

Being Motivated by Nutrition Is Associated With Healthy Home Food Environment of *Supplemental Nutrition Assistance Program* (SNAP) Recipients

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ABSTRACT

Objective: To examine the relationship between food shopping motivating factors and the home food environment (HFE).

Methods: Participants in the *Supplemental Nutrition Assistance Program* ($n = 123$) who were taking part in the *Utah State Double-Up Food Bucks* evaluation program were interviewed about their HFE, factors motivating shopping, and food security status. Composite HFE scores were derived from the Perceived Nutrition Environment Measure Survey questionnaire and food security score from the 6-item US Household Food Security Survey questionnaire. Analysis included multiple linear regression.

Results: Mean age was 46 ± 16.1 years. Regression models showed significant associations of being motivated by nutrition, education, and food security with HFE ($\beta = 4.70$, $P = .03$; $\beta = 1.44$, $P = .06$; and $\beta = 1.44$, $P = .06$, respectively).

Conclusion and Implications: In-store interventions to improve perceived nutrition importance among shoppers may be a useful tool to improve home food supplies. Further research is recommended examining the association between food shopping motivators and the HFE in a larger population.

Key Words: food environment, food security, food shopping, motivators, SNAP recipients (*J Nutr Educ Behav.* 2019; 51:101–106.)

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INTRODUCTION

Consumers shopping for food face an array of decisions in terms of what store to choose and what to buy.^{1,2} These shopping choices are critical to the availability of healthy food in the home environment.³ The home food environment (HFE), which includes access to and availability of both healthy and less healthy foods, has an important influence on household members' eating patterns and health outcomes.⁴ Mormann et al² showed that consumers make food decisions within one third of a second while shopping. These decisions are influenced not only by individual factors such as preference, affordability, convenience, and nutrition

knowledge but also by product- and market-related features such as price, size, promotion, special display, and size.^{2–6}

Evidence supporting any 1 of these factors as that which best predicts shopping behavior is complex. Some studies showed that a consumer's nutrition consciousness⁵ tends to influence grocery shopping behavior over price.⁷ Sanlier and Karakus⁸ showed that considerations for nutrition value and price of products while grocery shopping differed based on factors such as gender and percentage of income spent on food. Women were more likely than men to consider nutrition content and product reliability when shopping

for food. Also, those who spent $\geq 50\%$ of their income on food consider both nutrition and food price more than those who spent less of their income on food. In a qualitative research study, Raskind et al⁹ also found that women with children in the home were more likely to consider nutrition and their children's preferences when grocery shopping, whereas women with no children in the home considered tastes and preferences of another family member in the home. Furthermore, other studies^{7–10} supported the idea that these grocery shopping behavior motivators varied across age groups and socioeconomic statuses.

Recent food environment research^{3,10,11} examined the interaction between the HFE and health outcomes. Some findings^{10,12} suggested a positive association between healthy home food supplies (food presence and location) and healthy eating, whereas another¹³ did not find such an association. Several studies^{14,15} also examined the association between food shopping behavior and

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Table 1. Demographic Characteristics of Supplemental Nutrition Assistance Program Recipients (n = 123)

Variables	% (n)	Mean ± SD
Age		46 ± 16.1
Race/ethnicity		
White	81.3% (100)	
Hispanic	8.9% (11)	
Other	9.8% (12)	
Gender		
Female	76.4% (94)	
Male	23.6% (28)	
Children in household, n		1.3 ± 1.7
Household size		3 ± 2.1
Primary language		
English	95.1% (117)	
Spanish	4.9% (6)	
Annual household income		
<\$10,000	35.0% (43)	
\$10,000 to \$14,999	31.0% (38)	
\$15,000 to \$19,999	15.4% (19)	
\$20,000 to \$24,999	7.3% (9)	
\$25,000 to \$34,999	5.0% (6)	
≥\$50,000	4.1% (5)	
No response	2.4% (3)	
Highest grade/year of school completed		
Never attended/kindergarten	0.8% (1)	
1–8	2.4% (3)	
9–11	8.9% (11)	
12 or General Equivalency Diploma	35.0% (43)	
College 1–3 y	35.8% (44)	
College ≥4 y	16.3% (20)	
Food security status		
Food secure	41.5% (51)	
Food insecure	56.1% (69)	
Missing	2.4% (3)	

