Relationship Between Grocery Shopping and Meal Preparation Self-Efficacy and Household Food Insecurity Among Food Pantry Clients

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Abstract

Prior research has focused on various social determinants of health as risk factors to food insecurity. Less work has focused on modifiable behaviors. This study examined the relationship between grocery shopping and meal preparation self-efficacy and food insecurity among food pantry clients. Surveys were used to collect the data from 10 food pantries in Atlanta, Georgia and 10 food pantries in Houston, Texas in 2022. Food insecurity status was ascertained by ≥3 affirmative responses on the 18-item USDA Food Security Scale Module. A total score of affirmative responses to 6-items each on a 1= not all confident to 4 = very confident scale was used to measure grocery shopping and meal preparation self-efficacy. Covariate-adjusted logistic regression models were conducted to examine the relationship between grocery shopping and meal preparation self-efficacy and food insecurity among the full sample. Standard errors in all regression models were corrected to account for multiple observations within a pantry. On average, participants (N=1,219) were 56 years old and had a grocery shopping and meal preparation self-efficacy total score of 20.73 (SD=3.35) out of 24.00. Over half of the sample experienced food insecurity (57%). For each unit increase in grocery shopping and meal preparation self-efficacy, food pantry clients experienced 7% lower odds of experiencing food insecurity (95% CI: 0.89-0.97). The findings hold when the models were stratified by sex. The results suggest interventions to improve grocery shopping and meal preparation self-efficacy may help reduce food insecurity.

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Introduction

In 2022, food insecurity, or having insufficient access to food due to limited resources, affected 12.8% of all U.S. households (Rabbit et al., 2023). People of color, single-parent households, men and women living alone, and those with incomes below 185% of the federal poverty line all reported higher rates of food insecurity (Rabbit et al., 2023). Food insecurity adversely impacts people's health and overall well-being. People who experience food insecurity are more likely to experience functional limitations, mental health issues, chronic disease, comorbidities, and have a higher risk of mortality compared to their counterparts who experience food security (Banerjee et al., 2021; Berryhill et al., 2019; Coakley et al., 2022; Gundersen & Ziliak, 2015; Hernandez et al., 2017; Koob et al., 2023; Murillo et al., 2017; Reesor-Oyer et al., 2023; Seligman et al., 2010b; Venci & Lee, 2018).

Addressing the determinants of food insecurity is one approach to reducing these

negative health outcomes. While previous research has focused on various social determinants of health as risk factors to food insecurity (Banks et al., 2021; Daundasekara et al., 2022; Hernandez, 2015; Norris et al., 2023), there has been comparatively less emphasis on modifiable behaviors, such as the role of self-efficacy. As defined by the Social Cognitive Theory, self-efficacy is a person's confidence in their capacity to carry out particular behaviors (Bandura, 2004). Previous researchers demonstrated that self-efficacy regarding diabetes self-management is central to improving health-related outcomes among individuals that experience both food insecurity and diabetes (Becerra et al., 2016; Kollannoor-Samuel et al., 2012; Lyles et al., 2013; Seligman et al., 2010a; Vijayaraghavan et al., 2011). Furthermore, a reduced rate of food insecurity has been associated with higher levels of overall self-efficacy (Kamimura et al., 2017).

The emerging link between self-efficacy measures of food-related behaviors and food insecurity began when the literature focused on the connection between meal preparation and food insecurity (Knol et al., 2019; Mercille et al., 2012). Among college students who experienced very low food security, these students reported significantly less participation in food preparation and lower cooking self-efficacy compared to students who experienced food security (Knol et al., 2019). Similarly, among Atikamekw women in Canada, lower self-efficacy regarding healthy food preparation was significantly associated with experiencing severe food insecurity (Mercille et al., 2012).

Due to the potential benefits of better meal planning and grocery store shopping, self-efficacy of food-related behaviors has been measured among participants of programs designed to increase food access (Horning et al., 2021; Martin et al., 2016). Research on mobile food markets (i.e. grocery stores on wheels) also suggests that greater self-efficacy for healthy cooking and eating fruits and vegetables are independently associated with lower odds of food insecurity (Horning et al., 2021). A food pantry in Connecticut designed a program to address poverty by providing its members with case management, motivational interviewing, and referrals to community programs and services (Martin et al., 2016). Program engagement and self-efficacy regarding grocery shopping and meal preparation were independently associated with reducing food insecurity (Martin et al., 2016).

