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## Monthly SNAP benefit duration and its association with food security, hunger-coping, and physiological hunger symptoms among low-income families

Eric E. Calloway

*Gretchen Swanson Center for Nutrition*, [ecalloway@centerfornutrition.org](mailto:ecalloway@centerfornutrition.org)

Hollyanne E. Fricke

*Gretchen Swanson Center for Nutrition*, [hfricke@centerfornutrition.org](mailto:hfricke@centerfornutrition.org)

Courtney A. Pinard

*Gretchen Swanson Center for Nutrition and University of Nebraska Medical Center*,  
[cpinard@centerfornutrition.org](mailto:cpinard@centerfornutrition.org)

Teresa M. Smith

*Gretchen Swanson Center for Nutrition*, [tsmith@centerfornutrition.org](mailto:tsmith@centerfornutrition.org)

Amy L. Yaroch

*Gretchen Swanson Center for Nutrition and University of Nebraska Medical Center*,  
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[ayaroch@centerfornutrition.org](mailto:ayaroch@centerfornutrition.org)

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## Monthly SNAP benefit duration and its association with food security, hunger-coping, and physiological hunger symptoms among low-income families

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## Introduction

The Supplemental Nutrition Assistance Program (SNAP) is the largest federal safety net for hunger and food insecurity in the United States.<sup>1</sup> SNAP has a broad reach in its ability to provide financial resources for supporting food purchasing to over 47 million people, among which approximately 21 million are children.<sup>1</sup> Several studies have indicated that SNAP plays an important role in reducing food insecurity.<sup>2-5</sup> However, concerns have been raised about current SNAP allotments and how they may not fully take into account all the factors that contribute to financial hardship, especially among families with children.<sup>6</sup>

Monthly SNAP allotment amounts are primarily calculated based on income and household size.<sup>7</sup> The household income amount used to determine allotments is the “net monthly income,” that is, the income after some household expenses are deducted. These deductions can include dependent childcare costs, child support payments, medical expenses for older adults or disabled individuals, and shelter expenses. A maximum allotment amount is set based on household size, of which a portion (i.e., 0.30 multiplied by net income) is deducted. The resulting figure is the amount that household will be allotted each month in SNAP benefits. Therefore, for families with no net income, SNAP will cover all of their projected monthly food expense. For families with a net income, SNAP will cover only a portion of their projected monthly food expense. However, the current calculation of allotment amounts does not take into account many other factors, such as other household expenses, food access, regional price fluctuations, household structure (e.g., ratio of children to adults or single parent vs. two-parent households), and time constraints (e.g., work schedules) that may affect families’ food purchasing budgets.<sup>8-10</sup>

Monthly SNAP benefit duration is defined as the number of weeks each month a household’s SNAP benefits provide sufficient food and may serve as a proxy measure to assess allotment adequacy in the context of food insecurity and hunger. If allotment amounts are not adequate to meet family needs, SNAP benefits may not sufficiently address food insecurity and hunger. Additionally, when SNAP benefits run out for the month, participants may engage in a variety of behaviors to cope with hunger and feed themselves and their families. Some common “hunger-coping” strategies include rationing the food supply by eating less, modifying food spending, skipping payment of bills, and/or acquiring food through less socially acceptable ways such as eating discarded food.<sup>11-13</sup>

The purpose of this study was to examine relationships between monthly SNAP benefit duration and 5 primary outcome variables: food security, three hunger-coping behavior scales (rationing food supplies,

financial strategies, and making trade-offs), and physiological hunger symptoms, among a sample of families with children (aged 0-18 years) currently receiving SNAP benefits.

### **Methods**

Cross-sectional baseline data were collected in the spring and summer of 2014 as part of a community-based childhood hunger alleviation initiative in a city in the midwestern United States. Survey respondents were parents recruited at venues in areas where low-income families lived and spent time (e.g., public libraries and food pantries). Eligible participants were 19 years of age and older and were parents or primary caregivers to at least one child (aged 18 or younger) living in the same household 50% of the time or more. The current study includes a subsample of participants who reported currently receiving SNAP benefits and who also provided complete data for the primary variables in the analyses (N = 161).

Each participant completed a survey that assessed hunger-coping behaviors, food assistance, food pantry use, diet intake frequency, food security status, possession of food preparation equipment, transportation, and sociodemographics and family characteristics. Survey items were selected from existing surveys and/or modified or newly developed as needed, described below. The survey was administered via Apple iPad Minis (survey was created electronically using Filemaker Pro, Santa Clara, CA) and via pencil and paper, with both English and Spanish versions available.

