

**RELIGION AND BODYWEIGHT:
ARE THERE VARIATIONS BY AFFILIATION? ***

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ABSTRACT

RELIGION AND BODYWEIGHT: ARE THERE VARIATIONS BY AFFILIATION?

Despite evidence of the salutary effects of religion on physical health, relatively little attention has been paid to the effects of religiosity on the risk of obesity. Our study examines this relationship with specific attention to the influence of Mormon (Latter-day Saint or LDS) affiliation and attendance on body weight. Latter-day Saints make an interesting test case because LDS proscriptions against alcohol, tobacco, and tea/coffee use could lead to either (1) reduced risks of overweight and obesity by reinforcing a broader constellation of healthful dietary practices (what we call a “generalized positive health disposition”) or (2) greater risks of overweight and obesity by promoting culturally approved unhealthful behaviors (e.g., overeating) that are substituted for religiously proscribed substance use (what we call “compensatory consumption”). Using a sample of Mormons and non-Mormons in Utah, we find that (1) Mormons exhibit a higher risk of overweight and obesity than their non-Mormon peers, (2) the effects of Mormonism on bodyweight vary by demographic characteristics, (3) religious service attendance more consistently attenuates the risk of overweight and obesity for non-Mormons while producing this effect only sporadically for Mormons (e.g., young women), and (4) smoking and drinking do not significantly affect Mormons’ bodyweight but do affect that of non-Mormons. These findings evince context-specific support for both forms of health habits (generalized positive health disposition, compensatory consumption), and underscore the importance of tracing physical health outcomes to particular forms of religiosity.

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Introduction

Despite the fact that overweight and obesity have been connected with increased susceptibility to myriad health complications and a diminished lifespan, little sociological research has examined the effects of religion on bodyweight. This study examines how bodyweight (both overweight and obesity) is linked to religion among Mormons (Latter-day Saints, LDS) and non-Mormons residing in Utah. Latter-day Saints provide an intriguing case through which to examine the influence of religion on bodyweight because Mormonism is distinguished by its commitment to the “Word of Wisdom,” a doctrine that proscribes the use of alcohol, tobacco products, coffee and tea while prescribing various healthy practices (e.g., regular physical activity, moderation in the consumption of meat).

Our investigation begins with a review of relevant literatures on religion, health-related practices, and bodyweight, after which we consider the contours of Mormon religious doctrine related to physical well-being. From this review and summary, we generate a series of key theoretical constructs and hypotheses that we test using public health data collected from residents of Utah. To this end, we consider countervailing outcomes that are possible concerning the religion-health connection. On the one hand, we theorize that religiously inspired health rationales can promote salutary bodyweight outcomes by instilling a set of general habits, what we call a “generalized positive health disposition,” that couples beneficial proscriptive practices (e.g., abstinence from harmful drugs) and prescriptive behaviors (e.g., regular physical activity). On the other hand, it is possible that religious proscriptions against drug use may undermine

healthy bodyweight by fostering “compensatory consumption,” through which unhealthy dietary practices (e.g. overeating) are substituted for religiously forbidden substances. Our investigation reveals the importance of considering the interplay of various religious factors (denominational affiliation, worship service attendance, and health-related theological rationales) when investigating the religion-health linkages.

Literature review

Although research has shown that religious involvement exhibits a series of beneficial effects on health (e.g. Hill et al. 2007, Hummer et al. 1999), the linkages between religion and bodyweight are not well understood. The relationship between religion and bodyweight gets no attention in the *Handbook of Religion and Health* (Koenig et al. 2001), and only a few studies exist on this topic. Among the earliest studies to explore the connections between religion and bodyweight, one investigation found no association between denominational families, crudely measured as Catholic versus Protestant, and obesity (Cohen et al. 1991). However, more recent ecological inquiries have called into question these non-findings. Obesity rates have proven to be higher in states that have larger proportions of religious individuals and vary somewhat by denominational affiliation, although these differences are reduced after controlling for socioeconomic status (Ferraro 1998).

Subsequent survey investigations have added to the knowledge base provided by this first generation of scholarship. Conservative Protestant men have been shown to be significantly (five pounds) heavier, on average, than those that indicated no religious preference, though no such effect was found for women (Kim et al. 2003). Similarly, in a cross-community

comparison study between neighboring cities in Massachusetts and Rhode Island, religious adherents of any type were more likely to be more than 20 percent overweight than the religiously unaffiliated (Lapane et al. 1997). This same study found that 48 percent of churchgoers had never smoked, compared to 35.4 percent of nonreligious respondents. This finding is potentially important because research suggests that smoking is associated with lower bodyweight (Krueger et al. 2004).

More recent investigations have explored the ways in which what might be called “compensatory consumption,” that is, increased food intake coupled with proscriptions against drug use, can have religious moorings. One of the more recent studies of religion and bodyweight suggests that the increased risk of overweight among Baptists is due to discouraging believers from smoking and drinking, but not encouraging them to engage in moderate food intake (Cline and Ferraro 2006). This finding is important as it provides evidence of how when religious values that emphasize abstinence of use of tobacco and alcohol which typically provides positive health consequences, may inadvertently raise one’s risk of becoming overweight and obese through the substitution of food for cigarettes and alcohol. Despite the valuable contributions made by the aforementioned studies, there is still insufficient research that has investigated the effects of religion on bodyweight.