The current study aimed to examine the association between grocery shopping and meal preparation self-efficacy and food insecurity among food pantry clients. This study builds on the Social Cognitive Theory's focus on self-efficacy, where a higher level of confidence is linked to a person's ability to carry out particular behaviors (Bandura, 2004). Specifically, we hypothesized: 1) households that experienced food insecurity would display lower grocery shopping and meal preparation self-efficacy compared to households that experienced food security (bivariate analyses) and 2) that greater self-efficacy regarding grocery shopping and meal preparation would be associated with reduced household food insecurity experiences (multivariate analysis). This study also builds on the Martin et al. (2016) study. We draw upon a total 20 food pantries from two urban locations in the south, where food insecurity rates are above the national average. This resulted in a larger sample, and a sample that is more racially/ethnically and linguistically diverse than the study conducted by Martin and colleagues (2016). A greater understanding of the associations between self-efficacy and food insecurity is important as there appears to be a spillover effect between parental and

child self-efficacy. Children from food insecure households appear to have lower self-efficacy to engage in healthy eating and physical activity (Godrich et al., 2019). Thus, self-efficacy influences the food security status of the entire family and can influence familial health-related outcomes.

Methods

Study participants

This study is part of a larger study examining patterns of food pantry usage among clients.

In 2022, 10 Atlanta-area (Georgia) and 10 Houston-area (Texas) food pantries were randomly selected based on their partnership with their respective food banks. Given the major aims from the larger study, pantries needed to meet the criterion of being a choice (n=5 per city) or non-choice (n=5 per city) as defined by their respective food banks. Within this criterion, pantries that were large enough to enable at least 75 interviews and were geographically diverse across the two service areas were selected. After selecting these pantries, the director of partner services for each respective food bank reached out to the pantry directors to inquire about their interest to participate. All pantries that were contacted agreed to participate.

Within the selected food pantries, study participants were recruited in-person and through printed flyers. Food pantry clients with an active profile in the food pantry attendance database, who were at least 18 years of age, and who spoke English or Spanish were eligible to participate. A total of 1,435 surveys were completed (n=685 in Atlanta and n=750 in Houston), and they were predominantly conducted in-person. Participants received a $25 gift card upon completion of the survey.

Among the 1,435 participants from Atlanta and Houston, 1,219 participants had complete data on the variables of interest for these analyses. Participants did not have missing data on the food insecurity nor on the self-efficacy variables. The 216 missing cases were all on covariates, with income being the variable with the most missing data (i.e. n=165 or 12% of participants from the total starting sample had missing data on income). Study participants with incomplete data (n=216) compared to those with complete data (n=1,219) were more likely to have a lower self-efficacy score and have more individuals living in their home. A greater proportion of participants that worked full-time and were from Atlanta were more likely to have incomplete data.

Measures

Food Insecurity

The 18-item USDA Food Security Scale was used to assess food security status in the past 12 months. Questions asked participants about running out of food, not having the funds to purchase more or an adequate amount of food, skipping meals, not eating enough, feeling hungry, and losing weight within the past year. If children were living in the participant's household, these questions were asked again referring to their children. Consistent with established cutoff criteria, participants were categorized as food insecure if they responded affirmatively to 3 or more questions (α=0.88 for this study) (Rabbit et al., 2023).

Grocery Shopping and Meal Preparation Self-Efficacy

A 6-item Self-efficacy for Food Security Scale developed by Martin et al (2016) based on Social Cognitive Theory (Bandura, 2004) was used to assess grocery shopping and meal preparation self-efficacy. Participants were asked how confident they were with: planning meals ahead of time, making food money last all month, making a shopping list

before shopping, comparing food item prices, and preparing cheap and healthy meals (Martin et al., 2016). Responses for each item were scored from 1= *not all confident* to 4 = *very confident* and summed to calculate a total score (α=0.65 for this study). Higher scores indicated greater self-efficacy related to grocery shopping and meal preparation.

Covariates

Covariates included age (years), sex (female vs. male), race/ethnicity [white, Hispanic (reference), Black, other], marital status [married vs. not married (reference)], educational attainment [less than high school diploma (reference), high school diploma, more than high school], employment status [full-time, part-time, unemployed/retired (reference)], household annual income [$0-$10,000 (reference), $10,001-$15,000, $15,001-$25,000, and ≥ $25,001], health insurance [private insurance, Medicare, Medicaid (reference), and uninsured], household size (continuous), language in which survey was conducted [Spanish vs. English (reference)], and city in which data was collected [Atlanta vs. Houston (reference)].

