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Relationship between religious social support and general social support with health behaviors in a national sample of African Americans

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Abstract

Chronic diseases are the leading cause of death and disability in the United States and have significant behavioral origins. African Americans suffer a disproportionate burden of chronic disease relative to other US racial/ethnic groups. Previous research supports an association between both general and religious social support and health behaviors that impact the risk of chronic disease. The present study examined the relative contributions of these constructs to a variety of health behaviors in a national probability sample of African American men and women (N=2,370). A telephone interview assessing fruit and vegetable consumption, physical activity, alcohol consumption, and current cigarette use was completed by participants. Results showed that several dimensions of religious social support predicted fruit and vegetable consumption, moderate physical activity, and alcohol use over and above the role of general social support. Findings highlight the unique role of religious support in this population in the context of health behaviors. Implications for health promotion interventions are discussed.

Chronic diseases, such as heart disease, stroke, cancer, and diabetes, are the most common and preventable health problems affecting Americans today (Centers for Disease Control and Prevention, 2009). The Centers for Disease Control and Prevention (CDC) reports that a lack of four behaviors, adequate physical activity, a diet consisting of fruits and vegetables, avoidance of harmful drinking, and abstinence from tobacco constitute common causes of all chronic disease (National Center for Chronic Disease Prevention and Health Promotion [NCCDPHP], 2009; USDHHS, 2004; Willet et al., 1995; Stamler, Stamler, & Neaton, 1993; USDHHS, 1989). Research suggests that these four modifiable behaviors are also associated with 10 or more years of increased life expectancy (CDC, 2009). Keeping a healthy weight through diet and physical activity can prevent Type II diabetes, cancer, and heart disease while also strengthening muscles and bones to improve ability to do daily activities (NCCDPHP, 2009; CDC, 2010; Powell, Thompson, Caspersen, & Kendrick, 1987). Cigarette smoking and heavy alcohol use are risk factors for heart attack, and colorectal, lung, liver, mouth, larynx, and throat cancers (NCCDPHP, 2009; Baan et al., 2007; USDHHS, 2004; USDHHS, 1989).

African Americans suffer disproportionately from chronic disease when compared to the general population (Pleis & Lethbridge-Çejku, 2007). African American men are more likely to die from heart disease and African American women are 1.7 times more likely to be obese when compared to Non-Hispanic White women and men (Kung, Hoyert, Xu, & Murphy, 2008; Ogden, Carroll, McDowell, & Flegal, 2007). Despite great advances in the screening and treatment of cancer, African Americans are still more likely than any other racial or ethnic group to die from this disease (ACS, 2009). Data also suggest that the four most common causes of chronic disease are more prevalent in this population. The CDC reports that in 2007 African Americans were 50% less likely to engage in some physical activity when compared to Non-Hispanic Whites (NCHS, 2008). In 2008, 21% of Non-Hispanic African Americans smoked cigarettes compared to 22% of Non-Hispanic Whites (NCHS, 2008). Though some research suggests that factors like racism and low screening rates may also contribute to the increased rates of chronic disease among African Americans, Healthy People 2010 challenges researchers to focus on increasing physical activity, fruit and vegetable consumption, and decreasing tobacco and alcohol use (ACS, 2009; Constantine, 2006). As a result, identifying and understanding the factors that are associated with these health behaviors is an important focus of public health research (NCCDPHP, 2009; Hiatt & Rimer, 1999).

Social Support

Health behavior theory and research suggest that social support, defined as the appraisal, belonging, and tangible support received from one's social network, is associated with a number of health behaviors. Social support or the perceived support or influence from family and friends has been shown to be associated with weight management, fruit and vegetable consumption, physical activity, general diet, and smoking cessation attempts (Wolfe, 2004; Fuemmeler et al., 2006; Tang, Brown, Funnell, & Anderson, 2008; Nollen, Catley, Davies, Hall, & Ahluwalia, 2005). As suggested in theory and evidenced in research, support from social networks can help promote physical activity, fruit and vegetable consumption, and decreased cigarette and alcohol use (Honda & Kagawa-Singer, 2006; Allen, Stoddard, & Sorenson, 2008; Kirchoff, Elliott, Schlichting, & Chin, 2008; Hamilton, 2008; Fuemmeler et al., 2006; Nollen et al., 2005). In a study of individual's perception and interpretation of social support received and self-care behaviors among African Americans with Type II diabetes, researchers found that positive social support was predictive of following a healthy eating plan and engaging in physical activity for at least 30 minutes daily (Tang et al., 2008). Similarly, another study reported a significant association between perceived availability of social support and smoking cessation among African Americans (Nollen et al., 2005). Those who reported greater social support were more likely to report quitting smoking when compared to those with weaker social support.

