Published in final edited form as:
J Nutr Educ Behav. 2013 ; 45(6): 676–682. doi:10.1016/j.jneb.2013.07.013.

Understanding African American Women's Decisions to Buy and Eat Dark Green Leafy Vegetables: An Application of the Reasoned Action Approach

Jylana L. Sheats, PhD[1,2], **Susan E. Middlestadt, PhD**[2], **Fernando F. Ona, PhD**[2,3], **Paul D. Juarez, PhD**[4], and **Lloyd J. Kolbe, PhD**[2]

[1]Stanford Prevention Research Center, Stanford University School of Medicine, Stanford, CA

[2]Department of Applied Health Sciences, Indiana University-Bloomington School of Public Health, Bloomington, IN

[3]Department of Public Health and Community Medicine, Tufts University School of Medicine, Boston, MA

[4]Research Center on Health Disparities, Equity, and the Exposome, The University of Tennessee Health Science Center, Memphis, TN

Abstract

Objective—Examine intentions to buy and eat dark green leafy vegetables (DGLV).

Design—Cross-sectional survey assessing demographics, behavior, intention, and Reasoned Action Approach constructs (attitude, perceived norm, self-efficacy).

Setting—Marion County, Indiana.

Participants—African American women responsible for buying and preparing household food.

Main Outcome Measure(s)—Reasoned Action Approach constructs explaining intentions to buy and eat DGLV.

Analysis—Summary statistics, Pearson correlations, and multiple regression analyses.

Results—Among participants (n = 410, mean age = 43 y), 76% and 80%, respectively, reported buying and eating DGLV in the past week. Mean consumption was 1.5 cups in the past 3 days. Intentions to buy (r = 0.20, P < .001) and eat (r = 0.23, P < .001) DGLV were positively associated with consumption. Reasoned Action Approach constructs explained 71.2% of the variance in intention to buy, and 60.9% of the variance in intention to eat DGLV. Attitude (β = .63) and self-efficacy (β = .24) related to buying and attitude (β = .60) and self-efficacy (β = .23) related to eating DGLV explained significant amounts of variance in intentions to buy and eat more DGLV. Perceived norm was unrelated to either intention to buy or eat DGLV.

Address for correspondence: Jylana L. Sheats, PhD, Stanford Prevention Research Center, 1070 Arastradero Rd, Suite 100, Palo Alto, CA 94304; Phone: (650) 721-2516; Fax: (650) 723-6450; sheats@stanford.edu.

Conclusions and Implications—Interventions designed for this population of women should aim to improve DGLV-related attitudes and self-efficacy.

Keywords

health behavior; diet; vegetable consumption; African American; women; Reasoned Action Approach

INTRODUCTION

Increased consumption of fruits and vegetables (FV) may help decrease disparities in diet-related health outcomes.[1] However, vegetable consumption in the US is low, and only 26% of adults meet national recommendations.[2,3] Vegetable consumption is even lower among minority populations (ie, Mexican Americans and African Americans [AA] relative to Whites).[4] Vegetables in the "dark green" group, as identified by the US Department of Agriculture, are both cruciferous and leafy (eg, spinach, broccoli, romaine lettuce, watercress, Swiss chard, kale, collard, and mustard greens). Although they are the most nutritious group, dark green vegetables are also the least consumed.[5–7] They are rich sources of vitamins A and C, folate, and β-carotene, and they provide numerous health benefits (eg, reduced risk of cardiovascular diseases).[7–10] The importance of consuming dark green leafy vegetables (DGLV) is highlighted in the US Department of Health and Human Services National Healthy People 2020 policy statement (ie, increase the proportion of dark green vegetables consumed by Americans) and the Dietary Guidelines for Americans (ie, women should consume 1.5 cups of DGLV per week, and men should consume 1.5–2 cups per week).[5,8,11]

The diets of AA have been of particular interest to researchers; Kirkpatrick, Dodd, Reedy, and Krebs-Smith posited that such racial minority populations could potentially benefit from eating more DGLV.[4,12–15] There is no single "typical" eating pattern to which all AA ascribe,[13] and studies indicate that DGLV are common in the AA culture and have been since the Atlantic slave trade. Specifically, during this time, dark green vegetables (eg, spinach and various types of greens) and other vegetables (eg, sweet potatoes, okra, squash) were brought from Africa to America.[16–19] Although DGLV remain an important and cultural component of some AA diets, determinants of their consumption have yet to be fully understood.[20–22] To identify these determinants, it has been recommended that DGLV be studied separately from fruit and other types of vegetables (eg, red, orange), a practice not often reported in the literature.[23]

Although an examination of DGLV eating behaviors is important, there is an expressed need to examine behavioral domains beyond eating,[14] given that eating is the most distal behavior relative to buying and preparing food.[24] African American women have been described as being household "gatekeepers" who are primarily responsible for buying and preparing food.[25] They often take pride in this role and have intentions to share food among family, friends, and those who are in need.[26] These notions support findings that characterize AA women as dietary change agents who influence familial consumption of healthful food such as FV.[12,13,27,28] Therefore, the current study sought to expand the DGLV evidence base by

using behavior change theory to explore intrapersonal factors associated with intentions to buy and eat more DGLV among a sample of midwestern AA women who buy and prepare household food.

