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Correlates of Dietary Intake Among Men Involved in the MAN for Health Study

Guadalupe X. Ayala, PhD, MPH, India Ornelas MPH, Scott D. Rhodes, MPH, PhD, James W. Amell, PhD, Janice M. Dodds, EdD, RN, Elvira Mebane, Earl Horton, BS, Jaime Montano, Janelle Armstrong-Brown, MPH, and Eugenia Eng, MPH, DrPH

San Diego State University, Graduate School of Public Health, Center for Behavioral and Community Health Studies, San Diego, California (GXA); the Department of Health Behavior and Health Education (IO, JWA, JA-B, EE) and Department of Nutrition (JMD), University of North Carolina at Chapel Hill, Chapel Hill, North Carolina; Section on Society and Health, Department of Social Sciences and Health Policy, Division of Public Health Sciences, Maya Angelou Research Center on Minority Health, and Section on Infectious Diseases, Department of Internal Medicine, Medical Center Boulevard, Wake Forest University Health Sciences, Winston-Salem, North Carolina (SDR); Orange County Health Department, United Voices of Efland, Hillsborough, North Carolina (EM); Strengthening The Black Family, Inc., Raleigh, North Carolina (EH); Chatham Social Health Council, Pittsboro, North Carolina (JM).

Abstract

The clustering of diet and other lifestyle behaviors and their psychosocial correlates were examined among 455 Latino and African American men in the U.S. Southeast. Men were recruited by male community health workers and surveys were self-administered in a group format. Latino men were younger, less educated, and more likely to be employed than African American men and reported a lower household income and larger household size. Fruit and vegetable consumption was associated with physical activity ($p < .001$). A more positive attitude toward health was associated with meeting vegetable dietary guidelines ($p < .05$) and consuming fast food less frequently ($p < .01$). Active coping was associated with meeting fruit and vegetable dietary guidelines ($p < .01$ and $p < .001$, respectively), and avoidant coping was associated with greater fast-food consumption ($p < .001$). Latino fast-food consumption was associated with binge drinking ($p < .001$). This research provides evidence for tailoring dietary intervention for men of color.

Keywords

diet; physical activity; coping styles; Latino men; African American men

Introduction

Dietary intake is an important target for health promotion and clinical prevention efforts, given its association with chronic disease (U.S. Department of Agriculture [USDA], 2005) and weight management in the United States (Rolls, Ello-Martin, & Tohill, 2004). *Healthy People 2010* objectives seek to increase the percentage of individuals who consume at least 2 fruits per day and at least 3 vegetables per day to 75% and 50%, respectively (U.S.

Department of Health and Human Services, 2000). Recently released nationally representative data suggest that less than one third of men meet dietary guidelines for fruit consumption, and less than a quarter meet dietary guidelines for vegetable consumption (Centers for Disease Control and Prevention [CDC], 2006). Evidence suggests that there are important racial and ethnic differences in dietary consumption; for example, Hispanic/Latino men in the United States consume more fruits than non-Hispanic men (CDC, 2006). Understanding these differences in dietary consumption is critical to reducing racial and ethnic disparities, given that men of color are at increased risk for chronic conditions, such as cancer and cardiovascular disease (American Cancer Society, 2006; National Center for Health Statistics, 2007).

Concurrent with inadequate fruit and vegetable consumption is overconsumption of away-from-home foods. Research from the USDA estimates that between 1985 and 2000 daily per capita energy consumption increased by 12% or 300 calories per day (Putnam, Allshouse, & Kantor, 2002), attributable in part to more frequent consumption of away-from-home foods. Away-from-home foods are generally defined as “full meals and single ready-to-eat items (including takeaway foods) purchased at restaurants, prepared-food counters at grocery stores, and other outlets” (USDA, 2006, p. 5). Fast-food restaurants are the most common source of away-from-home foods (National Research Association, 2008). In 1999 to 2000, 41% of U.S. adults reported eating away-from-home foods at least weekly (Kant & Graubard, 2004), and 25% of adults reported eating fast food at least daily (Bowman, Gortmaker, Ebbeling, Pereira, & Ludwig, 2004). Frequent consumption of fast food is associated with poorer diet quality and risk for obesity (Bowman & Vinyard, 2004).

Previous studies have examined two categories of influences on dietary intake: other lifestyle behaviors and psychosocial factors. National and international data support the clustering or co-occurrence of health behaviors (Burke et al., 1997; Poortinga, 2007; Pronk et al., 2004; Rosal et al., 2001; Schuit, van Loon, Tijhuis, & Ocke, 2002). In other words, health behaviors appear to occur in combination with other lifestyle behaviors and are not randomly distributed across the population. There is also evidence that this clustering of health behaviors is more common among low socioeconomic groups (Pronk et al., 2004; Schuit et al., 2002). Researchers have argued that this clustering may have a synergistic effect on health (Poortinga, 2007). This clustering has led researchers to consider the implementation of interventions targeting multiple health behaviors simultaneously or sequentially (Glasgow, Goldstein, Ockene, & Pronk, 2004; Hyman, Pavlik, Taylor, Goodrick, & Moye, 2007; Prochaska, Velicer, Prochaska, Delucchi, & Hall, 2006). However, a necessary step in this process is to examine the clustering of health behaviors in diverse populations, including the extent to which racial/ethnic groups may differ on this dimension.

