Social Support for Exercise as a Predictor of Weight and Physical Activity Status Among Puerto Rican and Mexican Men: Results From the Latino Men's Health Initiative

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Abstract

Social support is an important factor in increasing positive health outcomes and positive health behaviors across a variety of disease states including obesity. However, research examining the relationship between social support for exercise and weight and physical activity status, particularly among Latino men, is lacking. This paper examined whether social support for exercise predicted weight and physical activity status and whether the direction of these relationships differ as a function of Hispanic/Latino background (Puerto Rican/Mexican). Participants were 203 men who participated in a National Institutes of Health (NIH)-funded study addressing culture- and obesity-related variables. Both *family participation social support* and *family rewards and punishment social support* predicted higher weight status ($p < .005$ and $p < .05$, respectively). *Friend participation social support* did not predict weight status. The direction of the relationship between weight status and *family participation social support, family rewards and punishment social support*, and *friend participation social support* did not significantly differ as a function of Hispanic/Latino background. The direction of the relationship between physical activity status and *family participation social support, family rewards and punishment social support*, and *friend participation social support* did not significantly differ as a function of Hispanic/Latino background. Findings suggest that increased social support for exercise from family members may be focused on those who need it most—overweight and obese participants. Additional research is needed to explore sociocultural factors that may promote social support, physical activity, and weight loss and maintenance in Puerto Rican and Mexican men.

Hispanics/Latinos are the largest ethnic minority group in the United States and currently represent 17% of the U.S. population (U.S. Census Bureau, 2015). One important health problem that disproportionately affects Latinos is overweight and obesity, with 78.4% of Latino adults ages 20 years and above being overweight or obese compared to 68.5% of non-Hispanic Whites (Centers for Disease Control and Prevention [CDC], 2015b). This is concerning as overweight and obesity are associated with poor health outcomes, including the two leading causes of death among Hispanics/Latinos: heart disease and cancer (CDC, 2015a, 2016). Data from the

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Hispanic Community Health Study/Study of Latinos revealed that Puerto Rican men had the highest rates of obesity (40.9%) compared to other Hispanics/Latinos in that study (Daviglus et al., 2012). Mexican men also had a high rate of obesity (36.8%; Daviglus et al., 2012). Despite the high prevalence of overweight and obesity among Latino/Hispanic men, there are disparities in weight-related behaviors and outcomes research. For example, a 2012 systematic review on weight loss interventions reported that women were disproportionately represented (73% vs. 27%) in the majority of trials and that none in the previous 10 years had focused specifically on ethnic minority men (Pagoto et al., 2012). As such, research that investigates correlates of overweight and obesity among Latino men is warranted.

The causes of overweight and obesity are complex and multifactorial. Contributing factors include lack of physical activity, certain dietary patterns, genetics, and the social environment (CDC, 2016). Rates of physical inactivity appear to be high among Latinos and vary based on ethnic background. Results from the Hispanic Community Health Study/Study of Latinos revealed that almost 50% of the men in the study engaged in less than 150 min per week of moderate to vigorous physical activity, with variability in rates by Latino ethnic background (Arredondo et al., 2016). Puerto Rican men had the most minutes per day of moderate to vigorous physical activity, as assessed by an accelerometer, compared to other Latino groups. (Arredondo et al., 2016). While results are mixed as to which Hispanic/Latino groups have the highest levels of physical inactivity—perhaps due to differences in the measurement of physical activity—there is a clear trend of physical inactivity among Latino men.

In addition to behaviors like physical activity and diet, one's social or community environment can influence one's weight status (CDC, 2016). Moreover, another component that may be related to the high rates of overweight, obesity, and physical inactivity in Latinos is sociocultural factors, such as social support, cultural values, and health beliefs. Two influential Latino cultural values potentially related to social support are *familism* (family) and *personalismo* (personal relationships; Santiago-Rivera, Arredondo, & Gallardo-Cooper, 2002). Familism is a multidimensional cultural value that includes attitudes, beliefs, and behaviors driven by one's identification with and loyalty to the family (Comas-Diaz, 2006; Luna et al., 1996; Sabogal, Marín, Otero-Sabogal, Marín, & Perez-Stable, 1987; Valenzuela & Dornbusch, 1994). Personalismo is the cultural practice of valuing personal and positive connections and relationships (Santiago-Rivera et al., 2002). Both familism and personalismo appear to have aspects of social support within them, suggesting that social support, particularly from family and

friends, may be an influential factor in behaviors among Hispanics/Latinos. Across various populations and disease states, social support is noted to be associated with positive health outcomes including decreased morbidity and mortality (Cho, Jae, Choo, & Choo, 2014; Holt-Lunstad, Smith, & Layton, 2010; Mama et al., 2015). Yet there is a dearth of social support research among men, particularly Hispanic/Latino men, with the majority concentrated in the areas of mental health, chronic illnesses like HIV and cancer, and men who have sex with men (Munoz-Laboy, Severson, Perry, & Guilamo-Ramos, 2014; Rios & Eaton, 2016; Wohl et al., 2011; Zhou et al., 2010).

Findings regarding the role of social support in weight status and weight loss behaviors in Latinos have been mixed. Studies have demonstrated that social support for exercise from family and/or friends is positively associated with motivation to change behaviors, physical activity, and weight loss among Hispanic adults (Ashida, Wilkinson, & Koehly, 2012; Marquez et al., 2016; Marquez & McAuley, 2006; Winston et al., 2015). However, having obese members in one's social network, having a larger social network, and receiving negative opinions regarding physical activity from sources of social support are associated with weight gain among Hispanic adults (Winston et al., 2015). Results may be mixed due to the range of methodology of studies, from cross-sectional to weight loss interventions. Moreover, many of the studies do not differentiate between sources of social support (family/friends) and group all Latino backgrounds together. As such, the role of social support and the source of social support as it relates to weight status remains unclear. In addition to the need to better understand the role of social support in health behaviors and outcomes, the existing research is limited in that studies are often focused on women, are majority or only Mexican, and/or do not provide explicit information about the country of origin or ethnicity (Ashida et al., 2012; Wang, Pbert, & Lemon, 2014; Winston et al., 2015). Latinos/Hispanics are a heterogeneous group with a range of ethnic backgrounds and cultural practices (Sanchez-Johnsen, 2011; Santiago-Rivera et al., 2002). Additional research is needed to examine whether there are differences in social support and physical activity as a function of Hispanic/Latino background. The overall purpose of this study is to examine whether social support for exercise predicts weight and physical activity status in Latino men and whether the direction of this relationship differs as a function of Hispanic/Latino background (Puerto Rican/Mexican). Specifically, the first aim is to examine the relationship between social support for exercise from family and friends and weight status among Latino men across various weight statuses
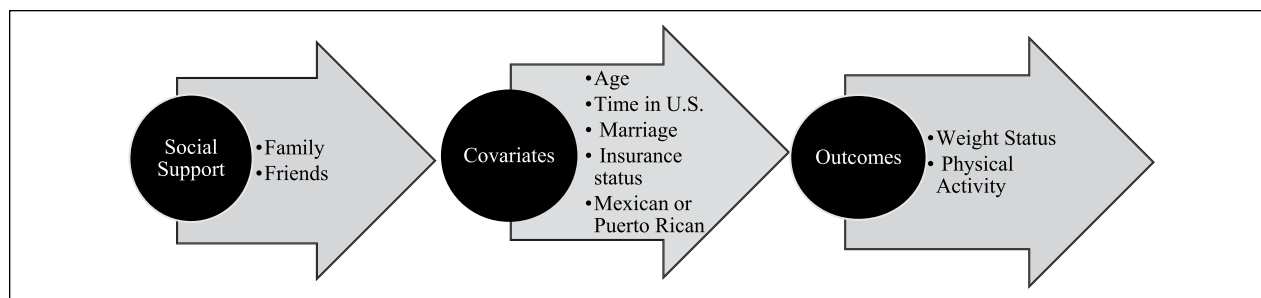
Figure 1. Social support for physical activity predicts weight and physical activity status.