All survey participants provided informed consent and received a \$7 gift card to a large chain superstore. This study was reviewed and approved by the University of Nebraska Medical Center Institutional Review Board.

### **Main Independent Variable**

**Monthly SNAP benefit duration.** To assess monthly SNAP benefit duration, participants responded to an item from the Hunger in America Survey:<sup>14</sup> “How many weeks do your food stamps or SNAP benefits usually last?” Response options were “1 week or less,” “2 weeks,” “3 weeks,” “4 weeks,” or “more than 4 weeks.” These responses were operationalized as a continuous variable.

### **Primary Outcome Variables**

**Household Food Security.** The United States Department of Agriculture’s (USDA’s) 6-item Household Food Security Survey Module<sup>15</sup> was used to assess household food security over the past year (e.g., “The food that we bought just didn’t last, and we didn’t have money to buy more”).

Based on USDA methodology, responses of “often,” “sometimes,” and “yes” were considered affirmative responses, and the number of affirmative responses represents a household’s raw food security score. The USDA considers households with raw scores of 0 to experience “high food security,” scores of 1 to experience “marginal food security,” scores of 2-4 to experience “low food security,” and scores of 5-6 to experience “very low food security.” These responses were collapsed to form two groups: “high and marginal food security” and “low and very low food security.”

**Physiological hunger symptoms and hunger coping.** The examination of physiological hunger symptoms and hunger-coping behaviors is a relatively novel concept in the hunger and food security literature. Although hunger has been assessed previously as part of the USDA’s 18-item Food Security Module,<sup>15</sup> the hunger symptom scale used in this study assesses the negative physiological experiences of hunger and may add greater context to these experiences. New and modified items to assess these constructs were developed as part of the current study, based on previous work.<sup>11,16,17</sup> In addition, some items were obtained from the Hunger in America Survey.<sup>14</sup> These items were psychometrically tested as part of this study, and four scales emerged: *hunger symptoms*, *financial coping*, *rationing coping*, and *hunger-coping trade-off strategies*. Scales exhibited good internal consistency ranging from 0.70-0.90 (Cronbach’s alpha and Kuder-Richardson [formula 20]) and convergent validity, compared to household food security scores, with Spearman’s correlations coefficients ranging from 0.52-0.69,  $p < 0.01$ .<sup>18</sup> Survey items are available upon request.

A *physiological hunger symptoms* scale consisted of 5 items with yes/no response options (“yes” = 1, “no” = 0) and asked participants whether they had experienced physiological symptoms (e.g., “had a headache” or “felt dizzy”) in response to hunger in the past month. (e.g., “In the past month, have you felt your stomach growl because you did not have money to buy food?”). High scores indicated experiencing more physiological hunger symptoms compared to those with lower scores. Raw scores were a continuous variable representing the sum of responses. The possible score range was from a low of 0 to a high of 5.

A *hunger-coping trade-off strategies* scale consisted of 5 items with 5-point Likert-scaled response options (“never” = 1 to “always” = 5), which asked about having to choose between paying for food or paying for bills/household expenses in the past month (e.g., “How often during the past month, did you or anyone in your household have to choose between paying for food and paying for utilities?”). High scores indicated a higher reported frequency of facing decisions about whether to pay for household expenses

or pay for food, compared to those with lower scores. Raw scores were a continuous variable representing the mean response and with a possible range from a low of 1 to a high of 5.

A *financial hunger-coping* scale consisted of 5 items with yes/no response options (“yes” = 1, “no” = 0), which asked participants about financial strategies they may or may not have used in the past month to cope with low food resources (e.g., “In the past month, have you avoided buying more expensive foods like fresh fruits and vegetables or meat?”). High scores indicated use of more financial strategies, such as borrowing money, selling property, skipping bills, or modifying food spending in order to pay for food, compared to those with lower scores. Raw scores were a continuous variable representing the sum of responses. The possible score range was from a low of 0 to a high of 5.