Research examining psychosocial correlates of dietary intake has primarily focused on constructs derived from well-known health behavior theories such as Social Cognitive Theory (Anderson, Winett, & Wojcik, 2000) and the Health Belief Model (Petrovici & Ritson, 2006). For example, attitudes and beliefs about dietary intake were associated with fruit and vegetable intake (Resnicow et al., 2000). In a sample of 291 African American men, greater perceived benefits of fruits and social norms promoting fruit consumption were associated with greater fruit consumption (Moser, Green, Weber, & Doyle, 2005). Fewer barriers and more extrinsic rewards were associated with greater vegetable consumption (Moser et al., 2005), although this finding has not been confirmed in other studies (Satia & Galanko, 2007; Trudeau, Kristal, Li, & Patterson, 1998). These studies have helped inform the development and implementation of behavioral interventions targeting these mediators of change. Nevertheless, Baranowski and colleagues have argued that only 30% of the variance is explained using these traditional psychosocial constructs (Baranowski, Cullen,

Nicklas, Thompson, & Baranowski, 2003). Novel constructs such as interest in health-related matters are also related to dietary intake, yet few studies have assessed the extent to which they motivate African American and Latino men's dietary behaviors (Satia & Galanko, 2007; Trudeau et al., 1998).

The association between eating and stress has received substantial attention in the research literature. In a review on the emotional influences of food choices, Gibson (2006) identified several mechanisms by which stress affects eating, including the physiological sensation of calmness after consuming certain foods and quantities of food. The extent to which other types of coping strategies are associated with dietary intake is a relatively understudied area in diverse populations. Coping strategies are cognitions and behaviors that individuals use to manage stress (Folkman & Lazarus, 1980). Those with an active coping style use strategies that are characterized by taking a problem on directly, whereas those with an avoidant coping style use strategies to evade, distract, or selectively ignore sources of stress. Active coping is associated with positive mental and physical health outcomes (Karlsen & Nazroo, 2006; Marion & Schover, 2006), whereas the opposite is true for avoidant coping (Moos & Schaefer, 1993). Only a few studies have examined the influence of these types of coping strategies on dietary behaviors, and of those, none have included African American and Latino men (Saklofske, Austin, Galloway, & Davidson, 2007; van Loon, Tijhuis, Surtees, & Ormel, 2001).

The present study builds on previous research by examining the clustering of men's other lifestyle behaviors with dietary intake as well as the extent to which several relatively understudied constructs were associated with dietary intake. The other lifestyle behaviors of interest in this study were physical activity, binge drinking, smoking, and television watching. It was hypothesized that a less healthy diet would be related to low levels of physical activity and more television watching. Psychosocial correlates of interest included masculinity (i.e., machismo), men's attitude toward health, and coping strategies (active and avoidant). The first two psychosocial constructs attempted to capture gender stereotypes and gender norms that are associated with less involvement and interest among men in food-related decisions (Levi, Chan, & Pence, 2006; Shannon, Story, Fulkerson, & French, 2002). Thus, it was hypothesized that a more masculine attitude and less interest in health would be associated with less healthy dietary intake. Examining coping strategies may help explain the extent to which men respond to stressful life experiences with other healthy or unhealthy behaviors. Here, it was hypothesized that less active coping and more avoidant coping would be associated with less healthy dietary intake. Importantly, data were gathered from both African American and Latino¹ men living in the Southeastern United States, a region characterized by significant obesity. Our findings provide needed evidence for future health promotion and clinical prevention efforts to reduce the burden of health disparities prevalent in this region of the United States and among men living in the United States who share their profile.

Methods

Sample and Study Design

This is a cross-sectional study using baseline data collected from men involved in the Men as Navigators for Health (MAN for Health) and HoMBReS studies (Hombres Manteniendo Bienestar y Relaciones Saludables), two CDC-funded community-based participatory research (CBPR) studies to evaluate a male community health worker intervention. The

¹We note that although the classification Hispanic/Latino comprises a broad spectrum of individuals, countries of origin, and cultural meanings and perspectives, the participants in this study chose to identify themselves by the term *Latino*.

long-term goal of the MAN for Health study was to improve chronic disease and sexual health outcomes among African American and Latino men living in three counties in North Carolina. HoMBReS complemented this study by adding a delayed treatment comparison group to the Latino site. At each site, men were recruited to become community health workers (navigators) and trained to recruit and provide health information to up to 12 men in their social network (confidants). Given role differences between navigators and confidants (e.g., navigators were identified based on their health-promoting lifestyles), analyses were limited to confidants and the Latino men in the delayed treatment control condition.

Recruitment

Baseline data collection occurred between the summers of 2005 and 2006. The baseline survey data represented 182 African American confidants, 139 Latino confidants, and 134 Latino men in the HoMBReS comparison group. Participants for the comparison group were recruited by the site's project coordinator. Confidants were recruited by the navigators at the two intervention sites through existing social networks and at community events. To be eligible for participation in this study, the men had to (a) self-identify as African American or Latino/Hispanic; (b) be 18 years of age or older; (c) be literate in Spanish or English; and (d) provide written informed consent. No differences were observed between confidants and men in the comparison group on this study's variables.

Procedures

Surveys were self-administered, though in a group setting, and required 30 to 60 minutes to complete, depending in part on whether a participant responded affirmatively to a question that required responses to additional related questions (e.g., if the participant reported condom use, he was asked additional questions on the behavior). In some instances, the survey was read aloud by either a navigator or a project coordinator to the entire group to facilitate administration, though confidants continued to fill in their own responses on the survey form. Navigators and project coordinators were trained on data collection procedures and research ethics prior to data collection. Each participant received \$5 for completing the baseline survey. The study protocol was approved by the University of North Carolina Public Health Institutional Review Board.

Measures

Development of the MAN for Health survey was iterative and consisted of identifying existing scales and developing new scales to measure agreed on determinants and outcomes. A team led by the evaluation coordinator (first author) met with representatives of community research partners from each site to (a) identify relevant determinants and outcomes; (b) appropriately operationalize these determinants and outcomes; (c) present existing scales to assess congruence with local operationalizations; and (d) review the final scales before pilot-testing. Concurrently, the evaluation coordinator worked with the academic partners to identify existing scales with adequate psychometric properties and construct new scales to measure determinants that were not available in the scientific literature (e.g., men's attitudes toward health). The ultimate goal of this process was to engage all research partners in creating a survey that was relevant to men in all three communities to allow comparisons across sites, yet concise enough to ensure completion by navigators and confidants. Prior to data collection, the survey was pilot-tested with community advisory group members in each site and modifications made before the survey was translated into Spanish using standard procedures (Brislin, 1970).

