Beyond Income: What Else Predicts Very Low Food Security among Children?

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Abstract

We examine characteristics and correlates of households in the United States that are most likely to have children at risk of inadequate nutrition – those that report very low food security (VLFS) among their children. Using 11 years of the Current Population Survey, plus data from the National Health and Nutrition Examination Survey and American Time Use Survey, we describe these households in great detail with the goal of trying to understand how these households differ from households without such severe food insecurity. While household income certainly plays an important role in determining VLFS among children, we find that even after flexibly controlling for income-to-poverty rates some household characteristics and patterns of program participation have important additional explanatory power. Finally, our examination of the NHANES and ATUS data suggests an important role for both mental and physical health in determining the food security status of children.

I. Introduction

Access to healthful food during critical periods of fetal and child development is an important determinant of long-term health and economic well-being.[1] In this study, we examine households in the United States that are most likely to have children at risk of inadequate nutrition – those that report very low food security among their children. Although food insecurity in the United States is quite common (about 20 percent of households with children in 2012), very low food security among children is relatively uncommon (about 1.2 percent of households in 2012).[2] Even though households with very low food security among children make up a small percentage of households, the percent of households with this status has roughly doubled over the last decade. Further, these households account for a disproportionate share of children, as poor households tend to have more children, and the children in these households are those for whom the risks of inadequate nutrition during critical periods of development are a real possibility. In this study, we examine the characteristics and correlates of households with very low food security among children. Among most low-income households, even those that report that they are food insecure, children appear to be insulated from food insecurity themselves. Here, we explore what publicly available data can tell us about households in the U.S. where the children live at the extremes of poverty.[3]

Using 11 years of the Current Population Survey, plus data from the National Health and Nutrition Examination Survey and American Time Use Survey, we describe these households in

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[1] See Currie (2009) for a review of the literature on the importance of early life incomes, and Hoynes, Schanzenbach and Almond (2012) for a specific example of the benefits of childhood food stamp receipt on reducing the likelihood of poor adult outcomes.

[2] These statistics come from http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx#children

[3] We are using the term "extremes of poverty" loosely, not the formal definition of "extreme poverty" defined by the World Bank as households living on $2 or less per person per day. Edin and Schaefer (2013) use this formal definition and find that 4.3 percent of non-elderly households with children in the U.S. were in this category in 2011.

great detail. Although income is clearly an important part of the story, most households even at very low-income-to-poverty ratios do not have food insecure children. Our goal in this paper is to try to understand what is different about those households that do. We are not attempting to provide a causal analysis of, for example, the impact of program participation or health status on the incidence of very low food security among children. However, we will present the correlations between a household reporting very low food security among children, and a large list of household descriptors. Insights that come out of these detailed descriptions can be used to guide further research and policy.

We proceed by first describing the data we use, explaining definitions of different types of food insecurity, and showing the prevalence of very low food insecurity among children. Focusing on data for households with children where the income to poverty ratio is less than 300% of the poverty threshold, we present summary statistics on participation in various public programs and household characteristics by different food security levels. By linking longitudinally across two years of Current Population Surveys, we also show transition rates into different programs and food security levels.

After establishing the correlates of food insecurity, we turn to regression analysis. Again, it is important to emphasize that this is not a causal analysis, but rather a "horse-race" style analysis to see which correlates of very low food security among children are statistically significant when income-to-poverty ratios and other covariates are held constant. The thought experiment here is that if income is the only thing that matters for determining children's food security, then even if income does a poor job of explaining the variation in children's very low food security status, nothing else should be systematically correlated with the outcome. Those

things that remain robustly statistically significant suggest correlates of unmet need and may provide guidance for public policy aimed at addressing the extremes of poverty.

Our findings suggest that some household characteristics and patterns of program participation, even controlling flexibly for income-to-poverty, systematically predict very low food security among children. For example, controlling for household size, having a larger share of the household in the 13-to-18 age range is positively associated with very low food security among children, suggesting that rapidly growing teenage children may put greater stress on a household's ability to provide food security for them. Participation in programs like free and reduced priced lunch and SNAP are positively correlated with very low food security among children, suggesting a selection story where these are struggling households that have already identified themselves as requiring assistance, but who continue to have unmet needs. Finally, our examination of the NHANES and ATUS data suggests an important role for both mental and physical health in determining the food security status of children.

II. Data Sources

A. The Current Population Survey

Food insecurity is officially measured in the U.S. based on a supplement to the Current Population Survey (CPS). Since 2001, this supplement has been part of the December survey. Because the questions refer to the past twelve months, we consider the food security measure to refer to the calendar year of the survey. Food security is defined based on a battery of 18 questions (10 if there are no children in the household), which are shown in Appendix Tables 1a and 1b. Based on the answers to these questions, households are categorized as food secure or food insecure. Food insecure households are further broken down into those suffering from very low food security. In addition to the overall food security status of the household, there are

specific designations for the children in the household, based on the questions about the children. The children themselves may be food secure or food insecure, and food insecure children may be suffering from very low food security. Appendix Table 2 shows how each of these six categories is defined. Very low food security among children (the topic of this paper) is clearly quite severe, with five or more of the eight questions specifically about children having to be answered in the affirmative to be so classified.

In order to analyze the determinants of very low food security among children, it is important to not only have data on the answers to the 18 food security questions, but also to have good information on the household's income and program participation. The March supplement to the CPS collects this information, in reference to the previous calendar year. The CPS sampling frame allows us to match this March supplement to the December supplement for a subset of the sample. A CPS household is in the sample for four consecutive months, out of the sample for eight months, and then back in for four consecutive months. Thus, for households where December is the first of one of their set of consecutive months, they will also be surveyed in March and the two surveys can be matched at the household level. Additionally, starting in 2002, the March supplement sample was expanded by asking the questions of the February and April sample households that were not also in the March sample, as well as some of the prior November sample. Matching on the household identifier across these months results in a sample of about 14,000 matched households per year. We limit our sample to households with children and with income of 300 percent or less of the poverty line. Thus, our main analysis sample has about 3,000 observations per year.

While our main analysis uses this matched December-March CPS data set, a subset of households can be matched from one year to the next. A household that first joins the CPS

survey in December will rotate out the following March, but rejoin the sample for December through March of the next year. For these households, we can observe the one-year transitions across program participation and food security status. The result of this matching process gives us about 4,500 households per year that can be matched to the previous year. Note, however, that because of a change in the household identifier between 2003 and 2004, we are unable to match across those years. Again limiting our sample to households with children and income of 300 percent or less of the poverty line leaves us with only about 750 observations per year.

B. National Health and Nutrition Examination Survey

While the official measures of food insecurity come from the CPS supplements, the same battery of questions is asked in the much smaller National Health and Nutrition Examination Survey (NHANES), which since 1999 has been fielded over consecutive two-year periods (i.e. 1999-2000, followed by 2001-2002, etc.). The NHANES includes a range of different questionnaire modules, physical examinations, and a food diary, all used to evaluate the health and nutrition status of the country. While typically not everyone in the household is a part of the NHANES (and many children are sampled without any adult household members), the food security questionnaire is completed at the household level for all sample members. In particular, the status of children is ascertained whether or not the child is a sample member. Over half of the actual sample members are the children themselves, but for our purposes we are most interested in information that is unavailable in the CPS, such as the dietary data, and questionnaires on drug use and mental and physical health that are characteristics associated with the adults in the household. Thus, we restrict our sample further to only those observations where the sample member is over 18. The result is a sample of almost 9,000 observations. However, many of the

questions and their samples change over time in the NHANES, meaning that for many variables we have much smaller samples.[4]

C. American Time Use Survey

The American Time Use Survey (ATUS) asks respondents to report on how, where, and with whom they spend their time. Respondents are a randomly chosen subset drawn from households that have completed their final CPS monthly survey response. To be useful for our analysis, a household must have participated in the December Food Security Supplement. Since the ATUS is asked between 2 and 5 months after a household completes its final CPS survey, the households that participated in a December CPS were surveyed for the ATUS between the months of February and August. The respondent is surveyed about his or her activities sequentially, walking through the 24-hour period that began at 4 a.m. on the designated day and continued through 3:59 a.m. on the following day. Respondents describe in their own words the primary activity in which they were engaged at each point in the day, and these activities are coded into categories. While we primarily show results across the major groupings (e.g. eating and drinking; working; household services), we also break out some activities such as food preparation and food shopping in more detail. We limit the sample to households with children. When the data are pooled across 2002-2010 December CPS data that can be linked to the ATUS, we have a sample of 17,341 respondents, 2413 of which are food insecure and 100 of which have very low food security among children.

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[4] For example, the depression screener was only given to all adults in the last three waves of the survey. Prior to that, only a half sample of 20 to 39 year olds was screened for depression.

III. Analysis Using the Current Population Survey

A. Descriptive Analysis

As noted above, a child is classified as suffering from very low food security (VLFS) if five or more of the questions about the child are answered in the affirmative. Essentially, then, it is impossible to be so classified unless there are extreme circumstances in the household such as the size of the child's meals being cut or the child being hungry, but with no more money for food. It is perhaps not surprising, then, that even among poorer households with income at or below 300% of the poverty line, the rate of very low food security among children remains relatively low, averaging about 0.013 over our CPS sample. That average masks some important time variation, with rates reaching as high as 0.021 at the start of the Great Recession. The average also masks geographic variation, as shown in Figure 1. In several states, such as Colorado and New Hampshire, the rate of very low food security among children over this time period averages under 0.003, while in states such as Missouri and Maryland it is over 7 times higher, at 0.020. As will be described in more detail below, state fixed effects are insignificant in a regression explaining whether a household contains a child with very low food security, while year fixed effects are significant. However, controlling for year has no real impact on the role of other explanatory variables. Note that the regression results reported below control flexibly for a household's income to poverty ratio, so it may be that the geographic variation we observe in Figure 1 is at least partially driven by differences in financial well-being across states.

