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Informal and Formal Social Integration Shape Eating and Drinking of Older Black and White Americans

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Abstract

Objectives: Health behaviors are seen as one possible pathway linking race to health outcomes. Social integration has also been consistently linked to important health outcomes but has not been examined as a mechanism accounting for racial differences in health behaviors among older U.S. adults.

Method: We use data from the American's Changing Lives (ACL) Study to explore racial differences in measures of social integration and whether they help account for racial differences in several dietary behaviors and alcohol use.

Results: We find differences by race and social integration measures in dietary behaviors and alcohol use. Net of socioeconomic status, health status, and reported discrimination, variation in social integration helps to account for racial differences in some health behaviors.

Discussion: Our results highlight the nuanced role of social integration in understanding group differences in health behaviors. Interventions should consider such complexities when including aspects of social integration in their design.

Keywords

Inequality; diet; health behaviors; marriage; employment; race

Introduction

Racial and ethnic disparities in many serious chronic health conditions, such as diabetes, hypertension, liver cirrhosis, and coronary heart disease (Benjamin et al., 2018; Scaglione et al., 2015) are pervasive and resilient (Phelan & Link, 2015; Williams & Sternthal, 2010). Health behaviors that contribute to differences in chronic disease, including diet and alcohol use (Bryant & Kim, 2019; Hiza, Casavale, Guenther, & Davis, 2013), are often targeted for intervention in addressing disparities (Bowen & Beresford, 2002; Crook et al., 2009; Marteau, Hollands, & Fletcher, 2012). However, racial differences in dietary and drinking behaviors are complex: Black Americans are less likely to report diets that meet minimum recommendations for fruit, vegetable, grain, and dairy consumption (Hiza et al., 2013) and report consuming more fried foods (Bahr, 2007), but also report less alcohol consumption

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than White Americans (Bryant & Kim, 2019). These complexities in racial differences in health behaviors and their social determinants deserve further attention.

Differences in these behaviors are in some cases consistent with the greater social hazards faced by Black Americans, including lower average socioeconomic status, residential segregation in communities with fewer resources for healthy lifestyles and greater hazards, and exposure to racial discrimination. Fundamental cause theory suggests that higher socioeconomic status (SES) increases access to material resources ideal for producing health and hastens access to information about health risks, strategies, and treatments (Phelan, Link, & Tehranifar, 2010). For example, Beydoun and Wang (2008) find that nutritional knowledge and income both contributed to the likelihood of meeting nutritional guidelines for fruit and vegetable consumption and overall diet quality among a sample of US adults. This makes SES a “fundamental cause” of health, and of health disparities, when elements of SES including education and income are unequally distributed. Further, because systemic racism leads to SES disparities between Black and White individuals, it also acts as fundamental cause of racial disparities in health (Phelan & Link, 2015). For example, residential segregation influences health behaviors indirectly through its impact on SES and directly through decreased number and quality of recreational facilities, fewer supermarkets, and increased exposure to advertising for tobacco and alcohol products (Williams & Collins, 2001).

While socioeconomic status and structural racism are indeed critical determinants, controlling for these factors does not fully account for racial differences in health behaviors. For example, racial differences in dietary practices persisted among adults in California, even after controlling for education and income as core measures of SES (Bahr, 2007). In this analysis, we explore the less examined role of formal and informal social integration in shaping these complex racial differences in dietary and drinking behaviors among older Black and White U.S. adults. Formal and informal social integration are less studied but important aspects of Black and White Americans’ social and cultural lives that shape the ways they eat and drink (Airhihenbuwa et al., 1996; Bahr, 2007; Devine, 2005; Devine, Sobal, Bisogni, & Connors, 1999).