Outcome variables—dietary intake—The outcome variables for the study were fruit, vegetable, and fast-food consumption. Fruit consumption was measured as the number of

times the participant ate fruits, including juice, in a typical day. Vegetable consumption was measured as the number of times the participant ate vegetables in a typical day, including juice but not French fries. Response options for both questions ranged from 0 to 10 or more. The men were classified as meeting dietary guidelines if they reported consuming fruits at least twice a day and if they reported consuming vegetables at least three times per day (USDA, 2005). Fast-food consumption was measured as the number of times in a typical week the men ate food from a fast-food restaurant. Response options ranged from 0 to 15, and this variable was retained on a continuous scale given no preexisting dietary guidelines for fast-food consumption.

Correlates—lifestyle behaviors—Several lifestyle behaviors were measured, including cigarette smoking, binge drinking, television watching, and physical activity. To allow comparison with state and national data, items measuring cigarette smoking, binge drinking, and physical activity were derived from the CDC Behavioral Risk Factor Surveillance Survey (CDC, 2005; Shea, Stein, Lantigua, & Basch, 1991). Smoking was assessed with two questions that measured whether the men currently smoked daily, occasionally, or not at all. Men were classified as current smokers if they reported smoking daily or occasionally. Binge drinking was assessed as the number of times during the past 30 days the men consumed five or more drinks on any one occasion. This item was retained on a continuous scale. TV watching was assessed as the number of hours the men watched TV during a typical day and was also retained on a continuous scale. Physical activity was assessed by asking whether the men participated in any physical activity in the past month, excluding work activity. Activities listed as examples included running, calisthenics, basketball, soccer, gardening, and walking for exercise.

Correlates—psychosocial variables—Several psychosocial variables were measured as correlates of dietary intake, including masculinity, men's attitudes toward health, and active and avoidant coping styles (see Table 1 for sample items). Masculinity was assessed using a 10-item scale with four response options ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). The items were drawn from existing scales measuring male honor and machismo (Cuellar, Arnold, & Gonzalez, 1995; Neff, Prohida, & Hoppe, 1991). A scale score was calculated based on the mean of the individual items, with a higher score denoting stronger traditional gender roles (Cronbach's $\alpha = .72$). Men's attitude toward health was measured with an 11-item scale developed within the context of this study and used a similar 4-point response scale. An overall mean score was calculated with a higher score, suggesting that health was more personally relevant (Cronbach's $\alpha = .81$). Coping styles were assessed with a 22-item scale (Billings & Moos, 1981). Response options were *not like me*, *somewhat like me*, and *a lot like me*. Items on the coping styles scale were used to classify the men on two dimensions: active coping strategies (13 items, $\alpha = .87$) and avoidant coping strategies (6 items, $\alpha = .75$). Three other coping items were deleted because they failed to load on either active or avoidant coping strategies. Mean scores were computed such that higher scores indicated a higher likelihood of using that particular coping style.

Demographic and sociocultural covariates—Demographic variables used in the analyses included age, household size, marital status, education, employment status, household income, and country of origin. Age in years and household size were measured and retained on continuous scales. Marital status, education, and employment were measured on categorical scales and dichotomized as follows: married/ living as married versus not married; high school educated/GED versus less than a high school education; and employed versus unemployed. The men were asked to indicate whether their annual household income fell into 1 of 10 categories ranging from \$10,000 or less to \$58,000 or

more. Country of origin was assessed using one open-ended question and then categorized as U.S.-born, Mexico-born, or other foreign-born.

Data Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) software, version 13.0 for Windows. Descriptive statistics were used to characterize the sample on demographic and dietary variables. The bivariate relationships between meeting fruit and vegetable dietary guidelines and the following four health behaviors were examined: Chi-square tests were used to examine the association with any physical activity in the past month and current smoker; *t* tests were used to examine the association with frequency of binge drinking in the past month and hours of television watched per day. Similar analyses were conducted to examine the relationship between frequency of fast-food consumption and each of the four health behaviors. Two logistic regression analyses were conducted to examine psychosocial correlates of meeting dietary guidelines. A multiple linear regression analysis examined the relationship between psychosocial correlates and frequency of consuming fast food. All analyses controlled for age, hours worked per week, household size, and country of origin. For all analyses, alpha levels of .05 indicated statistical significance.

Results

Demographic Characteristics and Dietary Intake

Latino and African American men differed on a number of demographic variables (see Table 2). Latino men in the sample were younger (29.06 vs. 44.15 years) and less likely to have completed a high school education or GED equivalent compared with African American men (40% versus 94%, respectively). Latino men lived on less household income, and their household income supported more family members in comparison to African American men. This was despite the fact that a greater percentage of Latino men indicated that they were employed as compared with African American men (76% vs. 64%). Of the men who were employed, both Latino and African American men reported working on average more than 40 hours a week. Equivalent percentages of Latino and African American men were married or living as married (56% overall).

Resident and cultural differences in the sample are reflected in where men were born. Nearly all African American men (98%) were born in the United States compared with only 3% of the Latino men. The majority of Latino men (70%) in the sample were born in Mexico, and the median number of years they reported living in the United States was 8 years.

Latino men and African American men also differed on dietary intake (see Table 3). A higher percentage of Latino men indicated that they met dietary guidelines for fruits compared with African American men (72% vs. 55%). On average, Latino men reported consuming 2½ fruits per day, whereas African American men reported 2 fruits per day. In contrast, similar percentages of Latino and African American men (29% and 26%, respectively) met dietary guidelines for vegetables. Specifically, Latino and African American men reported eating, on average, just more than 2 servings of vegetables per day, which is below the recommended guideline of three vegetable servings per day. Reported consumption of fast food occurred nearly three times per week among African American men as compared with twice a week among Latino men. More than 40% of the African American men reported eating fast food three times a week or more, as compared with 30% of the Latino men.