(normal weight, overweight, and obese). It was hypothesized that higher social support for exercise would predict lower weight status. The second aim is to examine the relationship between social support for exercise from family and friends and physical activity status among Latino men. It was hypothesized that higher social support for exercise would predict physical activity participation and increased physical activity duration and frequency. There are two exploratory aims. The first exploratory aim is to examine whether the direction of the relationship between weight status and social support for exercise differs as a function of Hispanic/Latino background (Puerto Rican/Mexican). The second exploratory aim is to examine whether the direction of the relationship between physical activity status and social support for exercise differs as a function of Hispanic/Latino background (Puerto Rican/Mexican).

Methods

Theoretical Models

This study is based on two models that may explain the relationship between social support and health. The buffering hypothesis posits that social support protects individuals from the negative influences of stressful events (Cohen & Wills, 1985). The Stress and Coping theory of social support explains the Buffering Hypothesis further by pointing to the mechanisms and factors related to this relationship (Lazarus & Folkman, 1984). The Stress and Coping theory suggests that support can be received through either the actions of others (such as encouragement) or the perception that support is available. The received or perceived support enhances an individual's ability to cope with behaviors and cognitions, which helps to buffer the stressful event from impacting his or her health (Lazarus & Folkman, 1984). These models provide an important framework to explore and increase understanding of the role and influence of social support for exercise in Latinos. As other factors, such as demographic characteristics (e.g., age and marital status), may influence

weight and physical activity status, they have been included in the model in Figure 1.

Setting and Participants

This is a secondary analysis of data obtained from Mexican and Puerto Rican participants who enrolled in the NIH-funded cross-sectional study that was called the *Latino Men's Health Initiative* (Iniciativa de Salud para Hombres Latinos). The study was conducted using a community-based participatory research framework (Gehlert & Coleman, 2010), the details of which have been described elsewhere (Sanchez-Johnsen et al., 2017). This article uses the terms Hispanic and Latino interchangeably, as done by researchers and government agencies (D'Alonzo, Johnson, & Fanfan, 2012; Sanchez-Johnsen et al., 2017; U.S. Census Bureau, 2016).

Eligibility criteria were as follows: Inclusion: (a) Mexican and Puerto Rican men. (b) Between the ages of 18 and 65 years. (c) Those who agree to provide informed consent. Exclusion: (a) Those with a lower body mass index (BMI) limit: <18.5 kg/m². No upper BMI limit. (b) Those who are not able to speak/read English or Spanish. (c) Those with an eating disorder (bulimia nervosa, anorexia nervosa, binge eating disorder). (d) Those who had plans to move from the Illinois area during the course of the study (i.e., 6 weeks).

Recruitment strategies are described in detail elsewhere (Sanchez-Johnsen et al., 2017) and consisted of direct and indirect methods. Direct methods included in-person recruitment at Hispanic/Latino organizations, churches, and community events. Indirect methods included newspaper and newsletter advertisements, website and listserv announcements, and letters to organizations with a Latino and/or health focus. All participants provided written informed consent. The original study was approved by the Institutional Review Board (IRB) at the University of Illinois at Chicago (IRB-2011-0187) and by the research review board at Alivio Medical Center. In addition, the University of Illinois at Chicago served as the IRB of record for Northwestern University (STU00204427).

Measures

Demographic and background information, as well as social support, physical activity, weight, and other variables were assessed during a 2 and a half hour health and culture interview (see Sanchez-Johnsen et al., 2017). For measures that were not available in Spanish, they were translated and adapted according to several guidelines (Brislin, Lonner, & Thorndike, 1973; Marin & Marin, 1991; Martinez, Ainsworth, & Elder, 2008). Measures were translated by a professional translation company and then reviewed by the study team and select members of the Hispanic/Latino Health Community Advisory Board (see Sanchez-Johnsen et al., 2017 for a description of this process).

Demographics. Latino background was assessed via self-report by asking participants the following question: "What is your Hispanic or Latino ethnicity?" Participants were asked to select from a list of ethnic backgrounds including Mexican and Puerto Rican. Marital status was assessed directly by asking participants, "What is your marital status?" This is similar to the question used in the U.S. Census (U.S. Census Bureau, 2017). Participants were also asked questions about their age, length of time lived in the United States, highest grade completed, and whether or not they had health insurance—all of which were assessed using continuous or categorical measures. For the purpose of this study, respondents were divided into three age categories (18–34 years, 35–54 years, and 55 years or older) from a continuous response that they provided. Duration of U.S. residence was also divided –into three categories (<= 10 years, 11–24 years, and 25 years or more) from a continuous response they provided. Finally, marital status was divided into two categories: single/never married and partnered (past or present) from eight initial categories. The "Partnered, past or present" category initially included the following responses: "married once," "living with someone," "separated," "divorced," "divorced, remarried," "widower," or "widower, remarried" and all of these responses were collapsed into one category for this study.

Weight status. Weight status was assessed via BMI (weight [kg]/height [m]²; Garrow & Webster, 1984). After removing their shoes, subjects' height and weight were assessed using a stadiometer and Seca company digital scale. In this study, BMI was used as a categorical variable. Weight status was defined as follows: normal weight: BMI = 18.5 to 24.99; overweight: BMI = 25 to 29.99; obese: BMI ≥ 30 (Garrow & Webster, 1984). To ensure statistical power, obese classes I to III were collapsed into one category and classified as obese.

