



Published in final edited form as:

J Child Poverty. 2014 January 2; 20(1): 1–20. doi:10.1080/10796126.2014.891973.

Understanding the Link between Poverty and Food Insecurity among Children: Does the Definition of Poverty Matter?

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Abstract

This paper examines the association between poverty and food insecurity among children, using two different definitions of poverty—the official poverty measure (OPM) and the new supplemental poverty measure (SPM) of the Census Bureau, which is based on a more inclusive definition of family resources and needs. Our analysis is based on data from the 2001–11 Current Population Survey and shows that food insecurity and very low food security among children decline as income-to-needs ratio increases. The point estimates show that the associations are stronger as measured by the new supplemental measure of income-to-needs ratio than when estimated through the official measure. Statistical tests reject the hypothesis that poor households' odds of experiencing low food security are the same whether the SPM or OPM measure is used; but the tests do not reject the hypothesis when very low food security is the outcome.

Keywords

Food insecurity among children; poverty; official poverty measure; supplemental poverty measure

A growing body of research demonstrates the negative consequences of food insecurity for children's health and developmental outcomes, including cognitive development and school achievement (Alaimo et al. 2001; Hernandez and Jacknowitz 2009; Howard 2011; Jyoti et al. 2005; Rose-Jacobs et al. 2008; Winicki and Jemison 2003), socio-emotional development (Alaimo et al. 2001, 2002; Casey et al. 2005; Dunifon and Kowaleski-Jones 2003; Huang et al. 2010; Jyoti et al. 2005; Weinreb et al. 2002; Whitaker et al. 2006b), and overall health. Food insecurity specifically among children further exacerbates these risks (Cook et al. 2006). The U.S. government has set a goal of eliminating very low food security among children by 2015. To achieve this goal, it is important to understand the causes of such food insecurity among children, and the role that policy can play in reducing it. While prior research has examined the causes and consequences of food insecurity, and the role that poverty plays, the measures of income and poverty used have not taken into account all the needs and resources of families. In addition, previous studies have focused mainly on overall food insecurity in the family. Fewer studies have investigated the causes of food insecurity and very low food security specifically among children.

Using data from the Current Population Survey Food Security Supplement (CPS-FSS) and Annual Social and Economic Supplement (ASES), this paper examines the association

between poverty and both food insecurity and very low food security among children using the official measure of poverty (OPM) and the new supplemental poverty measure (SPM) of the Census Bureau, which is more inclusive of family resources and needs. Specifically, this paper addresses two questions: what is the association between poverty and food insecurity among children; and to what extent does this relationship change when the improved supplemental measure of poverty is used?

Food insecurity and previous research

The prevalence and severity of food insecurity in the United States is tracked in the CPS-FSS, administered December each year. Food insecurity among children is defined as the lack of consistent access to adequate food. Very low food security among children refers to households in which children suffer disrupted meal patterns and food intake that is less than the amount their caregivers consider adequate (Nord 2009). At the peak of the Great Recession, in 2009, 11% of households with children experienced food insecurity among children, a notable rise after remaining between 8 and 9.5% for nearly a decade (Coleman-Jensen et al. 2013). As of December 2012, the most recent period for which these data are available, food insecurity among children was 10% and very low food security among children was 1% (Coleman-Jensen et al. 2013).

There is a large body of research linking food insecurity in general, and among children specifically, to a range of socio-demographic characteristics such as age and education level of household head, race/ethnicity, and family structure. Being younger, having minority status (particularly African-American or Hispanic), being a single mother, and having low levels of education increase the risk of food insecurity (Bartfeld and Dunifon 2006; Connell et al. 2001; Daponte and Stephens 2004; Dunifon and Kowaleski-Jones 2003; Kasper et al. 2000; Nord et al. 2004; Olson et al. 1997; Opsomer et al. 2003; Ribar and Hamrick 2003a; Rose et al. 1998). Poor mental health, disability, and chronic physical health conditions not only increase the likelihood of being food-insecure but are also associated with more severe levels of food insecurity among households experiencing food hardship (Coleman-Jensen and Nord 2013; Tarasuk et al. 2013).¹ Households with greater financial and food-management skills (i.e., managing bills, making a budget, stretching groceries, preparing meals) are less likely to be food insecure (Gundersen and Garasky 2012; Olson et al. 2004). Drug use has been linked to poor diet quality, hunger, increased risk of malnutrition, and food insecurity (Himmelgreen et al., 1998; Nelson, Brown, and Lurie 1998; Kaufman, Isralowitz, and Reznik 2005; Morabia et al. 1989; Mohs, Watson, and Leonard-Green 1990). Substance use may drain family resources and therefore increase the risk for food insecurity. It may also affect mothers' ability to manage family resources in other ways (Sullivan, Turner, and Danziger 2008).

¹Research suggests that maternal depression, mental health disorders, and intimate partner violence are associated with food insecurity, but the direction of causality is not clearly established (Casey et al. 2004; Corcoran et al. 1999; Ettner 1996; Lohman et al. 2009; Whitaker et al. 2006a; Sareen et al. 2011). It is possible that food insecurity increases the risk of domestic violence, maternal depression, and mental health disorders; at the same time, this latter set of factors may increase the risk of experiencing food insecurity.

