



Published in final edited form as:

J Nutr Educ Behav. 2017 April ; 49(4): 296–303.e1. doi:10.1016/j.jneb.2016.11.010.

‘Stretching’ Food and Being Creative: Caregiver Responses to Child Food Insecurity

Michael P. Burke, PhD, MPH^{1,2}, Lauren H. Martini, MPH^{2,3}, Christine E. Blake, PhD, RD^{2,4}, Nicholas A. Younginer, PhD^{2,4}, Carrie L. Draper, MSW², Bethany A. Bell, MPH, PhD^{2,5}, Angela D. Liese, PhD^{2,3}, and Sonya J. Jones, PhD^{2,4}

¹US Department of Agriculture, Food and Nutrition Service, Alexandria, VA 22312

²Center for Research in Nutrition and Health Disparities, University of South Carolina, Columbia, SC 29208

³University of South Carolina, Arnold School of Public Health, Department of Epidemiology and Biostatistics, Columbia, SC 29208

⁴University of South Carolina, Arnold School of Public Health, Department of Health Promotion, Education, and Behavior, Columbia, SC 29208

⁵University of South Carolina, College of Social Work, Columbia, SC 29208

Abstract

Objective—To examine the strategies and behaviors caregivers use to manage the household food supply when their children experience food insecurity as measured by the US Department of Agriculture’s Household Food Security Survey Module.

Design—Cross-sectional survey with open-ended questions collected in-person.

Setting—Urban and non-urban areas, South Carolina, United States of America.

Participants—Caregivers who reported food insecurity among their children (n=746).

Phenomenon of Interest—Strategies and behaviors used to manage the household food supply.

Analysis—Emergent and thematic qualitative coding of open-ended responses.

Results—The top three strategies and behaviors to change meals were 1) changes in foods purchased or obtained for the household; 2) monetary and shopping strategies; and 3) adaptations in home preparation. The most frequently mentioned foods that were decreased were protein foods (e.g., meat, eggs, beans), fruits and vegetables. The most frequently mentioned foods that were

Corresponding Author Christine E. Blake, PhD, RD, Associate Professor, University of South Carolina, Arnold School of Public Health, Department of Health Promotion, Education, and Behavior, 915 Greene St, Room 549, Columbia, SC 29208, Phone: (803) 777-1484, ceblake@sc.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

increased were grains and starches (e.g., noodles), protein foods (e.g., beans, hot dogs) and mixed foods (e.g., sandwiches).

Conclusions and Implications—Caregivers use a wide variety of strategies and behaviors to manage the household food supply when their children are food insecure. Future work should examine how these strategies might affect dietary quality and well-being of food-insecure children.

Keywords

food insecurity; hunger; children; household food management

INTRODUCTION

In 2014, the children in nearly 11% of households with children experienced food insecurity.¹ Households with food insecurity among children typically report reduced dietary quality, variety or desirability and may report disrupted eating patterns and reduced food intake. The US Department of Agriculture (USDA) uses the Household Food Security Survey Module (HFSSM) to measure and monitor food insecurity at the household and child levels.¹ The HFSSM was developed using insights from qualitative interviews with adults and caregivers who described what food shortages looked and felt like.² These interviews showed that households used a variety of strategies and behaviors to cope with food insecurity. For example, when food insecurity was at its most severe point, caregivers reported relying on low-cost foods to feed their children or reducing the food intake of their children. Since 1995 when the HFSSM was first implemented nationally, it has been an excellent tool for measuring and monitoring household food insecurity, due in large part to its grounding in research, practice and widespread adoption.

Although the HFSSM measures broad changes in strategies and behaviors related to managing the dietary quality and quantity of household members, it does not provide information on exact changes to the household food supply. Of particular concern is how food insecurity might affect children's dietary quality and quantity. An assumption embedded in the HFSSM is that caregivers will first sacrifice their personal food quality and quantity before they do the same for their children.^{1,2} Little is known, however, about specific changes to children's food quality and quantity when caregivers can no longer buffer the effects of food insecurity. Some work has examined the strategies and behaviors caregivers use to obtain more food for the household or make the food that is available last longer when food insecurity occurs (i.e. 'stretching' food). For example, relying on federal nutrition programs such as the Supplemental Nutrition Assistance Program (SNAP), food banks and family and friends are common.³⁻⁵ No work, however, has specifically examined the behaviors and strategies used when caregivers affirm child-referenced HFSSM items. Examining these strategies and behaviors is important not only for a better understanding of the HFSSM but also for practitioners, researchers and policymakers who work on nutrition education.