Clustering of Dietary Intake and Other Lifestyle Behaviors

Meeting dietary guidelines for fruits and vegetables—Meeting guidelines for vegetable consumption was significantly associated with physical activity (92% vs. 8%; $\chi^2 = 13.51$, $p < .001$). In addition, men who met dietary guidelines for vegetables reported significantly more frequent binge drinking episodes in the past month than men who did not meet guidelines (mean binge drinking episodes seven times versus four times; $p < .01$). Two variables approached significance in terms of a relationship with meeting dietary guidelines for vegetables: Men who met dietary guidelines for vegetables were less likely to smoke (42% vs. 58%; $p = .10$) and reported watching 1 hour less of television per day ($p = .10$). In contrast, meeting guidelines for fruit consumption was only associated with physical activity (86% vs. 14%; $\chi^2 = 12.77$, $p < .001$). These findings differed, however, when each ethnic subgroup was examined separately. What contributed to the overall results was observed differences between Latino men who met dietary guidelines and those who did not. Latino men who met dietary guidelines for fruits and vegetables were more likely to be physically active (see Figure 1; $p < .001$). Latino men who met dietary guidelines for vegetables binge drank more often than men who did not (mean binge drinking episodes six versus four times in the past month; $p = .05$). Among African American men, the only statistically significant relationship was between meeting guidelines for vegetables and physical activity (see Figure 1; $p = .05$). No relationship was observed between meeting guidelines for fruit and physical activity among African American men.

Fast-food consumption—In terms of fast-food consumption, the only significant relationship observed was a positive association between frequency of fast-food consumption and binge drinking episodes ($r = .22$, $p < .001$). When the analyses were limited to the Latino men, the observed relationship between fast-food consumption and binge drinking remained significant ($r = .23$, $p < .001$). In addition, a significant relationship was observed for Latino men between their fast-food consumption and physical activity (see Figure 1; $p = .05$), such that Latino men who consumed fast food more frequently did not engage in physical activity in the past month. This relationship was not observed among African American men.

Dietary Intake and Psychosocial Correlates

The three psychosocial variables examined in this study were masculinity, men's attitude toward health, and active and avoidant coping styles. Masculinity was not associated with fruit and vegetable dietary intake or fast-food consumption. Hence, the findings reported are limited to the observed relationships between men's attitude toward health, coping styles, and dietary intake.

Meeting dietary guidelines for fruits and vegetables—Models 1 and 2 in Table 4 present logistic regression analyses examining the odds associated with meeting fruit and vegetable guidelines among African American and Latino men. Analyses controlled for several demographic correlates of meeting dietary guidelines (age, hours worked, household size, and country of origin), given differences observed at baseline. Specifically, those who met dietary guidelines were younger (mean age 34 vs. 37 years; $p = .01$), worked fewer hours (mean hours per week 42 vs. 46; $p = .05$), lived in smaller households (3 people vs. 4; $p < .001$), and were more likely to have been born in Mexico (47%) rather than in the United States (35%) or another country (18%; $p < .001$). Results from Model 1 identify that men who meet fruit dietary guidelines were twice as likely to engage in active coping strategies as compared with those who did not meet fruit dietary guidelines. With regard to meeting vegetable dietary guidelines, Model 2 identifies that the odds of meeting vegetable dietary guidelines were nearly two times greater among men who had a more positive attitude toward their health and who were more likely to use active coping strategies.

Fast-food consumption—Model 3 presents ordinary least squares regression results for frequency of fast-food intake. Fast-food analyses were adjusted for significant demographic covariates based on bivariate results: age ($p = .001$), education, and country of origin. Those with a high school education ate fast food almost three times per week compared with two times per week among those without a high school education ($p = .001$). Similarly, men born in the United States reported consuming fast food more frequently than men born in Mexico ($p = .05$). Similar to results for meeting vegetable dietary guidelines, men who had more positive attitudes toward health consumed fast food less frequently in comparison to men with less favorable attitudes toward health ($\beta = -.14$; $p = .01$). Moreover, men who were more likely to engage in avoidant coping strategies consumed fast food more frequently than men who were less likely to engage in these strategies ($\beta = .18$; $p = .001$).

Discussion

Dietary intake is an important area of public health research, given its association with obesity and chronic disease (Drewnowski, 2007; Key et al., 2004). The current study sought to examine the clustering of dietary intake with other lifestyle behaviors as well as psychosocial correlates of dietary intake to inform future intervention programming for racial and ethnic minority men. The dietary variables of interest in this study were fruit and vegetable intake (specifically the extent to which men met dietary guidelines) and frequency of fast-food consumption. Results from the current study indicate that despite disparities in meeting dietary guidelines, this sample of men is doing somewhat better than a nationally representative sample of ethnically diverse men in which only 36% and 22% of the men met dietary guidelines for fruit and vegetable consumption, respectively (CDC, 2006). Similar to the present study, higher consumption of fruit was observed among Hispanics/Latinos as compared with non-Hispanics/Latinos (CDC, 2006). Frequency of fast-food consumption was relatively high, although consistent with reports from large national trials, placing these men at greater risk for obesity (Duffey, Gordon-Larsen, Jacobs, Williams, & Popkin, 2007; McCrory et al., 1999).

Results examining the clustering of health behaviors identified several well-established relationships as well as novel relationships. Being physically active in the past month was associated with meeting dietary guidelines for fruits among Latino men only and with meeting dietary guidelines for vegetables among both Latino and African American men. In a previous study, the combined prevalence of meeting physical activity guidelines and consuming five fruits and vegetables per day was 11.2% among African American men and 11.7% among Latino men (CDC, 2007). Although a direct comparison is not possible given differences in data collection methods, these findings support previous evidence for the clustering of these health behaviors among racially/ethnically diverse men in the Southeastern United States. Similarly, previous research indicates that usual/frequent fast-food consumption is associated with physical inactivity among African American men (Satia, Galanko, & Siega-Riz, 2004). This same relationship was only observed among the Latino men.