Prior theory and research suggest that aspects of social integration including informal social interactions, employment, marriage, and participation in formal social organizations like church could shape health behaviors (Umberson & Montez, 2010). Considerable research has demonstrated that social relationships and social networks, such as those built with friends and family at home, work, church, and in other spaces, are important for health (Berkman & Glass, 2000; Cornwell & Waite, 2009; Umberson, Crosnoe, & Reczek, 2010). We examine four aspects of social integration (marriage, employment, church attendance, and informal social contact) that vary in prevalence among racial groups (Chatters, Taylor, Bullard, & Jackson, 2009; Seitz, 2009; Taylor, Chatters, Woodward, & Brown, 2013), and which have been linked to health behaviors (Conklin et al., 2014; Devine, Connors, Sobal, & Bisogni, 2003; Schlundt et al., 2008).

Informal social contact—often measured with indicators of visiting, phoning, or writing to friends or family—may encourage positive health behaviors, including maintaining a

healthy diet or exercising, and help individuals cope with stress, thereby reducing negative health behaviors such as smoking or excessive drinking (Berkman & Glass, 2000). Indeed, greater informal social contact is shown to be associated with better diet quality and fruit and vegetable consumption (Conklin et al., 2014; Sahyoun & Zhang, 2004). However, the influence of informal social contact may not be universally positive; socially connected individuals may also share or transmit poorer eating or drinking patterns between social network ties (Pachucki, Jacques, & Christakis, 2011).

Formal social integration including employment, marriage, and church attendance are also important sources of social relationships and integration, and shape other influences on behavior, such as time use. Working for pay increases social integration with extra-familial networks, but also makes demands on time that could affect dietary practices. Flood and Moen (2015) found that employment was largely associated with less time spent in meal preparation among men and women ages 55 to 74. Stressful working conditions are also linked to higher drinking (Dobson, Ibrahim, Gilbert-Ouimet, Mustard, & Smith, 2018). However, in a qualitative study, some respondents described work relationships as having positive spillovers onto food choices, such as increasing efforts to eat healthy food around colleagues or sharing meal ideas (Devine et al., 2003). Consequently, employment involves multiple underlying mechanisms and the influence of employment may vary across different health behaviors.

Marriage has been more clearly linked to lower risk when considering health behaviors (Tucker, 2002; Umberson, 1992), as spouses may remind, encourage, or cajole partners to eat better or drink less. Marriage has been associated with more healthful eating and transitions out of marriage with negative dietary changes (Conklin et al., 2014; Eng, Kawachi, Fitzmaurice, & Rimm, 2005; Lee et al., 2005).

Religious service attendance has also been studied as an indicator of social control that could lead to less risky health behaviors. In a 2004 study of Texas adults, religious attendance was associated with a variety of healthy behaviors, such as never smoking, moderate drinking, and higher levels of physical activity and multivitamin use (Hill, Burdette, Ellison, & Musick, 2006), though level of attendance was not associated with the likelihood of sound diet quality in that sample. Another regional study of adults in Nashville, TN, showed overall religious involvement was positively associated with healthy eating behaviors (Schlundt et al., 2008).

This review of the literature reveals some gaps in understanding of differences in dietary practices and the role of social integration, which shape our research questions and contribution. First, how does social integration influence dietary behavior and alcohol use in a nationally representative sample of middle and older-aged US adults, net of socioeconomic status and other important predictors? Second, does variation in social integration help to account for racial differences in health behaviors among middle and older-aged Black and White Americans? We use nationally-representative data from the American's Changing Lives (ACL) Study to examine consumption of fruits and vegetables, red meat, olive oil, whole grains, and fried foods, and engagement in daily drinking. The ACL asks respondents about a series of healthful dietary practices and has detailed measures of both formal and

informal social integration, which other national surveys do not include. The ACL survey also allows us to control for important mediators and confounders, including health status, measures of socioeconomic status, and experiences of discrimination.

