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Church-Based Social Support's Impact on African-Americans' Physical Activity and Diet Varies by Support Type and Source

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Abstract The objective of this study was to examine sources (friends, family, church members, and pastors) and type (positive or negative) of social support and their association with eating and physical activity behaviors. Study participants consisted of 41 African-American adults (78% female), with an average age of 43.5 years (standard deviation = 15.7). Participants were recruited from churches in southwest, Ohio. Mean comparisons showed family members, and friends had the highest positive and negative social support scores for healthy eating and physical activity. Pastors and church members received the lowest social support scores related to these behaviors. Using a linear regression analysis, social support in the form of physical activity rewards from family members was positively associated with fruit and vegetable consumption after adjusting for gender, age, education level, and church location. Based on these findings, future research should continue examining how different social support sources and types influence physical activity and healthy eating behaviors among African-Americans.

Keywords Social support · Physical activity · Diet · African-Americans · Church

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Introduction

Compared to majority populations, African-American adults are disproportionately affected by chronic diseases including hypertension, diabetes, and various cancers (Mays et al. 2007). Meeting evidenced-based standards for regular physical activity and fruit and vegetable consumption, as well as restricting fat and sugar intake are associated with better health outcomes (Liese et al. 2015; United States Department of Health and Human Services: Office of Disease Prevention and Health Promotion 2008) and weight management (Wadden et al. 2005). Unfortunately, many African-Americans are less physically active and report lower fruit and vegetable intake than their racial counterparts (Casagrande et al. 2007; Haskell et al. 2007). Given the substantial health benefits of regular physical activity and a healthy diet, the lower levels of these healthy behaviors among African-Americans are a significant public health concern (Baskin et al. 2011).

Growing research suggests the church may be an important setting and effective partner for diet and physical activity behavior change interventions targeting African-American adults (Lancaster et al. 2014; Resnicow et al. 2004; Whitt-Glover et al. 2008; Wilcox et al. 2013). One reason may be the potential social support present within churches (Campbell et al. 2007; Debnam et al. 2012). Social support can be broadly defined as a sense of belonging, appraisal, and support from entities like family and friends (Debnam et al. 2012). The church is a setting for additional support from individuals, such as the pastor and other church members (Krause et al. 2001). Pastors in particular may provide support through increasing congregation members' awareness of health-related issues and behaviors, as well as by serving as role models (Baruth et al. 2014; Harmon et al. 2013). In addition, within African-American communities, the church is viewed with a strong sense of respect (Barnes 2005; Campbell et al. 2007) and trust (Davis 2013; Lincoln and Mamiya 1990). In return, the church provides its members and the community with a source of emotional and spiritual support (Davis 2013; Debnam et al. 2012). This support may be particularly important to older members (Davis 2013) and have the potential to positively impact health behaviors (Debnam et al. 2012; Kanu et al. 2008).

Among African-American participants, church-based social support has been positively associated with multiple health behaviors. Social support within the church was associated with increased time spent in walking (Kegler et al. 2012), leisure time physical activity (Li et al. 2012), and moderate physical activity (Debnam et al. 2012) among African-Americans. Support from the pastor and church members also predicted increased physical activity among African-American adults participating in a church-based physical activity intervention (Bopp et al. 2009; Wilcox et al. 2007). Social support within the church was also positively associated with healthier dietary habits (Baruth et al. 2013), and support from pastors had a positive influence on congregation members' fruit and vegetable intake (Campbell et al. 2000, 2004).

While such research has documented the presence of social support from pastors, church members, family members, and friends among African American adults (Bopp et al. 2007), gaps in our understanding of these sources of support and their impact on diet and physical activity remain. For example, one study found social support from friends was the leading influence on African-American women's physical activity (Sharma et al. 2005), while other research found family support was equally important (Eyler et al. 2002). Potential differences in sources of social support on diet are also uncertain. In one study, family members were more likely to be nominated by African-American women as sources of support for healthy eating habits (Thrasher et al. 2004); however, additional research found neither family members nor friends supported African-American adults' dietary change

(James 2004). More research is needed to clarify significant sources of social support for diet and physical activity behavior change among African-Americans.