Analytical Strategy

Descriptive analysis was conducted over the full sample and bivariate analyses were conducted by food insecurity status. One-sample t-test was used to test age differences and Wilcoxon rank-sum (Mann Whitney) test was used to examine differences in self-efficacy and number of people in the household. Chi-squared tests were used for categorical variables. A covariate-adjusted logistic regression model was conducted to examine the association between grocery shopping and meal preparation self-efficacy and food insecurity. Standard errors in regression models were corrected to account for multiple observations within a pantry. All analyses were conducted using STATA software, version 16 (StataCorp, 2019).

Results

Participant characteristics

Across the full sample (N=1,219), the mean grocery shopping and meal preparation self-efficacy score was 20.73 (SD=3.35) out of 24, and 57.10% of participants experienced food insecurity (Table 1). On average, participants were 56.34 years old (SD=14.17), predominantly female (75.80%), Hispanic (44.05%) and Black (42.08%), not currently employed (53.73%), and 77.52% of the sample had an annual income of $25,000 or less. Compared to participants who experienced food security, participants who experienced food insecurity had a statistically significant lower grocery shopping and meal preparation self-efficacy score ($p < .001$).

Adjusted logistic regression results

The regression model corresponding to the association between grocery shopping and meal preparation self-efficacy and food insecurity, controlling for socio-demographic characteristics, is displayed in Table 2. Participants experienced 7% lower odds of food insecurity for each unit increase in grocery shopping and meal preparation self-efficacy (OR=0.93, 95% CI: 0.89-0.97, $p < .01$).

Sensitivity analysis

Prior research suggests that there are sex differences in grocery shopping, meal preparation, and cooking (Crane et al., 2019; Flagg et al., 2019; Mortimer, 2013; Storz et al., 2022; Taillie, 2018; Virudachalam et al., 2014). Specifically, women exhibit higher levels of grocery shopping and food preparation compared to males (Flagg et al., 2019; Storz et al., 2022). Previous studies also indicate that food purchasing behaviors differ by sex (Crane et

Table 1. Descriptive Statistics for the Analytic Sample and by Food Insecurity Status, N(%) or Mean (Standard Deviation) [Range]

	Analytic Sample (N=1,219)	Food Insecure (n=696)	Food Secure (n=523)
Grocery Shopping and Meal Preparation Self-efficacy			
Total Score	20.73 (3.35) [0-24]	20.43 (3.46) [3-24]	21.13 (3.16) [0-24]***
Food Insecurity Status			
Food Insecure	696 (57.10%)	696 (100%)	--
Food Secure	523 (42.90%)	--	523 (100%)
Sociodemographic Characteristics			
Age	56.34 (14.17) [19-92]	53.67 (13.98) [19-92]	59.90 (13.65) [19-88]***
Sex			
Female	924 (75.80%)	538 (77.30%)	386 (73.80%)
Male	295 (24.20%)	158 (22.70%)	137 (26.20%)
Race/Ethnicity			
White	102 (8.37%)	62 (8.91%)	40 (7.65%)
Hispanic (ref)	537 (44.05%)	337 (48.42%)	200 (38.24%)***
Black	513 (42.08%)	260 (37.36%)	253 (48.37%)***
Other	67 (5.50%)	37 (5.32%)	30 (5.74%)
Marital Status			
Married	514 (42.17%)	286 (41.09%)	228 (43.59%)
Not Married (ref)	705 (57.83%)	410 (58.91%)	295 (56.41%)
Educational Attainment			
Less than High School Diploma (ref)	390 (31.99%)	237 (34.05%)	153 (29.25%)
High School Diploma	359 (29.45%)	211 (30.32%)	148 (28.30%)
More than High School	470 (38.56%)	248 (35.63%)	222 (42.45%)*
Employment Status			
Full-Time	334 (27.40%)	190 (27.30%)	144 (27.53%)
Part-Time	230 (18.87%)	150 (21.55%)	80 (15.30%)**
Not Currently Employed (ref)	655 (53.73%)	356 (51.15%)	299 (57.17%)*
Household Annual Income			
$0-$10,000 (ref)	316 (25.92%)	184 (26.44%)	132 (25.24%)
$10,001-$15,000	285 (23.38%)	175 (25.14%)	110 (21.03%)
$15,001-$25,000	344 (28.22%)	205 (29.45%)	139 (26.58%)

