their height and weight (BMI=kg/m^2). For most individuals, a healthy BMI ranges from 18.5 to 24.9; those with BMI's 25 to 29.9 are considered overweight. A BMI score greater than or equal to 30 is considered obese (CDC "Defining Overweight and Obesity 2009). With so many Americans in the obese BMI category, it is apparent that an understanding of what effect obesity has upon their daily lives is needed, including their interactions with others in social settings or communities, which is information that would be helpful to those working to curb obesity in this country as well as to scholars who are interested in discovering more about how the majority of Americans think, feel, and act.

Physical and Psychological Health Effects of Obesity

Current research on obesity and its effects emphasize two areas: the effect obesity has on one's physical health and the effects obesity has on one's psychological health. The physical health risks associated with being overweight and obese are well documented, particularly by those in the medical field (Gordon-Larsen et. al 2004, Villareal et. al 2005, Hsing, Sakoda, and Chua Jr. 2007,Galtier-Dereure, Boegner, and

Bringer 2000). Obese and overweight persons are more likely to suffer from physical problems such as high blood pressure, cardiovascular disease, diabetes, and complications with reproduction.

However, the effects of being overweight or obese are not limited to the physical. The psychological effects of being overweight or obese, and more specifically how this physical condition affects self esteem, have been extensively studied (Merten, Wickrama, and Williams 2008, Sinton and Berch 2006, Eisenberg et. al 2006, Peternel and Sujoldzic 2009). Using Waves 1 and 3 of the National Longitudinal Study of Adolescent Health, Merten, Wickrama, and Williams (2008) found that obese adolescent females have more depressive symptoms as they reach young adulthood than "normal" weight females, although this finding does not conclusively show that an obese BMI score is the cause of depressive symptoms, particularly in adolescents. Weight gain and an increase in BMI during the onset of puberty is associated with the perception of being overweight; this perception is associated with an increase in depressed moods, somatic complaints, and lower self esteem for both genders, although it is stronger in females than for males and stronger for whites than for African Americans or Hispanic-Americans (Merten, Wickrama, and Williams 2008, Ambwani and Strauss 2007, Heble and Turchin 2005, Edman, and Aruguete 2004). Ge et. al's (2001) study, also using the National Longitudinal Study of Adolescent Health, found that it is not necessarily having a high BMI score that is associated with poor self esteem, but rather one's perception of their weight gain and increase in BMI score. Even though it is normal for adolescents to gain weight quickly and increase their BMI

score as they enter puberty, if their perception of their weight and their increasing BMI score is negative, they are more likely to exhibit low self esteem.

One limitation of the previously cited studies (Peternel and Sujoldzic 2009, Merten, Wickrama, and Williams 2008, Ge, Elder, Regnerus, and Cox 2001) is that all three deal exclusively with adolescents. More studies devoted to the psychosocial effects of obesity have been done on adolescents than adults. One reason for this may be a dearth of good data sources which have adult respondents and the necessary physical health variables. The National Longitudinal Study of Adolescent Health is an excellent data source with the necessary physical health variables, but their primary respondents are adolescents, not adults. Additionally, obesity has never been as prevalent amongst young people as it is today and researchers are interested in the effects it has upon them as they transition to adulthood.

However, the effects obesity has upon adults is also worthy of study, especially considering the prevalence of obesity among American adults and the fact that there are no immediate signs of a turnaround in the trend of rising obesity. This is especially so considering that a third weakness in the available literature is research directly pertaining to relationships between obesity and social outcomes. Scholars have devoted a lot of time and resources to finding relationships between obesity and low self-esteem or depression and then linked these relationships to decreased involvement in social groups, but scant attention has been paid to finding direct relationships between obesity and involvement in social groups. Therefore one of the purposes of this study is to serve as a stepping stone into research that attempts to find these relationships.

Negative Relationships between Obesity and Social Engagement

However few and far between they are, several previous studies on obesity and social interaction indicate that adults with high BMIs tend to shy away from community and social activities in general (Eisenberg et al. 2006). The obese have been viewed as deviant or nonconformist in the past (Maddox, Back, and Liederman 1968, Morgan, Affleck, and Solloway 1990). BMI scores have a positive relationship with instances of being teased, as well as being accused of being lonely or lazy (Swami et. al 2008). Simply put, the obese are often stigmatized or are seen as unwelcome in social activities. As BMI increases, the likelihood of being nominated by a peer as a friend decreases, even though the likelihood of nominating others as friends does not, indicating that while those with high BMI may count those in their peer group as their friends, their peer group does not reciprocate and does not accept them (Crosnoe, Frank, and Mueller 2008). For adolescent females in particular, high BMI is associated with lower status attainment overall (Merten, Wickrama, and Williams 2008). These studies show that often those who are obese have good reason to avoid social activities. If a person has to face the possibility that they will be viewed as an outsider, be teased, or be seen as lazy, all the while experiencing little support from those they consider friends, it makes sense that engagement in social activities would be low. After all, it does not make sense to seek out situations where one is mocked. Rationally, such situations would be avoided to lessen negative stigmatizing treatment from others.

One possible reason for decreased participation in social settings has been attributed to poor self esteem. High BMI is associated with poor body image and McLaren and Kuh (2004) discovered that middle-aged women with poor body image

are likely to avoid various everyday situations because of how they feel about themselves. High BMI scores impose constraints on how women spend their leisure time; they are less likely to seek out group activities or social gatherings if they have poor body image (Liechty, Freeman, and Zabriskie 2006). This comes as no surprise; if you do not feel good about yourself, going out and engaging in the world around you or attending social events probably is not something that sounds appealing. Add feeling poorly about oneself with the perception that your presence will be unwelcome and it is not surprising that those who are obese do not attend social gatherings as often as those who have healthy BMI scores.