The observed associations between active coping styles and meeting fruit and vegetable guidelines as well as between avoidant coping styles and fast-food consumption represent important contributions to the literature on diet and coping. Our findings are consistent with the few studies that have previously assessed these relationships as well as studies linking active coping with more positive health outcomes and avoidant coping with negative health outcomes (van Loon et al., 2001). Similar to the concept of clustering of health behaviors, it is possible that men's dietary intake and coping strategies also cluster or co-occur, with men characterized as using more active coping strategies also selecting to engage in healthier dietary behaviors, whereas men characterized as using more avoidant coping strategies

selecting to consume more fast food. However, it is possible that men who have more positive coping resources at their disposal, may have more resources to support a healthier diet.

The observed relationship between men's attitude toward health and dietary intake is conceptually equivalent to findings demonstrating a relationship between autonomous/intrinsic motivation and consumption of fruits and vegetables. Autonomously or intrinsically motivated individuals are more likely to adhere to health behaviors than extrinsically or externally controlled individuals. Similarly, previous men's health research suggests that medical vulnerabilities and older age are associated with a greater awareness of the importance of healthy eating and of dietary change (Gough & Conner, 2006).

Consistent with a previous study (Roos, Prattala, & Koski, 2001), masculinity was not associated with meeting dietary guidelines for fruits and vegetables. However, especially surprising was the lack of association between masculinity and fast-food consumption given previous findings demonstrating an association between masculinity and other health risk behaviors (Courtenay, 2000; Gough, 2007). This finding may be because of limitations in measurement.

Limitations

Despite the important and novel findings observed in this study, interpretation and application of study findings should consider the study's limitations. First, a more rigorous assessment of diet would involve the use of a 24-hour dietary recall (Coulston, Rock, & Monsen, 2001). Food frequency questionnaires tend to underestimate dietary intake. Using 24-hour dietary recalls for dietary data collection was beyond the scope of this study, given our interest in measuring multiple health behaviors and keeping total survey completion time to a minimum. Our selection of Behavioral Risk Factor Surveillance System items to measure diet was further supported by our interest in assessing the generalizability of the study sample. Second, this study did not collect traditional psychosocial correlates of healthy eating such as self-efficacy for eating a healthy diet, outcome expectations associated with eating a healthy diet, and the benefits and barriers to eating a healthy diet. These constructs were considered during the survey item selection process but were dropped, given an interest in minimizing respondent burden and focusing on more global social determinants. Minimizing respondent burden was also the reason additional measures examining culturally ascribed attitudes were not examined (e.g., fatalism, health locus of control). These variables may have shed light on additional potential differences between African American and Latino men. Differences in the modifiability of more behaviorally specific antecedents versus the types of social determinants considered here are not yet known. Third, although this study controlled for hours worked per week, occupation status was not obtained from the participants—a factor that has been associated with dietary intake among men (Roos et al., 2001). The wide range in median household income suggests that types of occupation may have varied widely and yet are not reflected in our findings. Fourth, this study collected data primarily in a group setting. In a few cases, data were collected by having the survey read aloud to the men given their literacy levels in English or Spanish. Although not widespread and the respondents still filled in the survey on their own, this difference in modality of assessment may have introduced some response biases. This mode of administration was not tracked at the participant level; thus, we cannot evaluate the potential influence of this modality difference. Fifth, this study is cross-sectional in nature, and thus, causality cannot be inferred. Finally, this study reported no association between masculinity and dietary intake or fast-food consumption. Although the measure of masculinity was drawn from existing scales measuring *male honor* and *machismo* that demonstrated an internal consistency of $\alpha = .72$, it is possible that the scale did not

adequately capture the meaning of masculinity among these African American and Latino men.

Implications

Results from the current study as well as those from previous studies suggest that health promotion efforts tailored to men of color are sorely needed. African American men in the U.S. Southeast have the shortest life expectancy and highest mortality rate from cardiovascular disease of all groups in the United States. An important step for this population would include interventions that combine skill building in active coping and motivational interviewing to promote positive attitudes toward health, with context-sensitive options or meeting dietary guidelines for both fruits and vegetables and reducing consumption of fast food. For Latino men in the U.S. Southeast and other recently arrived immigrant men, interventions are needed that combine skill building in active coping and motivational interviewing to promote positive attitudes toward health with culturally relevant options for increasing vegetable consumption, decreasing fast-food consumption, and avoiding contexts that promote binge drinking (e.g., social events).

Recommendations such as these require an ecological view of behavior, which holds that the functioning of an individual is mediated by a behavior–environment interaction. This concept of reciprocal determinism suggests that the environment controls or sets limits on the behaviors that are likely to occur and that changing psychosocial and environmental variables results in the modification of behavior (Bandura, 1986). The inference is that public health initiatives can achieve their best results by changing environmental controls (e.g., economic, social, and cultural constraints) that impede engagement in healthy behaviors. The reciprocal side of this equation, however, holds that the behavior of individuals, groups, and organizations also influences their environments. This is the basis for actions to enable the empowerment of men of color by allowing them greater control over the determinants of their health, whether these are behavioral, psychosocial, or environmental. In taking greater control themselves, rather than depending on health professionals to exercise the control for them, men of color should be better able to adjust their behaviors to changing environmental conditions or to adjust their environments to changing behavioral conditions.

To eliminate disparities in health outcomes among men of color, focus is warranted on the following: culturally appropriate interventions with community involvement at all stages; more comprehensive data on gender, race, and ethnicity to properly characterize and monitor trends in health disparities; and addressing social determinants of health outcomes. The academic and community investigators for this study have a 15-year history of conducting CBPR together. We used a CBPR approach to build on the strengths and resources within these communities and the university, involving academic and community partners in all aspects of research, including study design, implementation, analysis, and dissemination. Our premise is that research planned and controlled with African American and Latino men will promote not only personal mastery and health-related behavior change but will also build and account for the strength of men's relationships to work collectively to improve their quality of life (Green & Kreuter, 1991).