Research has also found that macroeconomic factors such as low average wages, high housing costs, low participation in food and nutrition assistance programs, high unemployment rates, residential instability, and high tax burdens increase the probability of food insecurity in households with children (Bartfeld and Dunifon 2006).

A large body of research documents that the primary cause of food insecurity is low income. (See Gundersen, Kreider, and Pepper [2011] for a detailed review).² When income is constrained or limited, households may be forced to make difficult decisions that can result in a less-than-adequate supply of food. This is perhaps best illustrated in Edin and Lein's (1997) qualitative study *Making Ends Meet*, which documents how some poor urban mothers chose to go without food rather than forgo other essentials, such as medical care.

In 2012, 24% of households with incomes below the official poverty threshold reported food insecurity among children, compared with 7% of non-poor households, according to the CPS-FSS; nearly 3% of poor households with children reported very low food security among children versus less than 1% of non-poor households (Coleman-Jensen et al. 2013). Similar links between poverty and food insecurity have been found in the 1988–94 Third National Health and Nutrition Examination Survey (NHANES III), the Child Development Survey of the Panel Survey of Income Dynamics, multiple years of data from the Survey of Income and Program Participation (SIPP), and the 1989–91 Continuing Survey of Food Intake by Individuals (CSFII) (Alaimo et al. 1998; Connell et al. 2001; Dunifon and Kowaleski-Jones 2003; Gundersen et al. 2011; Rose et al. 1998).

While the rate of food insecurity among children is high in families with low income, various national surveys, (e.g. SIPP, CPS-FSS, CSFII) also document that close to half of all families reporting food insecurity have incomes above the official poverty line (Gundersen et al. 2011; Boushey et al. 2001; Fremstad 2010). In an effort to explain this paradox, researchers have used a more sophisticated treatment of income. For example, Gundersen and Gruber (2001) find that a measure of permanent income (i.e., an average of household income over a two-year period) is a better predictor of household food insecurity than current income. Ribar and Hamrick (2003) find that assets are protective against food insecurity.³ Further, a handful of studies have examined the effect of income volatility on food security and found that dramatic changes in income and negative income shocks increase the probability that a household will experience food insecurity (Leete and Bania 2010; Loopstra and Tarasuk 2013; Ribar and Hamrick 2003). However, all of these studies examine income and poverty using the official poverty measure, which does not fully capture the needs of families or the resources available to them.

The official measure of poverty, which was developed in the 1950s, is determined by comparing a family's or person's resources to a set of thresholds that vary by family size and composition and are determined to represent the minimum income required to support a

²Low income is almost inherent in the definition and measurement of food insecurity. Indeed, in the 18-item Household Food Security Scale, many of the questions ask whether a given behavior or condition occurred because of lack of money.

³Assets, particularly liquid assets, are protective against food insecurity (Leete and Bania 2010; Ribar and Hamrick 2003). Nord and Brent (2002) find uneven income, changes in household composition, multiple families residing in the same household without fully sharing resources, and unexpected economic needs (e.g., unexpected medical expenses) to be possible explanations for the anomalies in the relationship between income and food insecurity.

family (Iceland 2005). Families or people with resources that fall below the threshold are considered poor.

The current poverty measure is widely acknowledged to be inadequate (Iceland 2003; Citro and Michael 1995; Ruggles 1990). The method of calculating the poverty thresholds is outdated, and as a result, current poverty thresholds are too low—arguably arbitrary—and do not adjust for differences in the cost of living within and across states.⁴ The definition of resources under the official poverty measure is based solely on cash income. So while the measure takes into account a variety of income sources, including earnings, interest, dividends, and benefits, such as Social Security and cash assistance, it does not include the value of the major benefit programs that assist low-income families, such as the federal Earned Income Tax Credit, Medicaid, housing and child care assistance, and food assistance programs such as SNAP or other food and nutrition programs.

Considerable research has been done on alternative methods for measuring income poverty. A National Academy of Sciences (NAS) panel made specific recommendations for an alternative measure that would address many of the problems with the official measure (Citro and Michael 1995). In 2010 the Census Bureau implemented the supplemental poverty measure (discussed in further detail below), which incorporates many of the NAS recommendations. Not surprisingly, alternative measures of poverty, including the supplemental measure, result in different poverty rates for different subgroups of the population—some notably higher than others. For example, when the supplemental measure is used, poverty tends to be higher overall and higher among the elderly (aged 65 and older) and adult (aged 18–64) populations but lower among children, or those under 18 (Hutto et al. 2011; Short 2013; Fox et al. 2013).

Very few studies have examined whether a more comprehensive measure of poverty is more strongly correlated with material hardship in general and food insecurity among children specifically. A handful of studies have found that programs such as SNAP, the National School Lunch Program (NSLP), and the School Breakfast Program are associated with reductions in food insecurity (Bartfeld and Ahn 2011; Gundersen et al. 2012; Mykerezi and Mills 2010; Ratcliffe et al. 2011). Thus, families in poverty that receive benefits under SNAP (or other food and nutrition assistance programs) may be less food insecure than similarly placed non-poor families not eligible for SNAP (or other programs). Similarly, Mayer and Jencks (1988) found that family income explained only about 14% of the variation in the number of material hardships reported, while broader measures of economic resources, such as noncash benefits, home ownership, and access to credit, explained a little more. Finally, using data from the New York Social Indicator Survey, Meyers et al. (2000) found that a more comprehensive measure of resources and equivalence scales as well as an updated poverty threshold strengthens the association between poverty and hardship. Findings from this preliminary work suggest that improving the way we measure poverty may increase our understanding of the relationship between income and food hardship.