A *rationing hunger-coping* scale consisted of 5 items with yes/no response options (“yes” = 1, “no” = 0), which asked participants about rationing food supplies in the past month to cope with low food resources (e.g., “In the past month, have you eaten meals or snacks after your children finished to ensure they had enough?”). High scores indicated use of more rationing strategies such as hiding food, eating less food, eating only after children, avoiding providing food for guests, and over-consuming when food is available, compared to those with lower scores. Raw scores were a continuous variable representing the sum of responses. The possible score range was from a low of 0 to a high of 5.

Raw scores for each of the four scales were categorized into a “high” group (above the sample median) and a “low” group (at or below the sample median).

### **Sociodemographics and Family Characteristics**

Sociodemographics and family characteristics assessed included: race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic/Latino, American Indian, and all other races/ethnicities); age ( $\leq 39$  years old vs.  $\geq 40$  years old; cutoff based on sample median); sex (male vs. female); education ( $\leq$ high school diploma vs. some college or degree); income ( $\leq$ \$10,000 vs.  $>$ \$10,000; cutoff based on sample median); marital status (married or living with spouse vs. not); employment (employed vs. not); transportation (drives vehicle vs. all other forms of transportation such as public transportation, rides from friends/family, and active transportation); possession of food preparation equipment (has both stove and refrigerator vs. only one or none); household size ( $< 4$  members vs.  $\geq 4$  members; cutoff based on sample median); number of children in home (1 child vs.  $\geq 2$  children); child-to-adult ratio ( $\leq 0.75$ ,  $> 0.75-2$ , and  $> 2$ ; cutoffs based on

tertiles); Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) enrollment (yes vs. no); income assistance (being enrolled in any of the following: Supplemental Security Income [SSI], Social Security Disability Insurance [SSDI], Temporary Assistance for Needy Families [TANF] vs. being enrolled in none of these programs); and food pantry use (weekly or monthly use vs. a few times a year or never). Additionally, families' percent of the federal poverty line was derived based on reported income and family size to assess associations with monthly SNAP benefit duration.

### **Analyses**

Descriptive statistics, Chi-squared tests, and Kruskal-Wallis one-way analysis of variance tests were used to describe the sample and univariate associations between sample characteristics and the main variables of interest in this study. Differences in sociodemographics by survey mode (i.e., digital vs. paper versions) were also examined.

Binary logistic regression was used to determine the relationship between monthly SNAP benefit duration and the primary outcome variables in this study. Odds ratios were calculated for the odds of performing a “high” number of hunger-coping trade-off strategies, financial coping strategies, and rationing coping strategies or experiencing a “high” number of physiological hunger symptoms or experiencing “low or very low” household food security, based on reported monthly SNAP benefit duration as a continuous predictor. Both unadjusted and adjusted odds ratios are reported.

For the adjusted logistic model, control variables and interaction terms were selected from the sociodemographics and other sample characteristics using the automated backward elimination procedure.<sup>19</sup> All potential control variables were first entered into the model along with the independent variable of interest (i.e., monthly SNAP benefit duration). Potential control variables with p-values at or above 0.20 were removed from the model, one at a time, starting with the highest p-value, until all variables in the model had p-values <0.20. Next, all interactions between the included control variables were assessed in the same fashion. The final adjusted models included the independent variable of interest and all control variables and their interaction terms with p-values <0.20. Backward elimination ensures all variables are assessed, so it can detect confounders that might be missed using other automated significance-based procedures.<sup>20</sup> The choice of 0.20 as a cutoff for model inclusion was made based on simulation studies which show 0.20 as a preferred criterion for confounder detection if using a significance-based procedure for model

building, as lower cut points can fail to detect important confounders and higher cut points may incorporate unnecessary covariates into the model.<sup>21-24</sup>

Analyses were completed using Statistical Analysis Software (SAS), version 9.4. For primary analyses (Table 2), the alpha level for statistical significance was set at a p-value of 0.01 using the Bonferroni adjustment to control the family-wise type-1 error rate.

## Results

For this study, 175 participants reported being current SNAP participants, and 161 (92%) provided complete data for the primary variables in this study. Monthly SNAP benefit durations varied, with 59 (37%) reporting benefits lasting  $\leq 2$  weeks, 71 (44%) reporting benefits lasting 3 weeks, and 31 (19%) reporting benefits lasting  $\geq 4$  weeks. Mean scores ( $\pm$ SD) for the dependent variables were: food security ( $3.7 \pm 2.1$ ), physiological hunger symptoms ( $2.1 \pm 1.9$ ), hunger-coping trade-offs ( $2.1 \pm 1.0$ ), financial hunger-coping ( $2.7 \pm 1.5$ ), and rationing hunger-coping ( $2.2 \pm 1.7$ ). The sample was largely food insecure, with many participants experiencing low food security (36%) or very low food security (44%).