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References

- American Cancer Society. [July 14, 2007] Cancer facts and figures for Hispanics/Latinos 2006-2008: American Cancer Society. 2006. from http://www.cancer.org/docroot/STT/STT_0.asp
- Anderson ES, Winett RA, Wojcik JR. Social-cognitive determinants of nutrition behavior among supermarket food shoppers: A structural equation analysis. *Health Psychology*. 2000; 19:479–486. [PubMed: 11007156]
- Bandura, A. Social foundations of thought and action. A social cognitive theory. Prentice Hall; Englewood Cliffs, NJ: 1986.
- Baranowski T, Cullen KW, Nicklas T, Thompson D, Baranowski J. Are current health behavioral change models helpful in guiding prevention of weight gain efforts? *Obesity Research*. 2003; 11(Suppl.):23S–43S. [PubMed: 14569036]
- Billings AG, Moos RH. The role of coping responses and social resources in attenuating the stress of life events. *Journal of Behavioral Medicine*. 1981; 4:139–157. [PubMed: 7321033]
- Bowman SA, Gortmaker SL, Ebbeling CB, Pereira MA, Ludwig DS. Effects of fast-food consumption on energy intake and diet quality among children in a national household survey. *Pediatrics*. 2004; 113:112–118. [PubMed: 14702458]
- Bowman SA, Vinyard BT. Fast food consumption of U.S. adults: Impact on energy and nutrient intakes and overweight status. *Journal of the American College of Nutrition*. 2004; 23:63–68. [PubMed: 14963055]
- Brislin RW. Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*. 1970; 1:185–216.
- Burke V, Milligan RAK, Beilin LJ, Dunbar D, Spencer M, Balde E, et al. Clustering of health-related behaviors among 18-year-old Australians. *Preventive Medicine*. 1997; 26:724–733. [PubMed: 9327483]
- Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System survey questionnaire. Author; Atlanta, GA: 2005.
- Centers for Disease Control and Prevention. Fruit and vegetable consumption among adults—United States, 2005. *Morbidity and Mortality Weekly Report*. 2006; 56:213–217.
- Centers for Disease Control and Prevention. Prevalence of fruit and vegetable consumption and physical activity by race/ethnicity—U.S. 2005. *Morbidity and Mortality Weekly Report*. 2007; 56:301–304. [PubMed: 17410082]
- Coulston, AM.; Rock, CL.; Monsen, ER. Nutrition in the prevention and treatment of disease. Academic Press; San Diego, CA: 2001.
- Courtenay W. Constructions of masculinity and their influence on men's well-being: A theory of gender and health. *Social Science and Medicine*. 2000; 50:1385–1401. [PubMed: 10741575]
- Cuellar I, Arnold B, Gonzalez G. Cognitive referents of acculturation: Assessment of cultural constructs in Mexican Americans. *Journal of Community Psychology*. 1995; 23:339–356.
- Drewnowski A. The real contribution of added sugars and fats to obesity. *Epidemiology Review*. 2007; 29:160–171.
- Duffey KJ, Gordon-Larsen P, Jacobs DR Jr, Williams OD, Popkin BM. Differential associations of fast food and restaurant food consumption with 3-year change in body mass index: The Coronary Artery Risk Development in Young Adults Study. *American Journal of Clinical Nutrition*. 2007; 85:201–208. [PubMed: 17209197]
- Folkman S, Lazarus RS. An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior*. 1980; 21:219–239. [PubMed: 7410799]
- Gibson EL. Emotional influences on food choice: Sensory, physiological, and psychological pathways. *Physiology & Behavior*. 2006; 89:53–61. [PubMed: 16545403]
- Glasgow RE, Goldstein MG, Ockene JK, Pronk NP. Translating what we have learned into practice. Principles and hypotheses for interventions addressing multiple behaviors in primary care. *American Journal of Preventive Medicine*. 2004; 27(Suppl. 2):88–101. [PubMed: 15275677]