⁴Originally based on data from the 1950s, the poverty threshold was set at three times the cost of food and adjusted for family size. Since then, the measure has been updated only for inflation. Yet food now comprises only about one-seventh of an average family's expenses, while the costs of housing, child care, health care, and transportation have grown disproportionately.

Research methods

Data

The empirical analysis is based on data from the 2001–11 CPS-FSS. Since 2001 the CPS has administered the survey each December. Previously, however, the month of the FSS varied. Our analysis uses data from 2001–11 to ensure that seasonal variations in food insecurity do not influence the outcomes. Our focus is food insecurity among children; therefore, we restrict the sample of analysis to households with persons under 18. We exclude any household headed by an emancipated minor (i.e., a child who is the household reference person and lives alone, lives with other children, or is married to the household reference person) and any household whose food-security status is unknown. Observations with no income data are also dropped from the analysis (about 9%). We compared samples with and without those missing income data and found them to be relatively similar.

Measures of food insecurity among children are based on a set of 18 questions in the CPS-FSS. (See Appendix Table A.1 for a complete list of the 18 questions.) Per the USDA's guidelines, households are defined as food insecure if they respond affirmatively to at least three of the 18 questions. The food security of children in a household is based on responses to questions 11 through 18, which ask the main respondent in the household to report on the food security of children. Households reporting between two and four indicators of food insecurity among children are classified as having *low food security among children*, and households responding affirmatively on five or more questions are classified as having *very low food security among children*. The classification *food insecurity among children* includes both categories.

We study three outcomes relating to food security. The first is a dichotomous measure coded 1 for households reporting food insecurity among children and zero for all others. The second outcome is also a dichotomous variable coded 1 for households with very low food security among children and zero for all others. The third is a multinomial outcome in which households are assigned to one of five mutually exclusive categories based on responses to the 18 questions: *No Food Insecurity*; *Marginal Food Security among Adults, No Child Food Insecurity* (defined as households reporting at least one food insecure condition among adults, but none among children); *Marginal Food Security among Children* (households reporting one food-insecure condition among children); *Low Food Security among Children* (households reporting between two and four food-insecure conditions among children); and *Very Low Food Security among Children* (households reporting five or more food-insecure conditions among children). The choice to use these measures of food insecurity is based on the USDA's guidelines and prior research in the field (Bartfeld and Ahn 2011; Coleman-Jensen et al. 2013).⁵

The Annual Social and Economic Supplement (March CPS) 2002–12 data are used to construct the two measures of poverty, official and supplemental, for each year. To create the official poverty measure, we first use the official Census Bureau poverty thresholds and

⁵Research has shown that the food-security scale is stable over time and across broad subgroups of the population and is externally valid (Hamilton et al., 1997; Ohls, Radbill, and Schirm, 2001).

construct an income-to-needs ratio for each family. Because family income in the December CPS-FSS is available only in categories, we compute the median income of families within each income category in the March CPS-ASES and assign that value to respondents with the corresponding income category in the December CPS-FSS.⁶

The second measure of poverty, commonly referred to as the supplemental poverty measure, is based on the recommendations of the Interagency Technical Working Group on Developing a Supplemental Poverty Measure, established by the Office of Management and Budget's chief statistician. It is a somewhat modified version of the improved poverty measure recommended by the 1995 Panel of the National Academy of Sciences (Citro and Michael 1995). Specifically, SPM income (or resources) includes money income from all sources, plus cash transfers, value of near-cash benefits such as SNAP, National Lunch Program, Supplementary Nutrition for Women, Infants, and Children (WIC), Housing subsidies, and Low-Income Home Energy Assistance (LIHEAP) tax credits and payments such as the EITC, minus necessary expenses for critical goods and services not included in the thresholds. These expenses are income taxes, social security payroll taxes, child care and other work-related expenses, child support payments to another household, and out-of-pocket medical expenses. This more comprehensive measure of income is created by drawing data from the March CPS as well as the Consumer Expenditure Survey.⁷ The SPM thresholds are set, using data from the Consumer Expenditure Survey, at expenditures on a basic bundle (comprising food, shelter, clothing, and utilities) by two-child families within the 30th–36th expenditure percentile and a small additional amount (20% of the basic bundle) to allow for other essential expenditures.⁸ The SPM takes into account a fuller set of resources, including near-cash and in-kind benefits, as well as tax credits. Following the Census Bureau methodology, detailed in Fox et al. (2013), family income is adjusted for near-cash and in-kind resources. Specifically, we use the March CPS data on SNAP benefits, value of School Lunch Program, low-income home energy assistance, and tax credits to adjust family income to include these benefits. For the period of our study, the March CPS provides data on the number of WIC recipients per household, but not on the value of the WIC benefit. We calculate WIC value by multiplying the average annual WIC food costs per person (based on monthly USDA administrative costs multiplied by 12 from <http://www.fns.usda.gov/pd/wisummary.htm>) by the number of recipients per household. The March CPS also provides data on whether the household receives federal housing assistance. To estimate the value of the assistance, we first estimate rental payments as 30 percent of household income, and subtract this from the shelter portion of the poverty

⁶We also imputed a measure of continuous income from the March ASEC to the December CPS using a regression-based method that estimates continuous income separately by year and family income band in the March CPS. The results from the regression-based method, which are available upon request, are similar to what we report in this paper, suggesting that the relationship between income to needs and food insecurity among children is very similar from the two specifications of income—median income and imputed income. We have elected to present results from the former.