The practice of “compensatory consumption” has a basis in the broader literature on bodyweight, particularly that on “emotional eating.” Solomon (2001) points out that dietary behaviors are closely linked to social values for self-control (Solomon 2001: 570). Other researchers assert that that emotional eating may be a partial consequence from adherence to conservative women’s roles (Martz & Handley 1995) and that in general, women may be more

vulnerable to emotional eating than men (Greeno & Wing 1994). Therefore, it is logical to hypothesize that women who belong to a religious organization which promotes traditional women's roles may have a greater risk to develop elevated bodyweights compared to others.

In addition to the association between religious affiliation and bodyweight, the frequency of religious attendance, as an indicator of public religiosity, may be a critical factor in the etiology of obesity. Frequency of church attendance may act as a proxy indicator as to how closely members may abide by religious norms and are embedded in religious networks that directly influence their bodyweight. However, empirical research findings are far from consistent. For example, in a study performed by Baecke et al. (1983), both Lutheran Dutch males and females weighed more than non-Lutherans. However, among Lutheran males that attended religious service more frequently than once a month, the mean bodyweight to height ratio was lower than among Lutheran males who did not, suggesting that church attendance decreased bodyweight. This result is also supported by one recent nationally representative study performed by Cline and Ferraro (2006) which found that religious attendance was negatively associated with bodyweight, despite the fact that there was a significant positive relationship between obesity and Baptist women. These findings are at odds with those pertaining to religious affiliation reviewed above, and suggest that regular religious attendance may promote what we call a "generalized positive health disposition" that couples beneficial proscriptive and prescriptive health habits.

Turning to drug use and bodyweight, several key findings emerge. Current smokers have been found to have lower ratios of bodyweight to height than both never and former smokers even though they tend to lead a more sedentary lifestyle than nonsmokers (Wee & Rigotti 2001)

and do not appear to eat substantially less than nonsmokers (Perkins 1993). Tobacco appears to provide appetite suppressing effects among nonsmokers in laboratory studies (Perkins & Epstein 1990, Perkins 1993). However, this suppression effect appears to mediate as tolerance to the drug occurs and caloric intake resumes regularity. In spite of the tolerance achieved to the appetite suppressant affects, it is thought that metabolic effects persist which result in lower bodyweight among smokers compared to nonsmokers.

Moderate alcohol use has been shown to be negatively associated with bodyweight (Ball et al. 2003, Breslow & Smothers 2005, Nanchahal et al. 2000, Wannamethee & Shaper 2003). Interestingly, one study found that among the Dutch, not only did moderate drinking have a buffering effect upon bodyweight, teetotalers were found to be as unhealthy as excessive drinkers (Vasse et al. 1998). Moreover, Breslow and Smothers (2005) suggest that frequent drinkers exercise self-control and “substitute alcohol for other dietary intake” (Breslow & Smothers 2005:373), rather than consuming alcohol in addition to what they would normally eat. However, teetotalers may not have learned to exercise the same self-control in terms of dietary behaviors and substitute alcohol for excessive food consumption.

As was mentioned, some religious denominations strongly discourage and may even prohibit members from drinking alcohol. While such values have been placed upon alcohol consumption, guidelines and values regarding other dietary activities may have been neglected or minimized in importance (Sack 2001). As such, people who choose not to drink because of conservative religious values are not utilizing the protective qualities of moderate alcohol consumption. Additionally, they may feel that indulging in food is not immoral because it is not stigmatized by other members of the congregation. Thus, persons who abstain from alcohol

because of religious ideology may have a higher risk of having an elevated bodyweight than persons who moderately drink and/or smoke.

Turning finally to physical activity and bodyweight, those who regularly participate in physical activity report having overall better mental and physical health. Recent findings have found that “even in the absence of regular exercise ... small amounts of routine physical activity within a normal lifestyle, slight increases in fitness, and lower levels of body fat appear to mediate perceived mental and physical health” (Stewart et al. 2003:120). Still, only about 22 percent of adults in the US are following the recommended thirty minutes of physical activity most days (Reeves & Rafferty 2005) and participations rates vary by religious affiliation (Merrill & Thygerson 2001, Wallace & Forman 1998), church attendance (Merrill & Thygerson 2001, Strawbridge et al. 2001) and sex (Kim & Sobal 2004).

Why Mormons? An Intriguing Test of the Religion-Bodyweight Connection

One group that presents an excellent opportunity for investigation of the influence of religion on bodyweight is The Church of Jesus Christ of Latter-day Saints (LDS or Mormon). Scientists have concluded that Utah has a distinctive culture, primarily due to the influence of the religious concentration of Mormons (Toney et al. 2003:431). Some of the peculiarities of the “Mormon Culture Region” (MCR) are manifested in the effects from the strict code of health known as the Word of Wisdom to which many Mormons adhere. The Word of Wisdom is believed to be one of many revelations that Joseph Smith Jr., the church’s founder, reported receiving from God. This revelation contains words of counsel that strictly prohibit partaking of alcohol, hot drinks (interpreted as being coffee and tea), and tobacco. The Word of Wisdom also

advocates eating fruit and grains and discourages the consumption of meat. Despite the Word of Wisdom's encouragement to eat fruits and grains, and consequential health benefits, it does not mandate a healthy diet and never specifies its stance on exercise or other foods, such as sugars or fats.