Nutrition education for low-income populations emphasizes strategies and behaviors that maintain adequate dietary quality within a limited food budget. For example, SNAP

Education (SNAP-Ed, the nutrition education component of SNAP) has a goal “to improve the likelihood that persons eligible for SNAP will make healthy food choices within a limited budget.”⁶ (pg. 11) SNAP-Ed implementers have numerous well-evaluated nutrition education interventions that focus on policy, system, and environmental (PSE) changes to improve nutrition and food security such as increased awareness of federal nutrition assistance programs and social marketing campaigns that encourage healthy eating.⁷ Other resources, typically found through university agricultural extensions, advise families on issues such as using unit pricing to find lowest-cost foods, using smaller amounts of meat, poultry and fish and planning for leftovers. However, the frequency with which food-insecure caregivers use these strategies and behaviors is not known, especially when dealing with food insecurity among their children.

If nutrition education policies and programming seek to help reduce and eliminate food insecurity in children, then it is critical to first understand the behaviors and strategies used when caregivers report reductions in dietary quality and quantity among their children. The purpose of this study was to investigate the strategies and behaviors caregivers use to adjust the household food supply in reaction to food insecurity among their children. To serve this purpose, qualitative content analysis was used with a dataset that includes responses from caregivers who reported relying on low-cost foods to feed their children or cutting foods from their children’s diet because of a lack of financial resources.

METHODS

This study was part of a larger cross-sectional study that that investigated causes of very low food security in children (i.e., formerly known as food insecurity with child hunger). Details of the larger study can be found elsewhere,⁸ but essential components will be summarized here. Data were collected from March 2012 to May 2013. This study was approved by University of South Carolina Institutional Review Board for the Protection of Human Subjects.

Participant Recruitment

A recruitment-site sampling framework was used that focused on venues where families typically obtain food, with special consideration given to venues that capture households using nutrition assistance programs. These venues were conceptualized in the following manner: (1) traditional venues where families obtain food, such as grocery stores, convenience stores, farmers’ markets, dollar stores, daycare centers and other locations that accept SNAP or the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) benefits, and (2) emergency food-assistance venues, such as food pantries, food banks, family shelters and summer feeding sites. One notable exception to the sampling framework were schools, which were excluded because of the administrative burden of working with schools in the study area. Using databases provided by state and local agencies (e.g., food banks) and based on previous research in South Carolina,^{9,10} an initial list of 1,646 potential recruitment sites was generated, which was stratified by urban (n=776) and non-urban (n=870) areas. Next, Stata statistical software was used to randomly select an initial 40 urban and 40 non-urban sites for participant recruitment. These initial 80 sites were

chosen to provide enough variability in types of sites. Finally, we contacted each selected site to ask for permission to recruit. Sites were replaced at random when the site refused to participate, participant recruitment was not successful or recruitment of new families was exhausted. By the end of the study, 249 urban sites and 178 non-urban sites were contacted; 135 sites yielded screened participants. In addition, some participants were recruited by word-of-mouth from friends or family that were originally recruited from one of the recruitment sites.

At each recruitment site or over the phone, individuals were invited to complete a brief screening questionnaire. Verbal consent was obtained prior to administering the screener survey. To complete the screener fully and be eligible for the larger study, respondents had to (1) have a child under 18 years of age living in the household at least 50% of the time, (2) have a total household income less than \$100,000 per year and (3) live within an eight-county region in SC. The income limit of \$100,000 was used because it is ~300% of the federal poverty threshold for a family of four and captures families that are generally ineligible for federal assistance programs but might still struggle financially if they experienced an economic shock severe enough to cause food insecurity. Eligible participants were then administered the USDA 18-item HFSSM.

Measures

Demographic information—As part of the screener, limited demographic information was collected. In addition to the eligibility criteria already mentioned, each participant reported their race and ethnicity and home address. Based on this information, a race and ethnicity variable (non-Hispanic white; non-Hispanic African American; or other) was constructed. The other race category was not further defined because we had very few participants in this category (2.3%). Using a respondent's home address, an urbanicity variable was constructed. Participants who lived in a city center were coded as urban, and those who lived outside of a city center were coded as non-urban.

Household food security status—The USDA's 18-item HFSSM was used to assess household food security status. The HFSSM measures experiences with worrying about food shortages, reduced quality and quantity of food in the household and hunger among both adults and children in the previous 12 months. Household food security status of households was classified in the following manner: (1) food secure (affirming two or fewer items), (2) food insecure (affirming three or more items but fewer than five of the child-level items; this corresponds to the USDA label of 'low food security without very low food security in children') or (3) very low food security (VLFS) among children (affirming five or more child-level items). The HFSSM is a standard measure of food security in the US and is valid, reliable and widely used.^{1,2,11}

Follow-up questions

Two follow-up questions were added to the end of the HFSSM if participants affirmed certain child-level HFSSM items. The purpose of these follow-up questions was to elicit the strategies and behaviors caregivers use to adjust the household food supply in reaction to food insecurity among their children. These two follow-up questions were pilot-tested in a

small sample of caregivers (n=10). The pilot testing included reading the question to the participant and allowing the participant to comment on the clarity, comprehension, and relevance of the question. The results of the pilot testing were used to assess if the questions needed to be modified and the results are described below along with a description of each follow-up question.