⁷The CPS uses a rotating sample in which respondents are interviewed for four consecutive months, sit out for eight months, and are then interviewed again for four months before being permanently retired. Thus, for about one-fourth of our December sample, data drawn from the March CPS and used in constructing the SPM measure were taken from the same households that comprise the sample analyzed in this paper.

⁸In addition, the SPM sets separate thresholds for families who own their homes free and clear and families who either have mortgages or rent, and it adjusts thresholds for family size and composition and geographic differences in housing costs. In this analysis, we adjust thresholds for family size and composition. However, due to data limitations, we do not set separate thresholds for families who own their homes free and clear and families who have mortgages or rent, nor do we adjust for geographic differences in housing costs.

threshold.⁹ Finally, we use data from the Consumer Expenditure Survey to impute medical out-of-pocket expenses and child care expenses, and we use Survey of Income and Program Participation to compute work expenses.

We compute a continuous measure of SPM income-to-needs ratio in the December CPS by first taking the median value of SPM income within each income category in the March CPS and assigning this value to households in the December CPS in the corresponding income category. We then use the SPM thresholds to construct an income-to-needs ratio for each family. From both the OPM and SPM continuous income-to-needs ratios, we create seven categories: income less than 50% of the poverty threshold; income 50%–99% of the poverty threshold; income 100%–149% of the poverty threshold; income 150%–199% of the poverty threshold; income 200%–249% of the poverty threshold; income 250%–299% of the poverty threshold; and income 300% or more of the poverty threshold (reference category in regressions).

Analytic strategy

We first estimate a logistic regression model contrasting households reporting food insecurity among children with all others. Our baseline model is given by:

$$H_{it} = \alpha_0 + \alpha_I IP_{it} + \beta X_{it} + u_{it} \quad (1)$$

where H_{it} is an indicator for whether children in family i experienced food insecurity in year t , and is a function of IP_{it} , a set of dummy variables representing the income-to-needs ratio category of family i in year t , and X_{it} , a vector of family characteristics, namely race and ethnicity (non-Hispanic white; non-Hispanic black; Hispanic origin; and others), the number of people in the household, the age of the oldest child, the presence of a child under age six, the presence of a person aged 65 and older, parents' nativity, marital status, educational attainment (no parent completed high school; at least one parent completed high school, no more; at least one parent completed some college, no B.A.; at least one parent has a bachelor's degree or more), employment status (at least one parent is employed full-time [35 or more hours per week]; at least one parent is employed part-time [less than 35 hours per week]; no employed parents), and disability (either one or both parents report disability that prevents them from accepting any kind of work), whether housing is rented, mother's age (15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49 and 50–54, and 55 and older), state of residence, and year of survey. In this first step, IP_{it} represents income-to-needs ratio categories that are based on the official measure of poverty.

In order to assess whether income poverty based on the supplemental poverty measure correlates more closely with food insecurity among children than does the official poverty index, our second step is to estimate the baseline model given by equation (1) using the SPM. Specifically, in these analyses, IP_{it} represents income-to-needs ratio categories based on the supplemental measure of poverty.

⁹This is a simplification of complex HUD guidelines, but modeling the more complex HUD guidelines would require more information than is available in the March CPS. We apply a small correction factor to match our estimates of housing-subsidy values with the Census estimates.

The same procedure is used to examine the association between very low food security among children—the second outcome of interest—and income-to-needs ratios based on the official and supplemental poverty measures.

Next, we estimate a multinomial logistic regression model using detailed data on the level of food insecurity reported by families with children. We use the same baseline model, but here H_{it} is a multinomial outcome where families are assigned to one of the following mutually exclusive categories: no food insecurity (comparison category); marginal food security among adults only; marginal food security among children; low food security among children; very low food security among children. As in the logistic regression analysis described above, we estimate the multinomial model using the income-to-needs ratio based first on official poverty and then on the supplemental measure.¹⁰ We use z-scores to test for differences in regression coefficients across the two models.¹¹

Results

Panel A in Table 1 displays the percentage of households with children by food-security status across seven income-to-needs ratio categories based on the official and SPM measures of poverty. Panel B displays the distribution of households with children by food-security status across the income-to-needs ratio categories. These panels underscore two main findings. First, there is a strong association between income-to-needs ratio and food insecurity among children regardless of how income is measured. For instance, about 28% of households with incomes less than 50% of the official poverty threshold (both official and supplemental) are food insecure and 3% experience very low food security. The incidence of food insecurity declines as the income-to-needs ratios increase, irrespective of the measure. In addition, as displayed in Panel B, while overall about 18% of households with children are in official poverty (6.9+10.6), nearly one-half 19.9+27.7=47.5% of households with food insecurity among children are poor and 56% (23.6+32.3) of children in households with very low food security among children are poor, by official standards. The overall picture is roughly the same with the SPM income-to-needs ratio.