- Gough B. "Real men don't diet": An analysis of contemporary newspaper representations of men, food and health. *Social Science & Medicine*. 2007; 64:326–337. [PubMed: 17070972]
- Gough B, Conner MT. Barriers to healthy eating amongst men: A qualitative analysis. *Social Science & Medicine*. 2006; 62:387–395. [PubMed: 16011867]
- Green, LW.; Kreuter, MW. *Health promotion planning: An educational and environmental approach*. 2nd ed.. Mayfield Publishing; Palo Alto, CA: 1991.
- Hyman DJ, Pavlik VN, Taylor WC, Goodrick GK, Moye L. Simultaneous vs sequential counseling for multiple behavior change. *Archives of Internal Medicine*. 2007; 167:1152–1158. [PubMed: 17563023]
- Kant AK, Graubard BI. Eating out in America, 1987-2000: Trends and nutritional correlates. *Preventive Medicine*. 2004; 38:243–249. [PubMed: 14715218]
- Karlsen, S.; Nazroo, JY. Measuring and analyzing "race," racism and racial discrimination.. In: Oakes, JM.; Kaufman, JS., editors. *Methods in social epidemiology*. Jossey-Bass; San Francisco: 2006. p. 86-111.
- Key TJ, Schatzkin A, Willett WC, Allen NE, Spencer EA, Travis RC. Diet, nutrition and the prevention of cancer. *Public Health Nutrition*. 2004; 7(1A):187–200. [PubMed: 14972060]
- Levi A, Chan KK, Pence D. Real men do not read labels: The effects of masculinity and involvement on college students' food decisions. *Journal of the American College of Health*. 2006; 55:91–98.
- Marion M, Schover L. Behavioral science and the task of resolving health disparities in cancer. *Journal of Cancer Education*. 2006; 21:S80–S86. [PubMed: 17020507]
- McCrary MA, Fuss PJ, Hays NP, Vinken AG, Greenberg AS, Roberts SB. Overeating in America: Association between restaurant food consumption and body fatness in healthy adult men and women ages 19 to 80. *Obesity Research*. 1999; 7:564–571. [PubMed: 10574515]
- Moos, BS.; Schaefer, JA. Coping resources and processes: Current concepts and measures.. In: Goldberg, L.; Breznitz, S., editors. *Handbook of stress: Theoretical and clinical aspects*. Free Press; New York: 1993. p. 234-257.
- Moser RP, Green V, Weber D, Doyle C. Psychosocial correlates of fruit and vegetable consumption among 518 African American men. *Journal of Nutrition Education and Behavior*. 2005; 37:306–314. [PubMed: 16242062]
- National Center for Health Statistics. *United States, 2007 with chartbook on trends in the health of Americans*. Author; Hyattsville, MD: 2007.
- National Research Association. *Restaurant industry pocket factbook*. National Restaurant Association; Washington, DC: 2008. from http://www.restaurant.org/store/showdetl.cfm?User_ID=735012&St=3065&St2=90961475&St3=59439830&DS_ID=2&Product_ID=772&DID=12 [April 4, 2008]
- Neff JA, Prohida T, Hoppe SK. Machismo, self-esteem, education and high maximum drinking among Anglo, Black and Mexican-American male drinkers. *Journal of Studies on Alcohol*. 1991; 52:458–463. [PubMed: 1943101]
- Petrovici D, Ritson C. Factors influencing consumer dietary health preventative behaviours. *BMC Public Health*. 2006; 6(1):222. [PubMed: 16948839]
- Poortinga W. The prevalence and clustering of four major lifestyle risk factors in an English adult population. *Preventive Medicine*. 2007; 44:124–128. [PubMed: 17157369]
- Prochaska JJ, Velicer WF, Prochaska JO, Delucchi K, Hall SM. Comparing intervention outcomes in smokers treated for single versus multiple behavioral risks. *Health Psychology*. 2006; 25:380–388. [PubMed: 16719610]
- Pronk NP, Anderson LH, Crain AL, Martinson BC, O'Connor PJ, Sherwood NE, et al. Meeting recommendations for multiple healthy lifestyle factors. *American Journal of Preventive Medicine*. 2004; 27(2 Suppl.):25–33. [PubMed: 15275671]
- Putnam J, Allshouse J, Kantor LS. U.S. per capita food supply trends: More calories, refined carbohydrates, and fats. *Food Review*. 2002; 25:2–15.
- Resnicow K, Wallace DC, Jackson A, Digirolamo A, Odom E, Wang T, et al. Dietary change through African American churches: Baseline results and program description of the Eat for Life Trial. *Journal of Cancer Education*. 2000; 15:156–163. [PubMed: 11019764]

- Rolls BJ, Ello-Martin JA, Tohill BC. What can intervention studies tell us about the relationship between fruit and vegetable consumption and weight management? *Nutrition Review*. 2004; 62:1–17.
- Roos G, Prattala R, Koski K. Men, masculinity and food: Interviews with Finnish carpenters and engineers. *Appetite*. 2001; 37:47–56. [PubMed: 11562157]
- Rosal MC, Ockene JK, Ma Y, Hebert JR, Merriam PA, Matthews CE, et al. Behavioral risk factors among members of a health maintenance organization. *Preventive Medicine*. 2001; 33:586–594. [PubMed: 11716654]
- Saklofske D, Austin EJ, Galloway J, Davidson K. Individual difference correlates of health-related behaviours: Preliminary evidence for links between emotional intelligence and coping. *Personality and Individual Differences*. 2007; 42:491–502.
- Satia JA, Galanko JA. Intrinsic and extrinsic motivations for healthful dietary change in African Americans. *American Journal of Health Behavior*. 2007; 31:643–656. [PubMed: 17691877]
- Satia JA, Galanko JA, Siega-Riz AM. Eating at fast-food restaurants is associated with dietary intake, demographic, psychosocial and behavioural factors among African Americans in North Carolina. *Public Health Nutrition*. 2004; 7:1089–1096. [PubMed: 15548348]
- Schuit AJ, van Loon AJM, Tijhuis M, Ocke MC. Clustering of lifestyle risk factors in a general adult population. *Preventive Medicine*. 2002; 35:219–224. [PubMed: 12202063]
- Shannon C, Story M, Fulkerson J, French S. Factors in the school cafeteria influencing food choices by high school students. *Journal of School Health*. 2002; 72:229–234. [PubMed: 12212407]
- Shea S, Stein AD, Lantigua R, Basch CE. Reliability of the behavioral risk factor survey in a triethnic population. *American Journal of Epidemiology*. 1991; 133:489–500. [PubMed: 2000859]
- Trudeau E, Kristal AR, Li SUE, Patterson RE. Demographic and psychosocial predictors of fruit and vegetable intakes differ: Implications for dietary interventions. *Journal of the American Dietetic Association*. 1998; 98:1412–1417. [PubMed: 9850109]
- U.S. Department of Agriculture. *Dietary guidelines for Americans*. 6th ed.. U.S. Government Printing Office, U.S. Department of Health and Human Services; Washington, DC: 2005.
- U.S. Department of Agriculture. *The Keystone Forum on Away-from-Home Foods: Opportunities for preventing weight gain and obesity*. The Keystone Center; Washington, DC: 2006. from <http://www.keystone.org/spp/documents> [April 4, 2008]
- U.S. Department of Health and Human Services. *Healthy people 2010*. Author; Washington, DC: 2000. from <http://www.health.gov/healthypeople> [April 4, 2008]
- van Loon AJ, Tijhuis M, Surtees P, Ormel J. Personality and coping: Their relationship with lifestyle risk factors for cancer. *Personality and Individual Differences*. 2001; 31:541–553.