Methods

Data

The American's Changing Lives (ACL) study began in 1986 with a national face-to-face survey of 3617 adults ages 25 and up in the continental U.S., with African Americans and people aged 60 and older over-sampled at twice the rate of the others. Face-to-face re-interviews were conducted in 1989 with 83% (n=2867) of survivors, and survivors since 1989 have been re-interviewed by telephone, and where necessary face-to-face, in 1994 (83%), 2001/02 (74%), and 2011/12 (81%). Our analytic sample draws from the 1,427 respondents interviewed in 2011/12, the wave in which dietary questions were asked for the first time. Respondents were age 50 and older in 2011. We did not include interviews conducted with a proxy respondent (about 100 cases) as questions about diet were not asked, and we limited the sample to non-Hispanic White and non-Hispanic Black respondents, because the number reporting other race or ethnic identities was too small to consider separately. We also dropped a very small number of respondents missing values on any covariate, but preserved all possible cases for each outcome, bringing the final analytic sample to 1300–1302, depending on the health behavior.

Measures

To measure dietary behaviors, respondents were asked how many servings of fruit or vegetables they usually eat in a day (five or more, 3–4, 1–2, or no servings), and how many days in a week (almost every day, most days, some days, and rarely or never) they ate fried foods, olive oil, whole grain breads and cereals, and red meat (i.e., beef or pork or products made from them, such as hamburgers, hot dogs, bacon or sausages). Dietary items were coded so that higher values represent conventionally less healthful levels (less fruits and vegetables, olive oil, or whole grains and more red meat or fried foods). Respondents reported how many wine, beer, or liquor drinks they consume each month, and we dichotomized this indicator into categories of 30 or more per month versus less than 30 per month.

To capture social integration in 2011, we used an index of informal integration, a dichotomous measure of whether respondents report that they have a confidant, and measures of formal integration in the forms of employment status, marital status, and church attendance. Informal integration is measured with an index of three items that asked how often the respondent talks on the phone, writes or emails, and gets together with friends, neighbors, or relatives ($\alpha = .41$). Employment status distinguishes respondents in paid employment (employed, or unemployed but seeking employment) from others. In models not shown, we included a measure of volunteering to consider participation in unpaid work but it did not alter the results reported here. Marital status distinguishes those currently married or in a marriage-like relationship from others. Respondents were asked how often they attend religious services – never, less than once a month, about once a month, 2–3 times

a month, once a week, or more than once a week – and we consider attendance as a linear specification of this measure.

Comparisons were drawn by race, included as a dichotomous indicator (Non-Hispanic White or Non-Hispanic African American). We adjusted for gender (female or male) and age in 2011 in all multivariable models to address differences in employment likelihood and income changes after retirement.

As SES is an important factor in racial differences in health behaviors, we adjust for measures of educational attainment at baseline (less than 12 years, 12 years, 13–15 years, or 16 or more years), and household income in 2011 (less than 15K, 15K-29999, 30K-59999, 60K-99999, or 100K or more dollars). In models not shown, we also included measures of financial strain, but this did not alter the results reported here.

Because health risk behaviors may further serve as coping mechanisms in response to discriminatory treatment and have been associated with lower diet quality among adolescents and young adults (Brodish et al., 2011), we also adjust for measures of perceived discrimination. We used a scale of three items measuring everyday discrimination that asked how often (never, less than once a year, a few times a year, or a few times a month or more) the respondent has received poorer service than other people at restaurants or stores, has been treated with less courtesy or respect than other people, or has felt that people acted as if they think the respondent was not smart ($\alpha = .70$). Racism also impacts health behaviors through residential segregation and exposure to differential built environments. In models not shown, we also considered the potential influence of the community food environment by linking each respondent's record to a zip-code level measure of number of fast food establishments per 10,000 residents and census tract level measures of supermarket access, but neither altered the findings presented here.

We also adjust for health status, which on some measures differs on average for Black and White Americans, as researchers have noted that health problems influence the ability of individuals to begin or adhere to healthy behavior change recommendations, such as regular physical activity (Margolis, 2013; Piette & Kerr, 2006). Depressive symptoms have also been linked with Healthy Eating Index scores (Beydoun et al., 2009). Our health measures include a 9-item count of chronic conditions in the last 12 months (arthritis, cancer, diabetes, fractured or broken bones, heart attack, hypertension, lung disease, stroke, or uncontrolled urine loss), a measure of depressive symptoms derived from an eleven-item version of the Center for Epidemiological Studies Depression Scale (CES-D), and a measure of freedom from functional limitations which draws on several questions about respondents' abilities to complete activities of daily living (a score of 1 represents confinement to a bed or chair and a score of 4 denotes the ability to do heavy work inside or outside of the home).