Reasoned Action Approach

The Reasoned Action Approach (RAA) is a theoretical model of behavior change that has been used to identify beliefs underlying people's behavioral decisions. The theory is the latest formulation of the Theory of Planned Behavior, and it assumes that one's intention is the most immediate predictor of behavior.[29] According to the RAA, there are 3 global constructs that determine one's intention to perform a behavior: (1) *attitude* toward a behavior; (2) *perceived norms* about performing a behavior; and (3) *self-efficacy* about performing a behavior.[29,30] The RAA and its constructs have been used to understand behaviors associated with obesity and chronic disease prevention,[31,32] as well as determinants of AA fruit and vegetable consumption.[14,33,34] Such studies have supported the use of RAA constructs in explaining general variations in FV consumption among AA, but few studies have focused specifically on DGLV in this population.

In this study, the RAA was used to understand a sample of AA women's intentions to perform 2 behaviors: (1) eat more cups of DGLV each week over the next 3 months; and (2) buy more DGLV each week over the next 3 months. When using the RAA, behaviors are defined in terms of the target, action, context, and time.[35] Intention to eat and intention to buy are the chosen action elements. “More” (vs a specific number of cups) was selected as the target to reflect Healthy People 2020's recommendation to eat a higher proportion of DGLV.[11] Given that DGLV recommendations are based on weekly consumption, “each week” is the context.[5] “Three months,” which has been used in previous RAA research, was chosen as an appropriate time interval to initiate behavior change.[20,22]

METHODS

Participants were recruited from 8 local community and professional organizations, health clinics, and faith-based institutions. Recruitment methods varied by site and included personal contact and flyers at sites and announcements at meetings and services. Inclusion criteria were: AA; female; 18 years of age or older; resident of Marion County, Indiana; and primarily responsible for buying and preparing household food. Eligible women read and signed the study consent form. Participants were provided with a survey and a *Dark Green Leafy Vegetable Guide* to assist with the identification and measurement of DGLV. The guide was pilot-tested with members of the target population (n = 30) who did not participate in the current study. Revisions were made accordingly to enhance comprehension. As incentives to participate in the study, participants were given a $10 supermarket gift card and were allowed to keep the *Dark Green Leafy Vegetable Guide* after completing the survey. Study procedures were approved by the Institutional Review Board at Indiana University.

Survey Instrument

Demographic and behavioral items—Participants who were eligible and had given consent took part in the self-administered, cross-sectional survey. The survey assessed demographics, health status, food-related practices and preferences, DGLV purchasing and consumption, behavioral intention, and RAA global constructs (ie, attitude, perceived norm, self-efficacy). Geolocation data for participant household and preferred food store were obtained but are beyond the scope of the current analysis. The study survey was pilot-tested (n = 5) to ensure participants could understand the content, and it was revised as needed.

Demographic items were developed based on a review of relevant literature, and consisted of age, highest grade level or years of education completed, total household income last year, receipt of assistance from the government to buy food, number of adults and children living in the household, and height and weight. Participants were asked whether a doctor, nurse, or other health professional had ever told them that they had any of 6 chronic health conditions (eg, high blood pressure, heart disease, diabetes, cancer). Participants were also asked about their home food–related practices and preferences (eg, “Does your household eat the primary meal of the day together?”) and whether or not members of their household liked DGLV (ie, “How many of the people that you cook for in your household like dark green leafy vegetables?”).

Purchasing and consumption items—Participants were asked whether they had purchased DGLV in the past 7 days. To ascertain consumption, participants were asked to report whether they had eaten at least 1 type of DGLV in the past 7 days. They were then asked to recall the past 3 days and report the number of cups of raw DGLV they had eaten (ie, “How many cups of DGLV did you eat yesterday, the day before yesterday, and the day before that?”). The same questions were asked for cooked DGLV. A 3-day time frame was selected, given that similar participants in a pilot study had difficulty completing a DGLV 7-day recall.[20] Consumption of 2 cups of raw DGLV equates to 1 cup of cooked DGLV,[8] and cooked DGLV was summed to obtain total DGLV consumption.