In addition to differences in source, social interactions around health can be positive or negative (Nooney and Woodrum 2002; Tang et al. 2008). Positive support is the type most often thought of with regards to social support (Samuel-Hodge et al. 2000); however, research has recently been conducted on the concept of negative social support or support that is considered by the recipient as unhelpful (Diehl and Willis 2003). Research within churches found negative social support from the individual's congregation was associated with an increased likelihood of dieting among women attempting to lose weight (Kim 2006). Negative social support can also come in the form of sabotage from family and friends. Kiernan et al. (2012) defined sabotage as a family member's or friend's refusal to eat healthy foods with the individual or eating unhealthy foods in front of the individual. Using this definition, researchers reported sabotage did not have an influence on weight loss behaviors among women. To date, most research on social support within African-American churches has focused on the positive aspects of support. More research is needed on the presence of negative social support within church settings and its potential influence on the diet and physical activity behaviors of African-American church members.

The current study aimed to provide a more detailed examination of support within African-American churches and the influence on church members' diet and physical activity behaviors. Differences in positive and negative social support for participants' physical activity levels, sedentary behavior, and fruit and vegetable intake were examined between sources (friends, family, church members, and the pastor). Additionally, associations between positive/negative social support from each source and participants' physical activity levels, sedentary behavior, and fruit and vegetable intake were examined. Based on previous research, all sources of social support were expected to influence participants' physical activity and eating behaviors. High negative support was expected to have an adverse effect on behavior, while high positive support was expected to have a positive effect on behavior.

Materials and Methods

Participants and Setting

Participants were recruited from two predominately African-American churches in southwest Ohio via partnerships with the church first ladies and/or pastors. Informed consent preceded all study procedures, which were approved by the Miami University Institutional Review Board. Monetary compensation was provided at the individual ($20) and church levels ($300). Consented participants completed a 20- to 30-min paper-and-pencil survey relevant to social support and their physical activity and diet behaviors.

Measurement

The demographic information collected included participants' self-report of age, gender, ethnicity, and education level. Participants were also asked to self-report their current height and weight [calculated into body mass index (BMI): weight (kg)/height $(m)^2$]. Based on their BMI, participants were categorized as normal weight (19.0–24.9 BMI) or overweight/obese (BMI $\geq$ 25). Participants also reported their current perceived health

("Which best describes your current health status?") and responded on a 5-point Likert scale (1 = "Poor," 2 = "Fair," 3 = "Good," 4 = "Very Good," and 5 = "Excellent"). Similar self-assessments have been used previously, demonstrating strong association with mortality (Idler and Benyamini 1997). The following measurement sections describe the assessment of participants' daily physical activity, sedentary behavior, and fruit and vegetable intake, as well as their perceived levels of social support from specific sources: family, friends, church members, and the church pastor.

Physical Activity and Sedentary Behavior

Participants' physical activity was assessed using the short format International Physical Activity Questionnaire (Craig et al. 2003). The IPAQ is a 4-item self-report measure to assess the frequency and duration of moderate-to-vigorous physical activity (MVPA). Moderate physical activity was defined to participants as "activity causing small increases in breathing or heart rate (e.g., brisk walking, bicycling, vacuuming)." Vigorous physical activity was described as "causing a large increase in breathing &/or heart rate (e.g. running, aerobics, heavy yard work." Participants were then categorized as meeting or not meeting the national recommendations of physical activity as outlined by the US Department of Health and Human Services (USDHHS); participants who met these recommendations self-reported engagement in at least 150 min of moderate-intensity physical activity or 75 min of vigorous-intensity activity each week (USDHHS 2008).