Physical activity status. Physical activity was measured through three questions assessing physical activity participation, frequency, and duration. These questions were also used in other studies examining physical activity in ethnic minority populations, including Latinos (Fitzgibbon et al., 2005; Sánchez-Johnsen, Stolley, & Fitzgibbon, 2006).

1. ***Physical activity participation.*** Do you currently participate in any regular activity designed to improve or maintain your physical fitness, either on your own or in a class? (For example, walking with effort, running, bicycling, dancing or aerobics.) Participants responded either yes or no to this question. If participants answered yes to this question, then they were asked the following questions:
2. ***Physical activity frequency.*** How many times during the last week did you engage in an activity designed to improve your physical fitness? Response categories were as follows: less than 1 time, 1 time, 2 times … more than 7 times.
3. ***Physical activity duration.*** On average, for how long (how many minutes) did you participate in this activity at one time during the last week? Participants answered this question with an open-ended response in terms of the number of minutes they participated in this activity.

Social support. Social support for exercise was assessed by the Social Support and Exercise Survey (SSES; Sallis, Grossman, Pinski, Patterson, & Nader, 1987). The SSES is a validated 13-item questionnaire that assesses perceived social support for exercise during the past 3 months from family and friends. Sample items include "Exercised with me," "Gave me rewards for exercising (bought me something or gave me something I like)," "Helped plan activities around my exercise," "Criticized me or made fun of me for exercising," and "Complained about the time I spend exercising." Items on the SSES are rated on a 6-point Likert scale, ranging from 1 *None* to 5 *Very often*, with a sixth option of *Does not apply*. Participants answered each item twice, once for family and once for friends. When scoring, *Does not apply* was recoded to 1. Scores were calculated for family and friends separately, with a total of three scores: Family Participation, Family Rewards and Punishment, and Friend Participation (Sallis et al., 1987). Family and Friend participation scores range from 10 to 50; higher scores indicated greater perceived social support for exercise. Family Rewards and Punishment scores ranged from 3 to 15; higher scores indicated greater frequency of these behaviors. The SSES has high internal consistency, acceptable test-retest reliability and

internal reliability, and good validity among white and Latina adults (Keller et al., 2014; Marquez, Dunsiger, Pekmezi, Larsen, & Marcus, 2016; Sallis et al., 1987). To facilitate a more understandable interpretation of the results, social support scores were collapsed into two categories (low and high) based on the median split as done in a prior study (Schoeny, Fogg, Buchholz, Miller, & Wilbur, 2017).

Statistical Analyses

The data were analyzed using the R statistical package (Version 0.99.902) with all levels of significance set at *p* < .05. To ensure statistical power and/or to avoid the removal of outliers due to skewness, several variables were collapsed or converted to categorical variables, including age, duration of U.S. residence, marital status, and weight status. First, frequencies and percentages were calculated to describe the demographic characteristics. Next, bivariate analyses using Pearson's χ2 test were conducted to determine which variables were associated with weight status, whether or not a participant was physically active, and Hispanic/Latino background (Puerto Rican/Mexican). Variables that had significant associations with weight, physical activity status, or Hispanic/Latino background were included in the regression analyses. Total scores for each measure were computed and tested for normal distribution. Minutes of exercise was Log-Ten transformed to handle non-normal data. Multinomial logistic regressions were calculated to predict weight status (normal weight was the reference category) across the relevant independent variables of family and friend social support after controlling for age, insurance, marital status, and duration of U.S. residence. Odds ratios (odds of overweight or obese status in the high social support category compared with the odds in the low social support category) were calculated. Logistic regressions were calculated to predict physical activity status (no was the reference category) across the relevant independent variables of family and friend social support, with age, insurance, marital status, duration of U.S. residence, and weight status as covariates. Family and friend social support were examined, with both aspects of family social support (Participation and Rewards and Punishment) being examined separately in the regression analyses. Stepwise linear regressions (variables entered in a forward manner) were calculated to predict the number of times engaged in physical activity and minutes of physical activity across the relevant independent variables of family and friend social support after controlling for age, insurance, marital status, duration of U.S. residence, and weight status among those who reported participating in physical activity. Multinomial logistic regressions were calculated to evaluate whether the direction of the relationship between weight status and social support for exercise differed as a function of Hispanic/Latino background (Puerto Rican/Mexican), controlling for age, insurance, marital status, duration of U.S. residence, and weight status. In addition, logistic regressions were calculated to examine whether the direction of the relationship between physical activity status and social support for exercise differed as a function of Hispanic/Latino background (Puerto Rican/ Mexican). This was done by assessing the statistical significance of the interaction between the social support and Puerto Rican/Mexican background, controlling for age, insurance, marital status, duration of U.S. residence, and weight status. Statistical significance was set at *p* < .05 for regressions.

Power calculations were based on the primary analysis of assessing the relationship between social support (continuous scales split at the median and analyzed as a dichotomous variable) and weight status (normal, overweight, obese). With 67 people in each weight category, there was 80% power to detect an odds ratio (as defined earlier) of 2.76 at a two-tailed significance of *p* < .05.

Results

Demographic Characteristics

The demographic characteristics are described in detail elsewhere (see Sanchez-Johnsen et al., 2017) and summarized here. The sample included 203 Latino men (99 Mexicans and 104 Puerto Ricans), ages 18 to 65 years (mean = 39.4, *SD* = 12.3). The majority of participants were single or had never been married (*n* = 107, 52.7%), lived in the United States for more than 10 years (*n* = 190, 93.6%), and had health insurance (*n* = 114, 56.2%). Demographic information is reported in Table 1.

Bivariate Analyses

Table 1 also compares ethnic groups on demographic characteristics. Differences were identified for Hispanic/Latino background (Puerto Rican/Mexican) for marital status [χ2 (1, *n* = 203) = 9.26, *p* < .005], age [χ2 (2, *n* = 203) = 23.75, *p* < .0001], and duration of U.S. residence [χ2 (2, *n* = 203) = 37.44, *p* < .0001]. Table 2 summarizes bivariate relationships between demographic characteristics/social support and weight/physical activity. Age [χ2 (4, *n* = 203) = 13.07, *p* < .05], marital status [χ2 (2, *n* = 203) = 13.41, *p* < .005], and insurance status [χ2 (4, *n* = 203) = 13.07, *p* < .05] were significantly associated with weight status. Both *family participation social support* [χ2 (2, *n* = 203) = 11.18, *p* < .005] and *family rewards and punishment* [χ2 (2, *n* = 203) = 6.06, *p* < .05] were significantly associated with weight. Finally, insurance status was significantly associated with

Table 1. Demographic Characteristics by Hispanic/Latino Background (*n* = 203)[a].