Analytic Approach

We calculated the prevalence of our outcome measures in relation to our explanatory factors of interest: marriage, employment status, church attendance, and informal integration, first in unadjusted bivariate and then fully adjusted ordered logistic (dietary) or linear probability (drinking) models. We also compared the prevalence of each dietary or drinking behavior for

non-Hispanic Black and White respondents, and calculated Pearson chi-square tests of the significance of between-group differences. Next, we examined racial differences in predicted dietary and drinking behaviors, before and after controlling for measures of social integration. For comparing racial differences, the first multivariable model adjusts for age, gender, measures of health status and SES, and perceived discrimination. The second model further adjusts for measures of social integration. Appendix A shows that measures of dietary practices are correlated with one another, but not highly so, motivating separate models for each. We present average marginal effects (AMEs) for racial differences and the influence on these of adjustment for social integration and other factors, because coefficients should not be compared across nested logistic models (Mood, 2010). Appendix B shows that the correlations between measures of social integration are not excessive, allowing their joint inclusion in multivariable regressions. Non-Hispanic White respondents are the referent category in the multivariable models. All analyses use survey weights for the 2011 interview wave that adjust for the original sample design and loss to follow up, and we used survey estimation procedures in Stata 13SE to adjust for the complex sampling design.

Results

Descriptive statistics are presented in Table 1. There were racial differences in our dependent variables, control variables, and measures of social integration, except for red meat consumption, age, and whether the respondent did not report having a confidant.

Does social integration influence dietary behavior and alcohol use, net of socioeconomic status and other important predictors?

Table 2 summarizes the direction of significant associations of the focal social integration indicators and each dietary or alcohol behavior. These results are based on ordered logistic regression models for dietary outcomes and linear probability models for daily drinking. Results for Model 1 show the unadjusted bivariate association between the social integration measure and each health behavior and the Model 2 further controls for all demographic, socioeconomic, health and other social integration variables. Full adjusted results for social integration measures are shown in Appendix C. Many of the results for the adjusted model are consistent with expectations that increased social integration would be associated with healthier behaviors. Informal integration and church attendance are associated with a lower likelihood of low fruit and vegetable consumption. Church attendance is also associated with lower likelihood of low whole grains consumption and drinking daily. Having a confidant, higher levels of informal integration, and being married are associated with a lower likelihood of low olive oil consumption. Being employed is associated with a lower likelihood of high red meat consumption.

However, we also find some less healthful associations between social integration and dietary and drinking behaviors. Having a confidant is associated with increased likelihood of daily drinking, and being married is associated with higher risk of high red meat consumption. Employment is also associated with a higher risk of low whole grains consumption. These less positive associations between health behaviors and social integration may be due to an increased likelihood of going out to socialize, cooking more

traditional “meat-centric” meals when eating with a partner, and less time to prepare meals and healthy snacks among those working.

Does variation in social integration help to account for racial differences in health behaviors among middle and older-aged Black and White Americans?

Figure 1 displays the percentage of respondents reporting each level of the focal outcomes by race, showing that there are meaningful differences. The stars indicate that White Americans reported more healthful outcomes on all dietary practices except red meat consumption (difference significant at $p < .10$) and daily drinking, for which Black Americans showed healthier behaviors.

In Table 3, we present average marginal effects from two regression models which help answer our second research question; Model 3 includes race and all our control variables (SES, health status, and discrimination) and Model 4 is the fully adjusted model, including measures of social integration (identical to Model 2 in Table 2). The first column for each outcome (M3) shows the average marginal effect and standard error estimate associated with the indicator for African American race, adjusted for all our control variables. The second column for each outcome (M4) shows whether and how these adjusted differences between Black and White respondents change after further adjustment for social integration. Stars next to the AME indicate a statistically significant difference between Black and White respondents for that value of a given outcome. When adjusting for measures of social integration results in a change in the difference between Black and White respondents for a given outcome, we refer to the associations presented in Table 1 and Table 2 and to comment on these shifts.