The results from the regression analyses (presented in Tables 2 and 3) indicate that even after we control for a rich set of covariates, such as parents' education and employment, which are both highly correlated with income, there is a very strong relationship between income-to-needs ratio and food insecurity among children.

Table 2 presents results from a logistic regression model of food insecurity among children and very low food security among children. Each regression controls for race/ethnicity, number of people in the household, age of the oldest child, presence of a young child, presence of an older adult, parent's marital status, parental education level, employment status, disability status, home-ownership status, mother's age, state of residence, and year of survey. The odds of a household experiencing food insecurity among children are about 10 times greater among children in officially poor families (both poor and extremely poor

¹⁰In results not reported, we also estimated an ordered logistic regression model. The results are similar to what is reported below.

¹¹We tested whether coefficients across models were statistically significantly different by dividing the difference between the coefficients by the square root of the sum of the sampling variances of the two coefficients.

families) than among households with income at 300% or more of the official poverty threshold; the odds of experiencing very low food security are about 11 times greater among officially poor households than among those with an income-to-needs ratio of 300% or more. The results using SPM income are relatively the same in the sense that the odds of experiencing food insecurity and very low food security among children tend to go down as income increases. However, there are two notable differences in the results using the SPM. First, the odds ratios of experiencing food insecurity for extremely poor (income-to-needs ratio less than 50% of the poverty threshold) and poor households are larger when measured with the SPM than when calculated through the OPM: households are nearly 13 times more likely to experience food insecurity if they are in poverty according to SPM income than households with income at 300% or more of the poverty threshold. Further, a simple conversion of both the OPM and SPM coefficients to Z scores suggests that the estimates of food insecurity among children (both low and very low) in the low-income categories are statistically significantly different at the $p < .05$ level.¹² We do not observe any statistically significant differences between OPM and SPM coefficients when we examine the most severe outcome of food hardship—very low food security among children.

Table 3 presents results from a multinomial logistic regression. Households with no reported food insecurity (i.e., fully food secure) are the comparison category. The odds ratios across each of the four food-insecurity categories are greater for poor households than for households with income at 300% or more of the poverty threshold. In addition, because these models refine the reference category to households who are fully food secure, the link between poverty and both food insecurity and very low food security is stronger than in the previous logistic regression models. We also observe here that the association between income and food insecurity among children is stronger when the SPM measure rather than the OPM measure is used. Statistical tests suggest that the odds ratios of experiencing low food security among poor households are significantly greater according to the SPM than according to the OPM.

Conclusion

This paper examines the association between poverty and household food insecurity among children using the official measure of poverty and the new supplemental poverty measure, which captures a more comprehensive set of resources and needs. The objective is to assess whether the association between food insecurity and poverty becomes stronger with a more inclusive measure. Very little work has explored the relationship between improved measures of poverty and experiences with food hardship, and what research does exist is based on small, local-area samples that may not necessarily be representative of the larger national population. The results suggest two main findings.

¹²Betson (1996) argues that the equivalence scales that are used to adjust the poverty thresholds for families of different size and composition are inadequate as they do not either fully take into consideration economies of scale or adjust for differences in consumption patterns. Thus, in results not shown, very low food security among children was regressed on family income in deciles. The results from this logistic regression are consistent with what is reported in the paper. Income is strongly associated with very low food security among children. Controlling for a rich set of covariates including number of young children, number of children aged 6–18, number of adults, and number of elderly, children in the bottom income decile are 12 times as likely as children in the top income decile to experience very low food security. The odds of experiencing very low food security decline as income increases.

First, we find evidence of a strong and statistically significant association between poverty and household food insecurity among children—both low and very low. This finding is consistent across both the official and SPM poverty measures. The incidence of food insecurity increases as income-to-needs ratio decreases.

Second, multivariate analyses suggest that a more inclusive measure of income and resources reveals a stronger association between poverty and food insecurity among children than does the official measure. The difference is statistically significant, although qualitatively the associations do not differ greatly. Our results suggest that with SPM, the risk of experiencing household food insecurity, particularly food insecurity among children, is strongly skewed toward lower-income families, which is what we would expect. We observe this in the bivariate analysis as well as in the multi-multinomial models. Statistical tests reject the hypothesis that the odds of experiencing low food security among poor households are the same when measured through the SPM as when calculated through the OPM measure; but tests fail to reject the hypothesis when very low food security is the outcome. There are limitations to the study. While CPS-FSS is a rich source of data on food security, it does not contain information on detailed family characteristics, such as parents' mental and physical health, parents' health-related behaviors, i.e., smoking, alcohol consumption, and illicit drug use, or parenting styles. In future research, we will explore additional data sources, such as the Fragile Families and Child Wellbeing Study (FFCWS) and the Early Childhood Longitudinal Studies, to examine the association between income and food insecurity, taking advantage of more detailed information on children and their families currently missing from the literature.