Reliance upon low-cost foods to feed children—Participants who affirmed the HFSSM item “We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food” were asked an open-ended follow-up question: “You mentioned that sometimes your family has to rely on a few low-cost foods to feed your children because there was not enough money to buy food. How do you change the meals in your household when this occurs?” A variant of this question was pilot-tested where instead of asking “How do you change the meals in your household when this occurs,” we asked “Tell me the low-cost foods you rely upon.” Instead of describing specific low-cost foods, participants would describe how they changed their children’s meals and did not solely focus on low-cost foods. Therefore, we decided that the follow-up question should focus on changes to meals rather than specific low-cost foods.

Cutting children’s meal size—Participants who affirmed the item “In the last 12 months, did you ever cut the size of any of the children’s meals because there wasn’t enough money for food?” were asked an open-ended follow-up question: “You mentioned that sometimes you have to cut the size of your children’s meals because there was not enough money for food. Tell me about the foods you usually cut.” This question performed well in pilot testing and was not modified.

Analytic Approach

Participant responses to each follow-up question were manually typed in real-time into a database during the screening process. Four master or doctorate level students in public health and social work collected participant responses. The students received in-person and in-field training in qualitative data collection from a Master of Social Work researcher with previous qualitative data collection experience. Further, study staff, except for one person, had completed at least one research methods course as a part of their field of study, which included qualitative methods. The one person who helped complete screening surveys without this level of education received extensive training in the field before conducting any data collection on their own. The typed responses were exported to Microsoft Excel. Participant responses to each follow-up question were used as the source for participant strategies and behaviors as well as foods increased and decreased in children’s meals. Emergent coding¹² was used to first identify strategies and behaviors caregivers used to adjust the household food supply in reaction to child food insecurity. Three researchers coded the qualitative data. All steps in the coding process involved multiple coders and extensive peer review of themes and assignment of text passages. One coder (LM) conducted the initial emergent coding to first identify strategies and behaviors caregivers used to adjust the household food supply in reaction to child food insecurity. A second coder (CB) reviewed the coding and adjusted the emergent code list. A third coder (MB) reviewed the emergent code list and provided guidance on the interpretation of passages and code list.

During the emergent coding process, it became clear that participants mentioned strategies and behaviors for cutting children's meal size when asked about relying on low-cost foods and vice versa. This was true even when participants answered only one of the follow-up questions. Many participants described the same strategies or behaviors in reaction to relying on low-cost foods or cutting the size of their children's meals. Therefore, the responses to the two questions were merged and coded for strategies and behaviors across all responses. Participants could list multiple strategies or behaviors per follow-up question. Upon completion of emergent coding, the code list and the full coded data set was shared with the entire research team. The research team then reviewed the code list and assignment of passages to codes and provided further revisions and guidance on next steps.

The first coder then used thematic coding techniques¹² to place strategies and behaviors into two categories: 1) broad strategies and behaviors that affected the overall household food supply; and 2) behaviors related to decreasing or increasing specific foods. Within each of these categories, primary and subcategories were coded. For example, the primary category 'changes in foods purchased or obtained for household meals' was created, which was further refined into the subcategories 'prioritize some foods (e.g., hot dogs, noodles, chicken, rice, beans, potatoes, bread and grits)' or 'use foods that can be 'stretched' (e.g., stews, soups, casseroles, pasta, bean or rice dishes)'. As another example, the primary category 'increasing or decreasing dairy' was created, which was further refined into the subcategories 'milk', 'cheese' or 'yogurt'. The second (CB) coder again reviewed the coding and adjusted codes after discussion with the full coding team (LM and MB). The number of instances respondents mentioned the primary and subcategories was counted, as well as their relative frequencies (i.e., number of instances a strategy or behavior was mentioned divided by the total number of strategies and behaviors mentioned). At this point the new code list, the full coded data set, and preliminary findings was again shared with the entire research team. The purpose of this analysis methodology was to enumerate the qualitative strategies and behaviors respondents used while maintaining the integrity of the respondents' own experiences.

RESULTS

Seven hundred and forty-six participants affirmed at least one of the two child food insecurity items; 11 provided responses to the follow-up question about cutting foods only; 221 provided responses to the follow-up question about changes to meals only; and 514 provided responses to both follow-up questions (Table 1). Thirty-five percent of the sample had VLFS among children; 61% lived in an urban area; and 80% were African American. We initially stratified the analysis by food security status (food-insecure households where children were experiencing VLFS compared to food-insecure households where children were not experiencing VLFS). Upon comparing the stratified to non-stratified analyses, the authors found that the frequency of strategies and behaviors to be nearly identical with no considerable differences; therefore, only the non-stratified analysis are presented.