Not attending a party or an office function for these reasons is one thing; not attending a religious service or activity is entirely different. Religious service attendance is often related to one's deep-seated religious beliefs, overall religiosity, and religious identity. Is an obese person's personal religious belief enough to overcome any misgivings they may have about attending a social gathering if that gathering is religious in nature? Previous studies say no; in a study of health, wellbeing, and religion, Cline and Ferraro (2006) found that religious affiliation and attendance is often associated with lower levels of BMI in denominations other than Baptist, which may indicate that those with higher BMI scores shy away from religious community activities the same way they avoid other social non-religious gatherings. However, this study does not use BMI as a predictive variable and leaves the question of whether or not obesity has a relationship with community engagement in a religious setting unanswered. Thus far, BMI has not been used as a predictor of church attendance and religious community involvement.

Since it has been well documented that having a high BMI is associated with decreased participation in social settings and that denominations other than Baptist are associated with lower levels of BMI, the first hypothesis (H1) of this study is that having an obese BMI will be negatively related to engagement in a religious community.

Positive Relationships between Obesity and Social Engagement

The previous studies cited show there is good reason to believe that those with high BMI scores will not engage in religious community activities. However, there is some reason to believe the opposite as well. Churches and other religious communities often bill themselves as accepting places where individuals are not judged based upon external appearances; all are supposed to be welcomed. If indeed they are so, then they should be natural places for those with high BMI scores to seek out. High BMI scores are often associated with low self esteem, and it has been found that those with low self esteem tend to seek out individuals and places who seem accepting and place high status upon them (Rudich, Sedikides, and Gregg 2007). Since individuals with high BMI scores tend to have low status attainment (Merten, Wickrama, and Williams 2008, Crosnoe, Frank, and Mueller 2008, Maddox, Back, and Liederman 1968, Morgan, Affleck, and Solloway 1990), they may try to attenuate that loss in status. Belonging to a religious group has been found to increase social attractiveness and confer status amongst those who belong (Hayward and Elliott 2009). Additionally, Lapane et. al (1997) discovered, data from the Pawtucket Health Program, that individuals who were 20 percent overweight or more were more likely to be church members than not.

Obesity is also higher in states where the proportion of the population claiming a religious affiliation is high, and particularly in states where the religious affiliation claimed is Baptist (Ferraro 1998). All of this suggests that those with high BMI scores may actually have a higher tendency to belong to a religious community, despite the fact that they avoid other social activities. The level of acceptance and status attainment they may get from a religious community could act as enough of a motivator to establish a relationship with such a community despite low levels of self esteem and body satisfaction. Religious communities may confer social capital and status to those who struggle to find it elsewhere. Regular worshippers and people who say that religion is very important to them are more likely to be more civically and socially involved, have more friends, and volunteer more often than those who do not attend worship services regularly or do not hold religion in high regard in their lives (Putnam 2000). The prospect of increased social capital and involvement may be enough to draw obese individuals to engage in a religious community. Therefore, the second hypothesis of this study (H2) is that obesity will have a positive relationship with engagement in a religious community.

Obesity, Social Engagement, and Gender

There are racial, class and gender differences in the emotional effects of having a high BMI. The previously cited study done by Merton, Wickrama, and Williams (2008) has shown that a high BMI score is associated with decreased sociability in adolescent females, but not for adolescent males. This is not the only study to note a more powerful relationship between high BMI scores and poor self esteem or other

negative psychosocial symptoms in females compared to males. This may be because females may be more stigmatized than men for having a high BMI and are more likely to have poor body image, higher body dissatisfaction, and lower self confidence than men (Ambwani and Strauss 2007). McClaren and Kuh's study (2004) of over 1000 middle-aged women found that almost 80 percent of them reported dissatisfaction with their weight; this dissatisfaction was highest in higher social classes and amongst those who rated themselves to be in relatively poor health. Body dissatisfaction is related to overall poor appearance schemas[1] in girls and is associated with depression (Sinton and Birch 2006). However, some disagree that such effects differ between the genders. Markey and Markey (2005) report that BMI is inversely related to body satisfaction, as well as healthy and unhealthy dieting behaviors for both genders. Hebl and Turchin (2005) find that while there are differences between how the genders both experience stigmatization and stigmatize others regarding weight, men are still powerfully affected by said stigmatization. They report that black and white men stigmatize obesity in others and experience stigmatization themselves for being overweight. However, black men are stigmatized less for their body weight than white men. Additionally, black men have a wider acceptable standard for women's weight than white men do and as a result stigmatize women on body weight less than white men do. This study not only suggests that weight stigmatization differs between the races but that overweight individuals may also be implicit in the stigma that they experience themselves by stigmatizing others who are similarly overweight. Yates, Edman, and Aruguete's (2004) study of approximately 800 college students in Hawaii agrees with Hebl and Turchin's findings;

[1] Appearance schemas are a "suggested cognitive component of body image" or a psychological picture of how a person sees their own appearance mentally (Sinton and Birch 2006).

they determined that BMI was highly correlated with body and self-dissatisfaction for both males and females, but males were more satisfied with their bodies than females, possibly due to their overall wider standards regarding what the ideal body type is for men.

Since previous studies indicate that relationships between BMI, body image, and stigma are gendered and are particularly strong for women, the third hypothesis of this study (H3) is that relationships between BMI and engagement in a religious community will be stronger for women than men.