Religious Social Support

As noted by Ellison and colleagues (2010), persons who have social networks that include a religious or faith-based organization may additionally or uniquely benefit from the salutary role of social support. People who attend religious services tend to have larger social networks (Musick, Traphagan, Koenig, & Larson, 2000) and engage in more direct support activities than those with less frequent attendance (George, Ellison, & Larson, 2002; Ellison & George, 1994; Bradley, 1995). Social relationships are facilitated in this setting because religious organizations are generally made up of a group of people with similar backgrounds, interests and values (Ellison & George, 1994). Within African American communities, the church plays a significant role in individuals' beliefs, practices, experiences and daily activities (Lincoln and Mamiya, 1990; Ellison, Hummer, Burdette, & Benjamins, 2010). In fact, a recent Gallup pole reports that 55% of African Americans

attend church at least once a week or almost every week (Newport, 2010). Churches have a tradition of supporting those who are less fortunate and conducting outreach programs, particularly in African American and other minority faith communities (Caldwell, Greene, & Billingsley, 1992). Church members are also an important part of the informal social network (Taylor, Lincoln, & Chatters 2005). Researchers describe the perceived social support provided by clergy and congregational members as religious social support, church-based support, or spiritual support (Kanu et al., 2008). For the purpose of the current study and based on research conducted by Krause and colleagues (2001), the term “religious social support” is used to describe the emotional support provided and received, anticipated support, and negative interaction from one’s congregation or faith-based organization.

Significant associations between religious social support and various health-related outcomes are emerging in the literature. One study explored the association between physical activity and religious social support, as defined by informational and instrumental support from church members, in a rural population (Kanu et al., 2008). Respondents who had levels of physical activity that met recommended guidelines also reported receiving informational religious support which was defined as receiving information about increasing physical activity from a clergy member during weekly services. Another study showed that the degree of interaction with religious individuals or social religiosity was inversely related to risk for major depression, generalized anxiety disorder, phobias, alcohol dependence, drug abuse, and adult antisocial behavior (Kendler, Liu, Gardner, McCullough, Larson, & Prescott, 2003). Persons who reported a high frequency of interaction with religious individuals and church attendance were less likely to be at risk for these psychiatric disorders (Kendler et al., 2003). Finally, Krause (2006) showed that emotional support from fellow church members was associated with significantly reduced mortality risk among older adults. Emotional support provided by their church network helped older adults deal with the effects of financial strain.

Religious social support has been operationalized in different ways across studies. Minimally it has included amount of religious involvement, frequency of church attendance and participation in church groups; where religious involvement is a proxy measure of the social interaction and supportive friendships that one may form with church members. Religious social support can then be described by the type (emotional or spiritual) and source (clergy or congregational members) of the support. Another recent multidimensional model of religious social support has been proposed by Krause, as outlined in the context of the Brief Multidimensional Measure of Religiousness/Spirituality for use in Health Research (NIA working group/Fetzer Institute, 1999). This instrument includes four dimensions: emotional support provided, emotional support received, negative interaction, and anticipated support. This model was used in the current study because it recognizes the multidimensional nature of religious support, and comes from an established, widely-used battery of instruments utilized in the scientific study of religious involvement and health.

The Present Study

Many have documented the importance of the church in the African American community. It is often considered the cornerstone of African American culture (Lincoln and Mamiya, 1990). African Americans in general report higher rates of religious involvement than Whites (Ferraro & Koch, 1994; Levin, Taylor, & Chatters, 1994; Taylor, Chatters, Jayakody, & Levin, 1996). Given the role of organized religion in this community, African Americans may be more likely than other populations to benefit from the support provided by this social network. In fact, social support from both family and church networks was reported in over half of a national representative sample of African Americans (Chatters, Taylor, Lincoln, & Schroepfer, 2002). Research has suggested the salutary effects of social

support on health (Cobb, 1976; Gottlieb, 1985; Kaplan, Cassel, Gore, 1977). One of the proposed mechanisms through which religious involvement may impact health behaviors and outcomes is through the provision of social support (Krause, 2002; Siegel, Anderman, & Schrimshaw, 2001; Ellison & George, 1994). Based on the literature documenting the importance of religious social support in health outcomes, it is appropriate to examine the possibility that religious support may be associated with health behaviors above and beyond the contribution of general social support. This would be supportive of the unique impact of religious involvement in health, and would in part rule out the potential confound of the social network provided by faith-based settings (Krause, 2002).