Though instituted for moral reasons, this doctrine does have some clear health benefits. For example, Utah has very low rates of alcohol and tobacco use when compared to other states in (Office of the Executive Director 2001). Moreover, less than one percent of Mormons who attend church weekly smoke cigarettes (Merrill & Thygerson 2001). While Mormons interpret the Word of Wisdom as literally prohibiting alcohol and tobacco, they may not believe that the Word of Wisdom is intended as a more general comment on the importance of a healthy diet. For example, Merrill and Thygerson (2001:43) note that not only are Mormons who attend weekly church services less likely to exercise than non-Mormons, but those “who attend church less than weekly are at greatest risks for a sedentary lifestyle.” Thus, instead of using the Word of Wisdom as counsel to help Mormons achieve a healthy life, Mormons may use it as a means to ban certain behaviors but legitimize others that are not expressly prohibited.

Brizer (1993:343) also suggests that the unusually high prescription abuse rate in Utah is due to Mormons using “medically ‘legitimized’ drugs preferentially” because they are medically prescribed. Of these legitimated drugs, food could be the most abused as Mormons may view this behavior as a guilty pleasure, rather than a form of abuse because they are not “sinning” according to the literal interpretation of the Word of Wisdom.

The sociocultural explanation states that “cultural beliefs are reinforced by in-group ties when all members of the social network know and interact with each other and share the same

cultural background” (Geertsen 1997:276). In other words, individuals tend to associate with those who have similar beliefs and behaviors because they share a common culture and repeatedly associating with others who share similar values reinforces one’s beliefs.

Lupton’s (1996) sociological examination of food clearly argues that food is not only a physical commodity, but it is also a symbolic good that provides cultural meaning. Moreover, throughout history, food has been an integral part of worship and around which strict dietary practices have been invoked. However, we contest that if a religion stresses abstaining from certain foods or drinks, but places far less emphasis on foods or drinks that should be consumed, the absence of the prohibited foods may serve as the symbol of devoutness. Moreover, if one associates primarily with those who are actively engaged in *not partaking* of particular foods or drinks, the symbol of abstinence may be reinforced and *inadvertently* a healthy diet is evaluated in terms of what is avoided rather than what is consumed. In other words, Mormons who adhere to the prohibitions in The Word of Wisdom may view that their healthful behaviors compensate for their unhealthy ones which will increase their risk of being obese or overweight.

Among possible confounding factors, several need to be taken into consideration. Age has been correlated with bodyweight in a curvilinear direction (Baecke et al. 1983). However, age does not significantly alter church activity among Mormons but does so for non-Mormons in a positive association (Merrill & Salazar 2002). Similarly, the effects of religious involvement may increase as one ages and thus, affect bodyweight. Additionally, the effects that smoking, drinking, and other health behaviors have on bodyweight may vary with age.

Race and gender have also been linked to religious involvement in Utah. For example, about 70.5 percent of whites are affiliated with the Mormon Church compared to only 22.6

percent of Hispanics (Mason et al. 2004). Additionally, women are more likely to be active participants in Mormon and non-Mormon church services (Merrill & Salazar 2002). Therefore, variations in bodyweight between religious groups may be modified by race or gender.

Marital status has been shown to be associated with bodyweight in both men and women (Ball et al. 2002). In addition, marital stability has been associated with higher levels of religious involvement and health (Strawbridge et al. 1997). The Mormon church places a strong focus on traditional marriage, and proportionally more Mormons are married than non-Mormons (Merrill & Salazar 2002). Consequently, the relationship between religious involvement and bodyweight may be accounted for by marriage.

Lastly, it is possible that Mormon women will have an elevated bodyweight due to the conservative Mormon dogma that emphasizes traditional women's roles. For example, Mormon theology emphasizes the importance of family and encourages women to stay home with children rather than pursue careers. If they practice this ideology, women may feel marginalized and isolated from others. Conversely, Mormon women who choose to follow their career path may find themselves suffering from guilt because they are not adhering to mainstream Mormon ideology. In other words, there may be an interaction effect that exists between sex, employment status, and religious affiliation that accounts for the relationship between religion and bodyweight.

Research Questions

There are two overarching research questions that guide this study.

1. To what degree is affiliation with the LDS Church associated with a higher or lower risk of overweight and obesity? Where this question is concerned, we entertain competing hypotheses. On the one hand, the Word of Wisdom may create a *generalized positive health disposition* that fosters healthy lifestyle practices and is, in turn, associated with reduced likelihood of overweight and obesity. Yet, on the other hand, the Word of Wisdom could foster compensatory consumption habits in which some unhealthy dietary practices (e.g., emotional eating) are used to substitute for legal mood-altering substances (e.g., coffee, tobacco) that are proscribed by the faith.
2. To what degree is religious attendance among Mormons and non-Mormons associated with distinct risk of overweight and obesity? This facet of religiosity is important because respondents can claim an affiliation with a faith without being active in that faith. High levels of attendance in a faith tradition often indicate robust integration within networks of coreligionists and also suggest a higher “dosage” of doctrinal exposure and adherence. Therefore, high levels of Mormon attendance could indicate distinctions between “active” and “inactive” Latter-day Saints that would manifest themselves in different lifestyle choices and, perhaps, different health outcomes with regard to overweight and obesity.

Research Design

Sample

This study draws on the 1996 Utah Health Status Survey, which is a cross-sectional study conducted by the Utah Department of Health, Office of Public Health Assessment Survey

Center. These data contain responses from about 6,300 Utah households and have a completion rate of over 66 percent. Pregnant women and those under the age of 18 are excluded from this inquiry. The second source of data comes from the official Mormon Church website:

www.lds.org in which we searched popular doctrinal periodicals (e.g. Ensign).