CHAPTER THREE

Data and Measures

The data used in this study are from the first (2006) wave of the Panel Study of American Religion and Ethnicity (PS-ARE). The PS-ARE is conducted by researchers at Rice University and is a multi-level panel study focused on religion in America and its impact on everyday life. The PS-ARE contains modules on family relationships, deviance, health, civic participation and volunteering, moral and social attitudes, and race and ethnic issues (Emerson and Sikkink 2006). The study was conducted by RTI International Inc., which purchased lists of residential addresses to randomly select addresses across the United States. These addresses were cross-referenced with the 2000 Census data zip codes. After this cross-referencing, 60 primary sampling units of three-digit zip codes were selected to represent the diversity of the US population; from this sample of 60 three-digit zip codes, approximately 120 five-digit zip codes were selected. From these five-digit zip codes, 248 postal carrier routes were selected, resulting in approximately 10,320 selected addresses nationwide. The goal of the study was to complete 2600 interviews with participants, including an oversampling of Asians, Hispanics, and African Americans. The final interview completion total was 2610, including 190 Asians, 520 Hispanics, 528 African Americans, 1263 Whites, and 109 Other participants.

RTI International, Inc. sent advance letters to all selected households approximately five days before their initial visit to the sample household. The sample

households were screened; if a respondent was selected from the household, a questionnaire was given via a laptop computer. Respondents were paid an incentive of $50 to complete the interview, which had an average length of 80 minutes. The response rate for the survey was 50 percent and the cooperation rate (those reached who agreed to the interview) was 71 percent. After the electronic questionnaire an additional questionnaire was left behind or mailed to the household for respondents to complete at a later date. Emerson and Sikkink (2006) provide a detailed overview of the methodology behind the PS-ARE.

This data is most appropriate for this study because it contains an extensive set of religion variables, as well as the health variables (height and weight) needed to calculate a BMI independent variable. Both previous studies regarding associations between current adult BMI and religiosity (Ferraro 1998, Cline and Ferraro 2006) use the Americans' Changing Lives (ACL) survey, Waves 1-3. Both studies acknowledge that ultimately the ACL has small proportions of some religious affiliations and that their results would benefit from additional study using a different national random sample, such as the PS-ARE. The PS-ARE data has all the necessary variables to complete this study and has the advantage of being a newer dataset than the ACL with more viable response cases.

BMI and Obesity

This study uses the variables of a person's BMI score and BMI categories (underweight, healthy weight, overweight, and obese) to predict involvement in a religious community. A person's BMI score was calculated using the self-reported

height and weight variables on the PS-ARE. The height variables on the PS-ARE are reported in two separate variables, feet and inches. One's height in feet was multiplied by twelve to convert it to inches and then added to the additional inches variable. The resulting heights ranged from 49 inches to 95 inches. The weight variable on the PS-ARE is one's self-reported weight in pounds. The formula for calculating BMI (BMI=kg/m^2) using imperial measures is BMI=weight in pounds*703/height in $inches^2$ (Health Tools: How to Calculate BMI 2009). A new variable, BMI score, was created using this formula. BMI scores ranged from 13.8 (which would be considered underweight) to 62.2 (which qualifies as morbidly obese). BMI category dummy variables were created using this new BMI variable. The dummy variables were created according to CDC guidelines. The underweight dummy variable was created coding all BMI scores less than 18.5 as 1 and all other scores as 0; the healthy weight dummy variable coded all scores between 18.5 and 24.9 as 1 and all other scores as 0; the overweight dummy variable coded all scores between 25 and 29.9 as 1 and all other responses as 0; the obesity dummy variable coded all scores that were 30 and above as 1 and all other responses as 0. Regression models were run using the BMI categories as the predictive variables of interest with the healthy weight dummy variable suppressed for comparison.

Dependent Variables

Three measures of engagement with a religious community were used as dependent variables: congregation affiliation or membership, religious service attendance, and participation in congregation activities outside of weekly attendance in

the last three years. In his book *Bowling Alone* (2000), Putnam measures religious involvement at these three levels. Engagement in a religious community occurs at three levels. The first is congregation affiliation or membership, which shows a baseline commitment to a congregation, but only a nominal level of engagement. The second level is attendance; once a congregant is committed to a religious community, how often do they attend that community? Finally, the third level of engagement is participation in religious community activities above and beyond regular worship services, what Putnam describes as involvement in the "social life" of the church (2000:71).

To assess the first level of engagement with a religious community, respondents to the survey were asked "Are you currently involved in, affiliated with, or a member of a religious congregation or other place of worship? By congregation, I mean a church, temple, synagogue, mosque, or other place of worship." Respondents answered with either yes or no; this was converted into a dummy variable with a response of yes being coded as 1 and no coded as 0.

To measure religious service attendance, respondents were asked "How often do you attend worship services, not including weddings or funerals?" There are eight possible responses: "Never," "Once or twice a year," "Several times a year," "Once a month," "2-3 times a month," "Once a week," "Twice a week" and "Three or more times a week". To measure additional participation in church activities outside of weekly worship services, respondents were asked "In the past 3 years, not including attending worship services, how often have you participated in activities, groups, or organizations of this congregation? (Such as social gatherings, choir, small groups or

prayer meetings, outreach or social service groups, etc.?)" Response categories are "Never," "A few times," "Once a month," "More than once a month," "Once a week," "More than once a week," "Once a day," and "More than once a day." This question was part of a skip pattern; if respondents indicated that they were not affiliated with a congregation, they were not asked this question. As a result, the number of respondents decreased from 2610 to 1451, since those who were not affiliated with a congregation were not asked this question. Despite this significant decrease in respondents, meaningful analysis is still possible and thus this variable was included as a dependent variable in this study.This variable is an important measure of how involved someone is with their congregation. Being affiliated with a congregation is a base-line level of commitment; going beyond that affiliation to take part in activities held at the congregation shows a high level of engagement with that religious community. These measures of religious community engagement are appropriate for this study because congregational affiliation or membership, high attendance at worship services and participation in extra church activities or organizations show how committed, engaged and participatory one is with their religious community. Descriptive statistics of the dependent variables, the BMI categorical variables, and the linear BMI variable (included solely for comparison) can be seen in Table 1.