	Mexican (*N* = 99)	Puerto Rican (*N* = 104)	*p* value
Marital status			
Single/never married	63 (63.6%)	44 (42.3%)	<.005
Partnered (present/past)[b]	36 (36.4%)	60 (57.7%)	
Age			
18–34	52 (53.1%)	23 (22.1%)	<.0001
35–54	39 (39.8%)	57 (45.8%)	
55+	7 (7.1%)	24 (23.1%)	
Weight status[c]			
Normal	31 (31.3%)	37 (35.6%)	.79
Overweight	36 (36.4%)	34 (32.7%)	
Obese	32 (32.3%)	33 (31.7%)	
Time in the United States			
<=10 years	5 (5.1%)	8 (7.7%)	<.0001
11–24 years	52 (52.5%)	13 (12.5%)	
25+ years	42 (42.4%)	83 (79.8%)	
Highest grade completed			
Grade 6 or less	4 (4.0%)	0 (0%)	.06
Grade 7 to 9	8 (8.1%)	6 (5.8%)	
Some HS	8 (8.1%)	21 (20.2%)	
HS/HS equivalent/GED	27 (27.3%)	26 (25%)	
College 1 to 3 years	27 (27.3%)	22 (21.2%)	
Graduated 2-year college	3 (3.0%)	7 (6.7%)	
Graduated 4-year college	14 (14.1%)	8 (7.7%)	
Part graduate/professional	3 (3.0%)	4 (3.9%)	
Completed graduate/professional	5 (5.1%)	8 (7.7%)	
Other	0 (0%)	2 (1.9%)	
Have health insurance			
Yes	52 (52.5%)	62 (59.6%)	.31
No	47 (47.5%)	42 (40.4%)	

Note. [a]Adapted from Sanchez-Johnsen et al. (2017). Additional demographic and background characteristics can be found in Sanchez-Johnsen et al. (2017). [b]Marital status—"Partnered, past or present" includes married once, living with someone, separated, divorced, divorced, remarried, widower or widower, remarried. [c]Weight status—normal weight: BMI = 18.5–24.99; overweight: BMI = 25–29.99; obese: BMI ≥ 30. BMI = body mass index; GED = general educational development; HS = high school.

whether or not a participant was physically active [$\chi2$ (1, *n* = 203) = 5.74, *p* < .05].

Social Support and Weight Status

Family social support. The first hypothesis was that higher social support for exercise would predict lower weight status. As seen in Table 3, results from the multinomial logistic regressions revealed that both forms of family social support were significant predictors of weight status. However, the results were in the opposite direction than was hypothesized and therefore, this hypothesis was not supported. Specifically, after controlling for age, insurance status, marital status, and duration of U.S. residence, family participation social support was a significant predictor of overweight [b = 1.28, odds ratio 3.60, *p* < .005] and obese [b = 1.05, odds ratio 2.85, *p* < .05] weight status.

Thus, as family participation social support moved from low to high, the odds of being overweight increased by a factor of 3.60 times compared to normal weight. As family participation social support moved from low to high, the odds of being obese increased by a factor of 2.85 times.

Next, as seen in Table 3, results from the multinomial logistic regression revealed that after controlling for age, insurance status, marital status, and duration of U.S. residence, family rewards and punishment social support was a significant predictor of overweight status [b = 0.94, odds ratio 2.56, *p* < .05)] and obesity [b = 0.84, odds ratio 2.31), *p* < .05]. As family rewards and punishment social support moved from low to high, the odds of being overweight increased by a factor of 2.56 times. In addition, as family rewards and punishment social support moved from low to high, the odds of being obese increased by a factor of 2.31 times.

Table 2. Bivariate Associations Between Social and Contextual Factors, Physical Activity, and Weight (*n* = 203).

Independent covariates	Weight status[a]				Physical activity[b]		
	Normal	Overweight	Obese	*p* value	Yes	No	*p* value
Latino background							
Mexican	31 (45.6%)	36 (51.4%)	32 (49.2%)	.79	67 (48.9%)	32 (48.5%)	.96
Puerto Rican	37 (54.4%)	34 (48.6%)	33 (49.2%)		70 (51.1%)	34 (51.5%)	
Age							
18–34	36 (52.9%)	22 (31.9%)	17 (26.2%)	<.05	56 (40.9%)	19 (29.2%)	.17
35–54	22 (32.4%)	35 (50.7%)	39 (60%)		59 (43.1%)	37 (57%)	
55+	10 (14.7%)	12 (17.4%)	9 (13.8%)		22 (16%)	9 (13.8%)	
Marital status[c]							
Single/never married	48 (70.6%)	29 (41.4%)	30 (46.2%)	<.005	76 (55.5%)	31 (47%)	.26
Partnered (present/past)	20 (29.4%)	41 (53.8%)	35 (53.8%)		61 (44.5%)	35 (53%)	
Time in the United States							
<=10 years	3 (4.5%)	6 (8.6%)	4 (6.1%)	.16	8 (5.9%)	5 (7.6%)	.84
11–24 years	29 (42.6%)	16 (68.6%)	20 (30.8%)		43 (31.4%)	22 (33.3%)	
25+ years	36 (54.5%)	48 (22.8%)	41 (63.1%)		86 (62.8%)	39 (59.1%)	
Highest grade completed							
Grade 6 or less	0 (0%)	2 (2.8%)	2 (3%)	.12	2 (1.4%)	2 (30.3%)	.91
Grade 7 to 9	5 (7.4%)	6 (8.5%)	3 (4.6%)		8 (5.8%)	6 (9.1%)	
Some HS	11 (16.2%)	10 (14.3%)	8 (12.3%)		19 (13.9%)	10 (15.1%)	
HS/HS equivalent/GED	25 (36.8%)	17 (24.3%)	11 (17%)		36 (26.3%)	17 (25.7%)	
College 1 to 3 years	12 (17.6%)	21 (30%)	16 (24.6%)		34 (24.8%)	15 (22.7%)	
Graduated 2-year college	2 (2.9%)	2 (2.9%)	6 (9.2%)		8 (5.8%)	2 (3.0%)	
Graduated 4-year college	7 (10.3%)	6 (8.6%)	9 (13.8%)		14 (10.2%)	8 (12.1%)	
Part graduate/professional	4 (5.9%)	0 (0%)	3 (4.6%)		4 (2.9%)	3 (4.5%)	
Completed graduate/professional	2 (2.9%)	6 (8.6%)	5 (7.7%)		10 (7.3%)	3 (4.5%)	
Other	0 (0%)	0 (0%)	2 (3.1%)		2 (1.4%)	0 (0%)	
Have health insurance							
Yes	39 (57.3%)	31 (44.3%)	44 (67.7%)	<.05	69 (50.4%)	45 (68.2%)	<.05
No	29 (42.6%)	39 (55.7%)	21 (32.3%)		68 (49.6%)	21 (31.8%)	
Family participation social support							
Low	46 (67.6%)	28 (40%)	31 (47.7%)	<.005	68 (49.6%)	37 (56.1%)	.39
High	22 (32.4%)	42 (60%)	34 (52.3%)		69 (50.4%)	29 (43.9%)	
Family rewards/punishment social support							
Low	51 (75%)	39 (55.7%)	39 (60%)	<.05	83 (60.6%)	46 (69.7%)	.21
High	17 (25%)	31 (44.3%)	26 (40%)		54 (39.4%)	20 (30.3%)	
Friend social support							
Low	34 (50%)	32 (45.7%)	39 (60%)	.24	65 (47.4%)	40 (60.6%)	.08
High	34 (50%)	38 (54.3%)	26 (40%)		72 (52.6%)	26 (39.4%)	