Participants mentioned a total of 1,354 strategies and behaviors to adjust the household food supply in reaction to child food insecurity, and these were grouped into five primary categories (n=735; Table 2). 'Changes in foods purchased or obtained for household's

meals' was the most frequent primary strategy or behavior mentioned (n=773) and had the greatest share of total mentions (57%). Common subcategories within this category included 'prioritize some foods (e.g., hot dogs, noodles, chicken, rice, beans, potatoes, bread and grits)' (n=239; 17%) and 'use foods that can be 'stretched' (e.g., stews, soups, casseroles, pasta, bean or rice dishes)' (n=206; 15%). 'Monetary and shopping strategies' was the second most frequent primary strategy or behavior mentioned (n=245). Common subcategories within this category included 'buy according to price (e.g., sale, cheapest and store brands)' (n=191; 14%) and 'shop at budget stores' (n=30; 2%). 'Changes in household meal patterns' was the third most frequent primary strategy or behavior mentioned (n=194; 14%). Common subcategories within this category included 'serve smaller portions at meals' (n=125; 9%) and 'cut adult portions or adult does not eat at all' (n=22; 2%). 'Adaptations in home preparations' was the fourth most frequent primary strategy or behavior (n=130; 9%). Common subcategories within this category included 'be creative/make stuff up/use what we have' (n=92; 6%) and 'make use of leftovers and freeze meals' (n=21; 2%).

Caregivers reported a total of 1,365 behaviors related to decreasing or increasing specific foods in their children's meals, and these were grouped into 11 primary categories (n=525; Table 3). Protein foods were the most commonly mentioned decreased food (n=322; 57%), specifically meat (non-specific type) (n=254; 45%), beef (n=14; 2.5%), chicken or turkey (n=22; 3.9%) and pork or bacon (n=10; 1.8%). Vegetables were the second most commonly mentioned decreased food (n=66; 11%), followed by grains and starches (n=63; 11%). Within grains and starches, commonly mentioned decreased foods were breads (n=17; 3%) and rice (n=20; 3.5%). The least likely primary behaviors for decreasing foods were decreasing baby food or formula (n=3; <1%) and decreasing fats or oils (n=2; <1%). Grains and starches were the most commonly mentioned increased foods (n=365; 45%), specifically noodles (n=140; 17%) and rice (n=76; 9%). Protein foods were the second most commonly mentioned increased foods (n=208; 26%), specifically hot dogs (n=47; 6%) and beans (n=52; 6%). Mixed dishes were the third most commonly mentioned increased foods (n=152; 19%), specifically sandwiches (unknown type) (n=40; 5%), cold cut sandwiches (n=28; 3%) and peanut butter and jelly sandwiches (n=40; 5%). The least likely foods to be increased were fruits (n=4; <1%) and dairy (n=12; 1%).

DISCUSSION

This study found that caregivers who report food insecurity among their children use many strategies and behaviors previously documented in the literature. For example, Kempson and colleagues³ used data collected from focus groups with low-income individuals to categorize strategies and behaviors in the following manner: relying on community resources; interacting with informal support systems; supplementing financial resources; lowering food costs by using shopping strategies; managing the household food supply; and regulating eating patterns. Anater and colleagues⁴ collected survey data from a sample of low-income mostly food-insecure individuals who were using emergency food assistance. They found that the top three strategies and behaviors engaged in during the 12 months prior to survey administration were going to a food pantry; buying foods because they were on sale; and making meals with low-cost foods. Other work among low-income and food-insecure

populations shows common strategies and behaviors that include relying on food banks, using coupons or buying discounted foods, shopping at low-cost stores, relying on friends, family and neighbors, 'stretching' existing food over more meals, eating less, budgeting household financial resources and using federal nutrition assistance programs.^{13,14} A distinction between the current study and previous studies is that only caregivers whose children were experiencing food insecurity were included, and strategies and behaviors were only asked about when caregivers affirmed certain HFSSM items. Previous studies instead asked about strategies and behaviors among participants with and without children, among those who were food secure or food insecure and not in response to HFSSM items. Given these differences, it was possible for the current study to find strategies and behaviors distinct from those reported previously. The strategies and behaviors used by caregivers of food-insecure children, however, were similar to those in other studies with more demographically inclusive populations. It is possible that the strategies and behaviors individuals use in reaction to food shortages remain the same regardless of who in the household is affected. Future work should examine strategies and behaviors used in reaction to food insecurity within households with and without children, as well as in households with and without food insecurity among children.