Respondents were predominately female (78%), a majority reported annual family incomes below \$10,000 (58%), and nearly all (95%) were below the federal poverty line. The sample was comprised of 43% non-Hispanic black, 30% non-Hispanic white, 10% Hispanic/Latino, and 17% American Indian, mixed-race/ethnicity, or other racial/ethnic groups. Mean household size was  $4.2 \pm 1.7$ , with  $2.3 \pm 1.3$  children per household, and a mean ratio of  $1.5 \pm 1.2$  children per adult; approximately one-third of respondents were married or living with a partner (35%). Only 8% of participants were enrolled in both TANF and WIC, and 32% of households had at least one member receiving SSI or SSDI. Nearly two-thirds (65%) had a high school diploma or equivalent, but only 8% had a 4-year college degree. The vast majority of participants reported having a stove and a refrigerator in their home (89%). A minority of participants (18%) completed the paper version of the survey instead of the digital version. Those who completed the paper version were more likely to make more than \$10,000 annually and to rarely or never use food pantries, compared to those who completed the digital survey, but no other differences were observed. Income and food pantry use were investigated as covariates in this study. Additional sample characteristics can be found in Table 1.

In Table 1, the relationship between sample characteristics and the main variables in this study are displayed. Participant sex, education, household size, number of children in household, child-to-adult ratio, marital



status, and enrollment in an income assistance program were not associated with monthly SNAP benefit duration, hunger coping, physiological hunger symptoms, or food security. Those who rarely or never reported using food pantries and those enrolled in the WIC program generally had the “most desirable” scale scores (i.e., “low” group for hunger coping and physiological hunger symptoms or the “high or marginal” group for food security) and reported the longest average monthly SNAP benefit durations. Those with the lowest monthly SNAP benefit duration and “least desirable” scale scores for the hunger-coping, physiological hunger symptoms, and food security were generally frequent food pantry users, non-WIC enrollees, parents at or above the age of 40 years, and those in the lowest income group.

Although SNAP allotment amounts were not measured (which theoretically could influence monthly SNAP benefit duration), household size and income were assessed. Household size and income are primary metrics used to determine SNAP allotment amounts and were not statistically significantly associated with monthly SNAP benefit duration in this study (Table 1). Similarly, households’ percent of the federal poverty line was not associated with monthly SNAP benefit duration ( $p = 0.36$ ). Significant between-group differences in monthly SNAP benefit duration were seen by parent age, pantry use, and WIC enrollment. Parents under the age of 40 years, parents who reported rarely or never using food pantries, and WIC participants reported benefits lasting longer than older parents ( $p = 0.02$ ), frequent food pantry users ( $p = 0.01$ ), and nonparticipants of WIC ( $p = 0.03$ ), respectively.

In Table 2, the unadjusted and adjusted odds ratios for the “least desirable” outcomes for hunger coping (i.e., “high” groups), physiological hunger symptoms (i.e., “high” group), and food security (i.e., “low or very low” food security) was assessed, with monthly SNAP benefit duration as a continuous predictor variable. In unadjusted analyses, as monthly SNAP benefit duration increased, odds of being in the “least desirable” groups significantly decreased for all except the hunger-coping trade-offs scale. After controlling for relevant covariates, most effects were attenuated (other than the hunger symptom scale) but remained significant for food security ( $p = 0.003$ ) and hunger symptoms ( $p = 0.005$ ). For each 1-week increase in monthly SNAP benefit duration, the chances of being in the low or very low food security group fell by nearly 56%, and the chances of experiencing “high” levels of physiological hunger symptoms fell by approximately 46%. These adjusted models explained between 7% and 33% of the variation in responses.

## Discussion

The purpose of this study was to examine relationships between monthly SNAP benefit duration and 5 primary outcome variables: food security, three hunger-coping behavior scales (rationing food supplies, financial strategies, and making trade-offs), and physiological hunger symptoms, among a sample of families with children (aged 0-18 years) currently receiving SNAP benefits. As monthly SNAP benefit duration increased, chances of being in the low or very low food security group or experiencing “high” levels of physiological hunger symptoms decreased, after controlling for relevant sociodemographics and family characteristics. These findings suggest that increased monthly SNAP benefit duration, possibly due to allotment adequacy or more efficient utilization of benefits, may be protective against food insecurity and experiencing physiological symptoms of hunger.