Table 1a begins our descriptive analysis by looking at rates of program participation and at some various demographics for each of four samples. First, is the full sample of households with children and income below 300% of the poverty line. Second is a subset of this sample made up of only households that are coded as being food insecure, followed by the subset with

very low food security. Finally, we look at those households containing very low food secure children. Columns (1), (3), (5) and (7) present the means for these four samples, with the following columns giving the standard deviations. Looking across columns the columns of means gives us insight into the characteristics associated with progressively more dire food security situations. For example, participation in the free/reduced price lunch program and in SNAP (Supplemental Nutrition Assistance Program, formerly known as food stamps) both increase sharply across the columns, as does receipt of energy assistance, SSI benefits and welfare. In all cases, participation comes close to doubling when moving from the full sample of merely low-income households to the subsample of households containing a child with very low food security.

It is important to make clear that it would be unwise to interpret these patterns as implying that receipt of these important safety net programs causes lower food security.[5] Rather, in these unconditional means, it may simply be the case that these programs are most highly correlated with the lowest resource levels that would be expected in the most food insecure households. Below, we will control for the ratio of household's income to poverty, but for now, it is interesting to note that not all programs have participation rates that increase as sharply across the columns. In the case of non-means-tested programs, such as unemployment compensation, workers compensation, social security, veterans' benefits, survivors' benefits or retirement benefits, this lack of a sharp increase is consistent with the idea of some program participation simply capturing relative resources. At the same time, there are also differences in participation increases across the means-tested programs. Medicaid participation increases a bit between all low-income households (column 1) and all low-income food insecure households

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[5] In fact, Schmidt et al. (2013) show that safety net programs played an important role in keeping many families food secure during the Great Recession.

(column 4), but then stays fairly constant across the more severe levels of food insecurity.

Somewhat similarly, eligibility for the Earned Income Tax Credit (EITC) is relatively flat across

the first three samples, before increasing a bit for the households with a very low food secure

child.[6] These results may also be consistent, however, given that both of these programs are often

available to both low- and moderate-income households.

The rows in the lower half of Table 1a investigate the means of assorted demographic

variables.[7] First, we see that while overall household size is not very different across samples, the

number of teenagers is much higher in families with low food security children at 0.944

compared to just 0.655 for food insecure households. Given the higher caloric needs of older

children, this result may reflect the increased difficulty of avoiding hunger as children age while

incomes remain the same. Looking at aspects of the household head, we see several

characteristics that become more common across the samples. Households with very low food

secure children, are more likely to be headed by a female, by an African American, by a recent

immigrant, by someone who is disabled, and by a high school dropout, but less likely to be

headed by a homeowner or an individual who is neither black nor white.[8] Finally, potential

workers in households with a low food secure child spend a larger fraction of the year looking

for work and a lower fraction working. As was the case with program participation, these

household characteristics may simply be correlated with resource availability, making it

important to investigate their role in a regression framework, as we will do below.

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[6] Note that here and elsewhere in our analysis of the CPS, EITC receipt is imputed based on earnings and observed family characteristics. The CPS does not ask households about EITC receipt.

[7] Coleman-Jensen, McFall and Nord (2013) presents a range of descriptive statistics on food insecurity in households with children in 2010-2011 that is complementary to our longer time period.

[8] These results are similar to past findings on correlates of household food insecurity (versus very low food security among children) reviewed in Gundersen, Krieder and Pepper (2011).

At the bottom of Table 1a, we can see that among this sample of poor households, 28 percent are food insecure, 7.7 percent have very low food security, and just 1.3 percent have a very low food secure child. The fact that many households are able to protect their children from very low food security is made most clear by columns (3) and (5), where we see that less than 5 percent of food insecure households have children with very low food security, and even among very low food security households, only 17 percent have very low food security among their children.

Using the subsample of observations that can be matched back one year shows that food insecurity in general, and the extreme outcome of very low food security among children in particular, is far from a permanent state.[9] Column (3) in Table 1b shows that 44 percent of households that are currently food insecure were not in that situation last year. Similarly, column (5) shows that almost 61 percent of household with very low food security just entered that state this year, with 32 percent considered food secure in the previous year. Finally, in column (7) we see that almost 82 percent of households with very low food security among children had protected their children from this status last year. In fact, 52 percent of households with very low food security among children were not very low food security households last year, and over 21 percent were not at all food insecure last year. The good news from this information on transitions is that very low food security among children may not be a persistent state. The bad news is that poor nutrition, even for brief periods, if those periods are critical for development, may have long-lasting consequences. If very low food security among children is a state that happens suddenly, policies to address it must be able to act quickly, without long screening delays.

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[9] See Kennedy et al. (2013) for a detailed analysis of transitions into and out of food security.

The remaining rows of Table 1b reflect changes in program participation across the year. There are a few interesting patterns across the columns. First, perhaps not unexpectedly, more households began getting SNAP, the more severe the food security situation. This result is consistent with the fact that many households were newly facing food insecurity problems, as such households would now have a reason to apply for SNAP. Interestingly, while there are some increases in the fraction of households newly receiving free/reduced price lunch, it is not as noticeable as it is for SNAP. New SNAP receipt increases from 7.4 percent for the full sample of poor households to 17.7 percent for households with very low food security among their children. By contrast, school lunch participation increases only from 12.2 percent to 17.2 percent. The other programs with noticeable increases in new receipt across columns are mainly the same programs that had noticeable patterns in Table 1a. New welfare beneficiaries increase from 2.8 percent of poor households to 9.6 percent of the very low food security among children sample, while new SSI claimants double from 2.9 percent to 5.8.

A final descriptive look at the CPS data is shown in Table 2. Here, we present the food security status of poor households with children by selected characteristics. Not surprisingly, this table provides many of the same take-away messages at the previous tables. Food security status is much lower among households that receive free/reduced price lunch, that receive SNAP, and that receive EITC. Households with teenagers, those headed by a female, by a high school dropout, by an African American, or by a disabled person also have worse food security outcomes, as do those not owning their own homes. Focusing specifically on very low food security among children, we often see a doubling (or more) of the rate across categories. For example, poor households that do not participate in the school lunch program have a rate of 0.7 percent, while those that do have a rate of 2.4 percent. The pattern across those that do and do

not receive SNAP is comparable (1 percent for SNAP non-recipients versus 2.6 percent for

SNAP recipients). Similarly, poor households not on welfare have a rate of 1.2 percent, while for

welfare recipients it is 3 percent. This exact same change is observed when comparing

households that are not and are headed by a disabled person.

It is important to emphasize that the results shown in these tables are simple correlations,

with no implication that receipt of certain safety net programs causes food insecurity. Rather, as

before, we should look at these results as evidence that certain programs best capture the low

resources and other issues that lead to problems maintaining food security, as do certain

characteristics of the household head (such as disability, or female). Clearly, it will be important

to turn to a multivariate framework to better investigate these associations, but first, we will

briefly examine the relationship between income and food security.

Given that the definition of very low food security among children revolves mainly

around a lack of resources, it is reasonable to assume that said resources should play an

important role in determining food security status. Figures 2a and 2b graph the rate of very low

food security among children by 20-point income to poverty rate bins for both of our data sets

(i.e. the CPS and the NHANES).[10] Broadly speaking, both figures tell a similar story, wherein

those below the poverty line have higher rates of very low food security among children (in the 2

to 4 percent range), and these rates decline to well below 1 percent for those with income twice

the poverty line. In addition to allowing one to visualize the role played by household monetary

resources in determining very low food security among children, these figures make clear that it

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[10] See Gundersen, Kreider and Pepper (2011) for a related graph showing household-level very low food insecurity in 2009 by income-to-poverty ratio.

will be imperative to control for these resources in our exploration of what household characteristics are associated with this extreme child outcome.[11]

B. Regression Analysis

Table 3 presents multivariate regression analyses of the correlates of very low food security among children. These are linear probability models where the dependent variable is equal to 1 if the household reports very low food security among its children, and 0 otherwise (the standard errors are robust to heteroskedasticity). We will refer to this outcome variable as VLFS among children. The data are 11 years of the December Current Population Survey matched to the subsequent March Current Population Survey data in order to combine food security status, income-to-poverty ratios, and program participation information. The data are restricted to households with children with income-to-poverty ratios below 300% of the poverty line.

In each regression, income-to-poverty measures are held constant with dummy variables for fifteen income-to-poverty ratio bins (grouped by 20 percentage points, with zero to 20% of the poverty line as the omitted category). In regressions not shown, we find that when the income-to-poverty dummies are entered into the regression alone, they are jointly statistically significant, but explain only about 0.5% of the variation in VLFS among children. Although Figure 1 shows that there are states with higher rates of VLFS among children, a complete set of state fixed effects are not jointly statistically significant when included.[12] Controlling for year dummies, on the other hand, does significantly increase the explanatory power of the regressions. This is, perhaps, unsurprising since the data span the years of the Great Recession when all

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[11] In these graphs and in the rest of the paper, we use the official poverty measure for resources and thresholds. Notably, this resource measure is cash, pre-tax family income and therefore does not include the value of in-kind programs such as SNAP and tax based assistance through the EITC.

[12] State fixed effects are jointly statistically significant correlates of food insecurity and even very low food security for households in this sample. However, the do not explain variation in very low food security among children.

degrees of food insecurity increased. Thus, all of the regressions in the table include year dummies (with 2001 as the omitted group) but we do not include state fixed effects.

The first column of regression results includes the dummy variables for the (20 percentage point) income-to-poverty bins, year dummies, and controls for household size and composition. Controlling for household size, having more children in the 13-to-18 year old age range significantly increases the probability that a household reports very low food security among its children.[13] The point estimate suggests that one additional child in this age range, holding constant household size, increases the probability of VLFS among children by 0.64 percentage points. As 1.3 percent of households in this sample report VLFS among children, this is roughly a 50% increase in the probability of being in this category.

The second column includes a set of dummy variables that control for characteristics of the head of household and for whether the household lives in a rural area. The head of household being African American, female, or a recent immigrant are all statistically significantly and positively correlated with VLFS among children. If the household head is a high school dropout, conditional on other controls, the probability that children in the household have VLFS is also higher. If the household head is disabled, there is a 1.3 percentage point increase in the probability that children in the household have very low food security – roughly a 100% increase in this probability. Finally, if the household head is a homeowner, the household is significantly less likely to report very VLFS among children.