≥ $25,001	274 (22.48%)	132 (18.97%)	142 (27.15%)**
Health Insurance			
Private Insurance	251 (20.59%)	121 (17.39%)	130 (24.86%)**
Medicare	219 (17.97%)	111 (15.95%)	108 (20.65%)*
Medicaid (ref)	472 (38.72%)	281 (40.37%)	191 (36.52%)
Uninsured	277 (22.72%)	183 (26.29%)	94 (17.97%)**
Household Size	2.37 (2.09) [0-12]		
Language Survey was Conducted			
Spanish	390 (31.99%)	247 (35.49%)	143 (27.34%)**
English (ref)	829 (68.01%)	449 (64.51%)	380 (72.66%)**
City			
Atlanta	544 (44.63%)	292 (41.95%)	252 (48.18%)*
Houston (ref)	675 (55.37%)	404 (58.05%)	271 (51.82%)*

ref = Reference category in the regression models
Significant differences between food insecure and food secure: ***$p < .001$; **$p < .01$; *$p < .05$.

Table 2. Adjusted Logistic Regression Model For The Association between Grocery Shopping and Meal Preparation Self-Efficacy and Food Insecurity (N=1,219), Odds Ratio (OR)[95%CI]

Grocery Shopping and Meal Preparation Self-efficacy		
Total Score	0.93**	[0.89,0.97]
Socio-demographic Characteristics		
Age	0.97***	[0.96,0.98]
Sex		
Female	1.07	[0.84,1.36]
Male	1.00	--
Race/Ethnicity		
White	1.08	[0.65,1.79]
Hispanic	1.00	--
Black	0.75	[0.50,1.12]
Other	0.97	[0.52,1.81]
Marital Status		
Married	0.71**	[0.56,0.89]
Not Married	1.00	--
Educational Attainment		
Less than High School Diploma	1.00	--
High School Diploma	1.04	[0.72,1.50]
More than High School	0.91	[0.62,1.33]
Employment Status		
Full-Time	0.87	[0.58,1.30]
Part-Time	1.15	[0.83,1.59]
Not Currently Employed	1.00	--
Household Annual Income		
$0-$10,000	1.00	--
$10,001-$15,000	1.31	[0.90,1.93]
$15,001-$25,000	1.01	[0.74,1.38]
≥ $25,001	0.62	[0.38,1.02]
Health Insurance		
Private Insurance	0.91	[0.74,1.12]
Medicare	1.19	[0.82,1.72]
Medicaid	1.00	--
Uninsured	1.16	[0.72,1.88]
# of People in Household	1.16**	[1.05,1.27]
Language Survey was Conducted		
Spanish	1.06	[0.69,1.63]
English	1.00	--
City		
Atlanta	1.16	[0.81,1.66]
Houston	1.00	--

*** $p < .001$; ** $p < .01$.

al., 2019; Mortimer, 2013). In addition, women cook more frequently than males (Taillie, 2018; Virudachalam et al., 2014). Thus, additional analyses were conducted to investigate whether the inverse association between grocery shopping and meal preparation self-efficacy and food insecurity differed for females and males. The regression models indicated a significant inverse association for both females (OR=0.95, 95% CI: 0.90-1.00, $p < .05$) and males (OR=0.88, 95% CI: 0.79-0.96, $p < .01$) (results not shown in the table).

Discussion

This study analyzed the association between grocery shopping and meal preparation self-efficacy and food insecurity among food pantry clients. Bivariate analyses suggested that households who experience food insecurity have a lower total score for grocery shopping and meal preparation self-efficacy compared to households who experience food security. Multivariate analyses on the full sample showed that higher grocery shopping and meal preparation self-efficacy predicted significantly lower odds of food insecurity. These findings are in line with Social Cognitive Theory (Bandura, 2004) and support both hypotheses. These results are consistent with literature which found that self-efficacy was greater among food secure populations and that food-related self-efficacy reduced food insecurity (Horning et al., 2021; Kamimura et al., 2017; Knol et al., 2019; Lyles et al., 2013; Martin et al., 2016; Seligman et al., 2010a; Vijayaraghavan et al., 2011).