Weekly minutes of moderate and vigorous physical activity were then weighted by the associated metabolic equivalent (MET) value. MET values represent the metabolic equivalent of physical activity in multiples of resting oxygen consumption using the following calculations: (moderate × 4.0) and (vigorous x 8.0). MET values were used for all inferential analyses. IPAQ questions and MET calculations have been reported to be both reliable and valid among African-American populations (Wolin et al. 2008). Participants' sedentary behavior was assessed with two questions relevant to daily television (TV) time and computer time. TV time was assessed by asking participants, "In a typical day, how many hours (outside of work) do you usually watch television & or videos?" Sedentary computer time was measured by asking participants, "In a typical day, how many hours outside of work do you use the computer"). Participants' daily minutes of TV and computer usage were then averaged to represent their daily sedentary time. Similar assessments and calculations of daily TV and computer time have been reported previously with appropriate validity (Clark et al. 2009).

Fruit and Vegetable Consumption

Based on food guide pyramid recommendations (USDA 2005), participants were asked to report their typical daily fruit and vegetable intake in servings. One serving of fruit was described as, "One medium piece of fresh fruit, ½ cup of fruit salad, ¼ cup of raisins, apricots or other dried fruit, 6 oz. of 100% orange, apple, or grapefruit juice, (do not count fruit punch, lemonade, Gatorade, Sunny Delight or fruit drink)." One serving of vegetables was described as, "One medium carrot or other fresh vegetable, one small bowl of green salad, ½ cup of fresh or cooked vegetables, ¾ cup of vegetable soup (do not count French fries, onion rings, potato chips, or fried okra)." Next, in two separate questions, participants were asked to report their daily fruit and vegetable intake: "How many servings of fruits/vegetables do you usually eat each day." Daily fruit intake and vegetable intake were then summed and averaged across the sample for analyses. Participants

reporting consumption of 5 or more daily servings of fruits and vegetables were categorized as meeting recommendations (USDA 2005).

Social Support

Social support for participants' healthy eating and physical activity was measured using the Support for Heart Healthy Eating Habits Scale and the Support for Exercise Habits Scale, which have been previously validated for support from family and friends (Sallis et al. 1987). The survey was modified to additionally assess support from the church pastor and church members (Baruth et al. 2010). For both healthy eating and physical activity, each question began with, "During the past three months my family, friends, church, and pastor…". Participants were asked to respond to each item on a 5-point Likert scale (1 = "None" to 5 = "Very Often"). Participants were also given the choice, "*Not applicable*" if the statement was not relevant to one or more of the social support sources; such responses were recoded as 1 ("*None*"). Total social support was calculated for each social support source by averaging total healthy eating support and physical activity support; details of social support subscales are described below.

Physical Activity Social Support

Participants' perceptions of social support for physical activity were assessed with 13 items that targeted social support for physical activity participation (10 items) and support in the form of verbal or tangible rewards or punishments (3 items). Example questions for participation support included, "…offered to exercise with me." The 10 participation items were then averaged to represent physical activity support. The 3-item punishment/reward scale consisted of both positive and negative responses. One example item for punishment was "complained about the time I spend exercising," and the one reward item was "gave me rewards for exercising (bought me something or gave me something I like)." The two punishment items were first reversed scored and then averaged with the one reward/punishment item. Cronbach alpha values for physical activity participation support ranged from 0.89 to 0.95 and 0.46 to 0.72 for reward support.

Healthy Eating Social Support

Participants' perceptions of social support for a healthy diet were assessed with 10 items. Healthy eating support items targeted positive social support in the form of encouragement (5 items), as well as negative social support or discouragement for healthy eating (5 items). Example questions for encouragement were "…complemented me on changing my eating habits ('Keep it up', 'We are proud')"; an example of discouragement was "…refused to eat the same foods I eat." Factor scores were then calculated for both encouragement and discouragement. Cronbach alpha values for healthy eating encouragement ranged from 0.66 to 0.76 and 0.66 to 0.80 for discouragement.