Control Variables

Controls included in this analysis are the standard demographic controls as well as several religious controls. The demographic controls are informed by previous studies showing that there are gender, race, age, and income differences regarding how people feel about their bodies and BMI (Merten, Wickrama, and Williams 2008, Ge,

Elder, Regnerus, and Cox 2001, McClaren and Kuh 2004, Markey and Markey 2005, Heble and Turchin 2005). Whether or not respondents were smokers was also included

Table 1:
Descriptive Statistics of Variables of Interest

Variable Responses	Frequency	Percentage	Mean	Standard Deviation
	Affiliation		0.44	0.497
Affiliated	1155	44.3		
Not Affiliated	1455	55.7		
Total	2610	100		
	Attendance		3.66	1.594
Never	628	24.1		
Few times	405	15.5		
1-2 times/year	358	13.7		
1 time/month	183	7.0		
2-3 times/month	274	10.5		
1 time/week	483	18.5		
2 times/week	156	6.0		
3+times/week	116	4.4		
Total	2603	100.0		
	Activities		2.62	1.594
Never	400	27.6		
Few times	504	34.7		
1 time/month	174	12.0		
>1 time/month	130	9.0		
1 time/week	129	8.9		
>1 time/week	103	7.1		
1 time/day	6	0.4		
>1 time/day	5	0.3		
Total	1451	100.0		
	BMI			
BMI	13.67-62.18	100.0	27.66	6.33
	BMI Categories			
Underweight	57	2.3	0.022	0.146
Healthy Weight	884	35.8	0.339	0.473
Overweight	795	32.2	0.305	0.46
Obese	731	29.6	0.28	0.45
Total	2467[2]	99.9		

Source: PS-ARE 2006

[2] The *N* dropped approximately 150 cases after the creation of the BMI variables. The BMI variables were created using three separate variables: height in feet, height in inches, and weight in pounds. Cases where one or more of these self-reported variables were missing were dropped, resulting in the 150 missing cases.

as a control since Lapane et. al (1997) found that adding smoking in as a variable can actually attenuate some of the relationships they found between BMI and involvement in social activities. Religion controls have been included since congregational affiliation, religious service attendance and participation in church activities have a relationship with some demographic variables, such as race, education, and income (Rice 2003) but are not fully explained by them; obviously, one's religious beliefs play a role.

Demographic Controls

Several demographic controls are included in this analysis. Education was measured as highest degree completed. What was originally an 11-point variable ranging from "Less than High School" to "Professional Degree Beyond BA/BS (MD, DDS, JD/LLB ETC." was simplified into a five point variable, where 1 equals "less than high school" (including the categories "Less than High School" and "GED"), two equals "high school degree", including those who had attained a high school diploma and had gone no further in their education, three equals "some college/2 year degree" (including the categories "Vo-tech," "Associates," and "2-year Religious Degree"), four equals "bachelor's degree"(including the category "Bachelor's"), five equals "post graduate work/degree" (including all of the following categories: "Masters," "Masters of Divinity," "Doctorate," and "Professional Degree"). Those who responded as "Other" were dropped. The reason for this recoding was because the original categories were not definitively linear. For example, originally "Master's of Divinity" was originally coded as linearly higher than having a "Master's," but the case cannot be

made that one of these is indicative of a "higher" degree than the other. Therefore, education was re-coded into a simpler, more linear variable.

Income was measured using the variable "Household income," a 19 point variable measured in $5,000 increments ranging from less than $5,000, to $35,000 to $39,999 and then in $10,000 increments ranging from $40,000 to $49,999, to $90,000 to $99,999. At that point, the variable categories continue in $25,000 increments ranging from $100,000 to $124,999, to $200,000 or more. In order to decrease missing answers for this question, mean replacement was used to create a more complete income variable. To control for smoking, a smoker dummy variable was created. Respondents were asked if they had smoked over 100 cigarettes in their lifetime. Those who responded yes were then asked how many cigarettes they smoked daily. These two variables were combined so that respondents who answered no to the initial question and those who smoked 0 cigarettes daily were coded as 0 to indicate they were non-smokers. Those who responded yes to the initial question and then answered that they smoked at least one cigarette per day were coded as 1 to indicate that they are a smoker. The other demographic variables in this analysis include: age in years up to 80 and higher, gender (male=1), marital status (married=1), and race (white=1). Finally, region was also controlled for with south (south=1) contrasted with the rest of the country.

Religion Controls

Since dependent variables such as congregational affiliation, religious service attendance and participating in church activities are undoubtedly related to one's religious beliefs and attitudes, the religion controls of biblical literalism, and a

RELTRAD typology developed by Steensland et al (2000) were included as controls. A system of dummy variables was created using a RELTRAD variable included in the PS-ARE dataset based upon the Steensland typology. Categories included: Black Protestant, Evangelical, Catholic, Mainline Protestant, Jewish/Other, Other Protestant[3], and Unaffiliated. Ultimately, Jewish and Other had to be combined because of the small numbers in the Jewish category. Because of these combinations, both the Jewish/Other category and the Other Protestant category cannot be meaningfully analyzed and thus will not be discussed in the results section. Evangelical was used as the comparison category. Biblical literalism was a dummy variable created from the question "Was your religious text fully inspired by God, partly inspired by God, or not inspired by God?" Those who responded that their religious text was fully inspired by God were coded as 1; all other responses were coded as 0.