Acknowledgments

This project was supported with a grant from the University of Kentucky Center for Poverty Research through funding by the U.S. Department of Agriculture, Food and Nutrition Service, contract number AG-3198-B-10-0028. The opinions and conclusions expressed herein are solely those of the author(s) and should not be construed as representing the opinions or policies of the UKCPR or any agency of the Federal Government. We are also grateful for support from Grant R24, Project Number HD058486-03 from the National Institute of Child Health and Human Development to the Columbia Population Research Center. The authors also thank James Ziliak and Craig Gundersen for their thoughtful comments on an earlier draft and thank Liana Fox, Nathan Hutto, and Chris Wimer with their help with the SPM thresholds.

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Table 1

Children by food security status, 2001–2011

Households with children	Total	No Food Insecurity	Marginal Food Security among Adults	Marginal Food Security among Children	Food Insecurity among Children		
					Total	Low Food Security	Very Low Food Security
Panel A: Households by Food Security Status							
All households	100.0	68.0	10.6	11.7	9.6	8.8	0.8
<u>Official Predicted Income</u>							
Income <50% poverty threshold	100.0	29.5	19.6	23.2	27.7	24.8	2.8
Income 50%–99% poverty threshold	100.0	33.2	19.0	22.6	25.2	22.7	2.5
Income 100%–149% poverty threshold	100.0	43.4	18.0	21.4	17.2	15.8	1.4
Income 150%–199% poverty threshold	100.0	53.3	15.8	18.7	12.2	11.3	0.9
Income 200%–249% poverty threshold	100.0	68.9	11.2	11.9	8.0	7.5	0.5
Income 250%–299% poverty threshold	100.0	77.7	9.0	8.1	5.2	4.9	0.3
Income 300% or more of poverty threshold	100.0	91.1	4.1	3.4	1.4	1.4	0.1
<u>SPM Predicted Income</u>							
Income <50% poverty threshold	100.0	29.3	19.7	23.3	27.8	24.9	2.9
Income 50%–99% poverty threshold	100.0	33.5	19.0	22.8	24.8	22.3	2.5
Income 100%–149% poverty threshold	100.0	44.2	18.0	21.1	16.7	15.3	1.4
Income 150%–199% poverty threshold	100.0	56.2	14.7	17.7	11.4	10.5	0.9
Income 200%–249% poverty threshold	100.0	71.8	10.8	10.5	7.0	6.6	0.4
Income 250%–299% poverty threshold	100.0	79.6	8.5	7.4	4.5	4.3	0.2
Income 300% or more of poverty threshold	100.0	92.3	3.5	3.0	1.2	1.1	0.1
Panel B: Distribution of Households							
<u>Official Predicted Income</u>							
Income <50% poverty threshold	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Income 50%–99% poverty threshold	6.9	3.0	12.8	13.7	19.9	19.5	23.6
Income 100%–149% poverty threshold	10.6	5.2	18.9	20.5	27.7	27.3	32.3
Income 150%–199% poverty threshold	11.4	7.3	19.2	20.8	20.3	20.3	19.3
Income 200%–249% poverty threshold	10.5	8.2	15.6	16.8	13.3	13.4	11.8
Income 250%–299% poverty threshold	10.0	10.1	10.5	10.2	8.3	8.5	6.1

Households with children	Total	No Food Insecurity	Marginal Food Security among Adults	Marginal Food Security among Children	Food Insecurity among Children		
					Total	Low Food Security	Very Low Food Security
Income 250%–299% poverty threshold	7.8	9.0	6.6	5.4	4.2	4.4	2.9
Income 300% or more of poverty threshold	42.8	57.3	16.4	12.6	6.4	6.6	4.0
SPM Predicted Income	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Income <50% poverty threshold	7.3	3.2	13.6	14.6	21.2	20.8	25.3
Income 50%–99% poverty threshold	10.8	5.3	19.3	21.1	27.9	27.4	32.4
Income 100%–149% poverty threshold	12.1	7.9	20.5	21.9	21.0	21.0	20.0
Income 150%–199% poverty threshold	11.7	9.7	16.2	17.7	13.8	14.0	12.5
Income 200%–249% poverty threshold	10.1	10.6	10.2	9.0	7.3	7.6	4.3
Income 250%–299% poverty threshold	9.2	10.8	7.4	5.8	4.3	4.5	2.5
Income 300% or more of poverty threshold	38.8	52.6	12.9	9.9	4.6	4.8	2.9
N	152,363	106,117	16,761	15,629	13,856	12,643	1,213

Note: "No Food Insecurity" includes households reporting no food insecure conditions; "Marginal Food Security among Adults, No Child Food Insecurity" includes households reporting at least one food insecure condition among adults, but none among children; "Marginal Food Security among Children" includes households reporting one food insecure condition among children; "Low Food Security among Children" includes households reporting between two and four food insecure conditions among children; "Very Low Food Security among Children" includes households reporting five or more food insecure conditions among children. Income-to-Needs ratio categories are based on the median value of continuous income in each income band.

Source: Authors' calculations of the 2001–2011 Current Population Survey, Food Security Supplement.