Our research suggests that strengthening grocery shopping and meal preparation self-efficacy among populations at risk for food insecurity has the potential to reduce food insecurity among both females and males. Households with limited grocery shopping and meal preparation self-efficacy may not be optimizing their food purchases, resulting in food scarcity. The skills associated with increased confidence in grocery shopping and meal preparation may include 1) knowing how to substitute more expensive food items for less expensive food items; 2) taking advantage of food items on sale; 3) being able to consider how to use food items that are on sale to supplement prior food purchases; and 4) managing time needed to shop for food, engage in meal preparation, and cook. Individuals that have more confidence in these areas could use these skills during times of inflation and personal economic crisis. Targeting these skills could be achieved by programs aimed at reducing food insecurity and assisting underserved populations in developing essential skills such as creating grocery lists, comparing food prices, planning and preparing healthy meals, and effectively managing a budget. This is similar to previous literature that has underscored the significance of financial literacy and financial management skills as protective factors to maintain food security (Carman & Zamarro, 2016; Chang et al., 2017; Gundersen & Garasky, 2012; Jomaa et al., 2020; Millimet et al., 2018). By building these skills and increasing self-efficacy in grocery-shopping and meal preparation, food pantry clients, regardless of sex, could better meet the needs of their household while potentially improving their overall food security status. Thus, incorporating strategies to enhance grocery shopping and meal preparation self-efficacy, along with financial literacy and financial management skills, into programs targeting populations at-risk for experiencing food insecurity could further strengthen program participants' ability to address food insecurity effectively.

Because differences were not found by sex, the programs to enhance grocery

shopping and meal preparation self-efficacy can be inclusive of sex. Including both females and males in programs adds diversity that can help promote the sharing of ideas regarding food substitutions, food sales, and time management. However, there are challenges with creating programs despite the potential benefits. Individuals who attend food pantries often face barriers to attending pantries and related programs due to personal and public transportation challenges, childcare needs, and scheduling conflicts (Eigege et al., 2022; Freedman et al., 2016; Haynes-Maslow et al., 2015; Hernandez et al., 2021; Ritter et al., 2019). Thus, strategies to increase accessibility should be considered to ensure programs are effective.

It must be noted that grocery shopping and meal preparation could be influenced by other forms of economic hardship or unobserved characteristics not considered in the current analyses. For example, a financial strategy to lower a utility bill that is sometimes implemented by lower income individuals is to not use the stove and oven as often. This financial strategy positively addresses an economic hardship but may negatively influence grocery shopping and meal preparation self-efficacy. Further, the analyses are cross-sectional, and causality nor directionality can be implied. Last, both self-efficacy and food insecurity measures are self-reported, which increases social desirability bias. Yet, the bias in these measures may be in the opposite directions - self-efficacy biased upward and food insecurity biased downward – reducing the strength of the social desirability bias.

Implications for Health Behavior Research

Overall, these findings help provide insight into the relationship of self-efficacy and food security based on a racially/ethnically and linguistically diverse sample and from two large US urban areas. Given the links between food security and mortality, chronic disease, and mental health problems (Banerjee et al., 2021; Berryhill et al., 2019; Coakley et al., 2022; Hernandez et al., 2017; Koob et al., 2023; Murillo et al., 2017; Reesor-Oyer et al., 2023; Seligman et al., 2010b; Venci & Lee, 2018), improving food-related health behaviors associated with food insecurity has important implications for enhancing overall health and quality of life. Programs designed to improve grocery-shopping and meal preparation self-efficacy, in conjunction with financial literacy and financial management skills, should be prioritized as a strategy to reduce food insecurity and related health disparities and evaluated in future health behavior research.

Discussion Questions

This study has shown that grocery shopping and meal preparation self-efficacy can be an important factor of food insecurity based on the sample from two large urban areas. Will it be similar on the sample from rural areas? Why and why not?

What are cultural and socio-economic factors that need to be taken into consideration when designing a behavioral intervention to reduce food insecurity among low-income families? For example, what factors need to be included in the intervention to ensure the intervention is effective for families that are immigrants or mixed-status families (i.e., documented and undocumented immigrants)? Individuals with limited or low English literacy? Individuals with unreliable transportation? Individuals that need childcare? Individuals with non-traditional work hours? Now that you have taken all of this into consideration, what does a manageable intervention look like?

Families on the Supplemental Nutrition

Assistance Program (SNAP) often face barriers meeting work requirements. If a program that is designed to assist with budgeting for grocery shopping and meal preparation is included as a requirement to receive SNAP benefits, what are some key challenges and potential solutions?

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Ethical Approval Statement

This study was conducted according to the guidelines offered in the Declaration of Helsinki, and all participants were provided informed consent before participating in the study. All procedures involving research study participants were approved by Georgia State University and University of Texas Health Science Center at Houston.

Potential Author Conflicts

The Authors declare that there are no conflicts of interests.

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