Caregivers reported a variety of changes to their children's meals in reaction to food insecurity. For example, the most commonly decreased foods in reaction to food insecurity among children were protein foods, specifically meat, followed by fruits and vegetables. The most commonly increased foods to cope with food insecurity among children were grains and starches (mostly noodles) and low-cost protein foods, particularly beans and hot dogs. The types of foods increased or decreased in reaction to food insecurity in children have several implications. First, the literature on dietary quality of children living in food-insecure households is mixed, and our study might help guide future work in this area. Hanson and Connor¹⁵ did a systematic review of the literature on the association between children's dietary quality and household food insecurity. They found substantial evidence for lower fruit consumption among children in food-insecure households but less evidence for grains, vegetables, dairy and sweets. Furthermore, according to Hanson and Connor, only 16% of studies find an adverse association between dietary quality and food insecurity. Caregivers reported decreasing and increasing a wide range of foods in their children's diets to cope with food insecurity, and the effects these changes have on children's diets likely vary substantially. For example, decreasing some protein foods and increasing other protein foods were commonly reported reactions to food insecurity among children. Many caregivers reported decreasing fruits and vegetables in reaction to food insecurity in their children. Children in low-income households do not meet fruit and vegetable intake,¹⁶ and our results suggest that child food insecurity might contribute to this disparity. The effects of the different kinds of changes on overall diet quality, physical health and caregiver and child psychological well-being are not known. It is possible that families that decrease consumption of red meats with high saturated fats and replace them with a healthier protein (e.g., legumes) have a net gain in overall nutritional quality. But the possible negative psychological effect of cutting meat or using low-cost proteins within the context of household food insecurity must also be considered. Many adults view meat as a necessary part of each meal, and its involuntary absence is considered detrimental to well-being.^{17,18} It

should be emphasized that changes to dietary quality because of food insecurity may have either positive or negative effects on dietary quality but may also have psychological implications. Future work should consider the exact changes to household members' diets in reaction to food insecurity and how they affect not only dietary quality but also psychological well-being.

This study has limitations that should be noted. First, the number of times a participant mentioned a strategy or behavior was measured, but not the extent to which each behavior occurred. For example, a participant might have mentioned that they "used coupons" or "increased breads," but it is not known how often they used coupons or how much they increased bread consumption. In addition, it is not known how long households used these strategies and behaviors. It is possible that households adapt their strategies and behaviors over time. Future work should quantify these behaviors and strategies to better capture their frequency and extent, as well as examine if they change over time. Second, a qualitative approach was used in this study. Qualitative methods are appropriate when the research questions seek to understand participant's experiences or perceptions and to capture these perceptions in their own words. The strategies that emerged from data collected in this study were from open-ended questions that were not designed to provide insight into statistical frequencies or differences. Future work could build upon our findings using quantitative methods and examine if there are significant difference in strategies and behavior between population groups and how these differences might relate to nutritional outcomes. Third, the sampling framework used was not meant to be representative of any population but, rather, to be large and diverse enough to capture considerable variation in participant characteristics. Therefore, findings from this might not be generalizable to other food-insecure households or populations. Finally, data were collected in-person and on-location during recruitment. In other words, it was not possible to do formal in-depth interviews with respondents to gain a deeper understanding of strategies and behaviors. In addition, some respondents might have not felt as comfortable answering questions in front of the interviewer, especially because of the social stigma of not being able to afford enough food for children in the household.

This study also has strengths that should be noted. First, strategies and behaviors among food-insecure households with children who all had some indication of child food insecurity as indicated by specific HFSSM items were examined. No other study has examined this population in such a way, and this study provides valuable insights into the strategies and behaviors used in reaction to child food insecurity. Second, participants could use their own words and thoughts when answering the questions. This allowed a wide range of strategies and behaviors to be captured from the perspective of those that perform them. Third, each participant was asked the same questions, allowing for standardization in data collection. Finally, this study provides insight into how participants interpret certain child HFSSM items, which is relevant for refinement of the HFSSM.

IMPLICATIONS FOR PRACTICE AND RESEARCH

Common strategies and behaviors suggested by nutrition educators to consume a healthy diet on a limited budget include making ingredient substitutions, using protein alternatives

and shopping for sales or coupons. Caregivers of food-insecure children were found to be already using many of these suggested strategies and behaviors. This study shows that such nutrition education suggestions reflect practiced strategies and behaviors within a food-insecure population. However, these findings could also show that these strategies and behaviors are not sufficient to buffer against the effects of having a limited budget in relation to food insecurity. That is, although many respondents use these strategies and behaviors, they are still food insecure (although possibly less food insecure than they would have been if not using any of the strategies or behaviors). While person-level SNAP-Ed is effective in reducing food insecurity,¹⁹ it is likely that a more comprehensive approach to addressing food insecurity in children through nutrition education is needed. PSE changes have become a recommended strategy for use in public health and SNAP-Ed, and many nutrition education interventions that use PSE strategies would likely increase food security as well. For example, the SNAP-Ed toolkit,⁷ which provides practitioners with numerous PSE strategies, suggests increasing access to school federal nutrition assistance programs, supporting development of wellness councils, promoting community gardens and increasing access to healthy food in retail settings. Each of these strategies may strengthen and support individual strategies and behaviors in reaction to food insecurity. Future research should examine if PSE strategies strengthen individual strategies and behaviors in reaction to food insecurity.