Table 2

Odds ratios from logistic regression of household food insecurity among children, 2001–2011 (using OPM and SPM income)

	Food Insecurity among Children	Very Low Food Security among Children
	Odds Ratio	Odds Ratio
Official Predicted Income		
Income <50% poverty threshold	10.18*** †	11.29***
Income 50%–99% poverty threshold	10.32*** †	11.44***
Income 100%–149% poverty threshold	8.19*** †	8.15***
Income 150%–199% poverty threshold	6.16*** †	6.10***
Income 200%–249% poverty threshold	4.27***	3.50***
Income 250%–299% poverty threshold	2.74***	2.69***
SPM Predicted Income		
Income <50% poverty threshold	12.75*** †	13.73***
Income 50%–99% poverty threshold	12.50*** †	13.37***
Income 100%–149% poverty threshold	9.76*** †	9.57***
Income 150%–199% poverty threshold	7.09*** †	6.60***
Income 200%–249% poverty threshold	4.49***	3.07***
Income 250%–299% poverty threshold	3.06***	2.73***
N	152,363	152,363

p<0.001,

**
p<0.01,

*
p<0.05.

† indicates OPM and SPM coefficients for the same income-to-needs ratio categories are statistically significantly different at the p<0.05 level.

Note: The estimates are based on regressions that control for race/ethnicity, number of people in the household, age of the oldest child, presence of a child less than age 6, presence of an adult aged 65 and older, parent is single, parental education, parental employment, parental disability, housing is rented, mother's age, state of residence, and year. The full set of results is available from the authors upon request.

Table 3

Relative risk ratios from multinomial logistic regression of household food security, 2001–2011 (using OPM and SPM income)

	Marginal Food Security among Adults	Marginal Food Security among Children	Low Food Security among Children	Very Low Food Security among Children
	Relative Risk Ratios	Relative Risk Ratios	Relative Risk Ratios	Relative Risk Ratios
Official Predicted Income				
Income <50 % poverty threshold	6.084*** †	11.103***	16.975*** †	23.268***
Income 50%–99% poverty threshold	6.167*** †	10.643***	16.788*** †	22.978***
Income 100%–149% poverty threshold	5.261*** †	8.786***	12.220*** †	13.972***
Income 150%–199% % poverty threshold	4.329***	6.658***	8.324***	8.997***
Income 200%–249% poverty threshold	2.612***	3.842*** †	4.950***	4.177***
Income 250%–299% poverty threshold	2.045***	2.322***	2.909***	2.879***
SPM Predicted Income				
Income <50 % poverty threshold	6.932*** †	12.086***	21.062*** †	27.865***
Income 50%–99% poverty threshold	6.986*** †	11.438***	20.082*** †	26.065***
Income 100%–149% poverty threshold	5.781*** †	9.153***	14.174*** †	15.685***
Income 150%–199% % poverty threshold	4.296***	6.604***	9.114***	9.060***
Income 200%–249% poverty threshold	2.801***	3.303*** †	5.021***	3.431***
Income 250%–299% poverty threshold	2.028***	2.279***	3.174***	2.818***

*** p<0.001,

** p<0.01,

* p<0.05.

† indicates OPM and SPM coefficients for the same income-to-needs ratio categories are statistically significantly different at the p<0.05 level.

Note: The estimates are based on regressions that control for race/ethnicity, number of people in the household, age of the oldest child, presence of a child less than age 6, presence of an adult aged 65 and older, parent is single, parental education, parental employment, parental disability, housing is rented, mother's age, state of residence, and year. The full set of results is available from the authors upon request.

Table A.1**18 Questions for measuring food security in the Food Security Supplement of the Current Population Survey.**

-
- | | |
|-----------|---|
| 1 | “We worried whether our food would run out before we got money to buy more.” Was that often, sometimes, or never true for you in the last 12 months? |
| 2 | “The food that we bought just didn’t last and we didn’t have money to get more.” Was that often, sometimes, or never true for you in the last 12 months? |
| 3 | “We couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for you in the last 12 months? |
| 4 | In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn’t enough money for food? (Yes/No) |
| 5 | (If yes to Question 4) How often did this happen – almost every month, some months but not every month, or in only 1 or 2 months? |
| 6 | In the last 12 months, did you ever eat less than you felt you should because there wasn’t enough money for food? (Yes/No) |
| 7 | In the last 12 months, were you ever hungry, but didn’t eat, because there wasn’t enough money for food? (Yes/No) |
| 8 | In the last 12 months, did you lose weight because there wasn’t enough money for food? (Yes/No) |
| 9 | In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn’t enough money for food? (Yes/No) |
| 10 | (If yes to Question 9) How often did this happen – almost every month, some months but not every month, or in only 1 or 2 months? |
| 11 | “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? |
| 12 | “We couldn’t feed our children a balanced meal, because we couldn’t afford that.” Was that often, sometimes, or never true for you in the last 12 months? |
| 13 | “The children were not eating enough because we just couldn’t afford enough food.” Was that often, sometimes, or never true for you in the last 12 months? |
| 14 | 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? (Yes/No) |
| 15 | In the last 12 months, were the children ever hungry but you just couldn’t afford more food? (Yes/No) |
| 16 | In the last 12 months, did any of the children ever skip a meal because there wasn’t enough money for food? (Yes/No) |
| 17 | (If yes to Question 16) How often did this happen – almost every month, some months but not every month, or in only 1 or 2 months? |
| 18 | In the last 12 months did any of the children ever not eat for a whole day because there wasn’t enough money for food? (Yes/No) |
-