Analytic Strategy

To determine if BMI is related to engagement with a religious community, nine models will be run, three models for each dependent variable. Each dependent variable will be regressed using the created BMI categories.[4] This will be done three times for each dependent variable; the first of each regression will be on the entire data set, including both genders. Men and women will then be analyzed independently in

[3] Through personal correspondence Adele James, project manager of the PS-ARE stated that "About 4 percent of persons described their religion as Christian but stated their Christian denomination as 'Just Christian' or 'Not close to any denomination or tradition' or 'Other' with no further description despite prompted clarification. These persons were placed in a category not found in Steensland et. al's model called 'Protestant—Other.'"

[4] Each dependent variable was also regressed upon linear BMI scores. The results were almost identical to the models using the BMI categories and so were not included for brevity's sake. These tables are available upon request.

subsequent regression modeling since previous research indicates that there are significant differences in how BMI affects men and women. The results of these models should indicate whether or not having a high BMI is at all associated with one's engagement or involvement in a religious community, as well as shed light on whether this is a gendered association. Bivariate regression (also known as an odds-ratio regression) will be used to test congregation affiliation since there are only two possible outcomes; respondents either are or are not affiliated with a congregation. A bivariate regression of this dependent variable will show how the independent variables of interest increase or decrease the odds of being affiliated with a congregation. All other regressions will be multivariate linear regressions, since results will indicate what type of linear relationship, positive or negative, the independent variables will have upon the dependent variables. If significant, do the included independent variables of interest show a positive or negative linear relationship with religious service attendance and participation in church activities and will therefore provide support for either the first or second hypothesis.

CHAPTER FOUR

Results

The first two hypotheses, H1 and H2, regarding an association between BMI and religious community engagement were tested simultaneously with each model run. The third hypothesis, H3, was tested in models 4-9 when the data was limited to either men or women. Results are mixed; BMI categories are predictive of congregational affiliation and have a relationship with religious service attendance for women. The variables of interest had no association with the dependent variable of participation in church activities.

Models 1-3 regressed the three dependent variables first on the BMI categories plus controls. These models controlled for gender, but both genders were included in the model, unlike Models 4-6 and Models 7-9. Results for Models 1-3 can be seen in Table 2 below.

In Model 1, obesity has a statistically significant positive relationship with congregational affiliation. While body mass index does not appear to have a significant relationship with either church attendance (Model 2) or participation in church activities (Model 3), the obese are almost 37 percent (exp(B)=1.369) more likely than those with a healthy BMI score to report that they are affiliated with a congregation (Model 1). These findings provide initial support for the hypothesis that those with high BMI scores seek out a religious community. However, merely reporting that one is affiliated with a congregation does not conclusively show engagement with a religious

community, since according to these models, affiliation does not extend to increased religious service attendance or participation in extra church activities.

Table 2

Models 1-3 Regression Results, Both Genders

Variable	Model 1: Affiliation (exp (B))	Model 2: Attendance	Model 3: Activities
Demographic Controls			
Income	1.053***	0.014	-0.001
Age	1.012***	0.015***	0.000
White	1.113	-0.441***	-0.23
Education	1.224***	0.112*	0.159***
Smoker	0.653***	-0.892***	-0.374***
South	1.008	0.224*	-0.054
Married	0.928	-0.021	0.080
Male	0.620***	-0.379***	0.014
Religious Controls[a]			
Black Protestantism	1.025	-0.186	-0.39
Catholicism	0.605***	-0.227*	-0.734***
Judaism/Other	0.462***	-0.334*	-0.013
Mainline Protestantism	0.854	-0.215	-0.173
Other Protestantism	0.201***	-1.057***	-0.112
Unaffiliated	0.095***	-1.819***	-0.225
Religious Belief			
Biblical Literalism	2.331***	1.172***	0.449***
BMI Categories[b]			
Underweight	0.836	-0.442	-0.215
Overweight	1.091	0.105	-0.027
Obesity	1.369*	-0.170	0.073
R^2	0.275	0.288	0.08
N	2447	2603	1362

Source: PS-ARE 2006; ***=0.001, **=0.01, *=0.05; [a] Evangelical Protestant is the excluded category; [b] Healthy weight is the excluded category

Many of the relationships between the control variables and the dependent variables are significant as well. In Model 1, income, age, education, and biblical literalism are positively associated with congregational affiliation. These findings are not surprising and are consistent with previous studies. Affiliation with Catholicism,

Judaism/Other, Other Protestantism, and those who state they are unaffiliated all have negative associations with congregational affiliation, which is also consistent with previous findings. The gender control also follows the expected result, with men being less likely than women to report an affiliation with a congregation. The smoking control is significant and quite powerful: smokers are approximately 35[5] percent less likely to report being affiliated with a congregation than non-smokers.

While the BMI variables of interest do not have a significant relationship with Model 2's dependent variable of religious service attendance, several expected control variables do. Age, education, and biblical literalism all have positive relationships with religious service attendance; once again, this is expected given previous studies on the subject. In terms of gender effects, being male has a negative relationship with religious service attendance. The unaffiliated also have a negative relationship with the dependent variable. As in the previous two models, smokers have a negative relationship with the dependent variables. Smokers attend religious services almost an entire unit less than non-smokers (-0.892). This will be seen throughout the remaining affiliation and attendance models as well; in each, smokers have a significant, negative association with both attendance and affiliation without fail.