nutrition-related outcomes using diverse measures of shopping behavior that included behavior related to shopping travels such as distance,¹⁶ time,¹⁶ frequency of shopping,¹⁷ choice of shopping outlet,^{17,18} amount spent on purchases,¹⁵ and factors influencing in-store food purchases.⁸ However, to the best of the authors' knowledge, no study has considered any of these factors in

relation to the healthfulness of the HFE. It is important to understand factors that may motivate consumers in making food choices and how this affects the availability and accessibility of healthy food in the home environment. This study examined the association between the motivators of consumers' food choices and the HFE. The researchers' definition of a healthful HFE encompasses the

physical presence (availability) and placement (accessibility) of healthy (low-calorie and nutrient-dense) and unhealthy (high-calorie and nutrient-poor) foods to facilitate consumption of healthy foods in the home.¹⁹

METHODS

Participant Recruitment and Setting

Cross-sectional data from the Utah State 2016 *Double-Up Food Bucks* program evaluation study, a survey of *Supplementary Nutrition Assistance Program* (SNAP) recipients conducted between June and October, 2016, were used to assess the relationship between shopping motivators and the healthfulness of the HFE. Letters were sent to a random sample of 4,000 SNAP recipients using addresses provided by the Utah Department of Workforce Services. Researchers made follow-up phone calls to only 1,265 recipients owing to time limitations (participants needed to complete baseline data collection before the start of the farmers' market season). Of the 1,265 SNAP recipients who were called, the researchers were able to reach 433. They left messages for 504; 327 could not be reached because of an invalid or disconnected number. Of the 434 people who were reached, 212 showed interest and participated in the evaluation study (participation rate: 212 / 4,000 = 5%); 47 were ineligible and 175 declined. However, this study included responses only from participants with complete data associated with this study's objective (n = 123; participation rate: 123 / 4,000 = 3%). Respondents were aged ≥18 years and were the main grocery shopper for their households. The Institutional Review Board at the Utah State University approved the study. All participants (n = 123) provided verbal informed consent via phone, as witnessed by 2 study personnel.

Data Collection and Measures

Data were collected over the phone using the validated Perceived Nutrition Environment Measure Survey (NEMS-P)²⁰ and the 6-item US

Table 2. Distribution of Food Shopping Motivators and Home Food Environment Measure Among Supplemental Nutrition Assistance Program Recipients (n = 123)

Variables	% (n)	Total Score
Food shopping motivators (important and very important)		
Nutrition	95.9% (118)	
Cost	97.6% (120)	
Convenience	88.6% (108)	
Weight control	79.6% (98)	
Taste	95.9% (118)	
Home food environment measures		
Accessibility of healthy food		
Low (0)	6.5% (8)	
Medium (1–2)	17.1% (21)	
High (4–6)	76.3% (94)	
Accessibility of unhealthy food		
Low (0)	24.4% (30)	
Medium (1–2)	50.4% (64)	
High (4–6)	25.3% (31)	
Availability of healthy food		
Low (0)	0.8% (1)	
Medium (1–3)	16.3% (20)	
High (4–11)	74.1% (99)	
Missing	1.6% (2)	
Availability of unhealthy food		
Low (0)	2.4% (3)	
Medium (1–3)	52.8% (65)	
High (4–7)	44.8% (55)	
Composite home food environment score		4.4 ± 4.0

Household Food Security Survey questionnaires²¹ in both English (n = 118) and Spanish (n = 5). Participants answered questions about their HFE, food security status, factors that motivate them while shopping, and sociodemographic characteristics.

The HFE score was derived from food availability and accessibility measures of the NEMS-P. Food availability was measured using a 19-item checklist that included questions about the availability of certain foods in the home in the previous week, such as fruits (3 items), vegetables (3 items), high-fat foods (2 items), low-fat foods (3 items), beverages (2 items), grains and grain products (4 items),

sweets (1 item) and chips (1 item).²⁰ Food accessibility was measured using questions about how often respondents had food items (fruits and vegetables, chips, and cookies) in various locations (such as on the counter, in bowls, in the refrigerator, etc) around their homes (options included never, often, sometimes, and always). Food items were defined as healthy or unhealthy based on calorie and nutrient content in the NEMS-P tools.²² For example, the survey defined low-fat milk, brown rice, fruits, and vegetables as healthy food items; reduced-fat hot dogs and diet soda were also categorized as healthy options because they have fewer calories per serving