Note. [a]Weight status—normal weight: body mass index (BMI) = 18.5–24.99; overweight: BMI = 25–29.99; obese: BMI ≥ 30. [b]Physical activity— Yes indicates currently participates in any regular activity designed to improve or maintain physical fitness. [c]Marital status—"Partnered, past or present" includes married once, living with someone, separated, divorced, divorced, remarried, widower or widower, remarried. BMI = body mass index; GED = general educational development; HS = high school.

Friend social support. As also seen in Table 3, results from the *friend participation social support* multinomial logistic regression revealed that after controlling for age, insurance status, marital status, and duration of U.S. residence, friend participation social support did not predict overweight [b = 0.56, odds ratio 1.76, *p* = .14] or obese status [b = 0.04, odds ratio 1.04, *p* = .93].

Social Support and Physical Activity Status

Family social support. The second hypothesis was that higher social support would predict physical activity participation and increased frequency and duration. As seen in Tables 4 and 5, contrary to this hypothesis, results from the regression analyses revealed that both types of family social support, *family participation* and *family rewards and punishment,*

Table 3. Adjusted Models: Multinomial Logistic Regressions Predicting Weight Status[a].

Variable	Overweight[b] OR (95% CI)	*p* value	Obese[b] OR (95% CI)	*p* value	Overall model *p* value
Family participation social support high[c]	3.60 [1.67, 7.75]	<.005	2.85 [1.31, 6.17]	<.05	<.00005
Family rewards/punishment social support high[c]	2.56 [1.16, 5.62]	<.05	2.31 [1.04, 5.14]	<.05	<.0005
Friend participation social support high[c]	1.76 [0.83, 3.71]	0.14	1.04 [0.49, 2.20]	0.93	<.005

Note. [a]Adjusted models—controlling for insurance status, age, marital status, and duration of U.S. residence. [b]Weight status—normal weight (baseline category): BMI = 18.5–24.99; overweight: BMI = 25–29.99; obese: BMI ≥ 30. [c]Baseline category—low social support. BMI = body mass index; CI = confidence interval; OR = odds ratio.

Table 4. Adjusted Models: Simple Logistic Regressions Predicting Physical Activity Status[a].

Variable	Physical activity status (yes)[b] OR	95% CI	*p* value
Family participation social support high[c]	1.41	[0.74, 2.74]	.30
Family rewards/punishment social support high[c]	1.70	[0.86, 3.44]	.13
Friend participation social support high[c]	1.48	[0.77, 2.87]	.24

Note. [a]Adjusted models—controlling for age, insurance status, marital status, duration of U.S. residence, and weight status. [b]Physical activity—Yes indicates currently participates in any regular activity designed to improve or maintain physical fitness. Baseline category: physical exercise (no). [c]Baseline category—low social support. CI = confidence interval; OR = odds ratio.

Table 5. Adjusted Models: Simple Linear Regressions Predicting Social Support and Physical Activity, Frequency, and Duration[a].

Model	B	95% CI	*p* value
Family participation social support high[b] **and number of times physically active**	0.24	[0.64, 2.54]	.49
Family participation social support high[b] **and minutes exercised**	0.07	[0.94, 1.22]	.32
Family rewards/punishment social support high[b] **and number of times physically active**	0.15	[0.58, 2.33]	.66
Family rewards/punishment social support high[b] **and minutes exercised**	0.01	[0.89, 1.15]	.88
Friend participation social support high[b] **and number of times physically active**	0.45	[0.78, 3.17]	.20
Friend participation social support high[b] **and minutes exercised**	0.08	0.95–1.24	.23

Note. [a]Adjusted models—controlling for insurance status, age, marital status, duration of U.S. residence, and weight status. [b]Baseline category—low social support. CI = confidence interval.

did not predict physical activity participation (*p* = .30; *p* = .13), frequency (*p* = .49; *p* = .66), or duration (*p* = .32; *p* = .88) after controlling for insurance status, age, marital status, duration of U.S. residence, and weight status.

Friend social support. Similarly, as also seen in Tables 4 and 5, contrary to the hypothesis, greater *friend participation social support* did not predict whether or not an individual was physically active (*p* = .24), the frequency (*p* = 0.23), or duration (*p* = 0.22) after controlling for insurance status, age, marital status, duration of U.S. residence, and weight status.

Within Hispanic/Latino Background (Puerto Rican/Mexican): Weight Status

Family and friend social support. The first exploratory aim examined whether the direction of the relationship between weight status and social support for exercise differed as a function of Hispanic/Latino background (Puerto Rican/Mexican). As seen in supplemental Table 1, results from the multinomial logistic regressions revealed that the direction of the relationship between *family participation social support* and weight status did not significantly differ as a function of Hispanic/

Latino background even after controlling for age, insurance status, marital status, and duration of U.S. residence (overweight status [b = - 0.11, odds ratio 0.89, p > .05)] and obesity [b = 0.39, odds ratio 1.48, p > .05]). Results also revealed that the direction of the relationship between *family rewards and punishment social support* and weight status did not significantly differ as a function of Hispanic/Latino background when controlling for age, insurance status, marital status, and duration of U.S. residence (overweight status [b = 1.02, odds ratio 2.77, p > .05)] and obesity [b = 1.02, odds ratio 2.79, p > .05]). Similarly, results from the multinomial logistic regressions revealed that the direction of the relationship between *friend participation social support* and weight status did not significantly differ as a function of Hispanic/Latino background when controlling for age, insurance status, marital status, and duration of U.S. residence (overweight status [b = 0.82, odds ratio 0.44, p > .05)] and obesity [b = 0.90, odds ratio 0.40, p > .05]).