Theory-based items—Direct RAA items for attitude, perceived norm, and self-efficacy were developed from earlier belief elicitation research with members of the target population not included in the current study.[20] Reasoned Action Approach survey items consisted of a 3-item measure of intention, a 2-item measure of attitude, a 2-item measure of perceived norm, and a 3-item measure of self-efficacy to buy and eat more DGLV, respectively, each week over the next 3 months. Although it is recommended that a minimum of 3measures be used to assess RAA constructs,[36] 2-item measures for attitude and perceived norm for eating and buying, respectively, were selected to keep the survey completion time to 40 minutes. Inclusion of fewer than 3 Theory of Planned Behavior/RAA measures has been used for the examination of FV consumption[28] and other health behaviors.[32,37]

Theory-based item: intention—Intention was measured through agreement with statements assessing the likelihood of performing each behavior using two 5-point scales ranging from 1 (extremely unlikely) to 5 (extremely likely) and 1 (strongly disagree) to 5

(strongly agree). For intention to buy more DGLV each week for the next 3 months, the statements were: “Is it likely that you will buy more DGLV each week over the next 3 months?” “I will buy more DGLV each week over the next 3 months,” and “My buying more DGLV each week over the next 3 months is likely.” Similar items were used to assess intention to eat more cups of DGLV. Measures of intention to buy and eat, respectively, were calculated by averaging the 3 items.

Theory-based item: attitude—Attitude toward action of buying was measured with ratings of the statements pertaining to buying more DGLV each week over the next 3 months and eating more cups of DGLV each week over the next 3 months on two 5-point semantic differential scales ranging from 1 (extremely unenjoyable) to 5 (extremely enjoyable) and 1 (extremely bad) to 5 (extremely good). Similar items measured attitudes about eating more DGLV over the next 3 months. Measures for attitudes about buying and eating, respectively, were calculated by averaging the 2 items.

Theory-based item: perceived norms—Perceived norms were assessed by agreement with statements about what participants' salient referents thought about buying and eating more cups of DGLV, respectively, each week over the subsequent 3 months. On a 5-point scale that ranged from 1 (strongly disagree) to 5 (strongly agree) for buying, participants rated the statements “Most people who are important to me think that I should buy more DGLV each week over the next 3 months,” and “Most people like me will buy more DGLV each week over the next 3 months.” For eating, similar items were constructed. Measures for perceived norms about buying and eating were calculated by averaging the 2 items.

Theory-based item: self-efficacy—Self-efficacy was based on responses from 3 items, 1 difficult/easy rating on a 5-point scale from 1 (extremely difficult) to 5 (extremely easy) and two 5-point scales from 1 (strongly disagree) to 5 (strongly agree). For buying more DGLV over the next 3 months, participants rated the statements as follows: “Buying more DGLV each week over the next 3 months is difficult/easy,” “It is up to me to buy more DGLV each week over the next 3 months,” and “I am sure that I can buy more DGLV each week over the next 3 months.” Similar items were used to assess self-efficacy to eat more cups of DGLV. An overall measure of self-efficacy for buying and eating, respectively, was calculated by averaging the 3 items.

Statistical Analysis

Summary measures were used to describe the participants and their DGLV buying and eating behaviors. Reliability analysis and exploratory factor analysis were conducted to understand the internal consistency of the items measuring RAA global constructs and to identify associations among constructs. Bivariate (Pearson) correlation coefficients were computed for associations between the 2 behaviors' psychosocial constructs for intention, attitude, perceived norm, and self-efficacy to buy and eat more DGLV. Bivariate correlations were also computed for the association between intention and actual consumption. Two hierarchical multiple regression analyses were conducted to determine the significance of the RAA global constructs in explaining intention for buying and eating more DGLV. As the dependent variable was intention to buy more DGLV, the independent

variables were entered into the "buying" regression model in the following order: 3-item self-efficacy, 2-item perceived norm, and 2-item attitude. The same order was used for the "eating" regression model. A value of $P < .05$ was considered statistically significant.

RESULTS

Participants

A convenience sample of 410 women with a mean age of 43 years (SD = 15.7) consented to be in the study. Additional participant and household data are in Table 1.

Purchasing and Consumption

Seventy-six percent of women in the study reported that they had bought DGLV within the past 7 days. On average, participants ate 1.5 cups of DGLV in the past 33 days, and 80% ate at least 1 type of DGLV in the past 7 days. Two thirds of participants indicated that members of their household eat their primary meal of the day together. When asked about members of their household, 62% perceived that "everyone liked DGLV."