Statistical Analyses

Data were analyzed using IBM SPSS 23 (IBM Corp 2015). Descriptive statistics were used to characterize the sample and describe participants' physical activity, sedentary behavior, as well as fruit and vegetable intake (i.e., multiple health behaviors). Given the low sample

size ($N < 50$), a 90% confidence interval determined statistical significance ($P < 0.10$) to minimize risk of type II error. To start, ANOVA F test was used to examine mean differences in participants' multiple health behaviors based on gender, age (18- to 29-year-olds or 30 +-year-olds), education (high school diploma or college degree or more), weight status (normal BMI or overweight/obese), and perceived health (poor/fair/good or very good/excellent). Next, paired-sample t tests were used to examine potential differences in social support for multiple health behaviors between family, friends, church members, and the pastor. Linear regression was then used to examine the associations between participants' perceived social support and their multiple health behaviors for each type of social support; gender, age, education level, and church location were included as covariates.

Results

All participants were African-Americans ($N = 41$) with an average age of 43.5 years (standard deviation (SD) = 15.7). Most participants reported being in at least good health (56%), with almost 44% of participants reporting very good to excellent health. The majority of participants were female (76%), overweight/obese (84%), and all had graduated from high school. Participants reported on average 143.4 min (SD 91.9) of daily television viewing and 151.5 min (SD 104.4) of daily computer time. Thirty-four percent of participants did not meet current physical activity standards and most fell below the recommended daily intake of fruit and vegetable servings (71%).

Table 1 depicts descriptive and ANOVA outcomes for participants' physical activity, sedentary behavior, and fruit and vegetable intake based on participants' gender, age, education, weight status, and perceived health. Compared to normal weight participants, overweight/obese participants reported significantly more daily sedentary minutes (mean difference (MD) = 107.4 min, $P = 0.09$). Also, participants 30 years or older reported eating more fruit and vegetable servings than participants 18- to 29-year-olds (MD = 1.51, $P = 0.07$). No other significant subgroup differences were found.

Within the total sample, paired-sample t tests were used to examine mean differences in support for participants' multiple health behaviors from each source of social support. Table 2 depicts the mean (M) and SD for each social support category and source. Healthy eating encouragement was highest from family, which was significantly higher than encouragement from church members ($n = 41$, mean difference (MD) = 0.69, $P = 0.00$) and the pastor ($n = 41$, MD = 0.85, $P = 0.00$). Healthy eating encouragement from friends was second highest and significantly higher than encouragement from church members ($n = 41$, MD = 0.62, $P = 0.00$) and the pastor ($n = 41$, MD = 0.78, $P = 0.00$). Health eating encouragement from church members ($M = 1.92$), while lower than encouragement from family and friends was significantly higher than encouragement from the pastor ($n = 41$, MD = 0.16, $P = 0.05$). Similar to healthy eating encouragement, discouragement for healthy eating was highest from family ($M = 2.32$), which was significantly higher than discouragement from church members ($n = 41$, MD = 0.83, $P = 0.00$) and the pastor ($n = 41$, MD = 1.13, $P = 0.00$). Discouragement for healthy eating was also higher from friends ($M = 2.14$) compared to church members ($n = 41$, MD = 0.65, $P = 0.00$) and the pastor ($n = 41$, MD = 0.95, $P = 0.00$). More discouragement was also reported from church members ($M = 1.49$) than the pastor ($n = 41$, MD = 0.30, $P = 0.02$).