Very few variables are shown to be significantly related to participation in church activities. Education has a slightly positive relationship with participating in church activities and affiliation with Catholicism has a strong negative relationship with this type of participation. The low R square score (0.08) shows that what predicts extra participation in religious communities are not the standard expected religious controls,

[5] The equation for this finding is: 1.0-0.653=0.347, or approximately 0.35. Thus the interpretation is that individuals who smoke are approximately 35% less likely to affiliate with a congregation than those who do not smoke.

since almost none of them, including biblical literalism, show up as significant in these models. This trend continues throughout the rest of the models and points to a need for additional research to determine what motivates a person to go above and beyond regular church service attendance and participate in additional activities.

BMI, Engagement with a Religious Community, and Gender

Since earlier studies suggest that how one feels about themselves and their body weight is heavily influenced by gender, subsequent models were run on subsets of each gender. The previous models were repeated, regressing congregation affiliation, religious service attendance, and participation in church activities first on the subset of males only and then on a subset for females only. Sub-setting the data to include only men decreased the number of respondents from over 2400 to just over 1000 for congregational affiliation and religious service attendance and just fewer than 500 for participation in church activities, which is still sufficient to conduct regression modeling. The results for the regression on the male-only subset can be seen below in Table 3.

While BMI score and the obesity dummy variable were significant in predicting congregational affiliation when controlling for gender, neither variable was significant in male-only models. The BMI categories are not significant for any of the models that included only men. Model 4, the congregational affiliation model, shows that approximately 30 percent of the variance is explained by the included variables. Age, education, and biblical literalism are positively related to congregational affiliation. Biblical literalism is the strongest predictor, with biblical literalists over two and half

times (exp(B)= 2.55) more likely to be affiliated with a congregation than non biblical literalists. The Judaism/Other, Other Protestantism, and the Unaffiliated RELTRAD categories are negatively associated with congregational affiliation, unsurprisingly.

Table 3
Models 4-6 Regression Results, Men Only

Variable	Model 4: Affiliation (exp (B))	Model 5: Attendance	Model 6: Activities
Demographic Controls			
Income	1.030	-0.001	-0.001
Age	1.015*	0.017***	0.009
White	0.927	-0.556***	-0.104
Education	1.277***	0.213*	0.170**
Smoker	0.665*	-0.766***	-0.241
South	0.966	0.174	-0.176
Married	1.045	-0.043	0.117
Religious Controls[a]			
Black Protestantism	0.909	-0.371	-0.363
Catholicism	0.724	-0.109	-1.164***
Judaism/Other	0.425*	-0.685*	-0.554
Mainline Protestantism	0.985	-0.176	-0.460
Other Protestantism	0.130***	-1.240***	-0.917
Unaffiliated	0.084***	-1.719***	-0.709
Religious Belief			
Biblical Literalism	2.546***	1.075***	0.230
BMI Categories[b]			
Underweight	0.919	-0.003	0.239
Overweight	1.005	-0.063	0.036
Obesity	1.300	-0.063	0.168
R^2	0.302	0.288	0.122
N	1038	2603	494

Source: PS-ARE 2006; ***=0.001, **=0.01, *=0.05; [a] Evangelical Protestants are excluded category; [b] Healthy weight is excluded category

Once again, smoking behavior also has a negative association with congregational affiliation. Men who are smokers are approximately 30 percent (exp(B)= 0.665) less likely than non-smoking men to report being affiliated with a congregation.

In Model 5 approximately 30 percent of the variance in church attendance among men is explained by the included variables. Age, education, and biblical literalism are positively related to church attendance. Race, affiliation with Judaism/Other or Other Protestantism, and the Unaffiliated have very similar negative relationships with religious service attendance. Men who are smokers also have a negative relationship with religious service attendance; smokers attend religious services approximately three-quarters of a unit (-0.77) less often than men who are non-smokers.

As with the activities models that included both genders, very few of the included variables in Model 6 are shown to be significant. The R-square score gets significantly better; Model 3 predicting participation in church activities when both genders were included was approximately 0.08; when the models are run on a sub-set including only men, the R-square score increases to approximately 0.12. Education is positively associated and Catholic affiliation is negatively associated with participation in church activities.

Model 1, which was run using the entire data set and only controlling for gender showed obesity to have a significant positive relationship with congregational affiliation; when the data was subset to include only men, this relationship did not appear. Thus, it seems likely that these relationships would appear if the data was sub-set to include only women. The women-only subset is larger than the male subset with an *N* of over 1400 respondents for Models 7 and 8. Participation in church activities, Model 9, had an *N* of 868. Results of models run on the women-only subset data appear below in Table 4.