Recall that all of these regressions control flexibly for income relative to poverty thresholds for the household characteristics. Thus, it should not be the fact that households with a disabled head are simply more likely to be poor that is driving the statistically significant

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[13] Other specifications examined whether age categories among adults were correlated with VLFS among children; 13-to-18 is the only age category that is significantly related to VLFS among children.

correlation between this group and VLFS. Rather, it suggests that income-to-poverty is not capturing the relationship between resources and food security requirements equally well across households of different types.

The third column examines the correlations between VLFS among children and program participation and labor force patterns among potential workers in the household. Conditional on income-to-poverty ratios, if the adults on average work a larger fraction of the year, the children are less likely to have very low food security. Interestingly, many of the indicators for participation in public assistance programs are positively correlated with VLFS among children, even holding constant income and other program participation. In particular, households where the children receive free or reduced priced lunch are particularly likely to report VLFS among children. Households that receive SSI – suggesting disability or elderly poverty in the household – are statistically more likely to report VLFS among children. Finally, households eligible for the EITC are statistically more likely to report VLFS among children.

The final column presents a "horse-race" regression among all of these different variables. Recall that year dummies and income-to-poverty 20 percentage point bin dummies are included. Column (4) allows us to examine, for example, whether the correlation between household composition and VLFS among children was simply that African American households, for example, are more likely to have children in this age range. Covariates that were statistically significant in the first three columns may simply have been highly correlated with other household descriptors that are highly correlated with VLFS among children. The "horse-race" model allows us to see which covariates have the strongest conditional correlation with VLFS among children.

Household composition – in particular having more children age 13 to 18 in the house – continues to be statistically and strongly correlated with VLFS among children. The coefficient is virtually unchanged from column 1, suggesting that having a child in this age range is not particularly correlated with any of the other included household descriptors. It is possible to imagine that a family might find that its current income and benefit levels are sufficient to insulate children from food insecurity when they are small, but when they hit the growth spurts of adolescence, the family's resources cannot keep up with food requirements.

The household head being African American and the household head being a high school dropout are no longer statistically significantly correlated with VLFS among children in column (4). The coefficient on "African American" was cut in half, but the standard error did not change, suggesting that having an African American head of household is significantly correlated with the other correlates of VLFS among children that are now included in the regression.[14] Similarly, the high school dropout variable is too highly correlated with labor market and program participation variables and household composition to be individually statistically significant in column (4).

On the other hand, other household characteristics remain statistically meaningfully correlated to VLFS among children. A household with a recent immigrant as the head is still significantly more likely to report VLFS among children. The fact that this coefficient is virtually the same as in column (2) suggests that having a recent immigrant head is not highly correlated with other included variables.[15] Further, having a disabled household head remains

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[14] In a subset of years we can consistently define a "central city" geographic designation. In that subset of years, the indicator variable for African American is positively correlated with VLFS among children, until central city status is held constant. This suggests that the fact that African Americans are more likely to live in central cities, and households in central cities are more likely to have VLFS among children, is driving the unconditional correlation between African American and VLFS among children.

[15] Research by Borjas (2004) shows that food insecurity among immigrants was affected by program eligibility changes for immigrants that came with welfare reform. Kaushal et al. (2013) focus on food insecurity among

positively correlated with VLFS among children, although the coefficient is about a third smaller; this is likely collinear with the receipt of SSI benefits, although both remain statistically significant when entered together. If the household owns its own home, it continues to be less likely to suffer from VLFS among children. Finally, female-headed households are statistically more likely to have VLFS among children, even when we control for this broad set of variables.

Turning to the coefficients on the program participation variables, we see that households that participate in free and reduced priced lunch are more likely to report VLFS among children, although the coefficient is about a third lower than in the previous column. Receipt of unemployment compensation, TANF, SSI, and EITC all remain positively correlated with VLFS among children in column (4).

This exercise is pointing to unmeasured and unmet needs in some households. If, for example, poverty thresholds correctly adjust for family composition, then we would expect that once income-to-poverty ratios are held constant, there would be little role for a household with more 13-to-18 year old children to be more likely to have very low food security among those children. Similarly, the fact that both disability status and receipt of disability payments are positively correlated with VLFS among children, suggests that there is unmeasured and unmet need in these households.[16] These households appear to have applied for and received many forms of public assistance, but perhaps the benefit levels do not adequately compensate for characteristics like disability status, or there are changes in the household to which these programs do not adjust quickly. For example, as children in a household age into the teen years, perhaps benefit levels of programs do not adjust to meet this new greater demand for food.

children (though not VLFS among children) and find that children in households with Mexican-born parents are about 3 to 4 percentage points more likely to be food insecure than other households, controlling for income-to-poverty ratios.

[16] Coleman-Jensen and Nord (2013) describe the strong positive relationship between adult food insecurity and disability.

Table 3 is best thought of as indicating which groups of people are likely to have unmeasured and unmet needs. In the next section, we turn to the National Health and Nutrition Examination Survey to glean insight into what some of these unmet and unmeasured (in the CPS) needs might be. The NHANES is smaller which is particularly limiting here in our analysis of a fairly rare status, but it goes into more depth about mental and physical health, and related behaviors, that will give insight into these households at the extremes of poverty in the United States.

IV. Analysis Using Alternate Data Sets

A. Descriptive Analysis Using the NHANES

Table 4 is similar in spirit to Table 1a, in that it presents characteristics of households with children that are below 300 percent of the poverty line, with columns (1) to (3) for the overall sample, columns (4) to (6) for food insecure households, columns (7) to (9) for very low food security households and columns (10) to (12) for households with very low food secure children. The sample used for Table 4, though, is derived from NHANES sampled households that interviewed an adult member, leaving us with a subset of all households and a much smaller analysis sample than that derived from CPS households. While a few basic characteristics are included to ensure that this sample is not very different from the larger CPS sample, the main focus here is on outcomes only measured in the NHANES. Recall that NHANES questionnaires vary over time in both the questions asked and the universe for those questions, resulting in wide variation in sample sizes across rows.

The first few rows of Table 4 focus on mental and physical health. Here, it is clear that depression is highly correlated with food security outcomes.[17] While 9 percent of the adults in households in column (1) report being depressed, this rate increases to 24.3 percent in column (10).[18] This increase in depression is monotonic, with a rate of 14.8 percent in food insecure households and 20.2 in households with very low food security. Also increasing monotonically is the number of days over the past month in which the household adult was kept from their usual activities by their mental or physical health, reaching almost a week for the households with very low food secure children, up from under 2 days for the full sample. Similarly, the fraction reporting only fair or poor health (versus good, very good or excellent) more than doubles across the columns, increasing from 21.8 percent to 48.4 percent.[19] Recall that in the CPS, a disabled household head was strongly associated with very low food security among children. Here, we see reinforcing information on the role of not only physical health, but also mental health. These results provide good evidence for the types of issues facing households in the extremes of poverty that are often unmeasured in standard data sets.

In addition to providing information on physical/mental health and potential deleterious behaviors, the NHANES also includes a food diary, which lets us examine the nutrition status of the sample household member. While there is very little difference in BMI across the columns, the small changes do reflect increasing BMI with more dire food security status.[20] Similarly, the small changes in total daily calories generally imply fewer calories eaten by the adults in

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[17] It is known, especially in the pediatrics literature, that children with a depressed mother (and father) are at greater risk for poor health, education, and behavioral outcomes (c.f. Kahn et. al. (2004) and cites therein).

[18] In the first three waves, only a half sample of 20 to 39 year-olds are asked about depression, while in the final three waves all adults are administered a 9-item depression screener.

[19] Siefert et al. (2004) find a relationship between food insufficiency and physical and mental health in a sample of welfare recipients, while Stuff et al (2004) find this relationship for a sample of adults in the Lower Mississippi Delta region. Note that the later's interpretation is that adult food insecurity leads to poor adult health outcomes.

[20] Obesity is often found in tandem with food insecurity in the United States, although there is some disagreement over the strength of the relationship. Kuku, Garasky and Gundersen (2012) argue that while parametric analyses find no relationship, a nonparametric approach can find a relationship for some groups.

households with very low food secure children, perhaps reflecting the adult's attempt to better shield the children from deprivation.[21] This same idea of the adults perhaps trying to protect the children, and "doing without" for themselves can also be seen as they eat a higher percentage of meals at home, a lower percentage at fast food restaurants, and reach a lower percentage of the recommended daily nutrients.[22] The fact that the adults in these households suffering from the extremes of child food insecurity are themselves the worst off nutritionally is consistent with the impression arrived at earlier that many of these households are likely to have unmeasured and unmet needs.

The questions in the next two rows of Table 4, reporting whether the respondents have someone on whom they can rely for emotional and financial support, are based on the smallest samples. In the first three waves of the NHANES the questions were only asked of respondents age 60 and over (many of whom may no longer have children in the household). While the sample was expanded to those age 40 and over for the next two waves, the questions on social support were dropped entirely for the wave completed in 2010. Nonetheless, the pattern across the columns is intriguing. Not only does the likelihood of having someone for financial support drop monotonically across the columns, so does that for emotional support. The former, while interesting, may not be overly surprising given that lack of financial resources is expected to be correlated with food insecurity. The latter result, however, is our first indication of the type of nonfinancial issue that may impact a household's food security status. A lack of emotional

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[21] In fact, if Table 4 is repeated for a sample where the children are the NHANES sample members, calories increase across the columns from 1831 to 2011. However, the children are also older in the final column averaging over 10 years old versus just 8.5 in the first column. This increase in average age is likely related to the CPS finding of households with older children being more likely to have food insecure children.

[22] When looking instead at the sample children, the percent of the recommended nutrients achieved is actually highest in the final column, at almost 65 percent, compared to about 63 percent in the other columns. However, the differences are small and the sample sizes very small in the final column.

support may be tightly linked with mental health, which as discussed further below, may have an important role to play.