Table 1 Multiple health behavior differences between subgroups based on gender, weight status, and education

Demographic	Weekly moderate-to-vigorous physical activity minutes[a]		Daily sedentary minutes		Daily fruit and vegetable servings	
	n (%)	Mean (SD)	*n* (%)	Mean (SD)	*n* (%)	Mean (SD)
Total sample	40 (98%)	338.0 (275.6)	40 (98%)	291.0 (145.4)	41 (100%)	3.5 (1.9)
Gender						
Females	31 (78%)	306.9 (269.9)	30 (75%)	284.0 (133.6)	31 (76%)	3.6 (1.8)
Males	9 (22%)	445.0 (283.6)	10 (25%)	312.0 (182.9)	10 (24%)	3.3 (2.1)
Age						
18–29 years	11 (31%)	371.8 (311.6)	11 (31%)	349.1 (149.0)	**11 (31%)**	**2.45 (1.6)**
30+ years	25 (69%)	268.0 (191.5)	24 (69%)	277.5 (145.7)	**25 (69%)**	**3.96 (1.7)**
Education						
HS diploma	14 (35%)	253.6 (228.5)	13 (33%)	309.2 (191.1)	14 (34%)	2.93 (1.7)
College degree or more	26 (65%)	383.5 (291.9)	27 (67%)	282.2 (120.90	27 (66%)	3.81 (1.9)
Weight status						
Normal	6 (16%)	334.2 (228.2)	**6 (16%)**	**210.0 (112.2)**	6 (16%)	4.17 (3.1)
Overweight/obese	31 (84%)	358.9 (290.3)	**31 (84%)**	**317.4 (143.0)**	32 (84%)	3.38 (1.6)
Perceived health						
Poor, fair, good	23 (58%)	297.8 (270.5)	22 (55%)	313.6 (145.7)	23 (56%)	3.2 (1.7)
Very good, excellent	17 (42%)	392.4 (281.1)	18 (45%)	263.3 (144.3)	18 (44%)	3.9 (2.0)

SD standard deviation, *HS* high school, Sedentary = daily television and computer minutes

[a]Weekly moderate-to-vigorous activity minutes are reported in the table; however, statistical tests were based on weekly moderate-to-vigorous physical activity IPAQ values. Bold indicates a significant difference ($P < 0.1$)

Physical activity participation support was highest from friends. Participation support from friends was not significantly higher than family, but was significantly higher than support from church members ($n = 41$, MD = 0.94, $P = 0.00$) and the pastor ($n = 41$, MD = 1.21, $P = 0.00$). Participants reported significantly higher participation support from family compared to church members ($n = 41$, MD = 0.64, $P = 0.00$) and the pastor ($n = 41$, MD = 0.91, $P = 0.00$), as well as from church members compared to the pastor ($n = 41$, MD = 0.27, $P = 0.00$). Physical activity reward support was highest from family and significantly higher compared to friends ($n = 41$, MD = 1.25, $P = 0.00$), church members ($n = 41$, MD = 0.24, $P = 0.08$), and the pastor ($n = 41$, MD = 0.52, $P = 0.00$). Reward support from church members ($M = 2.39$) was significantly higher than support from friends ($n = 41$, MD = 1.01, $P = 0.00$) and the pastor ($n = 41$, MD = 0.28, $P = 0.03$). Finally, reward support was significantly higher from the pastor compared to friends ($n = 41$, MD = 0.73, $P = 0.00$).

Table 3 illustrates results of the linear regression analyses, which were used to examine the influence of positive and negative social support from each source on participants' multiple health behaviors. In the unadjusted model, physical activity reward support from family was positively associated with participants' MVPA ($n = 34$, $\beta = 0.41$, $P = 0.08$);

Table 2 Mean and standard deviation of social support by source and category

	Family	Friends	Church members	Pastors	All sources[1]
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Healthy eating encouragement	2.61 $(0.89)_a$	2.54 $(0.89)_a$	1.92 $(0.81)_b$	1.76 $(0.77)_c$	2.21 (0.65)
Healthy eating discouragement	2.32 $(1.00)_a$	2.14 $(0.84)_a$	1.49 $(0.72)_b$	1.19 $(0.41)_c$	1.79 (0.62)
Physical activity participation	2.21 $(0.92)_a$	2.51 $(1.09)_a$	1.57 $(0.70)_b$	1.30 $(0.51)_c$	1.90 (0.62)
Physical activity reward	2.63 $(1.24)_a$	1.38 $(0.56)_b$	2.39 $(1.29)_c$	2.11 $(1.25)_d$	2.13 (0.86)