Reliability of Reasoned Action Approach Measures

Reliability analyses indicated that for buying more DGLV, there was high reliability for the 3-item measure of intention (Cronbach α = .94), 2-item measure of attitude (Cronbach α = .84), and 3-item measure of self-efficacy (Cronbach α = .79). The reliability of the 2-item measure of perceived norm was low (Cronbach α =.64). Similarly, for eating more DGLV, there was high reliability for the 3-item measure of intention (Cronbach α = .91), 2-item measure of attitude (Cronbach α = .84), and 3-item measure of self-efficacy (Cronbach α = .79). The reliability of the 2-item measure of perceived norm was low (Cronbach α = .57).

Mean Intention and Correlations

Mean responses for intention to buy (mean = 4.1, SD = 0.90) and eat (mean = 3.9, SD = 0.94) DGLV were high. Small, but significant, positive associations were found between DGLV consumption and intention to buy ($r = 0.20$, $P < .001$) and intention to eat ($r = 0.23$, $P < .001$) DGLV.

Significant positive correlations with intention to buy were revealed for attitude toward buying ($r = 0.83$, $P < .001$), perceived norm about buying ($r = 0.44$, $P < .001$), and self-efficacy for buying ($r = 0.73$, $P < .001$). Similarly, significant positive correlations with intention to eat were revealed for attitude toward eating ($r = 0.77$, $P < .001$), perceived norm about eating ($r = 0.33$, $P < .001$), and self-efficacy for eating ($r = 0.65$, $P < .001$). For both buying and eating behaviors, attitude showed the highest correlation with behavioral intention and the weakest with perceived norm. In comparing the 2 behaviors with respect to the RAA variables, significant positive correlations were found for intention ($r = 0.72$, $P < .001$), attitude ($r = 0.70$, $P < .001$), perceived norm ($r = 0.52$, $P < .001$), and self-efficacy ($r = 0.66$, $P < .001$). In other words, intention to buy DGLV was strongly associated with intention to eat DGLV; attitude toward buying DGLV was strongly associated with attitude toward eating, and so on.

Multiple Regressions Explaining Intention to Buy and Intention to Eat

Table 2 presents the results of the multiple regression analysis for variation in the dependent variable (ie, behavioral intention) related to the 3 global RAA constructs. For intention to buy and intention to eat DGLV, unstandardized regression coefficients (*B*), standard errors (SE *B*), standardized regression coefficients (β), *t* values, and *P* are presented. With an *R* of 0.84, RAA global constructs explained 71.2% of the variance ($F[3, 403] = 331.708$, $P < .001$) in intention to buy more DGLV. In explaining intention to buy, both attitude (β = .63) and self-efficacy (β = .24) had significant weights. Similarly, with an *R* of 0.78, the RAA global constructs explained 60.9% of the variance ($F[3, 403] = 209.611$, $P < .001$) in intention to eat more DGLV. In explaining intention to eat more DGLV, both attitude (β = .60) and self-efficacy (β = .23) had significant weights. Whereas the bivariate correlations between perceived norm and intention to buy and eat more DGLV were significant, the regression weights for perceived norm were not significant in the multivariate analyses.

DISCUSSION

In this sample of low- to moderate-income AA women residing in Marion County, Indiana (located in the mid-western region of the US), results indicated that most participants (80%) ate DGLV in the past 7 days and, on average, reported adequate intakes (ie, 1.5 cups in the past 3 days). Female sex and higher education level (ie, 57% completed at least 1 year of college) have been associated with general FV consumption in other samples.[38,39] As previously noted, studies have identified DGLV to be commonly consumed among some, though not all, populations of AA. Although beyond the scope of the current study, regionally specific cultural practices should be assessed in the future, as they could contribute to a better understanding of DGLV intakes across different AA samples.[16–18,40]

Behavioral intention is an important determinant of nutrition-related behaviors,[41] and participants in this study had strong intentions to buy and eat more DGLV each week over the subsequent 3 months. Yet correlations between reported consumption and intention to buy ($r = 0.20$, $P < .001$) and intention to eat ($r = 0.23$, $P < .001$) more DGLV were relatively low. Given that intention was assessed in terms of eating and buying “more” DGLV (vs a specific amount), intentions may differ if a more stringent behavioral criterion is applied. Additionally, the weakness of the behavior–intention associations not only supports the notion that one's intention to perform a behavior may not lead to action, but also highlights the need to consider other factors—some of which, such as local access or quality, may go beyond the individual.[20,21,42]

The current study's results also show that the stronger the intentions women had for each behavior, the stronger their attitudes and self-efficacy were about performing the behaviors of interest. Further, intention, attitude, and self-efficacy to buy were strongly associated with intention, attitude, and self-efficacy to eat. For both behaviors, attitude had the greatest weight in explaining intention, as the weight for self-efficacy was somewhat smaller. Although perceived norm was significantly associated with intention, it was not significant in the final regression analyses for either behavior. Study results for attitude and self-efficacy are consistent with previous research identifying them as important intrapersonal

constructs for AA and other racial/ethnic groups' intentions to eat fruit, vegetables, and other healthful food.[33,43–45]

On the one hand, the significant correlation of perceived norm with intention is consistent with research showing that spouses and other family members influence food choices and purchasing among AA and other groups.[12,46] On the other hand, the multivariate finding that perceived norm did not contribute when attitude and self-efficacy were considered is consistent with studies examining more general fruit and vegetable consumption[47] and intention to eat healthier food.[48] Clearly, the role of perceived norm deserves further attention.