The next several rows focus on drug and alcohol use and abuse. Broadly speaking, drugs and alcohol do not seem to have a major correlation with food security. For example, the rate of cocaine use over the past year is about 2 percent for each of the samples, while reported use of meth in the past 30 days is very low for all groups, and actually zero for the households with very low food security children. That said, while use of heroin in the past 30 days is also very low for all groups, it increases ten-fold across the columns, starting at 0.1 percent for the overall sample, rising to 0.3 percent for food insecure households and 0.8 percent for very low food security households, before almost doubling to 1.5 percent for households with very low food security children. While reporting smoking pot in the last 30 days is much more common – 12.4 percent for the sample overall, and peaking at 23.7 percent for very low food security households, it does not seem to be a good explanation for the most extreme outcome of very low food security among children. Both these households and those who are simply food insecure have similar rates of reported pot smoking – about 17.8 and 17.9 percent respectively. The idea that extremes of drug use may be most harmful (i.e. heroin versus pot) for the household's children is reinforced by the fact that the household adult is much more likely to have been to rehab for households with very low food security children. The 5.8 percent for the full sample column (1) increases to 8.8 percent for food insecure households, 11 percent for very low food security and reaches 16.2 percent for households with very low food security among children. While it is important to keep in mind that the sample sizes here are small, serious issues with

substance abuse for a household adult do appear to be highly correlated with very low food security among the children in the household.[23]

The final rows look at many of the same variables as in Table 1a, showing very similar results. Most importantly, the fraction of the overall sample that has very low food security children is identical at 1.3 percent in both data sets. While levels are not identical, similar patterns are seen for SNAP across tables, with receipt greatly increasing as food security status worsens. Overall, then, while the NHANES sample is generally smaller than the CPS, it does not seem to differ greatly in the basic demographics, reinforcing the validity of using the NHANES to draw conclusions about what unmeasured characteristics might be driving some of the CPS results.

Table 5 is parallel to Table 2, but again using the NHANES sample adults. As was the case with the CPS, this table mainly reinforces the lessons of Table 4. For example, the adult not being in good health more than triples the probability of the household having a very low food security child, as does the adult being depressed. While only 1.1 percent of children in a household where the adult has emotional support has very low food security, that increases to 5 percent with no emotional support. The results are fairly similar for financial support, where the rate increases from 0.8 percent to 3 percent. Viewing the data from this perspective makes smoking pot seem a bit more important, especially for the basic outcome of the household being food insecure. Here, 25.7 percent of households are food insecure when the adult has not smoked in the past month, while 39.6 percent are when the adult has smoked. Given the relatively high fraction of adults in this sample who have smoked pot in the last month, the rate of very low food security among children is just a bit higher than the overall rate of 1.3 percent for those smoking,

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[23] Interestingly, Kursmark and Weitzman (2009) report on recent studies finding that having a smoker in a house is associated with childhood food insecurity.

at 1.4 compared to 0.9 percent for those not smoking pot. As before, the relationship between

heroin use and poor food security outcomes is strong, but it is now clear just how rare it is for the

household adult to have used heroin in the past month – there are only five observations.

Nonetheless among these small number of households, food security outcomes are very poor –

71.7 percent are food insecure, 52.9 have very low food security, and 13.5 percent have very low

food security among their children – over ten times the average rate. Finally, we again see that

the adult having been to rehab is associated with much higher rates of very low food security

among the children, at 2.7 percent compared to 0.9 percent.

Recall from Figure 2b that like in the CPS, very low food security among children in the

NHANES declines sharply as the household's income to poverty ratio increases. Thus, it is

important to keep in mind that even though many of the characteristics explored above are not

directly tied to income levels (as many of the CPS program participation variables were), they

may still be highly correlated. In that case, these characteristics may still be proxying for income.

Figure 3 shows the means of selected NHANES variables by 50 percentage point income-to-

poverty bins (we use fewer bins due to the smaller sample sizes in the NHANES). Interestingly,

the social support variables that were so highly correlated with food security status do not seem

very positively related to income, although financial support in particular does rise notably for

the highest income group.[24] As for physical and mental health, the fraction in less than good

health and the fraction suffering from depression both decline somewhat with income. However,

having days of inactivity due to either mental or physical health problems is quite a bit more

stable over the income groups. Finally, having been to rehab does not appear to have a

completely monotonic relationship with income class. Rather, after being fairly stable across the

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[24] Remember that as described above, the questions on financial and emotional support are not asked for the full
sample; this may affect the interpretation of these findings.

two groups below the poverty line, it declines markedly before rising again for the group between 250 and 300% of the poverty line.

B. Regression Analysis Using the NHANES

The correlation between some of these variables and income makes clear that it is important to control for the income to poverty ratio. Unfortunately, we cannot follow the exact procedures from Table 3 that we used with the CPS data, and run a "horse race" to see which variables are most correlated with very low food security among children, conditional on income. Because the NHANES changes questions and samples over time, a model with all of our variables included together has only about 750 observations. Instead, we carry out the exercise presented in Table 6. Each column reports a regression of very low food security among children. The regressions in columns (1) through (9) each control for the set of 15 income-to-poverty bin dummies (representing 20 percentage point ranges of the household's income to poverty ratio), year dummies, household size, and dummies for the sampled adult in the household being African-American, a high school dropout, a US citizen, a homeowner, and employed, along with the NHANES variable shown on the left. Across each of these columns, we add to the basic controls one variable at a time capturing the health and behavioral variables discussed above.

Starting with the first five columns, we see that controlling for these baseline income and demographic variables, poor health and lack of social support for the household adult are significantly related to the probability that there is very low food security among the children in the household. In columns (6) to (9) we see that none of the drug use variables, including having been to rehab, significantly predict VLFS. The point estimate on heroin use, though, continues to

be extremely large – an increase in very low food security among children of 12.1 percentage points is predicted for households with an adult reporting heroin use. Finally, column (9) shows that receiving SNAP is significantly related to very low food security among children; as discussed above we interpret this as likely to be capturing unobserved aspects of the family's resources. In fact, controlling for either health, or social support, or drug use, as is done in columns (10) to (12) wipes out the importance of SNAP receipt.

Column (10) provides a horse race among the available health variables for the subset of observations for whom we observe these variables. When the poor health indicator, days of inactivity and the depression indicator are included together, the point estimates for the former two drop almost in half, losing significance. There is very little change for depression, however, which maintains its significant correlation with very low food security among children.[25] Moving to the social support variables in the next column, both point estimates are slightly reduced when included together, and individually their significance drops to the 10 percent level. However, the two variables are still jointly significant at better than the 1 percent level. In the final column, we include the drug use variables together, whose point estimates are little changed and thus remain insignificant (both individually and jointly).[26] It is also worth noting that in these last three columns none of the demographic variables are significant, other than being employed being significantly negative at the 10% level in the final column (coefficients not shown).

While Table 6 should be thought of as correlational, not causal, it does provide some insight into the types of household characteristics that are likely to lead to unobserved and unmet needs. In particular, there is strong evidence that good mental health in particular, and social

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[25] Note that even though we are better controlling for other attributes of the child's household, we are still not making claims of causality. It may, in fact, be the case that it is an inability to meet the child's nutritional needs has resulted in the adult becoming depressed, rather than the other way around. Note Powers (2013) also discusses this directional uncertainty in her study of parenting and very low food security among children.
[26] The results for columns (10) to (12) are essentially identical if the SNAP variable is excluded.

support structures more broadly, may play an important role in keeping children out of very low food security status. While the NHANES sample sizes are too small (and the behaviors too rare) to draw statistically significant conclusions about serious drug abuse, the coefficients point strongly in the direction of this being a serious problem for children's food security. Thus, it may well be the case that an emphasis on adult mental health and well-being (which includes building social support networks and addressing addiction issues) could have beneficial spillover effects on children's food security status.

C. Analysis Using the ATUS

Table 7 presents descriptive information about time use by food security status. This table merges December CPS to ATUS data, and therefore does not have detailed information on a household's income-to-poverty ratio that is collected in the March CPS survey. Instead, we only have an indicator for whether a household's income is less than 185 percent of the poverty line. We present means and standard deviations for all households in columns (1)-(2), all low-income households in columns (3)-(4), then in the subsequent columns regardless of whether a household is low-income we present all food insecure households, all households with VLFS, and all households with VLFS among children.

Food insecure households spend more time on personal care, and this is entirely driven by more time sleeping. Furthermore, the mean time spent sleeping increases monotonically in the severity of food insecurity, and the difference between adults in households with VLFS among children and all households is statistically significant. Increased time reported sleeping can be a marker for depression (Tsuno et al. 2005), which is consistent with our findings from the NHANES data that households with VLFS among children are more likely to have an adult suffering from depression.

Adults in households with VLFS among children spend more time in household activities (such as laundry, cleaning, and food preparation). When we break out time spent in food preparation separately, the pattern in means suggests that the most food insecure households are spending more time in food preparation, although the surveyed adult in households with VLFS among children are slightly less likely to report doing food preparation. Surprisingly, households with VLFS among children also spend statistically significantly less time caring for household members.

Low-income households and food insecure households report more time spent in leisure and less time spent on work than households overall, but there is no consistent pattern across severity of food insecurity. While average minutes spent working are relatively stable across low-income households and those with varying levels of food insecurity, but the fraction reporting any time spent working declines across levels of food insecurity. Neither is there a consistent pattern in time spent eating and drinking across groups. Time spent shopping, and in particular time spent shopping for food, decreases as food insecurity increases in severity. The difference in time spent shopping between households with VLFS among children and households overall is statistically significant.

There are no clear patterns across the remaining categories, including time spent in education, using services, sports, religious or volunteer activities, or travel. Adults in VLFS among children households report more time on the telephone, but this difference seems to be driven by a few respondents with very high telephone use, and the difference is not statistically significant.

Table 7 further builds evidence into the types of household characteristics that are likely to lead to food insecurity. In particular, respondents in households with VLFS among children

spend more time sleeping, and less time working, caring for household members, and are less likely to do food preparation. Consistent with the NHANES results, these patterns also suggest that unobserved mental health status may differ in important ways in households with VLFS among children.