The first set of models in Table 3 show significant differences between Black and White respondents across all levels of reported fruit and vegetable consumption, net of our control variables including age, gender, SES, perceived discrimination and health status. For example, Black respondents were about 4% less likely than White respondents to report consuming 5+ servings of fruits and vegetables, and 4% less likely to report consuming 3–4 servings. Black respondents were 7% more likely to report consuming 1–2 servings and 1% more likely to report consuming no servings of fruits and vegetables when compared to White respondents. After adjusting for measures of social integration, we see little further change in these race differences.

Table 3 also shows that Black respondents reported less consumption across all levels of olive oil consumption except for the category “some days” in the control adjusted model (M3). In the latter model (M4), after adjustment for social integration measures, there are no significant differences between White and Black respondents. As shown in Table 2, informal integration and marriage are positively associated with olive oil consumption and higher rates of both were reported by White respondents, suggesting that controlling for these factors likely decreased the marginal differences between Black and White respondents.

Black respondents were significantly less likely than White respondents to report whole grain consumption almost or every day and more likely to report consuming it some days or rarely/never. After adjusting for differences in social integration, Black respondents are 10%

less likely to report consuming whole grains almost or every day and 5% and 4% more likely to report consuming whole grains some days and rarely or never, respectively.

Results of Model 3 for fried food consumption shows Black respondents were 9% less likely than White respondents to report rarely or never eating fried foods, and 5%, 2%, and 2% more likely than White respondents to report eating fried foods some, most, and almost or every day, respectively. After further adjustment for social integration measures in Model 4, the magnitude of these differences between Black and White respondents decreased slightly across all levels of consumption.

After accounting for differences in age, gender, SES, perceived discrimination and health, Black respondents were about 8% more likely than White respondents to report rarely or never consuming red meat, 4% less likely to report consuming it most days, and 4% less likely to report consuming it almost or every day. Adjustment for social integration measures led to decreases in these marginal differences. Lower rates of marriage among Black respondents (as shown in Table 1) and the positive association of marriage with greater red meat consumption may have contributed to this decrease. The final set of models in Table 3 shows that Black respondents are 4% less likely than their White counterparts to report averaging daily drinking or more after accounting for differences in age, gender, SES, perceived discrimination, and health status. Adjustment for social integration measures, likely church attendance, reduced the difference to a non-significant value close to zero.

Discussion

This study examined the influence of social integration on dietary and drinking practices in a nationally-representative sample of non-Hispanic White and Black U.S. adults over 50, considering informal integration, the presence of a confidant, marital and employment statuses, and church attendance. We also explored whether variation in these forms of social integration could help to explain the pattern of racial differences in reported consumption of fruits and vegetables, red meat, olive oil, whole grains, fried foods, or alcohol use. While considerable previous research has demonstrated the importance of social integration to health outcomes (Umberson & Montez, 2010), less has examined social integration as a predictor of eating and drinking practices and to our knowledge, none has examined how social integration may help to account for racial differences in diet and alcohol use.

We found significant reported differences in these dietary practices by race in this sample of older Americans that were consistent with those found in past studies. Net of age and gender, Black respondents were more likely than their White counterparts to report lower fruit and vegetable consumption, higher fried food consumption, lower olive oil use, and lower whole grains consumption, while they were less likely to report higher red meat consumption or drinking 30+ drinks. These results are largely consistent with previous findings from studies of somewhat similar dietary practices in Californian adults in the 1990s, U.S. adults in 2003–04, and older adults in Alabama in 2004 (Bahr, 2007; Hiza et al., 2013; Hsiao et al., 2013), but extend to a nationally-representative sample of older adults over 50 in 2011. Racial differences in alcohol use are also consistent with previous research (Bryant & Kim, 2019).