The study results suggest that RAA-based interventions designed to promote increased buying and consumption of DGLV for AA women living in this region of the US may be more effective if they focus primarily on changing attitudes and increasing self-efficacy. For example, improving attitude may be addressed by identifying and addressing beliefs held by AA women about the advantages and disadvantages of buying and eating more DGLV. Self-efficacy may be addressed by improving skills related to buying and eating, such as cooking demonstrations and the provision of recipes showing healthy ways to prepare DGLV. Self-efficacy may also be addressed by altering features of the environment that make DGLV more accessible and easier to buy. In order to improve attitudes and self-efficacy about eating and buying more DGLV, a greater understanding of why these vegetables are healthful by the population of interest may be required, as well. For example, Lynch, Holmes, Keim, and Koneman found that among a sample of AA women, explanations of why and which food items are healthful differed within the sample.[49]

The use of qualitative methods to understand decisional processes around the behaviors of interest, such as those used by Reicks and colleagues, may also provide insight.[50] Such strategies to understand and address attitudes and self-efficacy highlight the potential for integrative, multilevel public health interventions and/or campaigns designed to reach the target population. Finally, studies have shown strong positive associations between significant others/caregivers buying and preparing healthy food and family members (eg, men, adolescent girls) subsequently eating and purchasing healthy food.[25,51] With over half of the sample reporting children living in their household, most participants perceived that all household members liked DGLV, and nearly two thirds of households ate their primary meal of the day together. These observations suggest that interventions that stimulate increased DGLV-related behaviors among this population may have particularly positive implications for other household members, relative to other populations. Given that family support has had a significant influence on eating behaviors of AA women, it may be beneficial to target and/or include household members in dietary intervention programs, as well.[52]

This study has several limitations. First, the study was cross-sectional, so causation cannot be inferred. Second, a sample of convenience was used, and study results should not be generalized beyond the characteristics of the group under study. Third, the relatively weaker reliability of the perceived norm measures may have had an impact on study the results. Following methods described by Fishbein and Azjen,29 for each behavior, there was an

injunctive item about what other people think (eg, “Most people who are important to me think that I should buy more DGLV each week over the next 3 months”) and descriptive item about what other people do (eg, “Most people like me will buy more DGLV each week over the next 3 months”). Although they both make up perceived norm, they are slightly different facets. Therefore, to improve reliability, additional injunctive and descriptive items could be developed for each behavior. Fourth, data were collected during the summer months, which may have increased the number and variety of DGLV available. Finally, the dependent variables for the regression models were behavioral intentions to eat and to buy DGLV, and they may not be strongly linked with the actual behaviors of interest.

Limitations notwithstanding, the current study addressed a number of gaps in the literature by focusing on a less-often-studied subgroup of vegetables; examining factors potentially linked with buying and eating DGLV among AAs; and using a theory-based survey instrument. The RAA measures showed acceptable reliability,[53,54] and research demonstrates that intention is often a reasonable predictor of behavior in many, though not all, cases.[29] Although the authors acknowledge the contributions of social-ecological frameworks[55] to the understanding of AA consumption of FV, this study, as far as it can be determined, is unique in its application of theory to identify intrapersonal determinants of buying and eating more DGLV among the study's target population. Thus, the primary implication of the study is that the RAA is appropriate for explaining intention to buy and intention to eat more DGLV among a sample of midwestern AA women. In an effort to build on the information obtained from the current results, future research should identify how the constellation of constructs assessed in this investigation could predict current and future DGLV buying and eating patterns in this population.

Acknowledgments

The authors would like to acknowledge Millicent Fleming-Moran, PhD, and staff at the Marion County Health Department; Ruth Lambert, PhD; LaWanda Lambert Girton; Terry Curtis; Dr. Linda Johnson; Brittany Baird; and Darleesa Gates-Doss, PhD, MPH for assistance in accessing the target population, the provision of resources, and/or technical assistance. Dr. Sheats is supported by US Public Health Service grant T32 HL007034 from the National Heart, Lung, and Blood Institute and Stanford University.