Key Measures

The main independent variables for this study are religious affiliation and attendance, smoking and alcohol use, and physical activity. Religious affiliation is dichotomized into two categories: Mormon and non-Mormon. Church attendance was categorized into: (1) “active” (attend religious activities at least once a week); (2) “less active” (attended less than once a week); and “no attendance” serving as the reference. Smoking is measured by one main question and two subquestions. Using this information, respondents were categorized into: “never smokers” (smoked less than 100 cigarettes in life); “ex-smokers” (smoked more than 100 cigarettes, but no longer smoke); “light smokers” (currently smoke less than a pack a day); and “heavy smokers” (smoke more than one pack of cigarettes a day). Alcohol use was computed using four questions which categorized respondents as: “never drinkers” (have had less than 12 drinks in their lives), “exdrinkers” (have had more than 12 drinks in their lives, but no longer drink), “light drinkers” (currently drink, but drink less than seven drinks a week), and “heavy drinkers” (drink seven or more drinks a week). Participation in physical exercise was measured by two questions. Respondents are then categorized into: “never exerciser” (does not participate in moderate or vigorous exercise at least three times a week for twenty minutes); “light exerciser” (has exercised less at said level less than one year); “moderate exerciser” (has

exercised one year and up to five years); and “heavy exerciser” (has exercised five years or more).

The dependent variable in this study is bodyweight status. One common method utilized by researchers who study bodyweight is the Body Mass Index (BMI). BMI is the ratio of bodyweight to height squared (kg/m^2). In practical terms, adults who have a BMI less than 25 are considered to be “not overweight” (coded as 0), greater than or equal to 25, but less than 30 are considered “overweight” (coded as 1), and those with a BMI greater than or equal to 30 are “obese” (coded as 2) (NHLBI 1998). BMI is a commonly used measure in population and medical studies because of its strong correlation with fat mass (Reither, 2005; Manson, Skerrett, & Willet 2002). Self-reported measures to compute BMI are known to be lower than observed BMI. To improve the accuracy of the self-reported data, BMI is truncated to a minimum of 12 and a maximum of 70, which has been found to more accurately represent the range of values in the U.S. adult population (Reither, 2005). This truncation resulted in dropping of four cases.

Separate analyses were performed by age and sex. As has been alluded to throughout the literature review, both BMI and religious involvement are related to age and sex. To help prevent the masking of subtle differentiations of BMI that occur by age and sex, age is trichotimized; 18-34, 35-54, and 55 or older among men and women. These age groups are chosen in part because of relatively even frequencies, and also because each of these stages is roughly representative of young adulthood, middle age, and older adulthood.

Several demographic variables are used to help ensure internal validity. In addition to the analyses being stratified by age and sex, age as a continuous variable is used as a control variable. This is to prevent residual confounding within the broad age categories. Other control

variables entered into the models are marital status, race/ethnicity, employment status, education, household size and household income. Descriptive statistics for all variables used in the multivariate analysis are shown in Table 1.

[TABLE 1 ABOUT HERE]

Results

The results of multinomial logistic regressions are shown in Tables 2 through 4, which illustrate the effects of religious affiliation and attendance, lifestyle behaviors, and other sociodemographic variables on the relative risk ratio of being overweight or obese for Utah adults in 1996. In each table, “not overweight or obese” is used as the reference category. In Tables 2-4, two models are examined. Model 1 tests the effects of religious affiliation and attendance on bodyweight, net of sociodemographic variables (age, race/ethnicity, marital status, household size, education, employment status, and household income). Model 2 explores the extent to which lifestyle factors (smoking, drinking, and exercise) mediate the relationship between religious affiliation and bodyweight found in Model 1. Table 2 also estimates the effects of religion on bodyweight by sex. Table 3 further investigates differences between Mormons and non-Mormons by sex (two-way interactions), with particular attention to religious attendance and lifestyle characteristics. In Table 4 we report the effects of religious affiliation and attendance on bodyweight by sex and age (three-way interactions).

The results in Table 2 show that the effect of belonging to the Mormon faith results in increased risk for being overweight among females, and obese among both sexes, even after controlling for potentially mediating lifestyle factors (i.e. smoking, drinking, exercise) in Model 2. This is illustrated in Charts 1 and 2. Among men, the relative risk ratio decreases only slightly

for Mormons between Models 1 and 2 for being obese (1.843, $p < .01$; 1.728, $p < .01$), all else being equal. The changes in the coefficients of overweight (1.661, $p < .001$; 1.638, $p < .001$) and obesity (1.711, $p < .05$; 1.577, $p < .05$) between the models are also small among Mormon females after controlling for other variables. Interestingly, however, Table 2 shows that church attendance does not significantly affect the risk of being overweight or obese in either Model 1 or Model 2 for men or women. Also of interest, we find that all else being equal, household size only significantly elevates the risk of being obese among women (Models 1-2: 1.134, $p < .01$; 1.108, $p < .05$) but not others.

[TABLE 2 ABOUT HERE]

Our findings in Model 2 (see Table 2) show that men who are heavy smokers have significantly lower risk ratios for being overweight (0.583, $p < .05$) or obese (0.398, $p < .01$) than those who have never smoked, all else being equal. Lastly, we find that all else being equal, participation in light exercise significantly raises the risk of being overweight among men (1.451, $p < .05$) compared to those who never exercise. On the other hand, we note that when compared to never exercisers, women who have participated in moderate exercise have lower risk for being obese (0.338, $p < .001$) after holding all other variables constant. Also, both men (0.778, $p < .05$; 0.319, $p < .0001$) and women (0.616, $p < .01$; 0.255, $p < .0001$) who are heavy exercisers have lower risk of being overweight and obese compared to those who never exercise, all else being equal.