Within Hispanic/Latino Background (Puerto Rican/Mexican): Physical activity Status

Family and friend social support. The second exploratory aim examined whether the direction of the relationship between physical activity status and social support for exercise differed as a function of Hispanic/Latino background (Puerto Rican/Mexican). As seen in supplemental Table 2, results from the logistic regressions revealed that the direction of the relationship between *family participation social support* and physical activity status did not significantly differ as a function of Hispanic/Latino background when controlling for insurance status, age, marital status, duration of U.S. residence, and weight status [b = 0.54, odds ratio 1.72, p > .05)]. Similarly, the direction of the relationship between *family rewards and punishment social support* and physical activity status also did not significantly differ between Puerto Ricans and Mexicans when controlling for insurance status, age, marital status, duration of U.S. residence, and weight status [b = 0.21, odds ratio 1.23, p > .05)]. Finally, results from the logistic regressions revealed that the direction of the relationship between *friend participation social support* and physical activity status did not significantly differ as a function of Hispanic/Latino background when controlling for insurance status, age, marital status, duration of U.S. residence, and weight status [b = 0.16, odds ratio 1.18, p > .05)].

Discussion

Due to the high rates of overweight and obesity among Mexican and Puerto Rican men and their associated health risks, research investigating potential causes and solutions for this public health issue is needed. The *Latino Men's Health Initiative* was an NIH-funded study designed to increase understanding of the sociocultural determinants of overweight and obesity with the goal of developing culturally appropriate health programs for Mexican and Puerto Rican men (for more information, see Sanchez-Johnsen et al., 2017). The primary aims of the current study were to examine whether social support for exercise predicted weight and physical activity status and whether the direction of these relationships differed as a function of Hispanic/Latino background (Puerto Rican/Mexican) among participants in the *Latino Men's Health Initiative*.

It was hypothesized that higher family and friend social support for exercise would predict lower weight status. Results for family social support were in the opposite direction than was hypothesized and therefore, the hypothesis was not supported. Specifically, results revealed that greater family participation social support and greater family rewards and punishment social support were both significantly associated with weight status, such that as social support increased, the odds of being overweight and obese also increased. These associations were attenuated for the obese category. Friend participation social support was not significantly associated with weight status.

These results align with previous findings suggesting that social support is an important and complex factor in weight status. For example, in one study, as the BMI of adult Hispanic participants increased, so too did the number of individuals providing emotional (moral support and encouragement) and tangible social support (aid/services like transportation) related to the disease (Brooks, Andrade, Middleton, & Wallen, 2014). However, this study was conducted among Hispanics with rheumatic diseases and did not assess the amount of social support provided. Nevertheless, results from the current study, as well as prior findings, suggest that increased social support may be focused on those who need it most, such as those who are overweight and obese. The present results suggest that as individuals become overweight, they are more likely to receive higher social support for exercise. While the results are attenuated for the obese participants, both overweight and obese participants were significantly more likely to receive high social support for exercise from family compared to those of normal weight. Although familial social support for exercise appears to be focused on those who would benefit, it is possible that the amount (or type) may not be sufficient to influence behaviors related to weight management. A recent social support intervention focused on decreasing body fat among overweight and obese sedentary postpartum

Latinas gives insight into this relationship (Keller et al., 2014). In that study, family social support for exercise was effective in increasing intentional physical activity when the social support was "active" (Keller et al., 2014). The researchers identified that family social support increased during the social support intervention and returned to baseline at the end of the intervention. They posited that participation in the intervention contributed to family members' increased support. Thus, although all women received some family social support for exercise before the intervention, participating in the intervention allowed the social support to become active, mediating increases in physical activity. Although the study was focused solely on postpartum Latina women, mostly of Mexican origin, it does provide insight into the benefits of a culturally informed social support weight management intervention.

In the current study, friend participation social support was not significantly associated with weight status. Winston and colleagues' (2015) study revealed that support from friends regarding eating and physical activity goals was not associated with increased weight loss among 121 Hispanic adults, even when considering the importance of friendship, frequency of contact, or body size of friends. This continues to suggest that weight status may be more influenced by social support provided by family members versus that by friends.

The influence of family is further supported by the results that even after controlling for marital status, family social support continued to be a significant predictor of overweight and obese weight status. Furthermore, in the bivariate analysis, men who were not married/not partnered were more likely to be normal weight. A recent modeling of longitudinal data from more than 3,000 adults also demonstrated the positive association of marriage/cohabitation and body weight, providing more insight into the influence of family relationships on weight (Teachman, 2016). Further studies are needed to better elucidate the role of different familial relationships, including between marital status and weight, and the possible role that social support from spouses may play with respect to weight loss and management.

It was hypothesized that increased social support for exercise would be associated with physical activity participation, increased frequency, and duration. However, contrary to this hypothesis, neither family nor friend support was significantly associated with any physical activity variables. The lack of significant associations between social support and all physical activity outcomes are interesting in the context of other studies. A recent lifestyle intervention with 278 Latino adults identified that baseline social support for exercise was not predictive of *baseline* physical activity. However, *during* the intervention, higher baseline social support for exercise was

associated with increased physical activity, adherence, and weight loss (Marquez et al., 2016). However, this particular study included Latinos with diabetes who were predominantly women. Another study among men and women of Mexican origin families reported that having at least one family member or friend who provided support for physical activity was associated with motivation to engage in exercise (Ashida et al., 2012). However, in that study, the amount of social support received was not investigated. Marquez and McAuley (2006) identified that among Latinos, increased social support and higher self-efficacy to overcome barriers to exercise were associated with greater levels of physical activity. However, that study was conducted with mainly women and Mexicans and it is unclear whether outcomes differed as a function of Hispanic/Latino background.

Additional exploratory aims investigated whether the direction of the relationships between social support for exercise (family participation social support, family rewards and punishment social support, and friend participation social support) and weight status differed as a function of Hispanic/Latino background. Results revealed that the direction of these relationships did not significantly differ between Puerto Ricans and Mexicans. Similarly, the direction of the relationship between social support for exercise (family participation social support, family rewards and punishment social support, and friend participation social support) and physical activity status did not significantly differ between Puerto Ricans and Mexicans. Although there were no differences as a function of Hispanic/Latino background, future studies are needed to further investigate additional factors that may affect the relationship between social support for exercise and weight and physical activity status. These factors may include examining cultural values and length of time in the United States.