REFERENCES

1. Celentano JC. Increased fruit and vegetable intake may reduce the nutrition-related health disparities in African Americans. Nutr Rev. 2009; 3:185–187.
2. Centers for Disease Control and Prevention (CDC). State specific trends in fruit and vegetable consumption, 2000–2009. MMWR Morb Mortal Wkly Rep. 2009; 59:1125–1130.
3. Guenther P, Dodd K, Reedy J, Krebs-Smith S. Most Americans eat much less tan recommended amounts of fruits and vegetables. J Am Diet Assoc. 2006; 106:1371–1379. [PubMed: 16963342]
4. Kirkpatrick SI, Dodd KW, Reedy J, Krebs-Smith SM. Income and race/ethnicity are associated with adherence to food-based dietary guidance among US adults and children. J Acad Nutr Diet. 2012; 112:624–635. [PubMed: 22709767]
5. US Department of Health and Human Services and US Department of Agriculture. Dietary Guidelines for Americans, 2010. 7th ed.. Washington, DC: US Government Printing Office; 2010.
6. Bachman JL, Reedy J, Subar AF, Krebs-Smith SM. Sources of food group intakes among the US population, 2001–2002. J Am Diet Assoc. 2008; 108:804–814. [PubMed: 18442504]
7. Johnston C, Taylor A, Hampl J. More Americans are eating “5 A Day” but intakes of dark green and cruciferous vegetables remain low. J Nutr. 2000; 130:3063–3067. [PubMed: 11110870]

8. US Department of Agriculture. [Accessed February 26, 2013] Inside the pyramid. Choose My Plate. http://www.mypyramid.gov/pyramid/vegetables_amount_table.html.
9. Van Duyn M, Pivonka E. Overview of the health benefits of fruit and vegetable consumption for the dietetics professional: selected literature. J Am Diet Assoc. 2000; 100:1511–1521. [PubMed: 11138444]
10. Butt, MS.; Sultan, MT. Nutritional profile of vegetables and its significance to human health. In: Sinha, NK., editor. Handbook of Vegetables and Vegetable Processing. Ames, IA: Blackwell Publishing; 2011. p. 107-123.
11. US Department of Health and Human Services. [Accessed October 13, 2012] Office of Disease Prevention and Health Promotion. Healthy People. 2020. http://www.healthypeople.gov/2020/topicsobjectives2020/default.aspx.
12. James DC. Factors influencing food choices, dietary intake, and nutrition-related attitudes among African Americans: application of a culturally sensitive model. Ethn Health. 2004; 9:349–367. [PubMed: 15570680]
13. James DC. Cluster analysis defines distinct dietary patterns for African American men and women. J Am Diet Assoc. 2009; 109:255–262. [PubMed: 19167952]
14. O'Neal CW, Wickrama KK, Ralston PA, et al. Eating behaviors of older African Americans: an application of the Theory of Planned Behavior. The Gerontologist. 2012 http://dx.doi.org/10.1093/geront/gns155 [Epub ahead of print].
15. Casagrande S, Whitt-Glover MC, Lancaster KJ, Odoms-Young AM, Gary TL. Built environment and health behaviors among African Americans: a systematic review. Am J Prev Med. 2009; 36:174–181. [PubMed: 19135908]
16. Huang Z, Wang B, Eaves DH, Shikany JM, Pace RD. Phenolic compound profile of selected vegetables frequently consumed by African Americans in the southeast United States. Food Chem. 2007; 103:1395–1402.
17. Grigsby-Toussaint DS, Zenk SN, Odoms-Young A, Ruggiero L, Moise I. Availability of commonly consumed and culturally specific fruits and vegetables in African American and Latino neighborhoods. J Am Diet Assoc. 2010; 110:746. [PubMed: 20430136]
18. Akbar JA, Jaceldo-Siegl K, Fraser G, Herring RP, Yancey A. The contribution of soul and Caribbean foods to nutrient intake in a sample of Blacks of US and Caribbean descent in the Adventist Health Study-2: a pilot study. Ethn Dis. 2007; 17:244. [PubMed: 17682353]
19. Whit, WC. Soul food as cultural creation. In: Bowes, AL., editor. African American Foodways Explorations of History and Culture. Urbana and Chicago, IL: University of Illinois Press; 2007. p. 45-58.
20. Sheats JL, Middlestadt SE. Salient beliefs about eating and buying dark green vegetables as told by Mid-western African American women. Appetite. 2013; 65:205–209. [PubMed: 23415980]
21. Izumi BT, Zenk SN, Schulz AJ, Mentz GB, Wilson C. Associations between neighborhood availability and individual consumption of dark-green and orange vegetables among ethnically diverse adults in Detroit. J Am Diet Assoc. 2011; 111:274–279. [PubMed: 21272702]
22. Middlestadt SE. Beliefs underlying eating better and moving more lessons learned from comparative salient belief elicitations with adults and youths. Ann Am Acad Pol Soc Sci. 2012; 640:81–100.
23. Kamphuis CB, Giskes K, de Bruijn G, Wendel-Vos W, Brug J, van Lenthe F. Environmental determinants of fruit and vegetable consumption among adults: a systematic review. Br J Nutr. 2006; 96:620–635. [PubMed: 17010219]
24. Bogers RP, Brug J, Van Assema P, Dagnelie PC. Explaining fruit and vegetable consumption: the theory of planned behaviour and misconception of personal intake levels. Appetite. 2004; 42:157–166. [PubMed: 15010180]
25. Griffith DM, Wooley AM, Allen JO. "I'm ready to eat and grab whatever I can get": determinants and patterns of African American men's eating practices. Health Promot Pract. 2013; 14:181–188. [PubMed: 22773618]
26. Hughes, MH. Soul, black women, and food. In: Counihan, C.; Van Esterik, P., editors. Food and Culture: A Reader. New York, NY: Routledge; 1997. p. 272-280.