Acknowledgments

This project was supported with a grant from the University of Kentucky Center for Poverty Research (UKCPR) through funding by the US Department of Agriculture, Food and Nutrition Service, contract number AG-3198-B-10-0028. Michael P. Burke completed this study as a doctoral student at the University of South Carolina, Arnold School of Public Health, Department of Health Promotion, Education, and Behavior. The opinions and conclusions expressed herein are solely those of the authors and should not be construed as representing the opinions or policies of the UKCPR or the US Department of Agriculture, Food and Nutrition Service.

References

1. Coleman-Jensen, A., Rabbitt, MP., Gregory, C., Singh, A. Household Food Security in the United States in 2014. Washington, DC: U.S Department of Agriculture, Economic Research Service; 2015.
2. National Research Council. Food Insecurity and Hunger in the United States: An Assessment of the Measure. Washington, DC: The National Academies Press; 2006.
3. Kempson K, Keenan DP, Sadani PS, Adler A. Maintaining food sufficiency: coping strategies identified by limited-resource individuals versus nutrition educators. *J Nutr Educ Behav.* 2003; 35(4):179–188. [PubMed: 12859882]
4. Anater A, McWilliams R, Latkin C. Food acquisition practices used by food-insecure individuals when they are concerned about having sufficient food for themselves and their households. *J Hunger Environ Nutr.* 2011; 6(1):27–44.
5. Eikenberry N, Smith C. Attitudes, beliefs, and prevalence of dumpster diving as a means to obtain food by Midwestern, low-income, urban dwellers. *Agric Human Values.* 2005; 22(2):187–202.
6. United States Department of Agriculture. Supplemental Nutrition Assistance Program Education Plan Guidance FY 2017---Nutrition Education & Obesity Prevention Grant Program. Washington, DC: U.S. Department of Agriculture; 2016.
7. U.S. Department of Agriculture. SNAP-Ed Strategies & Interventions: An Obesity Prevention Toolkit for States. Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service; 2016.

8. Liese AD, Draper CL, Martini L, et al. Recruitment strategies and participation in a study of childhood hunger. *J Hunger Environ Nutr.* 2016;1–18. [PubMed: 28491205]
9. Liese AD, Colabianchi N, Lamichhane AP, et al. Validation of 3 food outlet databases: completeness and geospatial accuracy in rural and urban food environments. *Am J Epidemiol.* 2010; 172(11): 1324–1333. [PubMed: 20961970]
10. Liese AD, Barnes TL, Lamichhane AP, Hibbert JD, Colabianchi N, Lawson AB. Characterizing the food retail environment: impact of count, type, and geospatial error in 2 secondary data sources. *J Nutr Educ Behav.* 2013; 45(5):435–442. [PubMed: 23582231]
11. Gundersen C, Ziliak JP. Food insecurity and health outcomes. *Health Aff.* 2015; 34(11):1830–1839.
12. Hsieh H, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res.* 2005; 15(9):1277–1288. [PubMed: 16204405]
13. Ahluwalia IB, Dodds JM, Baligh M. Social support and coping behaviors of low-income families experiencing food insufficiency in North Carolina. *Heal Educ Behav.* 1998; 25(5):599–612.
14. Jarrett OL, Bahar OS, Odoms-Young A, Jarrett RL, Sensoy Bahar O, Odoms-Young A. “You just have to build a bridge and get over it”: Low-income African American caregivers’ coping strategies to manage inadequate food supplies. *J Poverty.* 2014; 18(2):188–219.
15. Hanson KL, Connor LM. Food insecurity and dietary quality in US adults and children: a systematic review. *Am J Clinical Nutr.* 2014; 100(2):684–692.
16. Lorson BA, Melgar-Quinonez HR, Taylor CA. Correlates of fruit and vegetable intakes in US children. *J Am Diet Assoc.* 2009; 109(3):474–478. [PubMed: 19248865]
17. Szurek SM. Social identity and food choice in the Southeastern United States. *Nutr Anthr.* 2005; 27(1–2):23–37.
18. Douglas, M. *Deciphering a Meal.* Counihan, C., Van Esterik, P., editors. New York, NY: Routledge; 1997.
19. Eicher-Miller HA, Mason AC, Abbott AR, McCabe GP, Boushey CJ. The effect of food stamp nutrition education on the food insecurity of low-income women participants. *J Nutr Educ Behav.* 2009; 41(3):161–168. [PubMed: 19411049]