Table 4

Models 7-9 Regression Results, Women Only

Variable	Model 7: Affiliation (exp (B))	Model 8: Attendance	Model 9: Activities
Demographic Controls			
Income	1.068***	0.019	0.002
Age	1.010*	0.014***	-0.004
White	1.245	-0.287*	0.034
Education	1.195***	0.045	0.151*
Smoker	0.631*	-1.002***	-0.413*
South	1.029	0.229*	0.028
Married	0.840	0.001	-0.015
Religious Controls[a]			
Black Protestantism	1.075	-0.053	0.169
Catholicism	0.533***	-0.349*	-0.409*
Judaism	0.464***	-0.081	0.343
Mainline Protestantism	0.770	-0.289	-0.004
Other Protestantism	0.263***	-0.903***	0.433
Unaffiliated	0.100***	-2.033***	0.118
Religious Belief			
Biblical Literalism	2.813***	1.222***	0.597***
BMI Categories[b]			
Underweight	0.783	-0.710*	-0.414
Overweight	1.165	0.318*	-0.058
Obesity	1.410*	-0.254*	0.049
R^2 Score	0.237	0.264	0.063
N	1503	1503	868

Source: PS-ARE 2006; ***=0.001, **=0.01, *=0.05; [a] Evangelical Protestants is the excluded category; [b] Healthy weight is the excluded category

Models run with the women-only data subset yield very interesting results in regards to relationships between BMI and engagement with a religious community. As in the models run on the data including both genders, the obesity dummy variable has a significant positive relationship with congregational affiliation. The odds of an obese woman being affiliated with a congregation are 41 percent higher (exp(B)=1.41) than a

woman with a BMI score in the healthy range. This finding lends support to the second and third hypotheses. The relationship between obesity and religious engagement is positive and gendered. The variance of this model is also quite good; approximately 24 percent of the variation in congregational affiliation is explained by the included variables.

Other variables with positive relationships with congregational affiliation are income, age, education, and biblical literalism. Affiliation with Catholicism, Judaism/Other, Other Protestantism, and Unaffiliated have, unsurprisingly, negative associations with congregational affiliation. Smokers are also negatively associated with congregational affiliation; women who smoke are approximately 37 percent less likely (exp(B)=0.63) to report being affiliated with a congregation than non-smoking women.

While the affiliation models show some support for the second hypothesis that the obese will have higher engagement in a religious community than those who are not obese, the religious service attendance model subset including only women does not support this hypothesis. For the first time, obesity shows up as significant in regards to religious service attendance. Obesity is negatively associated with religious service attendance (-0.254) for women. Being underweight is also negatively associated with religious service attendance (-0.71). However, being overweight is positively associated with religious service attendance (0.318). This suggests that women at the more extreme ends of the BMI scale attend religious services less often than those who are more towards the middle with healthy or just overweight BMI scores. These findings give support to the first hypothesis, that obesity will have a negative relationship with engagement in a religious community. There is some support for each of the opposing

hypotheses H1 and H2 for women with high BMI scores; women with obese BMI scores affiliate with a religious community more than women with healthy BMI scores, but they attend less often and so do not actively engage with the religious community they are affiliated with.

In addition to the variables of interest, several of the control variables have significant relationships with religious service attendance as well. Approximately 26 percent (R^2=0.264) of the variation in church attendance is explained by the included variables. Age, biblical literalism, and southern residence are positively associated with religious service attendance. Race, affiliation with Catholicism or Other Protestantism, and the Unaffiliated are all negatively associated with religious service attendance. Here again smokers have a negative association with religious service attendance; women who smoke attend religious services approximately 1 unit less than non-smoking women.

The BMI categories are not significant in Model 9 predicting participation in church activities. While more variables have a significant relationship with this dependent variable when the data used is a subset of women, the R-square score is very low (0.063). Education and biblical literalism are positively associated with participation in church activities; affiliation with Catholicism is negatively associated with participation in church activities. Smoking behavior has previously had a consistently negative relationship with the other two dependent variables, but shows up as having a significant relationship with this dependent variable for the first time; women who are smokers are less likely to participate in church activities (-0.413) than non-smoking women.

CHAPTER FIVE

Discussion and Conclusion

The results of this study are mixed and provide some support for each of the three hypotheses, for women specifically. Separating the sexes in the data revealed that the BMI categories are not at all significant in predicting congregational affiliation or religious service attendance for men, but are for women, indicating a gendered relationship between BMI and religious behavior. These results are in agreement with previous studies, such as Merton, Wickrama and Williams'(2008) study finding relationships between depressive symptoms and BMI in adolescent females but not in males, or Yates, Edman and Aruguet's (2004) study that found males to be more satisfied with their bodies than females despite high BMI scores. While men may be negatively affected by or feel stigmatized because of having a high BMI score, these feelings do not translate into a change in engagement with a religious community.

The second hypothesis (H2) that the obese would engage in a religious community more than those with healthy BMIs, perhaps in an effort to gain status or attenuate any lost status due to excessive weight, is partially supported by the finding that obesity is positively associated with congregational affiliation. Obese women are more likely to report being members of a congregation than women who have healthy BMI scores. However, this affiliation does not extend to increased attendance or participation in a religious activity. The attendance models using women-only subset data shows that obese women and underweight women attend religious services less

often than healthy-weight women and that overweight women attend more often than healthy-weight women. These women are only nominally engaging in a religious community. They show a baseline commitment to a congregation through affiliating with it, but do not move on to the second and third levels of engagement and as a result do not acquire the social capital that is available to them at these levels (Putnam 2000).