SD standard deviation

Social support type for each source was reported on a 1 (none) to 5 (very often) point Likert scale

[1]Support type averaged across all sources (family, friends, church members, and pastors)

Any row mean not followed by the same letter was significantly different at $P < 0.10$

however, there were no significant relationships in the adjusted model. For daily sedentary minutes, physical activity participation support from the pastor was significantly influential in the unadjusted model ($n = 35$, $\beta = 0.48$, $P = 0.06$); however, again, there were no significant relationships in the adjusted model. Within the unadjusted model for daily fruit and vegetable serving intake, healthy eating encouragement from friends was significantly associated with participants' fruit and vegetable intake ($n = 36$, $\beta = 0.62$, $P = 0.01$), and physical activity participation support from friends was associated with decreased fruit and vegetable intake ($n = 36$, $\beta = -0.47$, $P = 0.04$). In the adjusted model, physical activity reward support from family was significantly associated with participants' fruit and vegetable intake ($n = 36$, $\beta = 0.41$, $P = 0.08$); participant education level ($\beta = 0.32$, $P = 0.05$) and church location ($\beta = 0.47$, $P = 0.08$) were significant covariates in this model.

Discussion

The purpose of this study was to test potential differences in positive and negative social support for African-Americans' multiple health behaviors across different support sources and to examine the influence of these social support types and sources on participants' multiple health behaviors. For diet, while ratings for healthy eating discouragement were slightly lower than those for encouragement, both were rated on average as occurring infrequently across sources ($M = 1.79$ and $M = 2.21$, respectively). This pattern of support was seen across each social support type, with the highest negative and positive support for healthy eating coming from family followed by friends, church members, and the pastor.

Similar to diet, physical activity participation and reward support were rated on average as occurring infrequently across sources ($M = 1.90$ and $M = 2.13$, respectively); however, support for physical activity did differ by source. Physical activity reward support was highest from family followed by church members, the pastor, and friends. On the other