V. Conclusion

Very low food security among children in the United States is, thankfully, a rare occurrence with about 1.3% of low-income households with children (<300% of poverty threshold) meeting the criteria for this categorization. Low-income relative to a household's resource needs is clearly highly correlated with very low food security among children, but even within narrow income-to-poverty bands, very low food security status among children varies. This paper is an attempt to move beyond measured income-to-poverty to understand the unmeasured and unmet needs of households that are correlated with this extreme manifestation of poverty. We use three different types of data to examine this question: Current Population Survey data (matched December to March, and December to December), National Health and Nutrition Examination Survey data, and the Current Population Survey data matched to the American Time Use Survey data.

A few clear paths for future research and policy analysis fall out of this investigation. First, the data sets that we currently have are likely inadequate to address questions like the causal impact of a policy change on very low food security among children (even if a robust empirical strategy for establishing a causal relationship were to present itself). The sample sizes of these households are simply too small to allow one to likely to be able to say anything with

statistical precision even about quite large effect sizes. Data collection for a target group will likely need to be a piece of any policy or program evaluation plan.

Despite the fact that the sample sizes for households with VLFS among children are small, we do have enough power to distinguish some clear correlates of this status, and these correlates may be used to guide policy. It seems clear that households are at risk for very low food security among children as some children in the household age into their teenage years. Note that these data do not tell us *which* children in the household are suffering from very low food security. It may be that as older siblings become teenagers, younger siblings who are developmentally vulnerable to poor outcomes due to inadequate nutrition, are the ones suffering from very low food security. In any case, the fact that income-to-poverty thresholds and benefit levels from programs do not take into account the age of the children in the household are issues ripe for attention.

Another point that emerges is that households that have very low food security among children are more likely to be participating in various safety-net programs than other households with similar income-to-poverty ratios and other characteristics. Without more detailed information on characteristics that determine eligibility we cannot say for certain that these households are navigating the complicated safety net and getting all benefits for which they are entitled. However, the results suggests that these are households that are accessing the safety net, and then something happens such that these benefits (combined with their income) are not sufficient.

The dynamics of what that "something" is are difficult to determine. However, each of the data sets points to the fact that physical and mental health (and their potential correlates of drug and alcohol use and addiction), are complicit in moving a household from one that is

merely low-income to one that is low-income and cannot adequately provide the basics for its children.

References

Borjas, George J. (2004). "Food Insecurity and Public Assistance." *Journal of Public Economics* 88(7): 1421-1443.

Coleman-Jensen, Alicia, William McFall and Mark Nord (2013). "Food Insecurity in Households with Children: Prevalence, Severity and Household Characteristics." *Economic Research Service – Economic Information Bulletin Number 113*.

Currie, Janet (2009). "Healthy, Wealthy and Wise: Socioeconomic Status, Poor Health in Childhood and Human Capital Development." *Journal of Economic Literature* 47(1): 87-122.

Edin, Kathryn, and H. Luke Schaefer (2013). "Rising Extreme Poverty in the United States and the Response of Federal Means-Tested Transfer Programs." National Poverty Center Working Paper Series #13-06, forthcoming in *Social Service Review*.

Gundersen, Craig, Brent Kreider and John Pepper (2011). "The Economics of Food Insecurity in the United States." *Applied Economic Perspectives and Policy* 33(3): 281-303.

Hoynes, Hilary W., Diane Whitmore Schanzenbach and Douglas O. Almond (2012). "Long Run Impacts of Childhood Access to the Safety Net." *NBER Working Paper #18535*.

Kahn, Robert S., Dominique Brandt, and Robert C. Whitaker (2004). "Combined Effect of Mothers' and Fathers' Health Symptoms on Children's Behavior and Emotional Well-being." *JAMA Pediatrics* (formerly *Archives of Pediatrics & Adolescent Medicine* 158(8): 721-729.

Kaushal, Neeraj, Jane Waldfogel and Vanessa R. Wight (2013). "Food Insecurity and SNAP Participation in Mexican Immigrant: The Impact of the Outreach Initiative," *The B.E. Journal of Economic Analysis and Policy* 14(1):203-240.

Kennedy, Sheela, Catherine A. Fitch, John Robert Warren and Julia A. Rivera Drew (2013). "Food Insecurity during Childhood: Understanding Persistence and Change Using Linked Population Survey Data." *University of Kentucky Center for Poverty Research Discussion Paper Series, DP2013-03*.

Kuku, Oluyemisi, Steven Garasky and Craig Gundersen (2012). "The relationship between childhood obesity and food insecurity: a nonparametric analysis." *Applied Economics* 44: 2667-2677.

Kursmark, Meredith and Michael Weitzman (2009). "Recent findings concerning childhood food insecurity." *Current Opinion in Nutrition and Metabolic Care* (12): 310-316.

Powers, Elizabeth T. (2013). "The Influence of Parental Aspirations, Attitudes, and Engagement on Children's Very Low Food Security." *Final Report UKCPR Research Program on Childhood Hunger*.

Schmidt, Lucie, Lara Shore-Shepard and Tara Watson (2013). "The Effect of Safety Net Programs on Food Insecurity." *NBER Working Paper #19558*.

Siefert, Kristine, Colleen M. Heflin, Mary E. Corcoran and David R. Williams (2004). "Food Insufficiency and Physical and Mental Health in a Longitudinal Survey of Welfare Recipients." *Journal of Health and Social Behavior* (45): 171 – 186.

Stuff, Janice E., Patrick H. Casey, Kitty L. Szeto, Jeffrey M. Gossett, James M. Robbins, Pippa M. Simpson, Carol Connell and Margaret L. Bogle (2004). "Household Food Insecurity is Associated with Adult Health Status." *Journal of Nutrition* (134): 2330-2335.

Tsuno, Norifumi, Alain Besset, and Karen Ritchie (2005). "Sleep and Depression." Journal of Clinical Psychiatry (66): 1254-1269.

Appendix Table 1a: Food Security Questionnaire (All Households)

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?

Appendix Table 1b: Food Security Questionnaire (Households with Children)

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)

Appendix Table 2: Food Security Categories for Households with Children

Category	Definition
Food Secure Households (with or without children)	0-2 of the total questions answered in the affirmative
Food Insecure Households (with or without children)	3+ of the total questions answered in the affirmative
Very Low Food Security Households (with children)	8+ of the 18 total questions answered in the affirmative
Households with Food Secure Children	0-1 of the 8 questions about children answered in the affirmative
Households with Food Insecure Children	2+ of the 8 questions about children answered in the affirmative
Households with Very Low Food Security among Children	5+ of the 8 questions about children answered in the affirmative

Figure 1

Rate of Very Low Food Security Among Children

For HHs w/ Children that are Below 300% of Poverty Line

.0200426

.0025857

Figure 2a

Rate of Very Low Food Security Among Children
CPS Data

Figure 2b

Rate of Very Low Food Security Among Children
NHANES Data
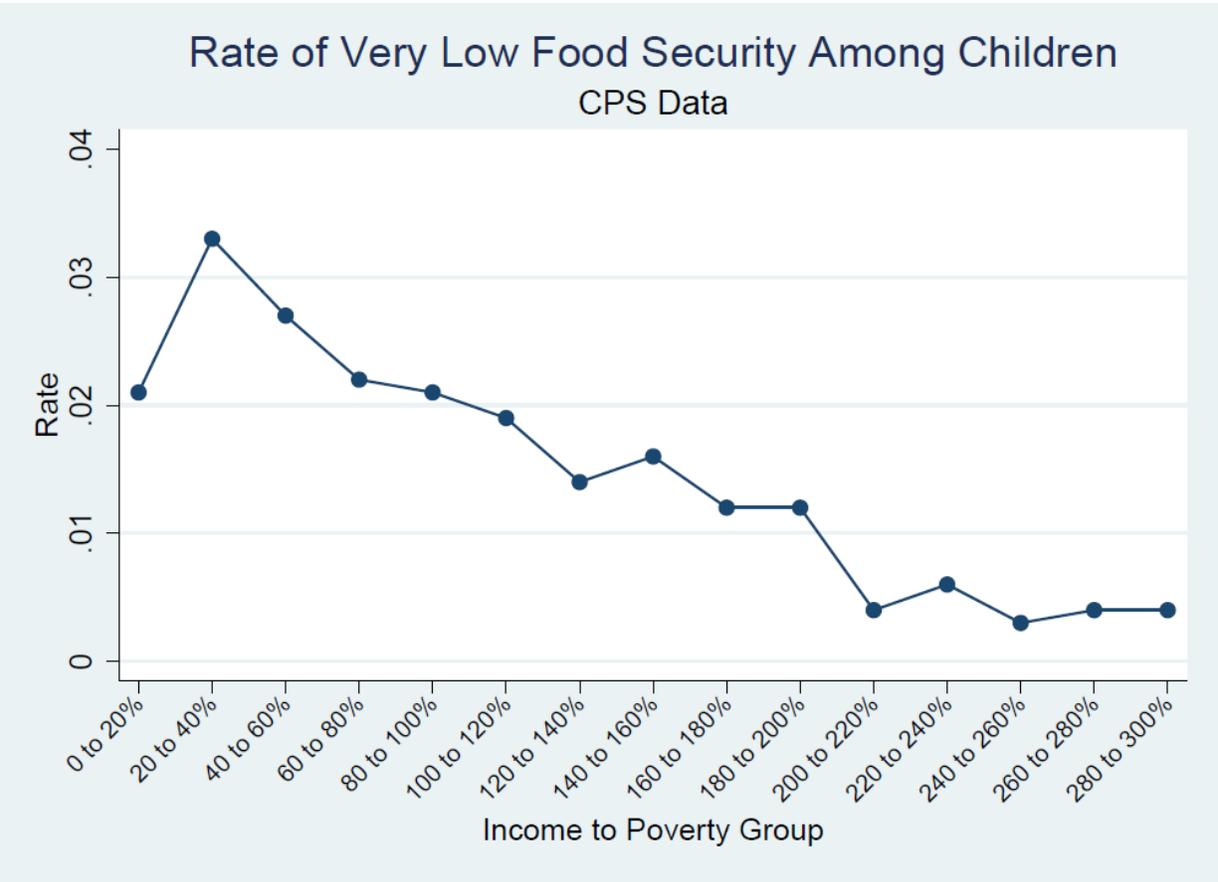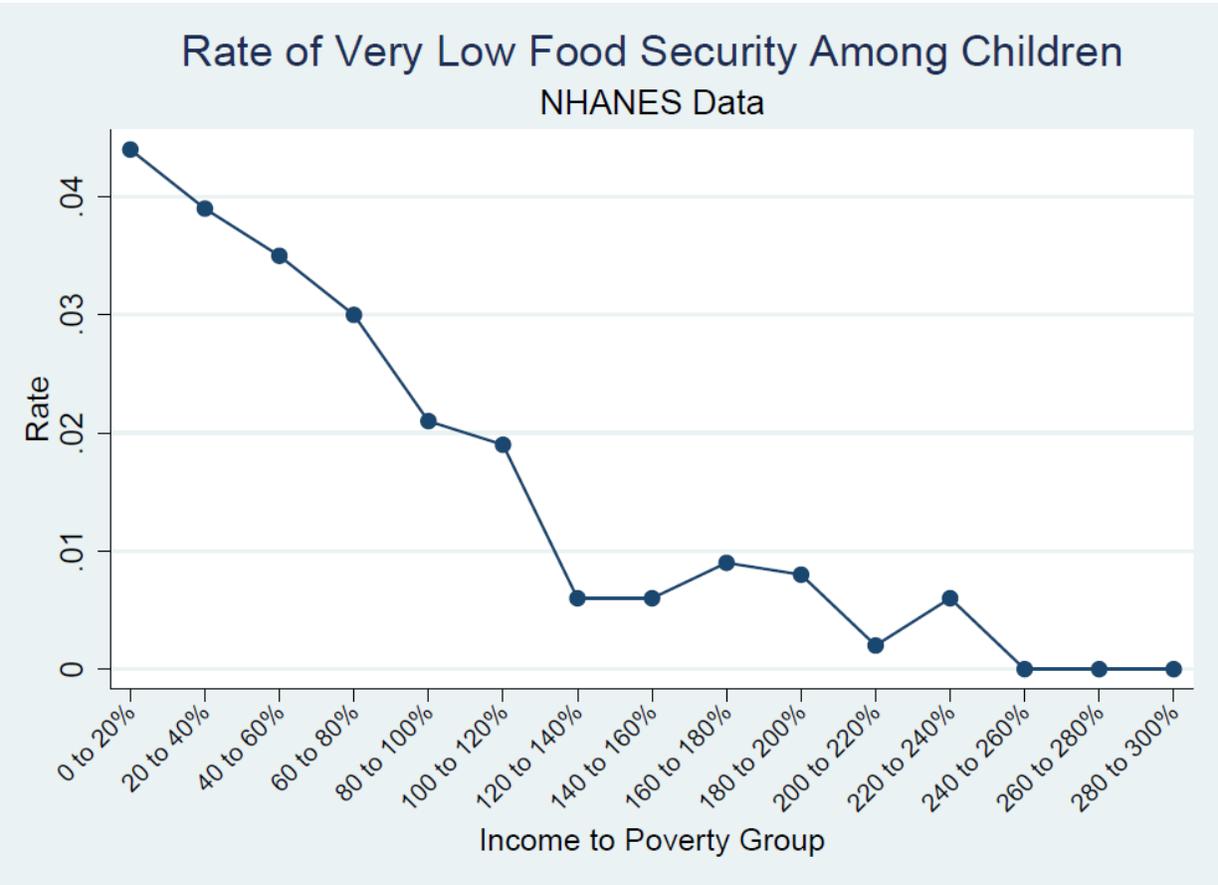
Figure 3