Interestingly however, when we explore the results from Table 3, which examined the effects of Models 1 and 2 among Mormons and non-Mormons of both sexes, we clearly see that among Mormons, no significant effects are observed from smoking or drinking, but are present

among non-Mormons. While our results regarding the negative effects of smoking are consistent with the literature cited in our review of the literature, the increased risk of overweight among women (1.886, $p < .05$) and obesity among men (2.711, $p < .05$) who are light drinkers compared to never drinkers is at odds. Still, our results are consistent among non-Mormon women who engage in heavy drinking (3.276, $p < .05$) with the literature review. Although, this sub-regression does not formally test for interaction effects, it does provide adequate evidence that interaction effects do exist. This finding is not surprising considering that previous research documents very low participation rates in using tobacco among Mormons (Merrill & Thygeson 2001).

[TABLE 3 ABOUT HERE]

Our final statistical analyses are presented in Table 4. Based upon the significant results of age in Tables 2 and 3, our final analyses perform six regression tests (using Model 2) among males and females between the ages of 18-34, 35-54, and 55 or older to better understand the effects of religion on bodyweight. These results show that controlling for other variables, Mormon affiliation significantly increases the risk ratios for Utahans 55 or older for obesity (Models 1-2: 4.324 $p < .001$; 3.371, $p < .01$), but no other age groups. Conversely, Mormon women exhibit higher risk of being overweight (Models 1-2: 2.015, $p < .01$; 1.822, $p < .05$) and obese (Models 1-2: 4.049 $p < .01$; 4.437, $p < .01$) among 34-55 year olds and being overweight (Models 1-2: 2.164, $p < .01$; 2.704, $p < .01$) among those who are 55 or older compared to non-Mormons, all else being equal.

[TABLE 4 ABOUT HERE]

Another interesting finding that manifests itself in these analyses is that church attendance becomes a significant negative predictor for being obese among 18 to 34 year old

women in Model 1 (0.531, $p < .05$) and 55 and older men in Model 2 (0.394, $p < .01$; see Table 4). On the other hand, among 35 to 54 year old women, we find that religious attendance significantly increases risk of overweight (1.446, $p < .05$) in Model 2, controlling for sociodemographic and lifestyle characteristics, all else being equal. Upon further examination in ancillary models, we find that this relationship is largely among non-Mormons (results not shown). In fact, we find that out of all of the said age/sex groups in which increased religious participation significantly influences risks of elevated bodyweight, all but one is non-Mormon. Among 18-34 year old women we find that controlling for sociodemographic factors and lifestyle behaviors increased church attendance decreases risk of obesity among Mormons (0.383, $p < .05$; results not shown). This is an unanticipated finding and we are agnostic about its implication.

Conclusion

We tentatively conclude that members of the Mormon faith have greater risk of being overweight because of their “compensatory consumption.” Through this process of compensatory consumption, Mormons selectively adhere to religious norms and doctrines such as the prohibition of alcohol and tobacco as outlined in their code of health, the Word of Wisdom. But this religion-induced behavior inadvertently raises one’s risk of overweight and/or obesity through the substitution of food for cigarettes and alcohol when compared to Utah non-Mormons.

Interestingly, when analyzed by age and sex, religious service attendance is negatively associated with bodyweight. However, our ancillary analyses show that this effect is largely for

non-Mormons, which suggests that the effect of being a member of the Mormon faith may be more important than how religiously active they are because the values surrounding the Word of Wisdom are a chief part of the subculture (see Toney et al. 2003). In other words, while the Mormon culture has long been acknowledged to have generalized positive health dispositions due to adherence to the Word of Wisdom, we also find evidence suggesting that this religious subculture stemming from the Word of Wisdom can inadvertently undermine other health benefits through compensatory consumption. Therefore, these findings evidence context-specific support for both forms of health habits and highlights the necessity of understanding physical health outcomes to particular forms of religiosity.

This study is not the capstone in understanding the relationship between religion and bodyweight. We recommend three directions for future research. First, researchers should perform a more systematic content analysis on popular Mormon publications to more thoroughly investigate how Church publications reinforce values and prescriptions related to the Word of Wisdom, thus influencing bodyweight. Secondly, we also suggest that researchers investigate whether the effects of religious service attendance vary across other faith traditions. And lastly, future research should also examine various religious denominations, especially conservative Protestant denominations that strongly discourage drinking and smoking to confirm if a similar religion-induced “compensatory consumption” exists.

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TABLE 1: Listwise-Deleted Sample Characteristics (unweighted)