Past research has shown that SNAP participation reduces food insecurity when the effects of self-selection and relevant confounders are taken into account.<sup>2-5</sup> However, studies have primarily assessed SNAP as a binary variable (e.g., SNAP participants vs. eligible nonparticipants) and, to the authors’ knowledge, have not fully examined intra-month variations in benefit duration between families and the effects on food security and hunger-related factors. In the current study, the longer families reported their SNAP benefits lasting each month, the less likely they were to experience food insecurity and physiological hunger symptoms, but there was no association with hunger coping in adjusted models. Due to the demonstrated relationship between SNAP and food security, this finding is intuitive for the hunger symptoms and food security measures that are more commonly used as outcomes in this type of research. However, the investigation of hunger-coping behaviors is novel and may be a more complex variable to conceptualize; this could have been one of the reasons there was no association in adjusted models. Qualitative research with low-income populations has identified many hunger-coping behaviors participants engage in to feed themselves and their families.<sup>11,12</sup> It is possible some participants use these hunger-coping behaviors as preventive strategies to make SNAP benefits last longer, while other participants may engage in these behaviors only after SNAP benefits have run out. This differential may have led to the null findings. More research is needed to examine intra-month usages of hunger-coping behaviors and relationships with monthly SNAP benefit duration, hunger, and food insecurity.

In the current study, benefits lasted longer in some households than in others. This variability in SNAP benefit duration was independent of a

proxy measure of allotment amounts. This suggests that some families may have used their benefits more efficiently (e.g., budget-conscious shopping) and/or received allotment amounts that more adequately met the needs of their family, compared to other families. In the United States, monthly SNAP benefits average approximately \$255 per month per household in 2014,<sup>25</sup> and in the current study, the average family was able to make benefits last just under 3 weeks. Between-group differences in monthly SNAP benefit duration were largest across parent age, WIC enrollment, and food pantry use groups.

The relationship between parent age and benefit duration in our study may be due to families having older children and differences in resource utilization (e.g., WIC enrollment). Older children eat more than younger children (despite counting the same in SNAP allotment calculations) and are likely to be too old to qualify for WIC, contributing to resource strain in households.<sup>11,12</sup> Conversely, older children potentially have access to free lunches and breakfast at school, and children  $\geq 16$  years of age can legally work to supplement household income, although the added income may reduce SNAP allotment amounts. Additionally, utilization of multiple assistance programs may play a role. Although parent age was not associated with simultaneous use of multiple assistance programs in the current study, it has been shown that WIC parents who were enrolled in multiple assistance programs were significantly younger than WIC parents only enrolled in WIC, despite having the same eligibility.<sup>26</sup> There may be differences between older and younger parents, such as family characteristics or utilization of resources, that may make families with older parents more vulnerable to decreased monthly SNAP benefit duration and increased frequency of “trade-off” hunger-coping behaviors and food insecurity. The Institute of Medicine convened a scientific committee to examine SNAP allotment adequacy and recommended that more research is needed in order to understand, among other factors, the role family characteristics, such as age of family members, plays in SNAP allotment adequacy.<sup>6</sup>

Food pantry use was also shown to be associated with decreased monthly SNAP benefit duration and “least desirable” scores on the food security, hunger symptoms, and hunger-coping scales. Food pantries typically serve food-insecure populations and are designed to be an emergency food source rather than providing enough food to substantially supplement diets.<sup>27</sup> Food pantries serve as a critical piece of the food safety net, serving approximately 16 million people annually in the United States.<sup>28</sup> These community sites offer a gateway to access this “hard-to-reach,” high-risk group (i.e., low-food-secure and hungry families) with resources,

programming, and policies to address food security, hunger, and SNAP benefit duration since they are more likely to be affected compared to less frequent pantry users or nonusers.