than their regular counterparts.²³ The survey defined white bread, chips, and regular soda as unhealthy. For food availability, healthy and unhealthy food availability scores were first derived separately by assigning 1 point to each food item available (in the healthy and unhealthy food group based on nutrient and calorie content, as previously explained) in the home and summing each group.²² The healthy and unhealthy food accessibility score was derived using the same food grouping approach. However, food accessible in the home received values ranging from 0 to 3 for the different options (never = 0, sometimes = 1, often = 2, and always = 3) instead of 1 point like availability.²² Scores for each group (healthy and unhealthy) were then summed. Finally, a composite HFE score was derived by summing healthy food availability and healthy food accessibility and then deducting unhealthy food accessibility and unhealthy food availability to reflect a penalty for unhealthy home food supplies, for a potential total score between –31 and 31. Higher values denote a healthier HFE.

Food shopping motivating factors were measured using the section of the NEMS-P questionnaire that addressed shopping behavior.²² Research assistants asked participants to rate the importance of taste, cost, weight control, convenience, and nutrition when shopping for food. Respondents could give 3 possible responses, ranging from not at all important to very important. The household food security score was calculated by summing affirmative responses to the 6-item US Household Food Security Survey questions.²¹ Based on the number of affirmative responses, a food security score was assigned (0–2 = high or marginal food security, 3–4 = low food security, and 5–6 = very low food security).

Food shopping motivators and food security status responses were dichotomized for data analysis. For food shopping motivators, somewhat important and very important were scored as 1 and not important as 0. For food security status, low and very

Table 3. Factors Predicting Healthfulness of Home Food Environment Among Supplemental Nutrition Assistance Program Recipients Using Linear Regression (n = 123)

Variables	Model 1 β (SE)	P	Model 2 β (SE)	P
Taste	−0.70 (1.84)	.71	−0.62 (1.96)	.75
Nutrition	4.70 (2.11)	.03**	4.89 (2.27)	.03**
Cost	−2.27 (2.43)	.35	3.22 (−1.51)	.14
Convenience	1.04 (1.20)	.39	0.87 (1.25)	.49
Weight control	0.67 (0.72)	.37	0.38 (0.77)	.62
Food security	1.44 (0.75)	.06*	1.29 (0.83)	.12

* $P < .10$; ** $P < .05$.

Notes: Model 1 used food motivators and food security as predictors; Model 2 was adjusted for age, sex, gender, education, income, ethnicity, adults in household, and children in household.

low food security was scored as 0 and high and marginal food security as 1. Covariates collected included age, gender, number of adults and children in the household, highest educational level attained, ethnicity, and annual income.

Data Analysis

Data were analyzed using SAS software (version 9.4, SAS Institute, Cary, NC, 2013). First, descriptive statistics were calculated for study variables: frequencies, means, and SDs for categorical and continuous variables, respectively. Significance was set at $P < .10$ ²⁴ because of the exploratory nature of this research. Linear regression models were used to predict the relationship between the composite HFE, food security status, and food shopping motivating factors. Two models were run. The first used food shopping motivators and food security as predictors of HFE, whereas the second included demographics as covariates.

RESULTS

Descriptive Information

The analysis included a total of 123 participants, a majority of whom were white (81.3%) female (76.4%) shoppers aged 18–83 years (mean [SD], 46 [16.1] years). Most participants (96.8%) had at least a grade-9 level of education; <1% had no formal schooling or only kindergarten. About one third of participants earned <\$10,000 annually. Table 1 provides descriptive statistics.

Concern regarding nutrition, cost, and taste while grocery shopping was higher among participants (95.9%, 97.6%, and 95.9%, respectively) than was concern about weight control and convenience (88.6% and 79.6%, respectively). About one quarter of respondents did not have frequent access to unhealthy foods and just 2.4% had low availability of unhealthy food items in their homes. A greater percentage of participants had high accessibility and availability of healthy foods (74.1% and 76.3%, respectively). The composite HFE scores obtained ranged between −15 and 19 (mean [SD], 4.36 [3.95]), as shown in Table 2.