Dependent Variable		Frequency	Percentage	Standard
Bodyweight	Not overweight	5,129	56.43	
	Overweight	2,891	31.81	
	Obese	1,069	11.76	
Independent Variables				
Religious Affiliation	Mormon	2,822	31.05	
	Not Mormon	6,267	68.95	
Church Attendance	Never attends	882	9.7	
	Less than once a week	3,184	35.03	
	More than once a week	5,023	55.26	
Sex	Men	4,462	49.09	
	Women	4,627	50.91	
Age	Mean age		41.974	0.177
	18-34 years	3,487	38.37	
	35-54 years	3,528	38.82	
	55 or older	2,074	22.82	
Race/Ethnicity	White	8,533	93.88	
	Hispanic	207	2.28	
	Other race/ethnicity	349	3.84	
Marital Status	Married	6,468	71.16	
	Divorced, widowed, or seperated	1,119	12.31	
	Never married	1,502	16.53	
Household Size			3.728	0.020
Education Status	High school or less	3,533	38.87	
	Some college	3,062	33.69	
	College graduate	1,532	16.86	
	Graduate school	962	10.58	
Employment Status	Full or part-time	6,250	68.76	
	Housewife	908	9.99	
	Other employment	1,931	21.25	
Household Income			\$43,098.66	\$204.01
Smoking Status	Never smoker	6,771	74.5	
	Exsmoker	1,183	13.02	
	Light smoker	561	6.17	
	Heavy smoker	574	6.32	
Drinking Status	Never drinker	5,154	56.71	
	Exdrinker	586	6.45	
	Light drinker	2,814	30.96	
	Heavy drinker	535	5.89	
Exercise Status	Never exerciser	4,847	53.33	
	Light exerciser	963	10.6	
	Moderate exerciser	1,230	13.53	
	Heavy exerciser	2,049	22.54	
n		9,089		

TABLE 2: Multinomial Logit Relative Risk Ratio Estimates of Being Overweight or Obese for Utah Adults (1996)

Predictor	Men				Women			
	Model 1		Model 2		Model 1		Model 2	
	Overweight RRR	Obese RRR	Overweight RRR	Obese RRR	Overweight RRR	Obese RRR	Overweight RRR	Obese RRR
Mormon (non as ref.)	1.013	1.843 **	1.078	1.728 **	1.661 ***	1.711 *	1.638 ***	1.577 *
Attendance	1.107	0.857	1.122	0.763	1.087	1.056	1.093	1.012
Age (continuous)	1.017	1.018	1.017	1.017	1.019 *	1.011	1.020 *	1.008
35-54 yrs (18-34 as ref.)	1.448 *	2.086 **	1.511 *	2.262 **	1.571 *	3.501 ***	1.651 *	3.851 ***
55 or older	0.945	1.559	1.024	1.730	1.433	2.541	1.496	2.856
Hispanic (white as ref.)	0.919	0.742	0.870	0.694	1.400	2.756 ***	1.285	2.315 **
Other Race/Ethnicity	1.441	2.244	1.419	2.338	1.507	1.187	1.456	1.034
Never Married (married as ref.)	0.448 ***	0.358 ***	0.475 ***	0.374 ***	0.808	1.206	0.831	1.213
Divorce, Widowed, or Separated	0.824	0.594	0.852	0.643	0.778	0.930	0.772	0.904
Household Size	0.950	1.038	0.956	1.022	1.015	1.134 **	1.019	1.108 *
Some College (high school as ref.)	1.067	1.231	1.049	1.196	0.863	0.944	0.862	0.938
College Graduate	1.047	0.938	1.028	0.872	1.005	0.952	1.004	0.964
Graduate School	0.818	0.732	0.820	0.726	1.156	0.978	1.184	1.007
Not Employed Full or Part-time	0.692 *	0.638	0.698 *	0.661	0.999	1.078	1.032	1.106
Housewife	n.a.	n.a.	n.a.	n.a.	0.919	0.914	0.920	0.903
Household Income	1.000	1.000	1.000	1.000	1.000 *	1.000 ***	1.000 *	1.000 ***
Exsmoker (never as ref.)			0.895	0.686			0.764	1.124
Light Smoker			0.986	0.507			0.742	0.900
Heavy Smoker			0.583 *	0.398 **			0.650	0.498
Exdrinker (never as ref.)			1.398	1.420			1.038	1.470
Light Drinker			1.334	1.028			1.213	0.886
Heavy Drinker			1.193	1.140			1.345	0.525
Light Exerciser (never as ref.)			1.451 *	1.208			1.321	1.063
Moderate Exerciser			0.935	0.778			1.076	0.338 ***
Heavy Exerciser			0.778 *	0.319 ***			0.616 **	0.255 ***
n	4462	4462	4462	4462	4627	4627	4627	4627

* $p < .05$. ** $p < .01$. *** $p < .001$

Notes: Design effects are corrected with robust standard errors and weights.

TABLE 3: Multinomial Logit Relative Risk Ratio Estimates of Being Overweight or Obese for Utah Adults by Religious Affiliation (1996)

Predictor	Mormon Men						Non-Mormon Men					
	Model 1			Model 2			Model 1			Model 2		
	Overweight RRR	Obese RRR	n	Overweight RRR	Obese RRR	n	Overweight RRR	Obese RRR	n	Overweight RRR	Obese RRR	n
Attendance	0.872	0.901	3041	0.914	0.692	3041	1.279	0.734	1421	1.252	0.705	1421
Exsmoker (never as ref.)				0.958	0.802					0.803	0.737	
Light Smoker				1.142	1.096					0.926	0.250 **	
Heavy Smoker				0.547	0.520					0.681	0.249 **	
Exdrinker (never as ref.)				1.588	1.319					0.733	3.923	
Light Drinker				1.165	0.695					0.933	2.711 *	
Heavy Drinker				1.553	0.992					0.608	2.481	
Light Exerciser (never as ref.)				1.693 *	1.368					1.116	0.956	
Moderate Exerciser				0.883	0.720					1.049	0.820	
Heavy Exerciser				0.796	0.271 ***					0.758	0.456 *	
n	3041	3041	3041	3041	3041	3041	1421	1421	1421	1421	1421	1421
	Mormon Women						Non-Mormon Women					
Attendance	1.083	0.808	3226	1.008	0.707	3226	1.078	1.379	1401	1.079	1.278	1401
Exsmoker (never as ref.)				0.910	0.922					0.653	1.306	
Light Smoker				2.004	1.019					0.343 **	0.785	
Heavy Smoker				0.902	1.043					0.506	0.210 *	
Exdrinker (never as ref.)				1.069	1.816					1.119	1.169	
Light Drinker				0.840	0.652					1.886 *	1.003	
Heavy Drinker				0.410	0.460					3.276 *	0.499	
Light Exerciser (never as ref.)				1.305	0.970					1.336	1.282	
Moderate Exerciser				1.133	0.345 ***					0.997	0.360	
Heavy Exerciser				0.762	0.229 ***					0.271 ***	0.406 *	
n	3226	3226	3226	3226	3226	3226	1401	1401	1401	1401	1401	1401