Selected NHANES Characteristics
by Income to Poverty Ratio

Legend:
- Have Someone for Emotional Support
- Have Someone for Financial Support
- Not in Good Health
- Have Days Can't Do Activities
- Suffer from Depression
- Have Been to Rehab

X-axis categories:
- 0 to 50% of Poverty Line
- 50 to 100% of Poverty Line
- 100 to 150% of Poverty Line
- 150 to 200% of Poverty Line
- 200 to 250% of Poverty Line
- 250 to 300% of Poverty Line

Table 1a: Characteristics of CPS Households with Children and Below 300% of Poverty Line

	All Households < 300% of Poverty Line		All Food Insecure Households		All Households with Very Low Food Security		Households with Very Low Food Secure Kids	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Receives Free/Reduced Price Lunch	0.377	0.485	0.542	0.498	0.600	0.490	0.686	0.465
Receives SNAP	0.235	0.424	0.396	0.489	0.445	0.497	0.450	0.498
Receives Energy Assistance	0.066	0.249	0.114	0.318	0.138	0.345	0.140	0.347
Receives Unemployment Compensation	0.105	0.307	0.132	0.339	0.141	0.349	0.137	0.344
Receives Workers' Compensation	0.015	0.119	0.020	0.140	0.021	0.142	0.021	0.144
Receives Social Security	0.115	0.319	0.132	0.338	0.149	0.356	0.157	0.364
Receives SSI	0.056	0.230	0.090	0.286	0.111	0.314	0.123	0.328
Receives Public Assistance/Welfare	0.062	0.240	0.106	0.307	0.120	0.325	0.140	0.347
Receives Veterans' Benefits	0.010	0.097	0.009	0.095	0.013	0.112	0.001	0.024
Receives Survivors' Benefits	0.006	0.075	0.005	0.069	0.006	0.079	0.002	0.049
Receives Disability Benefits	0.012	0.110	0.019	0.135	0.018	0.133	0.011	0.105
Receives Retirement Benefits	0.024	0.153	0.017	0.128	0.014	0.116	0.024	0.153
Receives Education Benefits	0.079	0.270	0.087	0.282	0.083	0.276	0.065	0.246
Receives Financial Benefits	0.020	0.141	0.032	0.177	0.042	0.199	0.035	0.185
Receives Medicaid	0.462	0.499	0.627	0.484	0.670	0.470	0.684	0.466
Receives Health Insurance	0.587	0.492	0.452	0.498	0.416	0.493	0.411	0.493
Receive EITC	0.507	0.500	0.579	0.494	0.574	0.495	0.649	0.478
# of Children Under Age 5	0.565	0.776	0.565	0.779	0.501	0.752	0.428	0.787
# of Children Age 5 to 12	0.976	0.988	1.012	1.007	1.027	1.008	0.993	1.032
# of Children Age 13 to 18	0.629	0.830	0.655	0.844	0.722	0.860	0.944	0.915
Total Household Size	4.283	1.743	4.219	1.778	4.132	1.730	4.301	1.754
Live in Rural Area	0.210	0.408	0.194	0.395	0.198	0.399	0.164	0.371
Household Head is Female	0.577	0.494	0.671	0.470	0.708	0.455	0.721	0.449
Household Head is Black	0.208	0.406	0.265	0.442	0.271	0.444	0.317	0.466
Household Head is Other Nonwhite	0.062	0.241	0.053	0.223	0.048	0.214	0.049	0.216
Household Head is Recent Immigrant	0.030	0.170	0.034	0.181	0.036	0.185	0.066	0.248
Household Head is Disabled	0.062	0.242	0.106	0.308	0.141	0.348	0.139	0.346
Household Head is a Homeowner	0.530	0.499	0.382	0.486	0.348	0.476	0.302	0.460
Household Head is HS Dropout	0.212	0.408	0.267	0.443	0.254	0.435	0.306	0.461
Fraction of the Year Looking for Work	0.037	0.106	0.052	0.123	0.056	0.125	0.057	0.115
Fraction of the Year Working	0.552	0.310	0.498	0.328	0.465	0.339	0.414	0.324
Household is Food Insecure	0.284	0.451	1.000	0.000	1.000	0.000	1.000	0.000
Household has Very Low Food Security	0.077	0.267	0.272	0.445	1.000	0.000	0.996	0.059
Children have Very Low Food Security	0.013	0.115	0.047	0.211	0.172	0.377	1.000	0.000
Sample size	32,572		9,078		2,502		431	

Table 1b: Changes in Characteristics of CPS Matched Households with Children and Below 300% of Poverty Line