27. Molasion E, Connell C, Stuff J, Yadrick K, Bogle M. Influences on fruit and vegetable consumption by low-income black American adolescents. J Nutr Educ Behav. 2005; 37:246–251. [PubMed: 16053813]
28. Shankar S, Klassen AC. Influences on fruit and vegetable procurement and consumption among urban African American public housing residents, and potential strategies for intervention. Fam Econ Nutr Rev. 2001; 13:33–45.
29. Fishbein, M.; Ajzen, I. Predicting and Changing Behavior: The Reasoned Action Approach. New York: Psychology Press (Taylor & Francis); 2010.
30. Fishbein M. A reasoned action approach to health promotion. Med Decis Making. 2008; 28:834–844. [PubMed: 19015289]
31. Downs DS, Hausenblas HA. Applying the theories of reasoned action and planned behavior to exercise: a meta-analytic update. J Phys Act Health. 2005; 2:76–97.
32. Middlestadt SE, Sheats JL, Geshnizjani A, Sullivan M, Arvin C. Factors associated with participation in work-site wellness programs: implications for increasing willingness among rural service employees. Health Educ Behav. 2011; 38:502–509. [PubMed: 21482700]
33. Brug J, de Vet E, de Nooijer J, Verplanken B. Predicting fruit consumption: cognitions, intention, and habits. J Nutr Educ Behav. 2006; 38:73–81. [PubMed: 16595285]
34. Watters J, Satia J, Galanko J. Associations of psychosocial factors with fruit and vegetable intake among African Americans. Public Health Nutr. 2007; 10:701–711. [PubMed: 17381950]
35. Azjen I. Constructing a TPB Questionnaire. Icek Azjen. http://people.umass.edu/aizen/tpb.html/.
36. Francis, JJ.; Eccles, MP.; Johnston, M., et al. [Accessed December 19, 2012] Constructing Questionnaires Based on the Theory of Planned Behaviour. A Manual for Health Services Researchers. 2004. http://pages.bangor.ac.uk/~pes004/exercise_psych/downloads/tpb_manual.pdf.
37. Hardeman W, Prevost AT, Parker RA, Sutton S. Constructing multiplicative measures of beliefs in the theory of planned behaviour. Br J Health Psychol. 2012; 18:122–138. [PubMed: 22988885]
38. McClelland J, Demark W, Mustian R, Cowan A, Campbell M. Fruit and vegetable consumption of rural African Americans: baseline survey results of the Black Churches United for Better Health 5 A Day Project. Nutr Cancer. 1998; 30:148–157. [PubMed: 9589434]
39. Ard JD, Fitzpatrick S, Desmond RA, et al. The impact of cost on the availability of fruits and vegetables in the homes of schoolchildren in Birmingham, Alabama. Am J Public Health. 2007; 97:367–372. [PubMed: 17138914]
40. Pollard J, Kirk SF, Cade JE. Factors affecting food choice in relation to fruit and vegetable intake: a review. Nutr Res Rev. 2002; 15:373–388. [PubMed: 19087412]
41. Brug J, Tak NI, te Velde SJ, Bere E, de Bourdeaudhuij I. Taste preferences, liking and other factors related to fruit and vegetable intakes among schoolchildren: results from observational studies. Br J Nutr. 2008; 99(Suppl 1):S7–S14. [PubMed: 18257952]
42. Sheeran P. Intention—behavior relations: a conceptual and empirical review. Eur Rev Soc Psychol. 2002; 12:1–36.
43. Verbeke W, Pieniak Z. Benefit beliefs, attitudes and behaviour towards fresh vegetable consumption in Poland and Belgium. Acta Alimentaria. 2006; 35:5–16.
44. Satia JA, Kristal AR, Patterson R, Neuhouser ML, Trudeau E. Psychosocial factors and dietary habits associated with vegetable consumption. Nutrition. 2002; 18:247–254. [PubMed: 11882398]
45. Yeh, M.; Obenchain, J.; Viladrich, A. Barriers and facilitating factors affecting fruit and vegetable consumption. In: Watson, R.; Preedy, V., editors. Bioactive Foods in Promoting Health. San Diego, CA: Academic Press; 2010. p. 85-98.
46. Brown JL, Wenrich TR. Intra-family role expectations and reluctance to change identified as key barriers to expanding vegetable consumption patterns during interactive family-based program for Appalachian low-income food preparers. J Acad Nutr Diet. 2012; 112:1188–1200. [PubMed: 22818727]
47. Brug J, Lechner L, De Vries H. Psychosocial determinants of fruit and vegetable consumption. Appetite. 1995; 25:285–295. [PubMed: 8746967]
48. Conner M, Norman P, Bell R. The Theory of Planned Behavior and healthy eating. Health Psychol. 2002; 21:194. [PubMed: 11950110]