The present study examined the relative contributions of general social support and religious social support to a variety of health behaviors in a national probability sample of African American men and women. Empirical studies suggest that there are relationships between both general social support, religious social support and health behaviors among African Americans. However, these relationships have not been studied together to determine their relative contributions in this demographic population- one disproportionately impacted by chronic health conditions. Previous studies have generally not been able to take advantage of a national sample of African Americans, or include a variety of health behaviors. This study examined four major causes of chronic disease (e.g., tobacco and alcohol use, and lack of physical activity, and diet consisting of fruits and vegetables; CDC, 2009). Specifically, the following hypotheses were tested:

1. General social support will be positively associated with physical activity and fruit and vegetable consumption, and negatively associated with cigarette and alcohol use.
2. Religious social support will be positively associated with physical activity and fruit and vegetable consumption, and negatively associated with cigarette and alcohol use. The exception is for negative interactions, in which the inverse of these relationships was expected.
3. Religious social support will make significant contributions to study outcomes above and beyond the variance contributed by general social support.

METHOD

Data Collection Procedures

The current study uses data collected from a larger study examining the religion-health connection, the Religion and Health in African Americans or “RHIAA” study. Data were collected using a professional call center contracted by the study. The study population consisted of African Americans age 21 and older living in a private residence with a telephone, in any of the 50 states in the US. Those living in households without a telephone were not eligible, nor were those living in group quarters, dormitories, jails/prisons, nursing homes, or hospitals. Based on data aggregated from a wide variety of publicly-available sources such as motor vehicle registrations, a professional sampling firm (Genesys) generated a call list. The call list was comprised of households randomly selected from data available to the sampling firm, from a national representation of US census tracts, making the sample “probability-based.” Due to response bias (discussed below), this can not be considered a “representative” sample of African Americans.

Professional interviewers called names randomly selected from the call list, recruiting participants by telephone. When interviewers were put into contact with an adult who lived at the address being dialed, they introduced the project. Interested individuals were then screened for eligibility criteria. Interested and eligible individuals were read the informed

consent script and provided their assent to participate. The first eligible individual who provided verbal consent in each household was interviewed, and only one individual was interviewed per household. The interviews lasted an average of 45 minutes and a \$25 gift card was mailed to each participant upon completing the interview.

Measures

General Social Support—The Interpersonal Support Evaluation List (ISEL-12) was used to assess general social support (Cohen, 2009). The 12-item version addresses appraisal (e.g., “I feel there is someone I can share my most private worries and fears with.”), belonging (e.g., “If I wanted to have lunch with someone, I could easily find someone to join me.”), and tangible (e.g., “If I were sick, I could easily find someone to help me with my daily chores.”) support, using a 4-point Likert-type scale (definitely false...definitely true). Internal reliability varied from .75 – .90 across four studies but was generally well above .80 (Cohen, 2009). Scores were associated with marital adjustment, social network diversity, and social network size, as well as a number of affective outcomes ($ps < .05$). Internal reliability in the present sample was adequate ($\alpha = .89$ overall scale; $\alpha = .84, .75, .75$ for subscales, respectively). Higher scores indicated higher levels of support.

Religious Social Support—Religious Social Support was assessed using an instrument from the Brief Multidimensional Measure of Religiosity/Spirituality for Health Research (Fetzer Institute, National Institute on Aging Working Group, 1999). The instrument contains items to measure emotional support received (e.g. “How often do the people in your congregation listen to you talk about your private problems and concerns?”), emotional support provided (“How often do you make the people in your congregation feel loved and cared for?”), anticipated support (e.g. “If you were ill how much would the people in your congregation be willing to help out?”), and negative interaction (e.g. “How often do the people in your congregation make too many demands on you?”). Items are rated on a 4-point Likert-type format from *never* to *very often* for emotional support and negative interaction and *none* to *a great deal* for anticipated support. The internal consistency reliability of this measure was acceptable for this study and given the brevity of the instrument ($\alpha = .83$ for overall scale; .61, .76, .64, .89 for subscales, respectively). Higher scores indicated higher levels of support.