Although this study has a number of strengths, certain limitations must be borne in mind when interpreting the findings. First, functional social support, described as the perceived quality and availability of emotional support, was examined, whereas structural social support, described as the number of individuals and frequency of contact, was not examined (Cohen & Wills, 1985). Investigating the size of the social networks of Latino men, their responsibilities within these networks, their relationships with specific family members as well as other possible support networks such as those related to living arrangements (living with friends or family), and employment status and type may provide additional information about men's weight and exercise patterns. For example, in one study, larger social networks were related to weight gain among Latino adults (Winston et al., 2015). Additionally, coworkers have been identified as helpful in weight loss interventions (Winston et al., 2015). A greater

understanding of the social networks of Latino men may provide additional insight into the roles of family members versus friends as providers of social support so that more effective targeted programs can be developed to enhance support. The perceptions that Latino men have regarding their social support network—particularly regarding physical activity—would also enhance understanding of how social networks may be used to improve physical activity, weight loss, and maintenance.

A second limitation is the reliance on self-report measures for physical activity. Future research that examines objective measures of physical activity such as results from the use of an accelerometer and from the validated International Physical Activity Questionnaire (Craig et al., 2003) is needed. In addition, the measure of physical activity specifically assessed participation in *any regular activity designed to improve or maintain physical fitness*. As such, other forms of physical activity, such as job-related physical activity or household activity were not analyzed in the current study and therefore, these findings relate only to how physical activity was defined in this particular study. Finally, the measure of social support for exercise is limited because the measure did not ask participants to specify which family members they were thinking about when completing the measure. Understanding which family members in particular provide social support would provide greater insight into the potential role of the influential people who support and promote exercise among Latino men. This is especially important in the context of the results that family members were still influential when controlling for marital status.

These limitations notwithstanding, this study has a number of important strengths that should be kept in mind. First, this study helps to address gaps in the research by focusing exclusively on Latino men—a greatly underserved and understudied group—with high rates of overweight/obesity. Second, this study examined differences as a function of Hispanic/Latino background, which is critical, as prior studies on social support for exercise have primarily been conducted on single ethnic groups and very few have examined differences across the Hispanic/Latino background. Although there were no differences in the direction of the relationship between social support for exercise and weight and physical activity status, future research is needed to examine the role of additional sociodemographic factors roles in social support. Finally, these results provide important initial information that may be used in the development of culturally competent health programs for Mexican and Puerto Rican men. For example, including family members who can provide support to Latino men during weight loss interventions appears to be important and can help to integrate the influential Latino cultural values of familism *(*family) and personalismo (personal relationships).

In conclusion, this study demonstrated that social support for exercise, particularly from family members, was an important variable related to weight status among Puerto Rican and Mexican men. Future research is needed to further examine the sociocultural determinants of physical activity and weight in Latino men in order to develop culturally appropriate interventions.

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Declaration of Conflicting Interests

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References

Arredondo, E. M., Sotres-Alvarez, D., Stoutenberg, M., Davis, S. M., Crespo, N. C., Carnethon, M. R., …Daviglus, M. L. (2016). Physical activity levels in US Latino/Hispanic adults: Results from the Hispanic community health study/study of Latinos. *American Journal of Preventive Medicine*, *50*(4), 500–508.

Ashida, S., Wilkinson, A. V., & Koehly, L. M. (2012). Social influence and motivation to change health behaviors among Mexican-origin adults: Implications for diet and physical activity. *American Journal Health Promotion*, *26*(3), 176–179. doi:10.4278/ajhp.100107-QUAN-2

Brislin, R. W., Lonner, W. J., & Thorndike, R. M. (1973). *Cross-cultural: Research methods* (Vol. 11). New York, NY: John Wiley & Sons.

Brooks, A. T., Andrade, R. E., Middleton, K. R., & Wallen, G. R. (2014). Social support: A key variable for health promotion and chronic disease management in Hispanic patients with rheumatic diseases. *Clinical Medicine Insights: Arthritis and Musculoskeletal Disorders*, 7, 21–26. doi:10.4137/cmamd.s13849

Bureau, U. S. C. (2017). American community survey 5-year estimates. Retrieved from https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtm. (Accessed September 29 2017)

CDC. (2015a). *Hispanic health*. Retrieved January 9, 2017, from https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-supplemental-report-vol-22–2.pdf

CDC. (2015b). *Normal weight, overweight, and obesity among adults aged 20 and over, by selected characteristics: United States, selected years 1988–1994 through 2011–2014*. Retrieved February 24, 2017, from http://www.cdc.gov/nchs/hus/contents2015.htm#058

CDC. (2016). *Adult obesity causes & consequences*. Retrieved February 24, 2017, from http://www.cdc.gov

Cho, J. H., Jae, S. Y., Choo, I. L., & Choo, J. (2014). Health-promoting behaviour among women with abdominal obesity: A conceptual link to social support and perceived stress. *Journal of Advanced Nursing*, 70(6), 1381–1390. doi:10.1111/jan.12300

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98(2), 310–357.

Comas-Diaz, L. (2006). Latino healing: The integration of ethnic psychology into psychotherapy. *Psychotherapy: Theory, Research, Practice, Training*, 43(4), 436–453.

Craig, C. L., Marshall, A. L., Sjostrom, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., & … Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise*, 35(8), 1381–1395. doi:10.1249/01.mss.0000078924.61453.fb

D'Alonzo, K. T., Johnson, S., & Fanfan, D. (2012). A biobehavioral approach to understanding obesity and the development of obesogenic illnesses among Latino immigrants in the United States. *Biological Research for Nursing*, 14(4), 364–374. doi:10.1177/1099800412457017

Daviglus, M. L., Talavera, G. A., Aviles-Santa, M. L., Allison, M., Cai, J., Criqui, M. H., … Stamler, J. (2012). Prevalence of major cardiovascular risk factors and cardiovascular diseases among Hispanic/Latino individuals of diverse backgrounds in the United States. *JAMA*, 308(17), 1775–1784. doi:10.1001/jama.2012.14517

Fitzgibbon, M. L., Stolley, M. R., Schiffer, L., Sanchez-Johnsen, L. A., Wells, A. M., & Dyer, A. (2005). A combined breast health/weight loss intervention for Black women. *Preventive Medicine*, 40(4), 373–383.

Garrow, J. S., & Webster, J. (1984). Quetelet's index (W/H2) as a measure of fatness. *International Journal of Obesity*, 9(2), 147–153.

Gehlert, S., & Coleman, R. (2010). Using community-based participatory research to ameliorate cancer disparities. *Health & Social Work*, 35(4), 302–309.

Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine*, 7(7), e1000316. doi:10.1371/journal.pmed.1000316

Keller, C., Ainsworth, B., Records, K., Todd, M., Belyea, M., Vega-López, S., … Nagle-Williams, A. (2014). A comparison of a social support physical activity intervention in weight management among post-partum Latinas. *BMC Public Health*, 14(1), 971.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York, NY: Springer.