This study contributed by exploring whether these racial differences in food and drink behaviors could be a function of racial differences in social integration. We found that at least one measure of social integration was a significant independent predictor for each health behavior, and further, differences in social integration helped to account for the racial difference in some. For example, greater levels of informal integration and church attendance were significant predictors of higher fruit and vegetable consumption and being married, having a confidant, and higher levels of informal integration were predictive of higher olive oil use. Further, accounting for measures of integration appeared to reduce racial differences in reported olive oil use, red meat and fried food consumption, and daily drinking.

Past studies have demonstrated a health-protective association between social integration and health behaviors, one that this is particularly evident for marriage (Conklin et al., 2014; Margolis, 2013), and our results generally add further support. However, we also found that being married was associated with higher likelihood of eating red meat almost every or every day. Couples' eating patterns are generally shared (Pachucki et al., 2011) and traditional gender roles around preparing and sharing meals may encourage married men and women to consume more meat (Nakagawa & Hart, 2019). Efforts to eat more healthfully may also be limited by a spouse's commitment to change. One study of middle aged and older adults found that smoking cessation among married individuals was worse if their partner was a smoker or had relapsed after attempting to quit (Margolis & Wright, 2016).

We also note employment had a complex relationship with health behaviors; it was associated with lower red meat consumption, but also lower whole grains consumption. This is likely reflective of the multifaceted ways in which employment may influence both social eating as well as time and financial resources (Devine et al., 2003; Flood & Moen, 2015). While there are many positive benefits of marriage and other forms of social integration, not all effects are necessarily positive, suggesting the need for nuanced future studies.

For a few dietary practices, racial differences persisted after adjusting for the indicators of sociodemographic characteristics, health, discriminatory treatment and social integration used here. Bahr (2007) and others (Airhihenbuwa et al., 1996; James, 2004) suggest that cultural differences may account for some of the racial difference in dietary practices, and cultural factors should be included in future studies. Families share a food heritage based on ethnic, national, or religious meals, recipes, or cooking traditions, and some evidence indicates these factors may contribute to differences in fruit and vegetable consumption, for example (Bahr, 2007). Such traditions may interact with social integration mechanisms as well; Devine and colleagues (1999) reported that individuals often described how spousal and family preferences and beliefs influenced their preparation of ethnic foods and use of specific cooking methods.

Our findings show that racial differences in reported health behaviors do not follow a single pattern, much as we and others find variation in the way different groups show healthier or less healthful behaviors across different aspects of diet and substance use. They also suggest that the extent to which racial differences in social integration may account for racial

disparities in health behaviors and outcomes is not simple. Interventions on particular dietary or alcohol behaviors should consider such complexities when including aspects of social integration in their design.

Limitations

These findings should be interpreted in light of some important limitations. Our sample of Black men in particular may be affected by selective mortality; the ACL sample was nationally representative in 1986 but there has been greater attrition of Black men in the four subsequent waves as compared to the other race-by-gender groups. Though we use survey weights that adjust for attrition due to mortality and other reasons, future studies should use larger samples to address this issue. In models not shown but available on request, we did not find multiplicative interaction between race and gender, but future studies with larger samples should be sensitive to possible intersectional identity specific patterns. Another limitation is the potential for inadequate measurement of financial resources, or their differential benefit for health among white and Black Americans. Ongoing research shows lesser returns of income to health for Black Americans (Assari 2018). Although we did test some measures of the food environment in models not shown, there remains a possibility that purchasing power at the same level of income may vary in ways that differentiate the diets of white and Black Americans, based on the quality and cost of foods available in their communities (Andreyeva et al. 2008; Chung and Myers 1999).