Health Behaviors

Fruit and Vegetable Consumption: Fruit and vegetable consumption was measured using an adaptation of the National Cancer Institute’s Five-A-Day Survey. The instrument asks participants to recall the number of servings of fruit and vegetable consumed in a typical day (e.g., In a typical day, about how many times do you have...1 cup of raw vegetables, like salad or tomatoes?). A score for daily fruit and for daily vegetable consumption is computed. This instrument has evidence to support its reliability and use with an African American population (2-week test-retest reliability $r > .70$; Kreuter et al., 2005).

Physical Activity: The short form of the International Physical Activity Questionnaire (IPAQ; Craig et al., 2003) was used to assess participants’ physical activity in the last seven days. This instrument assesses the number of days in the past week (frequency) and amount of time (duration) spent engaging in physical activity each day. Participants reported the amount of time spent engaging in vigorous and moderate physical activity as well as walking. Minutes per week are computed. This instrument has shown support for criterion validity when used with an African American population (Wolin, Heil, Askew, Matthews, & Bennett, 2008).

Alcohol and Cigarette Use: Items from the Behavioral Risk Factor Surveillance System (BRFSS) were used to assess alcohol use and history of cigarette use (CDC, 2009). Participants were asked to recall alcohol use in the past 30 days (e.g. “During the past 30 days, how many days per week or per month did you have at least 1 drink of any alcoholic beverage?”). Binge drinking is indicated by days per month consuming greater than 4 (for women) or 5 (for men) drinks on a single occasion. Current cigarette use was assessed using a single item (e.g. Do you now smoke cigarettes everyday or not at all?”

Demographics Module—Participant sex, race, date of birth, marital status, years of education, employment status, and self-rated health status were recorded in the survey demographics module.

Design/Analysis

Bivariate associations between all study variables were investigated using Pearson Product Moment correlations. Point biserial correlations were used when variables were dichotomous (e.g., sex). Hierarchical regression was used to determine whether the religious support dimensions contributed to study outcomes above and beyond general social support and the demographic covariates of age, education, sex, and self-rated health status (Powell, Shahabi, & Thoresen, 2003). Linear regression was used for continuous outcomes, logistic regression for dichotomous outcomes. Demographics and general social support variables were entered as the first block, and religious social support was entered as the second block. The overall model significance, R^2 , change in R^2 and significance of change in R^2 values were examined.

Results

Participant Characteristics

A total of 12,418 individuals were contacted for participation, and 2,370 individuals agreed to participate (see Table 1). The overall response rate, therefore, was 19% (accepted/ [accepted + non-interviewed]). Of those contacted who did not participate ($N=10,048$), 8,240 refused prior to a determination of eligibility; 1,658 were not eligible [81 were under age 21; 444 refused to provide an age for screening purposes; 878 were not African American; 224 reported a history of cancer; and 5 refused to respond to the question about cancer history]. Twenty six were incapable of participating in the interview. Only 150 were determined to be eligible but then refused to participate, making for an upper bound response rate of 94% (2,370/2,520).

Health Behavior Models

Fruit and Vegetable Consumption—Table 2 shows bivariate correlations between all study variables. Fruit and vegetable consumption was significantly and positively correlated with general social support and all religious social support variables with the exception of the negative interaction subscale. A linear regression model indicated that general social support was significantly and positively associated with both daily fruit and vegetable consumption, controlling for participant age, sex, education, and health status ($p < .001$) (see Table 3). Hierarchical linear regressions revealed that religious social support made a positive and moderate additional contribution ($\Delta R^2 p < .10$) to the association with fruit consumption above and beyond general social support. Specifically, emotional religious support received was positively and moderately associated with consumption ($p < .10$). For vegetable consumption, the additive role of religious support was significant ($\Delta R^2 p < .05$), and again the emotional religious support received dimension was responsible for this contribution ($p < .05$). Those with more social support consumed more fruits and vegetables,

and there was an additive relationship for those with more emotional religious support (moderately significant for fruit), relative to those with lower levels of support.

Physical Activity—Only moderate physical activity was found to be significantly correlated with a social support variable, anticipated religious social support ($r=.07$, $p<.05$). Social support was not significantly associated with either vigorous, moderate, or walking activity (see Table 3). However, for moderate physical activity, religious involvement made a significant additional contribution ($\Delta R^2 p < .05$), with anticipated support being positively associated ($p < .05$). Social support levels were not related to physical activity; however, those with more anticipated religious support engaged in more moderate activity relative to those with less of this type of support.