Table 3 Association of perceived social support with multiple health behaviors

	Weekly MVPA MET		Daily sedentary minutes		Daily fruit/vegetable servings	
	Unadjusted β (P)	Adjusted[1] β (P)	Unadjusted β (P)	Adjusted[1] β (P)	Unadjusted β (P)	Adjusted[1] β (P)
Family						
Healthy eating encouragement	− 0.39 (0.12)	− 0.31 (0.25)	− 0.20 (0.44)	− 0.09 (0.74)	− 0.11 (0.65)	− 0.10 (0.65)
Healthy eating discouragement	0.06 (0.75)	0.18 (0.40)	0.02 (0.92)	0.15 (0.49)	0.04 (0.84)	0.04 (0.80)
Physical activity participation	0.16 (0.41)	0.10 (0.62)	− 0.07 (0.73)	− 0.12 (0.55)	− 0.02 (0.92)	0.02 (0.91)
Physical activity reward	**0.41 (0.08)**	0.21 (0.46)	− 0.02 (0.95)	− 0.22 (0.43)	0.33 (0.14)	**0.41 (0.08)**
Friend						
Healthy eating encouragement	0.07 (0.77)	0.21 (0.47)	− 0.40 (0.10)	− 0.45 (0.15)	**0.62 (0.01)**	0.34 (0.20)
Healthy eating discouragement	− 0.02 (0.93)	− 0.01 (0.97)	0.29 (0.22)	0.32 (0.21)	− 0.25 (0.26)	− 0.14 (0.52)
Physical activity participation	− 0.22 (0.35)	− 0.32 (0.25)	0.17 (0.48)	0.24 (0.41)	**− 0.47 (0.04)**	− 0.09 (0.70)
Physical activity reward	0.38 (0.11)	0.28 (0.25)	− 0.10 (0.67)	− 0.17 (0.50)	0.32 (0.14)	0.31 (0.14)
Church member						
Healthy eating encouragement	0.26 (0.32)	0.31 (0.26)	− 0.15 (0.55)	− 0.11 (0.70)	0.08 (0.76)	0.32 (0.20)
Healthy eating discouragement	0.14 (0.61)	0.30 (0.28)	− 0.62 (0.82)	0.01 (0.98)	0.24 (0.37)	0.09 (0.72)
Physical activity participation	− 0.13 (0.62)	− 0.28 (0.29)	0.40 (0.13)	0.34 (0.23)	− 0.18 (0.49)	− 0.15 (0.52)
Physical activity reward	0.01 (0.96)	− 0.07 (0.75)	− 0.19 (0.33)	− 0.23 (0.28)	0.13 (0.51)	0.10 (0.58)
Pastor						
Healthy eating encouragement	0.11 (0.64)	0.32 (0.22)	− 0.01 (0.98)	0.13 (0.66)	0.19 (0.47)	0.24 (0.34)
Healthy eating discouragement	0.40 (0.14)	0.35 (0.18)	− 0.28 (0.30)	− 0.32 (0.25)	− 0.11 (0.69)	− 0.05 (0.84)
Physical activity participation	− 0.15 (0.54)	− 0.31 (0.23)	**0.48 (0.06)**	0.41 (0.15)	− 0.24 (0.35)	− 0.07 (0.78)
Physical activity reward	0.11 (0.55)	− 0.01 (0.97)	− 0.17 (0.38)	− 0.23 (0.27)	0.11 (0.56)	0.13 (0.47)

MVPA moderate-to-vigorous physical activity, *MET* metabolic equivalents of physical activity; β = standardized beta coefficient; significant values determined at $P < 0.10$ are indicated with bold

[1]Model was adjusted for gender, age, education level, and church location

hand, physical activity participation support was highest from friends followed by family, church members, and the pastor. Among the health behaviors examined, only fruit and vegetable intake was influenced by social support. Interestingly, physical activity reward support from family members demonstrated a cross-behavioral relationship, specifically, having a positive influence on participants' daily fruit and vegetable consumption. The following paragraphs discuss current outcomes in comparison with previous research.

Research shows social support from family members and friends is associated with healthy eating behaviors (Sandersphillips 1994; Stice et al. 2002) and increased physical activity (Hohepa et al. 2007). Family members and friends in this study were ranked the highest in terms of providing social support for healthy eating and physical activity behaviors; yet, overall perceived support was low across sources. Other studies using the same social support scale have reported a mixture of higher (Pope et al. 2011), lower (Webb and Bopp 2017), and similar (Sherwood et al. 2008) scores to this study. Most of these studies used only the scales for physical activity and found small differences between support from family and friends, with family rated as slightly more supportive (Sherwood et al. 2008; Webb and Bopp 2017). One study used the scales for both behaviors and found encouragement for healthy eating was higher from family than friends; however, discouragement for healthy eating was higher from friends than family (Pope et al. 2011). In their study of clergy health, Webb and Bopp included "friends, congregants, and fellow clergy" in the category of friends (Webb and Bopp 2017). Meanwhile, Pope et al. suggested spousal support should be looked at separately from family and friends (Pope et al. 2011). These findings suggest social support is complex, especially when examined across populations, and more complex methods such as social network analysis may be needed to fully understand how support differs across sources.

Family members of current participants received the highest social support score for healthy eating. This finding may be due to food consumption primarily occurring in settings where family members are present (Gillman et al. 2000; Herman 2015; Videon and Manning 2003). Given that African-Americans may have poorer dietary intake compared to other racial populations (Casagrande et al. 2007), incorporating family-centered education and social support in future studies may be beneficial in encouraging healthy eating habits within this population.