Table 1

Sociodemographic characteristics of caregivers who affirmed specific child-level items in the US Department of Agriculture's Household Food Security Module (HFSSM) (n=746)

| | <u>Number of caregivers (percentage)</u> |
|---|--|
| Food security ¹ | |
| Food insecure | 480 (64.3) |
| Very low food security among children | 266 (35.7) |
| Urbanicity | |
| Non-urban | 290 (38.8) |
| Urban | 456 (61.1) |
| Race/ethnicity | |
| Non-Hispanic African American | 601 (80.6) |
| Non-Hispanic white | 128 (17.2) |
| Other | 17 (2.3) |
| HFSS child-level items affirmed | |
| Reliance on low-cost food item only ² | 221 (29.6) |
| Cutting children's meal size item only ³ | 11 (1.5) |
| Both reliance on low cost food and cutting children's meal size items | 514 (68.9) |

¹Food-insecure households are those that affirmed three or more items in the 18-item HFSSM but did not have very low food security among children. Very low food security among children households affirmed five or more of the child-reference items in the HFSSM.

²Full item text "We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food. Was that often, sometimes, or never true for you in the last 12 months?"

³Full item text "In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food?" (Response options: yes or no.)

Strategies and behaviors caregivers used to adjust the household food supply in reaction to food insecurity among their children (n=735)[†]

Table 2

| Strategies and behaviors used to change children's meals | Times strategy mentioned | Percent of times mentioned |
|--|--------------------------|----------------------------|
| Changes in foods purchased or obtained for household meals | 773 | 57.1 |
| Prioritize some foods (e.g., hot dogs, noodles, chicken, rice, beans, potatoes, bread and grits) | 239 | 17.7 |
| Use foods that can be 'stretched' (e.g., stews, soups, casseroles, pasta, bean or rice dishes) | 206 | 15.2 |
| Eat more sandwiches to simplify meals | 64 | 4.6 |
| Use more canned goods | 56 | 4.1 |
| Cut quantity and quality of meats | 54 | 4.0 |
| Food banks, church food pantries, food giveaways | 45 | 3.3 |
| Borrow food or money (e.g., from family, friends, neighbors) | 40 | 2.9 |
| Cut some foods (exact foods not specified) | 28 | 2.0 |
| More processed and fast foods over fresh foods (e.g., boxed and canned dinners, dollar menus) | 23 | 1.7 |
| Child food preferences come first | 10 | 0.7 |
| Use of federal nutrition assistance programs | 5 | 0.4 |
| Garden to supplement food supply | 3 | 0.2 |
| Monetary and shopping strategies | 245 | 18.1 |
| Buy according to price (e.g., sale, cheapest and store brands) | 191 | 14.1 |
| Shop at budget grocery stores (e.g., Walmart, Aldi, Save-a-lot) | 30 | 2.2 |
| Buy foods in bulk, especially meats | 14 | 1.0 |
| Budget finances to stretch funds over a month | 4 | 0.3 |
| Use coupons | 3 | 0.2 |
| Use utility and other bill money for food purchases | 2 | 0.1 |
| Sell plasma for money to buy food | 1 | 0.1 |
| Changes to household meal patterns | 194 | 14.3 |
| Serve smaller portions at mealtime | 125 | 9.2 |
| Reduce adult portions or adult does not eat at all | 22 | 1.6 |
| Change meal times and frequency to 'stretch' food | 21 | 1.5 |
| Have breakfast foods any time of day | 14 | 1.0 |

| Strategies and behaviors used to change children's meals | Times strategy mentioned | Percent of times mentioned |
|--|--------------------------|----------------------------|
| Children and parents drink more to get full | 7 | 0.5 |
| More snacks to ease hunger | 4 | 0.3 |
| First come first serve | 1 | 0.1 |
| <hr/> | | |
| Adaptations in home preparation | 130 | 9.6 |
| <hr/> | | |
| Be creative, make stuff up or use what we have | 92 | 6.6 |
| Make use of leftovers and freeze meals | 21 | 1.6 |
| Prepare simpler meals with fewer ingredients | 7 | 0.5 |
| Cook less or more | 5 | 0.4 |
| Plan meals each week | 5 | 0.4 |
| <hr/> | | |
| Try to make do/don't know/do not cut back | 12 | 0.8 |

¹Each participant could list multiple strategies and behaviors. There were 1,354 total strategies and behaviors mentioned from 735 participants. Primary strategies and behaviors, as well as subcategories, are listed in descending order. Caregivers were asked "You mentioned that sometimes your family has to rely on a few low-cost foods to feed your children because there was not enough money to buy food. How do you change the meals in your household when this occurs?" or "You mentioned that sometimes you have to cut the size of your children's meals because there was not enough money for food. Tell me about the foods you usually cut." if they affirmed either "We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food. Was that often, sometimes, or never true for you in the last 12 months?" or "In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food?" (response options: yes or no) in the US Department of Agriculture's Household Food Security Survey Module.