Table A.2
Food insecurity among children and percentage distribution of households by food insecurity status, 2001–2011

	Food Insecurity among Children																	
	No Food Insecurity			Marginal Food Security among Adults			Marginal Food Security among Children			Total			Low Food Security			Very Low Food Security		
	%	Distrib.	%	Distrib.	%	Distrib.	%	Distrib.	%	Distrib.	%	Distrib.	%	Distrib.	%	Distrib.	%	Distrib.
Households with children																		
Sociodemographic Characteristics																		
White	75.9	67.5	8.7	49.2	9.3	48.1	6.1	38.4	5.7	39.2	0.4	30.2						
Black	50.7	10.1	14.9	19.1	17.5	20.4	16.9	23.9	15.2	23.6	1.7	27.3						
Other	72.3	7.8	9.6	6.6	6.1	6.1	8.5	6.5	7.9	6.6	0.7	5.9						
Hispanic	53.3	14.5	14.4	25.1	16.1	25.4	16.3	31.2	14.6	30.7	1.7	36.6						
Two people in the household	53.1	6.5	15.0	11.7	16.7	11.8	15.2	13.0	13.7	12.9	1.4	14.2						
Three people in the household	70.7	30.7	11.0	30.5	9.8	24.7	8.6	26.4	7.8	26.3	0.8	27.6						
Four people in the household	72.9	37.8	9.3	30.7	10.3	31.0	7.5	27.5	7.0	27.9	0.6	23.7						
Five or more people in the household	63.3	25.0	10.8	27.2	14.1	32.4	11.9	33.1	10.8	32.9	1.1	34.5						
No children less than aged 6 present	67.0	75.2	9.7	69.3	9.7	82.2	10.7	84.5	9.7	83.9	1.0	90.9						
Child less than aged 6 present	71.2	24.9	13.8	30.7	6.0	17.8	6.3	15.5	6.0	16.1	0.3	9.1						
No person aged 65 or older present	68.1	96.0	10.6	95.7	11.7	95.8	9.6	95.8	8.8	95.8	0.8	96.5						
Person aged 65 or older present	66.9	4.0	11.1	4.3	12.1	4.2	9.9	4.2	9.2	4.3	0.7	3.5						
Parents born in the U.S.	69.4	79.7	10.5	76.9	11.5	76.7	8.7	70.6	8.0	71.0	0.7	66.6						
At least one parent born outside the US	63.3	20.3	11.2	23.1	12.5	23.3	13.0	29.4	11.7	29.1	1.3	33.4						
Single parent	49.9	22.6	15.3	44.2	17.7	46.6	17.3	55.2	15.6	54.6	1.7	61.3						
Married parents	76.1	77.4	8.6	55.8	9.0	53.4	6.3	44.8	5.8	45.4	0.5	38.7						
Neither parent completed high school	40.3	6.2	16.6	16.3	19.9	17.8	23.2	25.1	21.1	25.1	2.0	25.7						
At least one parent completed high school, no more	55.5	20.2	14.7	34.2	16.4	34.8	13.4	34.5	12.2	34.4	1.2	36.0						
At least one parent completed some college, no B.A.	70.1	40.1	10.6	38.6	11.1	37.0	8.3	33.3	7.5	33.3	0.7	33.4						
At least one parent has Bachelor's degree or more	88.2	33.5	4.5	10.9	4.7	10.4	2.7	7.1	2.5	7.3	0.2	5.0						
At least one parent employed FT (35+ hours)	73.9	88.4	9.1	69.6	10.0	69.4	7.1	59.8	6.6	60.6	0.5	51.4						
At least one parent employed PT (<35 hours), no FT	48.7	4.5	16.8	9.9	18.2	9.8	16.4	10.7	14.7	10.5	1.7	12.7						
No employed parents	39.3	7.1	17.8	20.5	19.8	20.8	23.2	29.5	20.7	28.9	2.4	35.9						

	Food Insecurity among Children											
	No Food Insecurity				Marginal Food Security among Adults				Marginal Food Security among Children			
	%	Distrib.	%	Distrib.	%	Distrib.	%	Distrib.	%	Distrib.	%	Distrib.
Households with children												
No disabled parents	69.5	97.8	10.4	93.3	11.3	92.4	8.8	87.3	8.1	87.8	0.7	82.5
At least one parent is disabled	35.2	2.3	16.3	6.7	20.3	7.6	28.2	12.7	24.8	12.2	3.4	17.5
Housing is rented or occupied without payment	46.0	21.6	17.0	50.9	18.6	50.7	18.4	60.7	16.6	59.8	1.8	70.1
Housing is owned by household member	78.3	78.5	7.7	49.1	8.5	49.3	5.6	39.3	5.2	40.2	0.4	29.9
N	152363	106117	152363	16761	152363	15629	152363	13856	152363	12643	152363	1213

Note: Estimates of food insecurity are based on 2001–2011 CPS FSS and excludes cases with missing information on family income reported in the FSS. Sample sizes are unweighted; percentages are weighted using the appropriate supplement weight. The table does not include information on mother's age, year of survey, and state of residence.