In the current study, the lowest scores for social support across sources were observed for pastors and church members with regard to encouraging and discouraging healthy eating. These two sources of social support may be perceived as lower due to individuals only consuming meals within the church on special occasions (i.e., Easter, Christmas), (Rivera et al. 2010). However, previous health promotion studies within African-American churches found that church-based support can be an influential factor in improving healthy eating habits (Campbell et al. 2000, 2004). Hence, churches might be able to provide a positive social support environment for healthy eating, but intervention is required to build upon the potential support present. Previous faith-based interventions have attempted to improve healthy lifestyle behaviors of African-Americans by training church members in diet behavior change strategies (Condrasky et al. 2013; Resnicow et al. 2004; Wilcox et al. 2007, 2013). However, these interventions did not examine specifically whether increasing social support for healthy eating improved study outcomes. Our findings suggest future faith-based studies should incorporate strategies to strengthen support for healthy eating from pastors and church members and examine the impact of these strategies on dietary outcomes.

In addition, interventions aimed at helping pastors provide support for diet and physical activity behavior change are needed. Pastors report receiving little training related to health

during seminary (Bopp et al. 2013), and a qualitative study with 30 AA pastors found only a small number identified themselves as role models in part due to poor dietary behaviors (Harmon et al. 2013). Combined with our findings, these data suggest interventions are needed to train and support pastors in providing support for healthy eating to their congregations and communities.

Current outcomes revealed participation support for physical activity from friends was slightly higher than from family. This finding may be the result of different sources of support being linked to different health-related behaviors (Harmon et al. 2016; Thrasher et al. 2004). Friends in particular are believed to provide support in the form of companionship (Chatters et al. 2002). As a result, friends may be more sought out for physical activities than family members, serving as a stronger source of support.

Physical activity reward support from family members was positively associated with participants' fruit and vegetable intake, which is similar to previous research. For example, studies have demonstrated positive social support from family members serves as a predictor for engaging in healthy eating habits (Steptoe et al. 2004; Tang et al. 2008). Research has also suggested individuals expecting a reward may acquire more motivation to engage in healthy lifestyle changes (Locke and Latham 2002; Munson and Consolvo 2012). This could potentially explain the positive association observed between physical activity reward support provided by family members and fruit and vegetable intake. Previous studies also indicated support for one behavior can cross over and impact other behaviors, especially for physical activity and diet behaviors (Geller et al. 2017; Johnson et al. 2008). How social support in the form or rewards for one behavior has a positive effect on other behaviors should be explored with future studies.

There are some limitations to this study. A majority of study participants were women, and data were collected from two churches in Ohio, limiting generalizations to the larger African-American population. Additionally, the friend physical activity reward subscale was not supported with a previous factor analysis using data collected from white adults (Sallis et al. 1987), which could explain the low support scores observed and the limited associations found in this study. Current data were also self-reported, which may introduce bias, including those related to recall and social desirability (Hebert et al. 1995).

Despite limitations, this study adds to the literature on social support. The current study is one of few to examine both positive and negative support for diet and physical activity behaviors, as well as examine church-related sources of social support. Past studies examining the associations between social support and health behaviors among African-Americans have primarily focused on positive social support (Martin and McCaughtry 2008; Peterson and Cheng 2011). When both negative and positive social supports have been examined, the focus has primarily been on support provided by family members and friends (Stolley et al. 2009; Tang et al. 2008). Our study adds to this literature by including both pastors and church members and examining social support for multiple health behaviors. This study adds to the literature, but additional research is needed with larger populations to better understand both the positive and negative sides of social support and the role of the church in supporting healthy eating and physical activity behaviors in diverse populations. Such studies may also allow for a better understanding of our ability to enhance the support provided from sources outside of family and friends.

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