Table 3 Foods increased or decreased in children's meals by caregivers in reaction to food insecurity among their children (n=525)^a

| | Decrease | Increase |
|--|-----------|------------|
| Total mentions of decreasing or increasing foods (percent of total mentions) | 563 | 802 |
| All foods | 5 (0.9) | 0 (0) |
| Baby food or formula | 3 (0.5) | 0 (0) |
| Dairy | 21 (3.7) | 12 (1.4) |
| Milk | 14 (2.5) | 8 (0.9) |
| Cheese | 2 (0.4) | 3 (0.3) |
| Yogurt, pudding or ice cream | 3 (0.5) | 0 (0) |
| All dairy products | 2 (0.4) | 1 (0.1) |
| Fats or oils | 2 (0.4) | 0 (0) |
| Fruits | 32 (5.7) | 4 (0.4) |
| Fruit | 20 (3.5) | 4 (0.4) |
| Fresh fruit | 4 (0.7) | 0 (0) |
| Fruit juice | 8 (1.4) | 0 (0) |
| Grains and starches | 63 (11.2) | 365 (45.5) |
| Breads | 17 (3.0) | 33 (4.1) |
| Rice | 20 (3.5) | 76 (9.4) |
| Cereals | 6 (1.1) | 27 (3.3) |
| Potatoes | 7 (1.2) | 27 (3.3) |
| Oatmeal | 0 (0) | 8 (0.9) |
| Pasta | 2 (0.4) | 17 (2.1) |
| Noodles | 1 (0.2) | 140 (17.4) |
| Pancakes | 0 (0) | 2 (0.2) |
| Grits | 0 (0) | 29 (3.6) |
| Crackers or popcorn | 0 (0) | 4 (0.4) |

| | Decrease | Increase |
|---|------------|------------|
| All grains and starches | 10 (1.8) | 2 (0.2) |
| Junk food and sweets | 34 (6.0) | 14 (1.7) |
| Snacks | 10 (1.8) | 2 (0.2) |
| Junk food | 6 (1.1) | 0 (0) |
| Dessert or sugar | 9 (1.6) | 3 (0.3) |
| Sugar-sweetened beverages | 7 (1.2) | 6 (0.7) |
| French fries or potato chips | 2 (0.4) | 3 (0.3) |
| Mixed foods | 16 (2.8) | 152 (18.9) |
| Cold cut sandwiches | 2 (0.4) | 28 (3.4) |
| Peanut butter and jelly sandwiches | 0 (0) | 22 (2.7) |
| Any sandwich | 1 (0.2) | 40 (4.9) |
| Burritos, tacos, pizza, hot pockets or TV dinners | 4 (0.7) | 16 (1.9) |
| Casseroles, canned entrees, canned foods or hash | 1 (0.2) | 10 (1.2) |
| Soup or chili | 0 (0) | 17 (2.1) |
| Hamburger or tuna helper or mac and cheese | 3 (0.5) | 19 (2.3) |
| Side items | 5 (0.9) | 0 (0) |
| Protein foods | 321 (57.1) | 208 (25.9) |
| Meat (non-specific type) | 254 (45.0) | 8 (0.9) |
| Eggs | 6 (1.1) | 12 (1.4) |
| Beans | 4 (0.7) | 52 (6.4) |
| Fish | 5 (0.9) | 12 (1.4) |
| Hot dogs | 4 (0.7) | 47 (5.8) |
| Peanut butter | 2 (0.4) | 3 (0.3) |
| Beef | 14 (2.5) | 21 (2.6) |
| Chicken or turkey | 22 (3.9) | 43 (5.3) |
| Pork or bacon | 10 (1.8) | 10 (1.2) |
| Vegetables | 66 (11.7) | 40 (4.9) |

| | Decrease | Increase |
|-------------------|-----------------|-----------------|
| Vegetables | 57 (10.1) | 30 (3.7) |
| Canned vegetables | 1 (0.2) | 7 (0.8) |
| Fresh vegetables | 8 (1.4) | 3 (0.3) |
| Water | 0 (0) | 7 (0.8) |

Each participant could list multiple increases or decreases within and across each of the food groups. There were 1,365 total increases or decreases mentioned from 525 participants. Primary food group categories are listed alphabetically, and subcategories are listed in descending order. Caregivers were asked “You mentioned that sometimes your family has to rely on a few low-cost foods to feed your children because there was not enough money to buy food. How do you change the meals in your household when this occurs?” or “You mentioned that sometimes you have to cut the size of your children’s meals because there was not enough money for food. Tell me about the foods you usually cut.” if they affirmed either “We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food. Was that often, sometimes, or never true for you in the last 12 months?” or “In the last 12 months, did you ever cut the size of any of the children’s meals because there wasn’t enough money for food?” (response options: yes or no) in the US Department of Agriculture’s Household Food Security Survey Module.