Some other factors related to family food resource strain besides those examined in the current study include food preferences and shopping habits that may be suitable targets for intervention. Low-income individuals tend to prioritize meat when shopping for food,<sup>29,30</sup> even though it is often considered the most expensive food group per serving.<sup>31</sup> In addition, the frequency of shopping trips appears to impact allotment adequacy.<sup>32,33</sup> It has been shown that SNAP participants who shopped for food in frequent small trips throughout the month, rather than one large trip, were able to extend their SNAP benefits longer.<sup>32</sup> However, practical constraints, such as living in an area with low food access or having limited access to reliable transportation, can make frequent shopping trips difficult. Also, it has been shown that food-secure SNAP households were more likely than food-insecure SNAP households to utilize their social network for financial assistance in acquiring food and more likely to use budget-conscious shopping practices, such as shopping sales and comparing prices across multiple food outlets.<sup>34</sup> These factors and others should be considered in program and policy development and potentially explored in future studies.

The current study has several limitations. The measure of SNAP benefit duration is simplistic and cannot assess issues such as the nutritional adequacy of participants' diets. Also, the cross-sectional nature of the data prevents assessment of temporal relationships between independent and dependent variables.<sup>35</sup> In particular, this prevented assessment of the intra-month timing of hunger-coping behaviors in relation to SNAP benefit duration. Third, some of the items, such as the hunger-coping scales, assessed sensitive topics and may be subject to social desirability bias,<sup>36</sup> but such bias would have attenuated statistical relationships in this study rather than inflated them. Fourth, child enrollment in the National School Lunch Program and Summer Meals program was not included as a covariate because the respondents were parents; however, child enrollment in these programs could have indirectly influenced household food security and affected the results. Fifth, poverty level was used as a proxy for SNAP allotment amounts, but it is an incomplete measure of this as it does not take into account other variables that may be important in determining SNAP allotments. Finally, due to the small sample size and nonrandom recruitment, the study findings may not be generalizable to the entire SNAP population.

Strengths of this study include the use of novel measures to investigate hunger and poverty-related constructs (i.e., monthly SNAP

benefit duration, hunger-coping behaviors, and physiological hunger symptoms) that have not been thoroughly investigated in the food security and poverty literature. In addition, the recruitment of a very low-income and food-insecure sample of families allowed for expanded understanding of this hard-to-reach population, and the findings of the current study offer many future directions.

### **Conclusions**

Assessing monthly SNAP benefit duration can be a useful measure of SNAP benefit adequacy within the context of family food security and hunger. Programs, policies, and/or interventions seeking to assist families in extending their SNAP benefits may consider specifically targeting families with parents older than 40 years of age and those who frequently visit food pantries. Also, WIC participation was associated with SNAP duration in this study. Therefore, ensuring SNAP participants are enrolled in the WIC program or other assistance programs, if eligible, may be a beneficial strategy for extending benefits.

Other strategies to extend SNAP benefit duration may include promoting budget-conscious food purchasing habits and addressing resource gaps (e.g., transportation assistance to facilitate frequent shopping trips). More research is needed to better understand SNAP allotment adequacy, since many factors (e.g., family characteristics and household expenses) may be important in terms of adequacy. Additionally, the new hunger-coping scales used in this study can be employed alongside traditional measures (e.g., USDA's Food Security Survey Modules) to better characterize, study, and intervene with programs to help SNAP families with children.

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**Table 1.** Relationships Between Selected Sample Characteristics<sup>1</sup> and Monthly SNAP Benefit Duration, Hunger Coping, Physiological Hunger Symptoms, and Household Food Security