Additionally, while our dietary measures were designed to capture generally accepted healthy eating practices, they were self-reported measures of usual behaviors, and not designed to capture overall energy or nutrient consumption. However, these measures capture easily understood food choices and dietary practices that have been linked with morbidity and mortality, including decreased all-cause mortality risk and cardiovascular incidents (Aune et al., 2017; Etemadi et al., 2017; Hartz et al., 2018; Martínez-González, et al., 2014; Zong et al, 2016). Finally, we only explore differences among Non-Hispanic Black and Non-Hispanic White older adults. Further studies with more diverse samples of older adults are needed. Specifically, social integration may be important for understanding how dietary practices are influenced by acculturation among recent U.S. arrivals of Latinx or Asian American heritage and their communities, as acculturation has been associated with unfavorable dietary changes (Montez & Eschbach, 2008).

Limitations aside, this study has many strengths. We examined a variety of dietary practices and health behaviors, from standard food and consumption behaviors such as eating fruits and vegetables and alcohol use, to food preparation-focused practices such as frying foods or using olive oil. This broad view allowed us to test whether social integration had associations with some or all of these varying behaviors, and to show that racial differences are not consistent across different health behaviors, and not equally explained by accounting for patterns of social integration. Studying a variety of dietary practices individually provides different insights as compared with the healthy diet indexes used in other studies, because those may mask how distinctive dietary practices may be influenced differently by various social identities and mechanisms. Enhanced understanding of the social determinants of eating and drinking, and the way these contribute to social group

inequalities therein, could point toward pathways for addressing socially-structured differences in health behaviors and health outcomes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure I. Dietary Practices of Older US Adults (50+), Bivariate Analyses ^{a, b}^a N = 1300 (fruits/ vegetables, olive oil); 1302 (whole grains, fried foods, red meat, drinking)^b * p<.05 in Pearson chi-square tests for significance

Dependent and Independent Variable Descriptives, By Race, in Older US Adults (50+)^{a, b}

Fruits and Vegetables ^c	5+ Servings	15.2%	8.6%	15.8%	Has No Confidant	12.2%	11.8%	12.2%						
	3-4 Servings	43.7	38.4	44.2	Employed	51.8%	44.7%	52.6%						
	1-2 Servings	38.2	47.9	37.2	Married	64.3%	43.6%	66.4%						
	None	2.9	5.1	2.7	Informal Integration Score	3.60	4.16	*						
	Almost Everyday	21.9%	14.7%	22.7%	Church Attendance Score	4.00	3.10	*						
Olive Oil ^c	Most Days	12.7	10.6	13.0	Age in 2011	Less than HS	13.3%	26.2%	63.2					
	Some Days	31.5	33.8	31.2										
	Rarely/ Never	33.9	41.0	33.2										
	Almost Everyday	46.0%	39.0%	46.7%						Education	HS	32.7	29.9	33.0
	Most Days	18.9	15.8	19.2							Some College	28.4	32.8	28.0
Whole Grains	Some Days	25.1	28.7	24.8	BA or More	25.5	11.2	27.0						
	Rarely/ Never	10.0	16.6	9.3	<15K	9.6%	22.1%	8.3%						
	Rarely/ Never	52.6%	36.4%	54.3%	Household Income	15K-29999K	14.4	22.5	13.6					
	Some Days	37.3	50.9	35.9		30K-59999K	10.8	14.6	10.4					
	Most Days	4.9	8.1	4.5		60K-99999K	39.9	29.9	40.9					
Almost Everyday	5.2	4.7	5.2	100K+		25.3	11.0	26.8						
Fried Foods	Rarely/ Never	20.4%	27.4%	19.6%	Chronic Conditions Count	1.65	1.35	*						
	Some Days	51.3	48.7	51.6	Depression CESD Score	1.50	1.36	*						
	Most Days	16.4	13.2	16.7	Functional Limitations Score	1.80	1.44	*						
	Almost Everyday	12.0	10.8	12.1	Everyday Discrimination Score	1.94	1.69	*						
	< 30 Drinks/ mo	85.1%	92.4%	84.4%	Drinking	30+ Drinks/ mo	7.6	15.6						
30+ Drinks/ mo	14.9	7.6	15.6											

 $a_N = 1302$ ^b * p<.05 $\tilde{N} = 1300$

Table II.