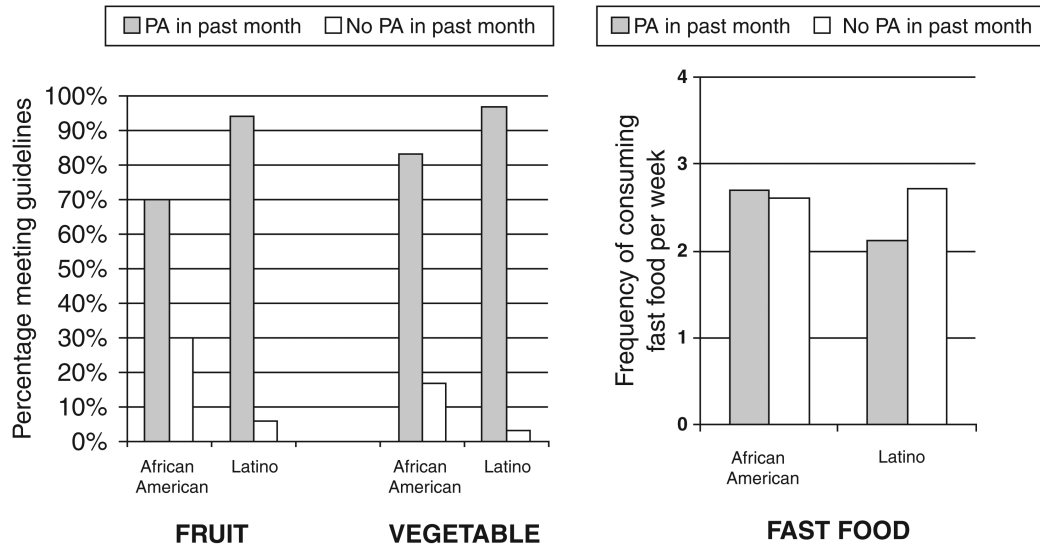


Figure 1. The relationship between physical activity (PA) in the past month and fruit, vegetable, and fast-food intake among African American and Latino men.

Table 1**Sample Psychosocial Items and Internal Consistency Analysis Results**

Masculinity ($\alpha = .72$)

It is important for a man to be strong

It is better for a man to give orders than to take orders

It is important for a man to be respected by others

Men's attitude toward health ($\alpha = .81$)

Men should only seek health care as a last resort

Men should leave decisions about their health to the women in their life

A man should be able to deal with his health problems on his own

Coping styles—Active ($\alpha = .87$)

I would take things one step at a time

I would pray for guidance or strength

I would talk with a professional person (e.g., doctor, clergy, lawyer) about the situation

Coping styles—Avoidant ($\alpha = .75$)

I would try to reduce the tension by smoking more

I would get busy with other things to keep my mind off the problem

I would keep my feelings to myself

Table 2
Demographic Characteristics of the Men Overall and Differences Between African American and Latino Men

	Total Sample N = 455	African American n = 182	Latino n = 273	Significance	Missing
Mean age (<i>SD</i>), years	35.17 (12.77)	44.15 (13.04)	29.06 (8.15)	.001	13
Percentage married or living as married	56% (248)	53% (95)	58% (153)	n.s.	11
Percentage completed high school or GED	62% (276)	94% (170)	40% (106)	.001	9
Percentage employed	71% (313)	64% (112)	76% (201)	<.01	15
Mean hours work per week (<i>SD</i>)	44 (15)	45 (17)	43 (13)	n.s.	21
Median household income range	\$16,000-\$22,000	\$34,000-\$40,000	\$16,000-\$22,000	.001	27
Median household [HH] size	4	3	5	.001	14
Median number of adults in HH	2	2	3		19
Median number of children in HH	1	1	2		31
Country of birth				.001	20
Percentage born in the United States	41% (176)	98% (169)	3% (7)		
Percentage born in Mexico	42% (183)	0% (0)	70% (183)		
Median years in the United States	n/a	n/a	8.00		25

Note: *SD*, standard deviation.

Table 3

Men's Dietary Intake

	Total Sample N = 455	African American n = 182	Latino n = 273	Significance	Missing
Percentage of men who meet dietary guidelines					
Fruits at least two times per day	65% (295)	55% (100)	72% (195)	<.001	3
Vegetables at least three times per day	28% (125)	26% (47)	29% (78)	n.s.	3
Characteristic dietary intake					
Mean (SD) number of times per day men consume					
Fruit	2.55 (1.71)	2.08 (1.66)	2.53 (1.73)	<.01	3
Vegetables	2.09 (1.61)	2.16 (1.46)	2.04 (1.70)	n.s.	3
Mean (SD) number of times per week men consume					
Fast food	2.39 (2.10)	2.69 (2.43)	2.19 (1.83)	<.05	3

Note: SD, standard deviation.

Table 4

Psychosocial Correlates of Men's Dietary Behaviors

	Model 1		Model 2		Model 3	
	Meeting Guidelines for Fruit ^{a,b}		Meeting Guidelines for Vegetables ^{a,c}		Frequency of Fast-Food Intake ^d	
	OR	95% CI	OR	95% CI	β	Significance
Masculinity ^e	0.93	0.54-1.6	1.2	.67-2.1	.02	n.s.
Men's attitude toward health ^e	1.0	0.59-1.8	1.9	1.1-3.4	-.14	.01
Coping strategies ^f						
Active	2.1	1.2-3.8	2.4	1.3-4.6	-.07	n.s.
Avoidant	.71	.36-1.4	1.2	.62-2.5	.18	<.001

Note: OR, odds ratio; CI, confidence interval.

^aMultivariate analyses controlled for age, hours worked per week, household size, and country of origin.

^b $\chi^2 = 17.02, p < .05$.

^c $\chi^2 = 16.47, p < .06$.

^dMultivariate analyses controlled for age, completion of high school education, and country of origin; $F = 5.90, p < .001$.

^eResponse options ranged from 1 = strongly disagree to 4 = strongly agree, with a higher score representing stronger traditional gender norms and more positive attitudes toward health.

^fResponse options ranged from 1 = not like me to 3 = a lot like me, with a higher score representing stronger endorsement of that coping style.