Sample characteristics	n	SNAP duration in weeks per month (Mean±SD) <sup>2</sup>	Trade-off coping (% "High") <sup>3</sup>	Financial coping (% "High") <sup>3</sup>	Rationing coping (% "High") <sup>3</sup>	Hunger symptoms (% "High") <sup>3</sup>	Food security (% "Low or Very Low") <sup>3</sup>
<b>Whole Sample</b>	161	2.8±1.0	52.2%	54.7%	57.8%	54.0%	80.1%
<b>Employment</b>							
Employed	56	2.9±1.0	51.8%	58.9%	57.1%	51.8%	69.6%
Not employed	105	2.7±1.0	52.4%	52.4%	58.1%	55.2%	85.7%*
<b>Age</b>							
19-39 years old	87	2.9±1.0*	43.7%	52.9%	57.5%	52.9%	72.4%
≥40 years old	74	2.6±0.9	62.2%*	56.8%	58.1%	55.4%	89.2%*
<b>Race/ethnicity</b>							
Non-Hispanic black	69	2.9±1.0	60.9% <sup>a</sup>	55.1%	63.8%	62.3%	81.2%
Non-Hispanic white	48	2.6±1.1	41.7% <sup>b</sup>	52.1%	52.1%	52.1%	72.9%
Hispanic/Latino	16	2.6±0.9	56.3% <sup>ab</sup>	56.3%	56.3%	43.8%	93.8%
American Indian	14	2.9±0.6	42.9% <sup>ab</sup>	50.0%	42.9%	42.9%	92.9%
Other	14	2.7±0.8	50.0% <sup>ab</sup>	64.3%	64.3%	42.9%	71.4%
races/ethnicities							
<b>Transportation</b>							
Drives vehicle	71	2.8±1.0	52.1%	56.3%	53.5%	49.3%	71.8%
Public transportation, rides from family/friends, or all other	87	2.7±0.9	52.9%	54.0%	62.1%	58.6%	87.4%*
<b>Annual household income</b>							
≤\$10,000	91	2.7±0.9	59.3%*	56.0%	65.9%*	62.6%*	85.7%*
>\$10,000	66	2.8±1.0	42.4%	54.5%	48.5%	43.9%	71.2%
<b>WIC client</b>							
Yes	36	3.1±1.0*	30.6%	38.9%	44.4%	41.7%	63.9%
No	125	2.7±1.0	58.4%*	59.2%*	61.6%	57.6%	84.8%*
<b>Food pantry use</b>							
Weekly or monthly	117	2.7±1.0	57.3%*	62.4%*	62.4%*	60.7%*	88.0%*
Rarely or never	37	3.1±1.0*	35.1%	32.3%	43.2%	32.4%	51.3%

<sup>1</sup>Sociodemographics and family characteristics not in Table 1 were not significantly associated with monthly SNAP benefit duration, hunger coping, hunger symptoms, or food security. These included sex, marital status, food preparation equipment, household size, number of children in home, child-to-adult ratio, and income assistance.

<sup>2</sup>Kruskal-Wallis one-way analysis of variance.

<sup>3</sup>Chi-squared tests.

\*Denotes significant differences (p<0.05) when two groups.

<sup>a,b</sup>Denotes significant differences (p<0.05) when more than two groups (i.e., "a" was significantly different than "b," and vice versa, but "ab" was not significantly different than "a" or "b.")

**Table 2.** Logistic Regression Analyses of Relationships Between a Continuous Predictor (Monthly SNAP Benefit Duration) and 5 Primary Binary Outcome Variables

Independent variable	Models	Outcome variables				
		Food security <sup>1</sup>	Hunger symptoms <sup>2</sup>	Hunger-coping trade-offs <sup>2</sup>	Financial hunger coping <sup>2</sup>	Rationing hunger coping <sup>2</sup>
<b>Monthly SNAP benefit duration</b>	Unadjusted odds ratios (95% CI)	0.408* (0.258-0.646)	0.618* (0.440-0.869)	0.784 (0.568-1.083)	0.603* (0.428-0.850)	0.718* (0.516-0.999)
	Adjusted odds ratios (95% CI)	0.444* <sup>a</sup> (0.259-0.761)	0.538* <sup>b</sup> (0.351-0.825)	1.028 <sup>c</sup> (0.708-1.492)	0.803 <sup>d</sup> (0.531-1.215)	0.739 <sup>e</sup> (0.525-1.040)

<sup>1</sup>Odds ratios for being in the "low or very low" food secure group.

<sup>2</sup>Odds ratios for being in the "high" scoring group (indicating increased use of hunger-coping strategies or increased experiences of physiological hunger symptoms).

<sup>a</sup>Controlled for food prep. equipment, sex, race, income, WIC use, pantry use, sex\* income, sex\* pantry use, and income\* pantry use.

<sup>b</sup>Controlled for food prep. equipment, employment, child-to-adult ratio, age, race, income, WIC use, pantry use, employment\* pantry use, child-to-adult ratio\* age, child-to-adult ratio\* income.

<sup>c</sup>Controlled for food prep. equipment, employment, transportation, income, WIC use, pantry use, and income assistance.

<sup>d</sup>Controlled for food prep. equipment, employment, transportation, sex, marital status, WIC use, pantry use, employment\* sex, employment\* marital status, transportation\* pantry use, sex\* marital status, sex\* pantry use, marital status\* WIC use, marital status\* pantry use.

<sup>e</sup>Controlled for employment, income, and WIC use.

\*p<0.01 (Bonferroni adjusted significance level).