There are several possible reasons as to why women on the more extreme ends of the BMI spectrum (underweight and obese) attend religious services less often than their healthy-weight counterparts, even though obese women actually affiliate with a congregation more often. The first possibility may be a combination of the poor self esteem and stigmatization many of the previous studies found women felt in social settings. Cline and Ferraro (2006) also found a negative association between church attendance and BMI in denominations other than Baptist; women who had high religious attendance were 24% less likely to become obese than women who did not have high religious attendance. One's personal religious convictions may not be enough to push an obese person to attend religious services, a profoundly social setting, and face the stigmatization they have come to expect from any social setting. Second, this study has found that overweight women attend church more often than healthy-weight women, but in an age where over half of the U.S. population is overweight (CDC 2009), perhaps those who qualify as overweight, but not obese, do not experience the stigmatization they once might have. It is difficult to stigmatize the majority. Despite the prevalence of overweight Americans, being obese or underweight are still not the norm and those who fall into those groups may still experience some level of stigmatization or do not feel good enough about themselves to engage in a social

setting, religious or not. A third reason obese women may not engage in a religious community may be attributed to depression. Since obese women are more likely than healthy-weight women to suffer from depression (Merten, Wickrama, and Williams 2008, Ambwani and Strauss 2007, Edman and Aruguete 2004), it is possible that their depression may cause them to decrease their engagement in all social activities, including religious social activities. Future studies related to this one may be able to determine if this is so by including controls for depression if such variables are available.

Fourth, it is possible that obese women, and perhaps underweight women as well, are getting their religious needs met in other ways. While little to no research has been done on relationships between having very low BMI scores and engagement in a religious community, Cline and Ferraro (2006) found a positive relationship between high BMI scores and consumption of religious media such as television or radio programs. Women who actively engage in religious media practices were 14% more likely to become obese than women who did not. While an obese woman may be affiliated with a congregation as part of her religious identity, perhaps she does not attend because she can take in the religious messages she wants to in a solitary, more non-judgmental setting than at a social religious service setting.

Fifth, the importance of physical comfort and ease one has in personal mobility cannot be discounted in studies such as this. Obese persons may have difficulty moving about or finding comfortable seating in a religious community's facilities which are not typically set up with those at the extreme ends of the BMI scale in mind. If an obese person cannot physically attend a worship service or does not feel comfortable in the

available facilities then it is no surprise that they may not attend very often or participate in additional activities at that religious community, even if they have committed to being a member of it. Additional studies into relationships between obesity and social participation and engagement should consider including questions that will determine if this is the case or not. In a society where obesity levels continue to rise, social communities, religious and otherwise, could benefit from this knowledge as they strive to meet the needs of all of their members.

One unavoidable limitation of this study is the inclusion of self-reported variables to create the BMI category variables. The findings of this study rest upon respondents accurately reporting both their height and weight in order to calculate a BMI score, which can be a flawed measure. Because of the nature of the equation used to calculate BMI, factors such as the greater weight of muscle relative to body fat are not taken into account. Therefore a very muscular person may find themselves in the "overweight" or "obese" category, even though they are very physically fit. Future research in this area can take steps to increase the reliability of their studies by measuring the height and weight of respondents themselves to get more accurate BMI measures. A second step is one that the PS-ARE has already taken, in part. When respondents refused to fill out the weight question, those administering the survey were asked after administering it "Would you say the respondent was very underweight, somewhat underweight, about normal weight, somewhat overweight, very overweight, or extremely overweight for his or her height?" While this is subjective and responses may vary according to what each survey administrator may find acceptable or attractive, taken in conjunction with reported height and weight variables may provide reliability

for both. Those who fall into the overweight or obese BMI categories who are also described as “very overweight” or “extremely overweight” for their height could then be reliably considered to truly belong in those categories. In the case of the PS-ARE, since the survey administrators were only asked this question regarding those who did not fill out the weight question, there were only 76 responses in this variable. These responses were not included in this study, but future research that has data with both BMI information and accompanying answers such as these from the survey administrators can overcome the limitations currently present in this study.

These findings do not conclusively answer the question as to whether the obese engage in a religious community more or less than those who have a healthy BMI score since the results are mixed. The models predicting participation in church activities yielded no answers since very few variables were significant at all. Whatever predicts participation in extra-curricular activities at church, it is not the standard religious controls or BMI. Further research into BMI and engagement in a religious community might include analyses including variables such as number of friends in that religious community, or offer up a comparison between attendance or participation in social religious activities and social secular activities to determine if there is a difference in behavior. Until more in-depth research can be done, there will not be a definitive answer to the question of whether BMI and obesity are related to increased or decreased participation in a religious community.

Perhaps the most important finding of this study is that the relationships that exist between obesity and religious engagement are gendered. This study, coupled with earlier studies (Ambwani and Strauss 2007, McClaren and Kuh 2004, Yates, Edman,

and Aruguete 2004) shows that being obese has a powerful relationship with women's engagement in social activities across the life course that is not seen in men. Obesity appears to affect the genders in different ways; additional study should address whether this is an effect of internal self esteem issues, external stigmatization, or other possible causes. Hebl and Turchin's (2005) findings showing how one feels about their body size differs along racial, as well as gender lines, suggests another area for future research. A study further separating the data by race could determine if the relationships between obesity and religious engagement differs are additionally related to race as well as gender.

A second important finding of this study is how strongly related smoking is to engagement with a religious community. Whether or not one was a smoker had a significant negative relationship with engagement in a religious community in eight of the nine models shown. Further studies interested in religious community engagement and participation should consider using smoking behavior as either an independent variable of interest or a control variable whenever possible. The nature of this relationship should be further explored to discover why smokers seem to participate in religious activities less often than non-smokers and whether this relationship is similar to the relationship between smokers and engagement in other social activities.

With the prevalence of overweight and obese adults in the United States, study into how one's BMI is related to other aspects of one's lifestyle is urgent. The relationships between gender, obesity, and engagement in a religious community are more complex than initially suspected and raises the question as to whether this is so for relationships with other social communities. Further research on the subject will reveal

insight into the everyday lives of the majority of adults in the United States. This study provides a stepping stone to that insight by providing a cross-sectional look at the relationship between obesity and engagement with a religious community.

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