Direction of Effects of Social Integration Measures on Dietary and Drinking Practices in Older US Adults (50+), Bivariate and Fully-Adjusted Models^{a, b, c}

	Has No Confidant		Married		Employed		Informal Integ.		Church Attend.	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Fruit/ Veg	5+ Servings	-	+				+	+	+	+
	3-4 Servings		+				+	+	+	+
	1-2 Servings	+	-				-	-	-	-
	None		-				-	-	-	-
Olive Oil	Almost Everyday	-	+	+			+	+		
	Most Days	-	+	+			+	+		
	Some Days									
	Rarely/ Never	+	-	-			-	-		
Whole Grains	Almost Everyday		+		-				+	+
	Most Days		-		+				-	-
	Some Days		-		+				-	-
	Rarely/ Never		-		+				-	-
Fried Foods	Rarely/ Never				+		+			
	Some Days				-		-			
	Most Days				-		-			
	Almost Everyday				-		-			
Red Meat	Rarely/ Never		-		+					
	Some Days									
	Most Days		+	+	-					
	Almost Everyday		+	+	-					
Drinking	30+ drinks/mo.	-	-		+				-	-

^aN = 1300 (fruits/ vegetables, olive oil); 1302 (whole grains, fried food, red meat, drinking)

^bFor each outcome, Model 1 is a bivariate ordered logistic (linear probability for drinking) model; Model 2 is a fully-adjusted model including race, age, gender, SES, health status, discrimination, and all social integration measures.

^cOnly effects for which $p < .05$ are shown

Table III.

Marginal Differences (Average Marginal Effects) in Dietary Practices between Black and White US Adults (50+)^a ^b, ^c, ^d

	Fruits/ Vegetables		Olive Oil		Whole Grains	
	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4
<i>5+ Serv</i>	-0.039 (0.014)	* -0.041 (0.014)	* -0.049 (0.022)	* -0.029 (0.025)	* -0.090 (0.035)	* -0.099 (0.035)
<i>3-4 Serv</i>	-0.039 (0.016)	* -0.041 (0.017)	-0.017 (0.009)	-0.009 (0.009)	0.002 (0.002)	0.002 (0.003)
<i>1-2 Serv</i>	0.067 (0.025)	* 0.069 (0.026)	-0.005 (0.004)	-0.002 (0.002)	* 0.050 (0.019)	* 0.054 (0.019)
<i>None</i>	0.011 (0.005)	* 0.012 (0.005)	0.072 (0.033)	* 0.040 (0.036)	* 0.038 (0.017)	* 0.043 (0.018)
			<i>Rarely/ Never</i>		<i>Rarely/ Never</i>	
	Fried Foods		Red Meat		Daily Drinking	
	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4
<i>Rarely/ Never</i>	-0.088 (0.035)	* -0.079 (0.038)	0.075 (0.029)	* 0.054 (0.029)	* -0.044 (0.020)	* 0.001 (0.025)
<i>Some Days</i>	0.050 (0.020)	* 0.045 (0.021)	<i>Rarely/ Never</i>	0.003 (0.005)	<i>30+ Drinks/Mo</i>	
<i>Most Days</i>	0.017 (0.008)	* 0.015 (0.008)	<i>Some Days</i>	* -0.039 (0.014)		
<i>Almost Everyday</i>	0.022 (0.009)	* 0.019 (0.009)	<i>Most Days</i>	* -0.030 (0.015)		
			<i>Almost Everyday</i>	(0.013)		

^aN = 1300 (fruits/ vegetables, olive oil); 1302 (whole grains, fried foods, red meat, drinking)

^bFor each outcome, Model 3 is an ordered logistic (linear probability for drinking) model including race, gender, age, SES, health status, and discrimination; Model 4 is Model 3 + all social integration measures

^cCoefficients represent the average marginal effect or difference for Black respondents, compared to White respondents, for each category; standard errors are beneath each coefficient in parentheses

^d * p<0.05