Alcohol Consumption—Table 2 shows that number of days in which 4 or 5 (for women and men, respectively) drinks were consumed was significantly correlated with the negative interaction subscale of religious social support ($r=.12$; $p<.01$). Social support was not significantly associated with days of alcohol consumption per month and nor was religious social support. However, social support was moderately significantly associated with number of days in which 4 or 5 drinks were consumed (see Table 4). For number of days in which 4 or 5 drinks were consumed, religious social support made a significant additional contribution ($\Delta R^2 p < .01$), with negative interaction being associated with consumption ($p < .001$). General social support became non-significant at this step in the model. Those with more general social support were marginally less likely to engage in binge drinking; however, those who experienced negative interactions with those in their faith-based community were more likely to engage in this type of drinking, independent of other types of support.

Cigarette Use—Current cigarette use was significantly and negatively correlated with emotional support received ($r=-.07$; $p<.05$), and anticipated support scales ($r=-.07$; $p<.05$). However, neither general social support nor religious social support was significantly associated with current cigarette use in the regression model.

Discussion

Overall, findings reveal significant associations between several health behaviors, and general and religious social support. Consistent with hypothesis 1, general social support was positively associated with fruit and vegetable consumption and negatively associated with alcohol use. These findings are consistent with prior research on social support and health behaviors (Fuemmeler et al., 2006; Menagi, Harrell, & June, 2008). However, a significant relationship between general social support and physical activity behaviors was not found.

Hypothesis 2 and 3 were partially supported by study results. Receiving emotional religious support was positively associated with fruit and vegetable consumption. Emotional support received from one's congregation was significantly associated with vegetable consumption above the effects of general social support. These findings suggest that African Americans may receive unique aspects of social support from involvement in faith-based organizations such as churches, which plays a positive role in dietary behaviors. While recent increases in the availability of fast food and socioeconomic status may influence food choices within the African American community, previous research has also found a significant association between religious involvement and fruit and vegetable consumption (Holt, Haire-Joshu, Lukwago, Lewelyn, & Kreuter, 2005). Anticipated support was found to be significantly associated with moderate physical activity over and above the effects of general social support. Several studies have found that church-based physical activity interventions

significantly increase physical activity among members (Bopp, Wilcox, Laken, & McClorin, 2009; Young & Stewart, 2006; Resnicow et al., 2005). Interventions aimed at increasing physical activity often encourage members to exercise together. African Americans may find it easier to begin a physical activity regime if they perceive receiving support from fellow church members. Those who reported negative interactions (e.g., criticism, many burdens/demands) in their faith based social networks were more likely to engage in heavy alcohol use (4 or 5 drinks on one occasion) than those who did not report such interactions. It is possible that individuals who engage in this pattern of drinking are also those more likely to have strained interactions with network members, or they use alcohol to cope with stressors such as role strain or troubled social relationships.

Previous research has shown that church membership can facilitate expanded social support networks that provide care, concern, and resources for its members. The current study found that religious social support was uniquely associated with fruit and vegetable consumption, moderate physical activity, and, for negative support, number of days in the last month consuming 4 or 5 or more alcoholic drinks. However, in a study of various indices of mental and physical health, religious social support was not found to be associated over and above the effects of general social support (Willoughby, Cadigan, Burchinal, & Skinner, 2008). Willoughby and colleagues (2008) examined religious social support using an instrument with separate subscales assessing support from God, congregation, and one's clergy. In contrast, the instrument used in the current study measures religious social support as a function of one's religious congregation as a whole. It is possible that this difference in measurement contributed to the discrepant findings.

Though religious social support added significant predictive value to several health outcomes over and above the contribution of general social support, more research is needed to understand how this contribution operates. Research suggests that African American's religious congregations may provide a homogeneous context for them to feel comfort, ease, and encouraged (Ellison & George, 1994). The church may also provide a daily continuous source of support that is not available from one's family and friends. Furthermore, a major guiding principal of many religions is to provide service and support to its members and those in need (e.g. community outreach, prayer lists, and education; Caldwell, Greene, Billingsley, 1992). As a result, religious social support may be a unique byproduct of church attendance and participation. However, the current analysis may be indicative that religious social support just provides *more* support than general social support alone, rather than unique benefits. This idea should not be ruled out, and could be explored in future studies.