49. Lynch EB, Holmes S, Keim K, Koneman SA. Concepts of healthful food among low-income African American women. J Nutr Educ Behav. 2012; 44:154–159. [PubMed: 22037147]
50. Reicks M, Smith C, Henry H, Reimer K, Atwell J, Thomas R. Use of the think aloud method to examine fruit and vegetable purchasing behaviors among low-income African American women. J Nutr Educ Behav. 2003; 35:154–160. [PubMed: 12773287]
51. Surkan PJ, Coutinho AJ, Christiansen K, et al. Healthy food purchasing among African American youth: associations with child gender, adult caregiver characteristics and the home food environment. Public Health Nutr. 2010; 14:670. [PubMed: 20920386]
52. Evans GL, McNeil LH, Laufman L, Bowman SL. Determinants of low-fat eating behaviors among midlife African American women. J Nutr Educ Behav. 2009; 41:327–333. [PubMed: 19717115]
53. Nunnally, JC.; Bernstein, IH.; Berge, JMT. Psychometric Theory. Vol. 2. New York, NY: McGraw-Hill; 1967.
54. Black SA, Porter LJ. Identification of the critical factors of TQM. Decision Sciences. 1996; 27:1–21.
55. Robinson T. Applying the socioecological model to improving fruit and vegetable intake among low-income African Americans. J Community Health. 2008; 33:395–406. [PubMed: 18594953]

Table 1

Sample Demographics and Health Status (n = 410)

Characteristic	n (%)[a]
Education	
High school graduate or less	177 (43.0)
Completed at least 1 year of college	233 (57.0)
Total household income	
< $25,000	230 (56.0)
$25,000–$44,999	86 (21.0)
≥ $45,000	94 (23.0)
Household composition	
Number of people in household[b]	
Adults (≥ 18 y)[c]	
Have at least 1 child (< 18 y)	230 (56.0)
Receive government assistance	
Yes[d]	164 (40.0)
No	246 (60.0)
Health status	
Underweight/normal	119 (29.0)
Overweight or obese	291 (71.0)
Have at least 1 chronic disease	
Yes	213 (52.0)
No	197 (48.0)

[a] Percentages were rounded up to the nearest 0.10;

[b] Mean (SD) is 3.0 (1.81);

[c] Mean (SD) is 1.8 (0.97);

[d] For example, Special Supplemental Nutrition Program for Women, Infants, and Children; Temporary Assistance for Needy Families; Supplemental Nutrition Assistance Program.

Table 2

Multiple Regression Analysis of Intention to Eat and Intention to Buy Dark Green Leafy Vegetables (DGLV) Each Week Over the Next 3 Months Among African American Women Who Buy and Prepare Food for Their Households (n = 410)

Model 1: Intention to Buy DGLV					
Explanatory Variable	***B***	**SE *B***	**β**	***t***	***P***
Attitude toward the buying DGLV	0.69	0.04	.63*	15.01	.001
Perceived norm	0.01	0.03	.01	0.345	.73
Self-efficacy	0.30	0.05	.24*	5.81	.001
Model 2: Intention to Eat DGLV					
Explanatory Variable	***B***	***SE B***	**β**	***t***	***P***
Attitude toward eating DGLV	0.67	0.04	.60*	13.64	.001
Perceived norm	0.00	0.03	.00	0.265	.79
Self-efficacy	0.27	0.05	.23*	5.23	.001

*$P \leq .001$.