* $p < .05$. ** $p < .01$. *** $p < .001$

Note: Design effects are corrected with robust standard errors and weights. Controls have been made for age, race/ethnicity, marital status, household size, education, employment, and household income in Model 2.

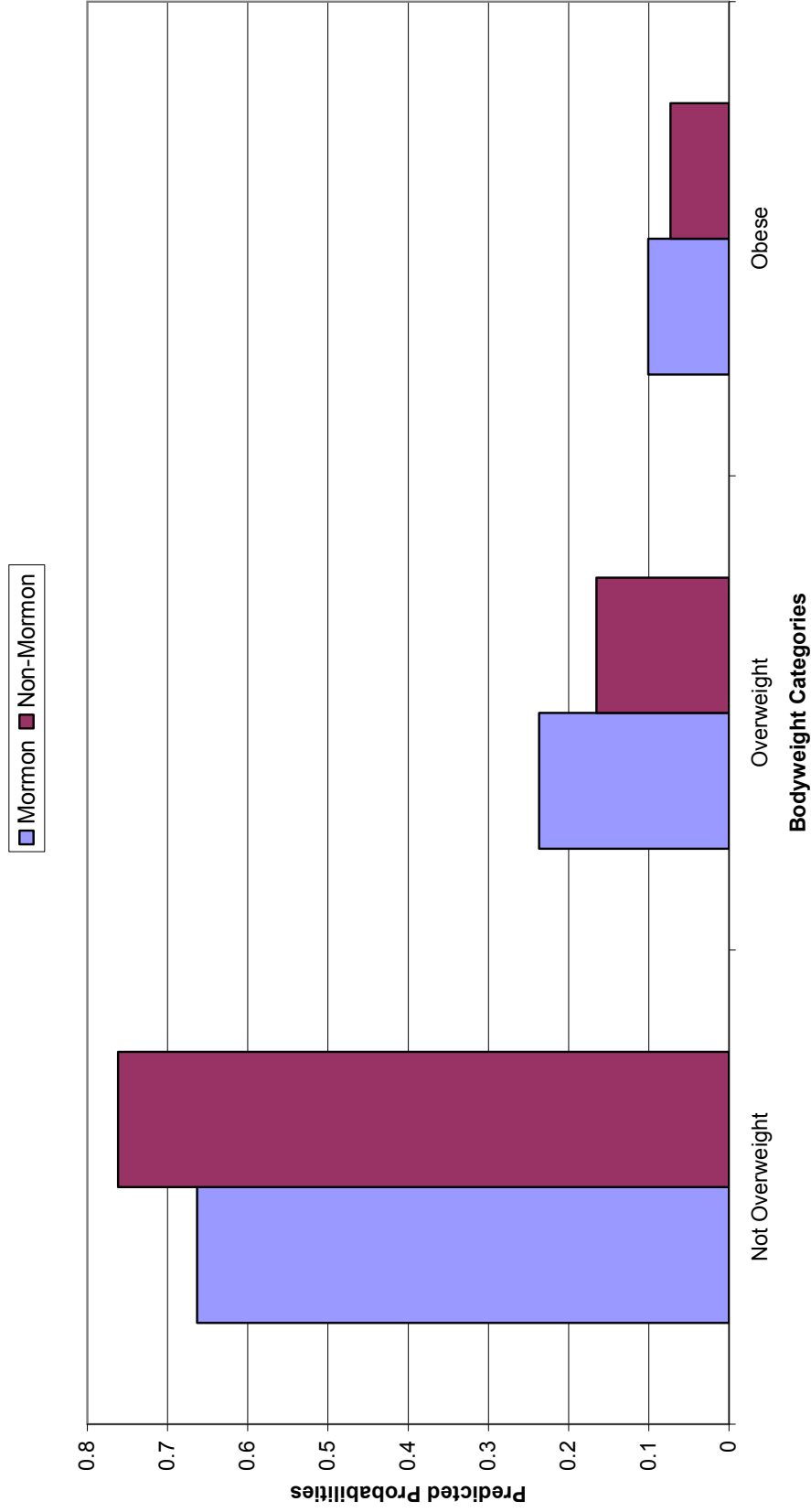
TABLE 4: Multinomial Logit Relative Risk Ratio Estimates of Being Overweight or Obese for Utah Adults by Age and Sex Categorization (1996)