Limitations

Some study limitations should be taken into consideration. Given that results are based on self-reported data from participants, it is possible that participants provided socially desirable answers to the health behavior questions. Another limitation is the generalizability of the data to other populations and African Americans. The response rate of the current study was 22% and survey responders were more likely to report attending church services in the past 12 months than nonresponders (83.6% vs. 65.0%, respectively). As a result, findings may not generalize to African Americans who do not regularly attend church. In addition, the majority of survey responders reported affiliation with Christian denominations (66.6%) and only small portion from non-Christian denominations (e.g., Muslim 0.4%). However, the sample does include a substantial segment of African Americans and makes a unique contribution to the literature in this area. Furthermore, the magnitude of the correlations between general social support and religious social support (-0.06 to 0.31) were in the range that Cohen (1988) would characterize as small to moderate. These correlations are not considered to be large enough to lead to problems with multicollinearity, and suggest that the general social support and religious social support constructs are largely distinct, as

measured with these instruments. Finally, the cross-sectional nature of this study design does not allow for any causal inferences to be made from the findings.

Future Research

The results of the current study can be used by health professionals seeking to prevent chronic disease among African Americans. Interventions designed for African Americans should take into account the potentially unique influence of social support from faith-based organizations on health promoting behaviors. This study found that several dimensions of religious social support were associated with fruit and vegetable consumption, moderate physical activity, and alcohol use over and above the effect of general social support. Prior to this study, religious social support had not been used to examine a variety of health behaviors or with a national sample of African Americans. Future studies should consider targeting church-based social networks to influence health behavior changes. This is consistent with the many church-based health behavior change interventions being utilized in African American communities. The present findings may provide an indication as to which health behaviors may be most suitable for focus in such interventions, given the key role of religious social support in these settings. The support provided by one's church-based network may provide the needed encouragement to lessen the prevalence of the common causes of chronic disease in this population.

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Table 1

Participant demographic characteristics

Characteristic	Categories	(N=2,370)
Age, mean(SD)		53.6 (14.8)
Sex	Male	38.2%
	Female	61.8%
Relationship status	Never married	13.3%
	Single	17.2%
	Married or living w/partner	36.9%
	Separated or Divorced	18.8%
	Widowed	13.8%
Education	Grades 1–8	2.7%
	Grades 9–11	9.4%
	Grade 12 or GED*	32.8%
	1–3 yrs college	29.3%
	4+ yrs college	25.7%
Work status	Full-time	38.3%
	Part-time	11.8%
	Not currently	12.6%
	Retired	26.2%
	Receiving disability	11.2%
Income	< \$5,000	7.5%
	\$5,000–\$10,000	10.7%
	\$10,000–\$20,000	12.7%
	\$20,000–\$30,000	11.5%
	\$30,000–\$40,000	10.0%
	\$40,000–\$50,000	8.1%
	\$50,000–\$60,000	7.2%
	> \$60,000	18.5%
Refused	13.8%	
Social Support, mean(SD)		42.0(6.7)
Religious Social Support, mean(SD)	Emotional support received	5.8(1.8)
	Emotional support provided	6.2(1.9)
	Negative interaction	3.2(1.5)
	Anticipated support	6.6(1.80)
Fruit Servings, mean(SD)		2.4(1.4)
Vegetable Servings, mean(SD)		2.2(1.0)
Vigorous Activity, mean(SD)		71.2(60.0)
Moderate Activity, mean(SD)		63.5(58.9)
Alcohol use - drinking days per month, mean(SD)		7.4(7.7)

Characteristic	Categories	(N=2,370)
Alcohol use - days more than 4/5 drinks mean(SD)		1.5(4.1)
Current Cigarette Use	Yes	51.9%
	No	48.1%

Note. Numbers may not sum to 2,370 or 100% due to missing data.