Regression Results

Table 3 shows the results of the multiple linear regression models. The unadjusted model provided evidence that being motivated by nutrition or food security was positively associated with a healthier HFE ($P = .03$ and $.06$, respectively). The adjusted model showed that being motivated by nutrition or education (covariate) was positively associated with a healthier HFE ($P = .03$ and $.06$, respectively).

DISCUSSION

Shopping motivators were defined in this study as factors that drive in-store food choice behaviors such as type of food purchased and quantity bought. This study found that concern regarding cost, nutrition, and taste as

motivators for in-store purchases was high among participants. This finding was consistent with other work that found that a combination of nutrition and price significantly influenced food purchasing.^{5,8,13}

In this study, 30 participants (24.4%) had low accessibility and 3 (2.4%) had availability of unhealthy food in their homes. A total of 74.1% had high access to healthy food and 76.3% had a high number of healthy food available in their homes. Few participants had low accessibility and availability of healthy food in their homes (6.5% and 0.8%, respectively). This is surprising because previous studies of SNAP recipients identified their diets as being of poorer quality compared with income-eligible non-participants.^{25,26} However, at least 1 study found that SNAP participants were more likely to consume whole fruit, less sodium, and less saturated fat than were nonparticipants.²⁷

Concern regarding nutrition while shopping and being food secure were predictive of a healthier HFE ($P = .03$ and $.06$, respectively). Food-secure individuals and those motivated by nutrition have healthier home food environments. However, after controlling for sociodemographic variables, only concern about nutrition remained significantly predictive of HFE ($P = .03$) whereas the observed association with being food secure became insignificant. This effect was observed after controlling for both income and ethnicity; thus, income or ethnic disparities in access to resources may influence food security status.^{28,29} The presence of children

in the home ($P = .56$) did not modify the association between concern about nutrition and the healthfulness of the HFE, as reported in Raskind et al.⁹ Education ($P = .06$) may also have an important role in the healthfulness of the HFE. Compared with those with less education, people with higher levels of education may perceive themselves to have more control over food-related decisions because of easier access to information.³⁰

Nutrition education has a role in improving participants' nutrition knowledge, but some studies showed that it has no significant effect on the healthfulness of food purchases.³¹ The ability to translate knowledge to action while shopping is important for nutrition-related outcomes. Therefore, in-store nutrition education activities such as shelf labeling and information leaflets may increase motivation for healthy food purchases, improving the HFE, and health outcomes.^{32–34}

The low participation rate in the current study was common for studies of this population. The sample population was comparable to that of Utah State SNAP recipients in terms of households with children (51% compared with 56%)³⁵ and race ethnicity (81.3% white compared with about 82% white).³⁶ Nationally, SNAP participants have an average annual income of \$10,000 and 56% are female; 35% of participants in the current sample reported an annual income of <\$10,000 and 76.4% were female.³⁷

This study had several limitations. First, this was an exploratory analysis of cross-sectional data on Utah SNAP recipients; thus, the results may not be generalizable to SNAP participants in other areas. However, the findings offer insights for future hypotheses. Second, the low multivariate coefficient values in the models (8% for unadjusted and 14% for adjusted) may be due to low variability among the explanatory variables. Improved question design may help increase this variability. Third, a self-reported HFE measure was used and limited food items were listed in the tool. A more objective measure of HFE is preferable, such as home food inventory, which would capture a wide range of food items.

IMPLICATIONS FOR RESEARCH AND PRACTICE

This study provides insight into in-store shopping motivators among study participants and how these may influence access to and availability of food within the home. The findings indicate that SNAP recipients who consider nutrition to be important when grocery shopping may have significantly healthier HFEs. Therefore, nutrition educators in SNAP could include programs that aim to increase the perception of nutrition importance among participants when grocery shopping. This may be useful tool for improving participants' HFE. Furthermore, in-store interventions aimed at eliciting healthy shopping behavior may be a fruitful area for continued research because consumers make many food-shopping decisions on the spot.³¹ Further research might explore these associations in a larger and more representative sample using an improved tool to capture the variables of interest. In addition, the effect of interventions might be examined to improve motivation for nutrition and its impact on the availability and accessibility of healthy food in the home environment.

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