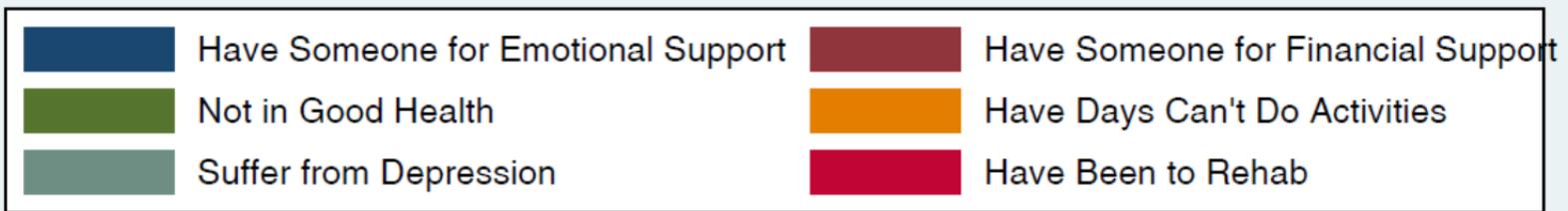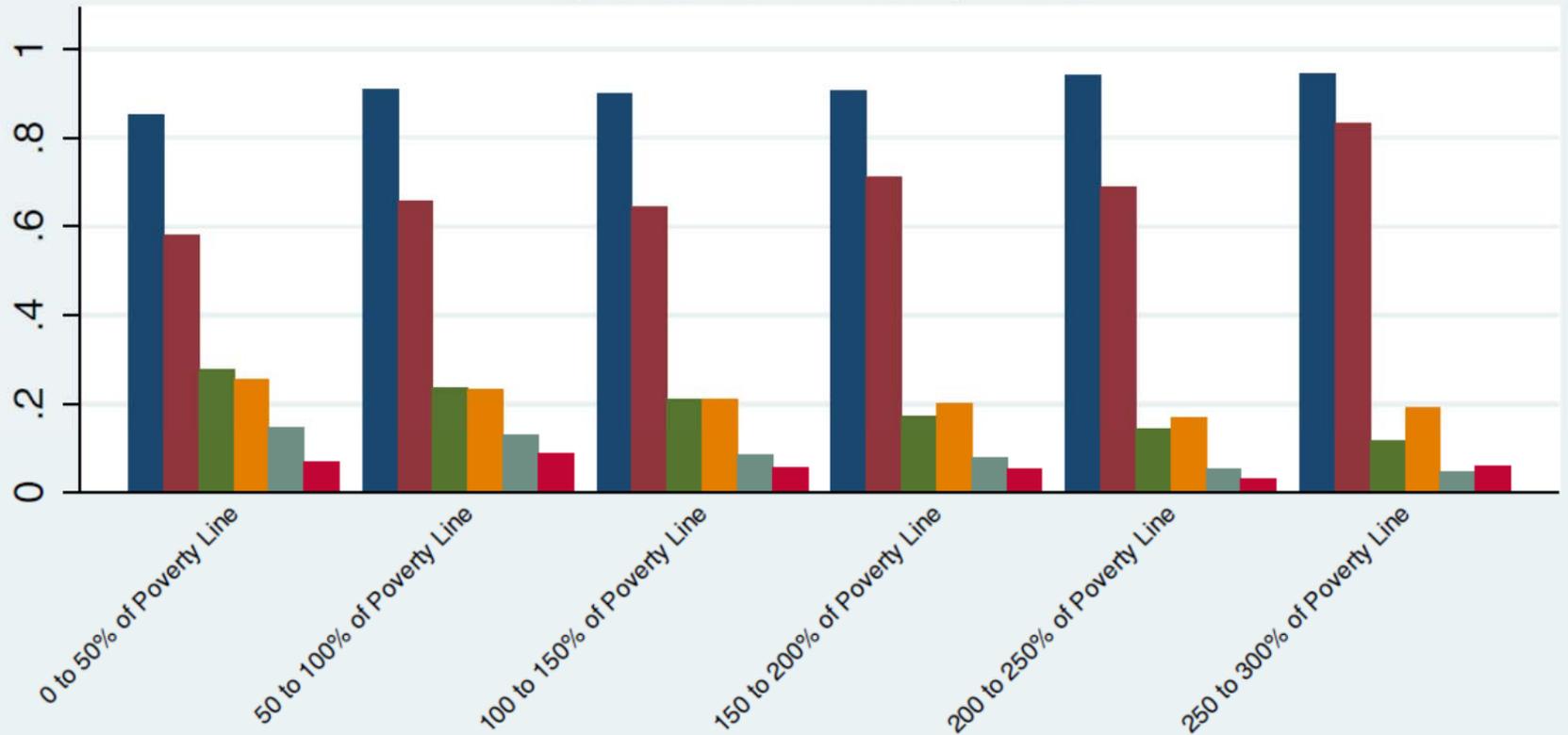|	All Households < 300% of Poverty Line		All Food Insecure Households		All Households with Very Low Food Security		Households with Very Low Food Secure Kids	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Household became food insecure	0.112	0.315	0.444	0.497	0.319	0.467	0.218	0.415
Household became very low food secure	0.043	0.202	0.169	0.375	0.608	0.489	0.523	0.502
Child became very low food secure	0.010	0.101	0.041	0.199	0.148	0.355	0.815	0.391
Began getting Medicaid	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Began getting free/reduced price lunch	0.122	0.327	0.166	0.372	0.145	0.353	0.172	0.380
Began getting SNAP	0.074	0.261	0.130	0.336	0.142	0.349	0.177	0.384
Began getting energy assistance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Began getting unemployment compensation	0.060	0.238	0.082	0.274	0.094	0.292	0.041	0.200
Began getting workers' compensation	0.011	0.105	0.015	0.122	0.016	0.125	0.000	0.000
Began getting Social Security benefits	0.042	0.200	0.053	0.224	0.050	0.218	0.062	0.242
Begain getting SSI benefits	0.029	0.169	0.051	0.220	0.074	0.262	0.058	0.236
Began getting public assistance/welfare	0.028	0.166	0.053	0.223	0.063	0.243	0.096	0.296
Began getting veterans' payments	0.005	0.074	0.005	0.071	0.015	0.122	0.000	0.000
Began getting survivors' benefits	0.004	0.066	0.002	0.040	0.001	0.030	0.000	0.000
Began getting disability benefits	0.009	0.095	0.014	0.116	0.007	0.081	0.000	0.000
Began getting retirement benefits	0.017	0.130	0.017	0.129	0.015	0.122	0.020	0.141
Began getting education benefits	0.051	0.219	0.055	0.227	0.041	0.198	0.028	0.165
Began getting health insurance	0.080	0.272	0.068	0.251	0.081	0.274	0.106	0.310
Began getting financial benefits	0.014	0.117	0.023	0.151	0.028	0.166	0.049	0.218
Began getting EITC	0.147	0.354	0.136	0.343	0.147	0.354	0.171	0.379
Sample size	6,805		1,679		453		86	

Table 2: Food Security Status of CPS Households with Children and Below 300% of Poverty Line by Selected Characteristics

	Don't Receive Free/ Reduced Price Lunch		Do Receive Free/ Reduced Price Lunch		Don't Receive SNAP		Do Receive SNAP	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Household is Food Insecure	0.209	0.406	0.409	0.492	0.224	0.417	0.480	0.500
Household has Very Low Food Security	0.050	0.217	0.123	0.328	0.056	0.230	0.146	0.354
Child has Very Low Food Security	0.007	0.082	0.024	0.154	0.010	0.097	0.026	0.158
Number of Observations	20,832		11,740		25,294		7,278	

	Don't Receive EITC		Do Receive EITC		Don't Receive Public Assist/Welfare		Do Receive Public Assist/Welfare	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Household is Food Insecure	0.243	0.429	0.324	0.468	0.271	0.444	0.487	0.500
Household has Very Low Food Security	0.067	0.250	0.087	0.282	0.072	0.259	0.150	0.357
Child has Very Low Food Security	0.010	0.097	0.017	0.129	0.012	0.110	0.030	0.171
Number of Observations	16,482		16,090		30,498		2,074	

	Household Contains No Teenagers		Household Contains Teenagers		Household Head is Male		Household Head is Female	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Household is Food Insecure	0.275	0.447	0.295	0.456	0.221	0.415	0.331	0.470
Household has Very Low Food Security	0.069	0.253	0.088	0.283	0.053	0.225	0.095	0.293
Child has Very Low Food Security	0.009	0.092	0.019	0.137	0.009	0.093	0.017	0.128
Number of Observations	18,046		14,526		14,015		18,557	

	Household Head Finished High School		Household Head is HS Dropout		Household Head is White		Household Head is Black	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Household is Food Insecure	0.264	0.441	0.359	0.480	0.265	0.442	0.363	0.481
Household has Very Low Food Security	0.073	0.260	0.093	0.290	0.072	0.259	0.101	0.301
Child has Very Low Food Security	0.012	0.108	0.019	0.138	0.012	0.107	0.020	0.141
Number of Observations	26,447		6,125		25,103		5,163	

	Household Head Is Not Disabled		Household Head Is Disabled		Household Head Is Not a Homeowner		Household Head Is a Homeowner	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Household is Food Insecure	0.272	0.445	0.485	0.500	0.373	0.484	0.205	0.404
Household has Very Low Food Security	0.071	0.257	0.175	0.380	0.107	0.309	0.051	0.219
Child has Very Low Food Security	0.012	0.110	0.030	0.171	0.020	0.139	0.008	0.087
Number of Observations	30,356		1,957		14,420		18,152	

Table 3: Correlates of Very Low Food Security Among Children in CPS Households Below 300% of Poverty Line

	(1)	(2)	(3)	(4)
# of Children Under Age 5	-0.001			-0.001
	(0.001)			(0.001)
# of Children Age 5 to 12	0.001			-0.000
	(0.001)			(0.001)
# of Children Age 13 to 18	0.006***			0.006***
	(0.001)			(0.002)
Total Household Size	-0.001			0.000
	(0.001)			(0.001)
Household Head is Black		0.004*		0.002
		(0.002)		(0.002)
Household Head is Other Nonwhite		-0.002		-0.003
		(0.003)		(0.003)
Household Head is Recent Immigrant		0.014*		0.015**
		(0.007)		(0.007)
Household Head is Female		0.003**		0.002*
		(0.001)		(0.001)
Household Head is Disabled		0.013***		0.009**
		(0.004)		(0.005)
Live in Rural Area		-0.002		-0.002
		(0.002)		(0.002)
Household Head is a Homeowner		-0.006***		-0.007***
		(0.002)		(0.002)
Household Head is HS Dropout		0.003		0.001
		(0.002)		(0.002)
Receives Medicaid			0.000	0.001
			(0.002)	(0.002)
Receives Free/Reduced Price Lunch			0.012***	0.009***
			(0.002)	(0.002)
Receives SNAP			0.002	0.002
			(0.003)	(0.003)
Receives Energy Assistance			0.003	0.003
			(0.004)	(0.004)
Receives Unemployment Compensation			0.003	0.004
			(0.003)	(0.003)
Receives Workers' Compensation			0.007	0.006
			(0.007)	(0.007)
Receives Social Security			0.001	0.002
			(0.003)	(0.003)
Receives SSI			0.008	0.006
			(0.005)	(0.005)
Receives Public Assistance/Welfare			0.007	0.006
			(0.005)	(0.005)
Receives Veterans' Benefits			-0.013***	-0.012***
			(0.002)	(0.002)

(Continued)

	(1)	(2)	(3)	(4)
Receives Survivors' Benefits			-0.009*	-0.009*
			(0.005)	(0.005)
Receives Disability Benefits			-0.005	-0.008
			(0.007)	(0.007)
Receives Retirement Benefits			0.002	0.005
			(0.005)	(0.005)
Receives Education Benefits			-0.004	-0.004
			(0.003)	(0.003)
Receives Health Insurance			0.001	0.002
			(0.002)	(0.002)
Receives Financial Benefits			0.005	0.005
			(0.007)	(0.007)
Receive EITC			0.004**	0.003*
			(0.002)	(0.002)
Fraction of the Year Working			-0.009***	-0.003
(per potential worker)			(0.003)	(0.003)
Fraction of the Year Looking for Work			0.003	0.007
(per potential worker)			(0.008)	(0.008)
Constant	0.017***	0.013**	0.009	0.004
	(0.006)	(0.005)	(0.006)	(0.006)
Observations	32,312	32,312	32,312	32,312
R-squared	0.009	0.010	0.011	0.015

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All models include dummies for 20 percentage point income/poverty ratio bins and year dummies.