* GED = General Equivalency Diploma

Table 2

Correlations between study variables

	Social support	RS, emotional received	RS, emotional provided	RS, negative interaction	RS, anticipated support	Fruit per day	Vegetables per day	Vigorous activity	Moderate activity	Alcohol days/mo.	Days/mo >4 or 5 drinks	Current Cigarette Use [^]
Social support	--											
RS, emotional received	.26**	--										
RS, emotional provided	.23**	.73**	--									
RS, negative interaction	-.06**	.13**	.23**	--								
RS, anticipated support	.31**	.64**	.63**	.10**	--							
Fruit per day	.22**	.13**	.11**	-.01	.12**	--						
Vegetables per day	.17**	.10**	.09**	.00	.10**	.45**	--					
Vigorous activity	.04	.00	-.00	.04	-.01	-.03	.02	--				
Moderate activity	.02	.04	.05	.01	.07*	-.01	.02	.56**	--			
Alcohol days/mo.	-.05	-.03	.00	.05	-.03	-.04	.06	.07	.06	--		
Days/mo >4 or 5 drinks	-.05	-.03	.00	.12**	-.04	-.08*	-.03	.08*	-.01	.42**	--	
Current Cigarette Use [^]	-.03	-.07*	-.03	.04	-.07*	-.19**	-.07*	.13**	.10*	.07	.11*	--

Note. "RS" = religious support;

[^] Point biserial correlation;

* = p < .05;

** = p < .01

Table 3

Regression models for fruit/vegetable consumption and physical activity

	Daily fruit servings	Daily vegetable servings	Vigorous physical activity	Moderate physical activity ^a
Model data	F(9,2077)=18.02, p<.001, R ² =.07 ΔR ² =.004 [^]	F(9,2077)=16.65, p<.001, R ² =.07 ΔR ² =.004 [*]	F(9,1480)=9.77, p<.001, R ² =.06 ΔR ² =.000	F(9,1444)=7.45, p<.001, R ² =.05 ΔR ² =.008 [*]
Block 1	β	β	β	β
Age	.12 ^{***}	.13 ^{***}	-.07 ^{**}	-.02
Sex	.06 ^{**}	.05 [*]	-.17 ^{***}	-.16 ^{***}
Education	.06 ^{**}	.13 ^{***}	-.11 ^{***}	-.06
Health status	.09 ^{***}	.09 ^{***}	.11 ^{***}	.09 ^{***}
Social support	.18 ^{***}	.11 ^{***}	.03	.02
Block 2				
Age	.11 ^{***}	.13 ^{***}	-.06 ^{**}	-.03
Sex	.06 ^{**}	.05 [*]	-.17 ^{***}	-.16 ^{***}
Education	.06 ^{**}	.13 ^{***}	-.11 ^{***}	-.06 [*]
Health status	.09 ^{***}	.09 ^{***}	.11 ^{***}	.09 ^{***}
Social support	.16 ^{***}	.09 ^{***}	.03	-.01
RS-Emotional received	.06 [^]	.07 [*]	-.01	-.02
RS – Emotional provided	.02	-.01	-.00	.03
RS – Negative interaction	.00	.01	.02	-.02
RS – Anticipated support	-.00	.00	.01	.08 [*]

Note.

^aSignificant effects were not found for “walking” behaviors; “RS” = religious support, “OR” = odds ratio, “CI” = confidence interval;

[^] = p < .10, moderately significant;

^{*} = p < .05;

^{**} = p < .01;

^{***} = p < .001

Table 4

Regression models for alcohol and cigarette use

	Alcohol days per month	Monthly days > 4 or 5 drinks~	Current cigarette use	
Model data	F(9,823)=3.49, p<.001, R ² =.04 ΔR ² =.003	F(9,811)=3.07, p<.001, R ² =.03 ΔR ² =.018**	N=895; p<.001	
Block 1	β	β	OR	95% CI
Age	.06 [^]	-.04	0.93***	0.92–0.95
Sex	-.16***	-.04	1.16	0.87–1.54
Education	.00	-.09**	0.83**	0.72–0.95
Health status	.03	.02	0.90	0.78–1.04
Social support	-.05	-.06 [^]	1.00	0.98–1.02
Block 2				
Age	.06 [^]	-.03	0.94***	0.92–0.95
Sex	-.16***	-.03	1.18	0.88–1.58
Education	.01	-.08*	0.82**	0.71–0.94
Health status	.03	.02	0.91	0.79–1.06
Social support	-.04	-.03	1.01	0.99–1.03
RS – Emotional received	-.04	-.09	0.93	0.82–1.06
RS – Emotional provided	.05	.04	1.08	0.96–1.22
RS – Negative interaction	.05	.13***	1.01	0.91–1.12
RS – Anticipated support	-.03	-.01	0.94	0.84–1.05

Note. "RS" = religious support, "OR" = odds ratio, "CI" = confidence interval;

[^] = p < .10, moderately significant;

* = p < .05;

** = p < .01;

*** = p < .001; ~ 4 for women, 5 for men; sample sizes vary due to skip patterns