Predictor	Men 18-34			Women 18-34		
	Model 1		Model 2	Model 1		Model 2
	Overweight RRR	Obese RRR	Overweight RRR	Overweight RRR	Obese RRR	Obese RRR
Mormon (non as ref.)	1.039	1.363	1.117	2.015 **	4.049 **	1.822 *
Attendance	1.102	0.925	1.109	0.838	0.531 *	0.691
n	1728	1728	1728	1759	1759	1759
	Men 35-54			Women 35-54		
Mormon (non as ref.)	1.063	1.718	1.137	1.204	1.391	1.156
Attendance	1.144	0.938	1.225	1.361	1.466	1.446 *
n	1777	1777	1777	1751	1751	1751
	Men 55 or Older			Women 55 or Older		
Mormon (non as ref.)	0.961	4.324 ***	0.834	2.164 **	1.437	2.704 ***
Attendance	1.174	0.751	0.921	1.364	1.257	1.387
n	957	957	957	1117	1117	1117

*p<.05. **p<.01. ***p<.001

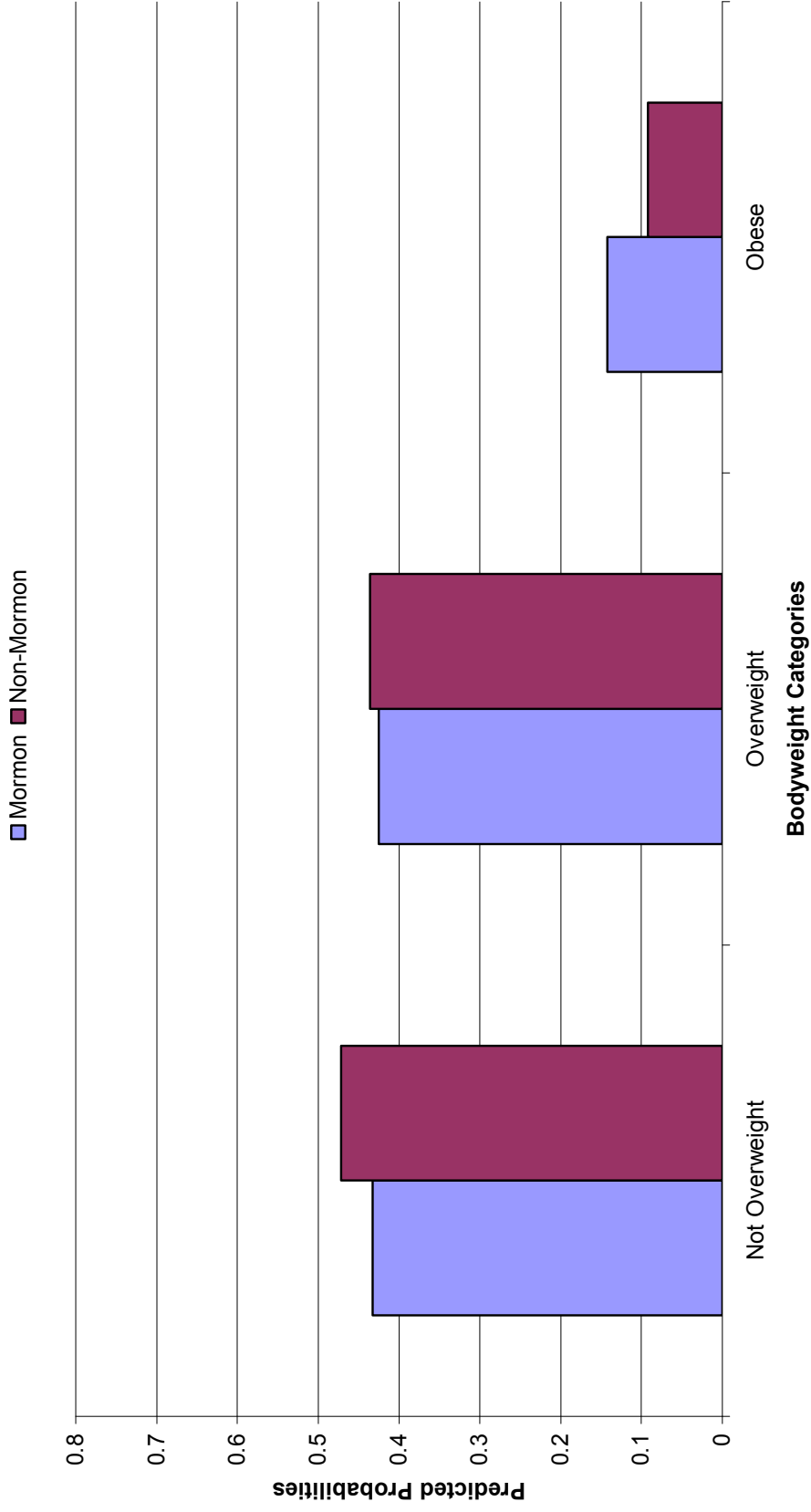
Notes: Design effects are corrected with robust standard errors and weights. Controls have been made for age, race/ethnicity, marital status, household size, education, employment, income, and drinking/smoking/exercise participation in Model 2.

**CHART 1: Predicted Probabilities of Bodyweight Categories for Utahan Women (1996)
Using Multinomial Logistic Regression**



Notes: Design effects are corrected with robust standard errors and weights. Controls have been made for religious service attendance, age, race/ethnicity, marital status, household size, education, employment, household income, drinking/smoking/exercise participation.

**CHART 2: Predicted Probabilities of Bodyweight Categories for Utahan Men (1996)
Using Multinomial Logistic Regression**



Notes: Design effects are corrected with robust standard errors and weights. Controls have been made for religious service attendance, age, race/ethnicity, marital status, household size, education, employment, household income, drinking/smoking/exercise participation.