Table 4: Characteristics of NHANES Households with Children and Below 300% of Poverty Line

	All Households < 300% of Poverty Line			All Food Insecure Households			All Households with Very Low Food Security			Households with Very Low Food Secure Kids		
	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Suffering from depression?	0.090	0.287	5,608	0.148	0.356	1,782	0.202	0.402	516	0.243	0.431	98
Days last month inactive due to health problems	1.99	5.98	6,601	2.84	7.07	2,064	3.57	7.99	596	6.46	10.67	105
Health is not good?	0.218	0.413	6,612	0.321	0.467	2,068	0.345	0.476	597	0.484	0.502	105
Current BMI	29.0	7.1	8,522	29.4	7.6	2,588	29.7	8.5	746	30.4	7.8	145
Daily calories (from food diary)	2209	991	8,185	2191	994	2,503	2198	960	720	2089	1080	138
Percent of meals eaten at home	71.03	26.40	8,185	74.03	26.14	2,503	73.89	26.76	720	75.61	31.04	138
Percent of meals from fast food	8.56	13.70	8,185	8.75	13.80	2,503	8.56	13.61	720	7.59	14.14	138
Percent of recommended nutrients	64.16	32.95	8,958	62.53	33.15	2,705	62.90	32.80	782	61.74	33.91	153
Have someone for financial support?	0.687	0.464	2,081	0.508	0.500	612	0.393	0.490	180	0.360	0.486	42
Have someone for emotional support?	0.912	0.284	2,085	0.883	0.322	613	0.854	0.354	181	0.699	0.464	42
Ever been to rehab?	0.058	0.234	3,493	0.083	0.275	1,148	0.110	0.314	321	0.162	0.372	52
Smoked pot in last 30 days?	0.124	0.329	3,493	0.179	0.383	1,148	0.237	0.426	321	0.178	0.386	52
Used cocaine in last year?	0.019	0.137	6,449	0.023	0.150	1,949	0.019	0.135	582	0.024	0.154	107
Used heroin in last 30 days?	0.001	0.034	3,677	0.003	0.054	1,197	0.008	0.087	336	0.015	0.123	59
Used meth in last 30 days?	0.005	0.071	3,677	0.004	0.060	1,197	0.008	0.090	336	0.000	0.000	59
Number of drinks on days drink?	2.36	3.09	7,238	2.50	3.18	2,160	2.26	2.98	636	2.46	2.99	113
Received SNAP?	0.252	0.434	8,953	0.420	0.494	2,703	0.437	0.496	781	0.539	0.500	153
Currently employed?	0.659	0.474	8,958	0.575	0.494	2,705	0.547	0.498	782	0.484	0.501	153
Currently married?	0.671	0.470	8,706	0.604	0.489	2,630	0.577	0.494	762	0.477	0.501	143
Never married?	0.167	0.373	8,706	0.205	0.404	2,630	0.194	0.396	762	0.172	0.378	143
High school dropout?	0.291	0.454	8,745	0.278	0.448	2,622	0.256	0.437	758	0.231	0.423	144
Homeowner?	0.537	0.499	7,178	0.392	0.488	2,051	0.427	0.495	590	0.311	0.465	124
US citizen?	0.811	0.392	8,947	0.739	0.439	2,702	0.800	0.401	781	0.778	0.417	153
Black?	0.169	0.374	8,958	0.192	0.394	2,705	0.222	0.416	782	0.295	0.457	153
Household size	4.44	1.39	8,958	4.65	1.48	2,705	4.52	1.44	782	4.42	1.53	153
Income/Poverty ratio	1.491	0.787	8,958	1.119	0.667	2,705	1.078	0.659	782	0.817	0.560	153
Household is food insecure?	0.251	0.434	8,958	1.000	0.000	2,705	1.000	0.000	782	1.000	0.000	153
Household has very low food security?	0.080	0.271	8,958	0.318	0.466	2,705	1.000	0.000	782	1.000	0.000	153
Children have very low food security?	0.013	0.112	8,958	0.050	0.219	2,705	0.159	0.366	782	1.000	0.000	153

Note: only observations of adult sample members used.

Table 5: Food Security Status of NHANES Households with Children and Below 300% of Poverty Line by Selected Characteristics

	Health Good		Health Not Good		Not Depressed		Depressed	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Household is Food Insecure	0.231	0.421	0.391	0.488	0.248	0.432	0.437	0.496
Household has Very Low Food Security	0.071	0.256	0.133	0.340	0.072	0.259	0.184	0.388
Child has Very Low Food Security	0.007	0.083	0.024	0.152	0.010	0.101	0.033	0.180
Number of Observations	4,795		1,817		5,064		544	

	Have Nobody for Emotional Support		Have Someone for Emotional Support		Have Nobody for Financial Support		Have Someone for Financial Support	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Household is Food Insecure	0.340	0.475	0.248	0.432	0.403	0.491	0.189	0.392
Household has Very Low Food Security	0.138	0.346	0.079	0.269	0.162	0.369	0.048	0.213
Child has Very Low Food Security	0.050	0.218	0.011	0.105	0.030	0.171	0.008	0.087
Number of Observations	238		1,847		672		1,409	

	Did Not Smoke Pot Past 30 Days		Smoked Pot Past 30 Days		Did Not Use Cocaine Past Year		Used Cocaine Past Year	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Household is Food Insecure	0.257	0.437	0.396	0.490	0.248	0.432	0.303	0.461
Household has Very Low Food Security	0.068	0.251	0.149	0.356	0.082	0.274	0.079	0.271
Child has Very Low Food Security	0.009	0.094	0.014	0.117	0.013	0.112	0.016	0.127
Number of Observations	3,076		417		6,334		115	

	Did Not Use Heroin Past 30 Days		Used Heroin Past 30 Days		Did Not Use Meth Past 30 Days		Used Meth Past 30 Days	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Household is Food Insecure	0.273	0.445	0.717	0.504	0.274	0.446	0.190	0.406
Household has Very Low Food Security	0.078	0.268	0.529	0.558	0.078	0.268	0.124	0.341
Child has Very Low Food Security	0.010	0.099	0.135	0.382	0.010	0.100	0.000	0.000
Number of Observations	3,672		5		3,662		15	

	Have Never Been in Rehab		Have Been in Rehab		Under 5 Drink Daily Average		5+ Drink Daily Average	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Household is Food Insecure	0.267	0.442	0.390	0.489	0.243	0.429	0.281	0.450
Household has Very Low Food Security	0.073	0.261	0.148	0.356	0.082	0.274	0.079	0.270
Child has Very Low Food Security	0.009	0.092	0.027	0.162	0.012	0.106	0.016	0.127
Number of Observations	3,295		198		6,109		1,129	

Note: only observations of adult sample members used.

Table 6: Correlates of Very Low Food Security Among Children
in NHANES Households Below 300% of Poverty Line

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Health is not good	0.011***									0.006		
	(0.004)									(0.004)		
Days inactive due		0.001***								0.000		
to health problems		(0.000)								(0.000)		
Depressed			0.017**							0.016**		
			(0.007)							(0.007)		
Have someone for				-0.032**							-0.028*	
emotional support				(0.014)							(0.015)	
Have someone for					-0.018**						-0.014*	
financial support					(0.007)						(0.007)	
Smoked pot						0.002						-0.000
in last 30 days						(0.005)						(0.005)
Used heroin							0.121					0.110
in last 30 days							(0.132)					(0.132)
Ever been to rehab								0.016				0.015
								(0.010)				(0.010)
Received SNAP									0.009**	0.001	0.008	-0.004
									(0.004)	(0.004)	(0.011)	(0.005)
Observations	6,398	6,387	5,377	2,082	2,078	3,422	3,606	3,422	8,704	4,564	2,074	3,399
R-squared	0.014	0.017	0.016	0.040	0.039	0.009	0.012	0.011	0.016	0.019	0.043	0.013

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All regressions include 20 percentage point income/poverty bin dummies, year dummies, household size and dummies for the sample adult
being African-American, a high school dropout, a US citizen, a homeowner, and employed

Table 7: Characteristics of ATUS Households with Children

	All Households		All Households with Income <185% Poverty		All Food Insecure Households		All Households with Very Low Food Security		Households with Very Low Food Secure Kids	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Personal Care	558	163	578	179	585	191	590	188	606	144
w/out Sleep	44	67	44	78	45	75	44	57	42	39
Sleep	515	153	535	167	540	189	546	182	565	133
HH Activities	106	158	112	179	112	162	118	188	127	216
Food Prep	34	63	40	80	40	78	42	87	47	107
% Doing Food Preparation	*0.58*		*0.59*		*0.59*		*0.57*		*0.55*	
Care for HH member	58	109	59	104	57	99	53	115	35	79
Care for Non HH member	7	53	9	67	9	78	9	56	9	51
Leisure	228	237	254	241	254	277	256	230	243	230
Work	212	298	178	292	174	288	160	311	169	383
% Reporting Work	*0.43*		*0.35*		*0.37*		*0.33*		*0.30*	
Eating Drinking	62	61	57	52	53	51	52	58	58	71
Shopping	22	47	22	53	20	52	18	43	14	49
Food Shopping	10	32	11	35	11	35	9	32	4	16
Education	44	169	42	170	42	191	43	169	38	159
Use of services	6	40	6	40	8	40	9	40	6	40
Sports	22	68	18	66	17	64	20	84	22	68
Religious/Volunteer	17	69	15	59	15	62	14	57	17	48
Telephone	6	38	7	40	6	40	7	42	16	86
Travel	79	104	73	117	73	151	81	242	75	106
Sample Size	17341		5237		2413		613		100	

Note: Time use in minutes. Service use includes personal care, household and government services.