Luna, I., de Ardon, E. T., Lim, Y. M., Cromwell, S. L., Phillips, L. R., & Russell, C. K. (1996). The relevance of familism in cross-cultural studies of family caregiving. *Western Journal of Nursing Research*, 18(3), 267–283.

Mama, S. K., Song, J., Ortiz, A., Tirado-Gomez, M., Palacios, C., Hughes, D. C., & Basen-Engquist, K. (2015). Longitudinal social cognitive influences on physical activity and sedentary time in Hispanic breast cancer survivors. *Psycho-oncology*, 26(2), 214–221. doi:10.1002/pon.4026

Marin, G., & Marin, B. V. (1991). *Research with Hispanic populations*. Newbury Park, CA: Sage Publications, Inc.

Marquez, B., Anderson, A., Wing, R. R., West, D. S., Newton, R. L., Meacham, M., … Evans-Hudsnall, G. (2016). The relationship of social support with treatment adherence and weight loss in Latinos with type 2 diabetes. *Obesity (Silver Spring)*, 24(3), 568–575. doi:10.1002/oby.21382

Marquez, D. X., & McAuley, E. (2006). Social cognitive correlates of leisure time physical activity among Latinos. *Journal of Behavioral Medicine*, 29(3), 281–289. doi:10.1007/s10865-006-9055-6

Martinez, S. M., Ainsworth, B. E., & Elder, J. P. (2008). A review of physical activity measures used among US Latinos: Guidelines for developing culturally appropriate measures. *Annals of Behavioral Medicine*, 36(2), 195–207.

Munoz-Laboy, M., Severson, N., Perry, A., & Guilamo-Ramos, V. (2014). Differential impact of types of social support in the mental health of formerly incarcerated Latino men. *American Journal of Men's Health*, 8(3), 226–239. doi:10.1177/1557988313508303

Pagoto, S. L., Schneider, K. L., Oleski, J. L., Luciani, J. M., Bodenlos, J. S., & Whited, M. C. (2012). Male inclusion in randomized controlled trials of lifestyle weight loss interventions. *Obesity (Silver Spring)*, 20(6), 1234–1239. doi:10.1038/oby.2011.140

Rios, D., & Eaton, A. (2016). Perceived social support in the lives of gay, bisexual and queer Hispanic college men. *Culture, Health & Sexuality*, 18(10), 1093–1106. doi:10.1080/13691058.2016.1150516

Sabogal, F., Marín, G., Otero-Sabogal, R., Marín, B. V., & Perez-Stable, E. J. (1987). Hispanic familism and acculturation: What changes and what doesn't? *Hispanic Journal of Behavioral Sciences*, 9(4), 397–412.

Sallis, J. F., Grossman, R. M., Pinski, R. B., Patterson, T. L., & Nader, P. R. (1987). The development of scales to measure

social support for diet and exercise behaviors. *Preventive Medicine*, *16*(6), 825–836.

Sanchez-Johnsen, L. (2011). Andrade people and cultures of Hawaii: A psychocultural profile. In J. F. McDermott & N. N. Andrade (Eds.), *People and cultures of Hawaii: The evolution of culture and ethnicity* (pp. 152–175). Honolulu, HI: University of Hawaii Press.

Sanchez-Johnsen, L., Craven, M., Nava, M., Alonso, A., Dykema-Engblade, A., Rademaker, A., & Xie, H. (2017). Cultural variables underlying obesity in Latino men: Design, rationale and participant characteristics from the Latino men's health initiative. *Journal of Community Health*, *42*(4), 826–838.

Sanchez-Johnsen, L., Stolley, M. R., & Fitzgibbon, M. L. (2006). Diet, physical activity, and breast health intervention for Latina women. *Hispanic Health Care International*, *4*(2), 101–110.

Santiago-Rivera, A. L., Arredondo, P., & Gallardo-Cooper, M. (2002). *Counseling Latinos and la familia: A practical guide* (Vol. 17). Thousand Oaks, CA: Sage Publications.

Schoeny, M. E., Fogg, L., Buchholz, S. W., Miller, A., & Wilbur, J. (2017). Barriers to physical activity as moderators of intervention effects. *Preventive Medicine Reports*, *5*, 57–64. doi:10.1016/j.pmedr.2016.11.008

Teachman, J. (2016). Body weight, marital status, and changes in marital status. *Journal of Family Issues*, *37*(1), 74–96.

U.S. Census Bureau. (2015). *FFF: Hispanic Heritage Month 2016*. Retrieved February, 23, 2017, from https://www.census.gov/newsroom/facts-for-features/2016/cb16-ff16.html

U.S. Census Bureau. (2016). *Annual estimates of the resident population by sex, age, race, and Hispanic origin for the United States and States: April 1, 2010 to July 1, 2015*. Retrieved July 11, 2016, from http://factfinder.census.gov/bkmk/table/1.0/en/PEP/2015/PEPAGESEX?slice=GEO~0 100000US

U.S. Census Bureau. (2017). American community survey 5-year estimates. Retrieved September 29, 2017, from https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml.

Valenzuela, A., & Dornbusch, S. M. (1994). Familism and social capital in the academic achievement of Mexican origin and Anglo adolescents. *Social Science Quarterly*, *75*(1), 18–36.

Wang, M. L., Pbert, L., & Lemon, S. C. (2014). Influence of family, friend and coworker social support and social undermining on weight gain prevention among adults. *Obesity (Silver Spring)*, *22*(9), 1973–1980. doi:10.1002/oby.20814

Winston, G. J., Phillips, E. G., Wethington, E., Devine, C., Wells, M., Peterson, J. C., … Charlson, M. (2015). Social network characteristics associated with weight loss among Black and Hispanic adults. *Obesity (Silver Spring)*, *23*(8), 1570–1576. doi:10.1002/oby.21155

Wohl, A. R., Galvan, F. H., Myers, H. F., Garland, W., George, S., Witt, M., … Lee, M. L. (2011). Do social support, stress, disclosure and stigma influence retention in HIV care for Latino and African American men who have sex with men and women? *AIDS and Behavior*, *15*(6), 1098–1110. doi:10.1007/s10461-010-9833-6

Zhou, E. S., Penedo, F. J., Lewis, J. E., Rasheed, M., Traeger, L., Lechner, S., … Antoni, M. H. (2010). Perceived stress mediates the effects of social support on health-related quality of life among men treated for localized prostate cancer. *Journal of Psychosomatic Research*, *69*(6), 587–590. doi:10.1016/j.jpsychores.2010.04.019