UKCPR
University of Kentucky
Center for
Poverty Research

Discussion Paper Series
DP 2012-09

ISSN: 1936-9379

Low Income Preschoolers' Non-Parental Care Experiences and Household Food Insecurity

Colleen Heflin
Truman School of Public Affairs
University of Missouri

Irma Arteaga
Truman School of Public Affairs
University of Missouri

Sara Gable
Department of Nutrition and Exercise Physiology
University of Missouri

Preferred citation

Heflin,C., Arteaga, I. & Gable, S., Low Income Preschoolers' Non-Parental Care Experiences and Household Food Insecurity *University of Kentucky Center for Poverty Research Discussion Paper Series, DP2012-09*. Retrieved [Date] from http://www.ukcpr.org/Publications/DP2012-09.pdf.

Author correspondence

Colleen Heflin, 229 Middlebush Hall, University of Missouri, Columbia, MO, 65211-6100; Email HeflinCM@missouri.edu; Phone: (573)882-4398

Low Income Preschoolers' Non-Parental Care Experiences and Household Food Insecurity

Irma Arteaga

Sara Gable

Colleen Heflin

University of Missouri, Columbia

This research was made possible with a grant from the University of Kentucky, Center for Poverty Research, Research Program on Childhood Hunger, funded by the Food and Nutrition Service of the United States Department of Agriculture, to the authors.

Low Income Preschoolers' Non-Parental Care Experiences and Household Food Insecurity

Abstract

Rates of food insecurity in households with children have significantly increased over the past decade. The majority of children, including those at risk for food insecurity, participate in some form of non-parental child care during the preschool years. To evaluate the relationship between the two phenomenon, this study investigates the effects of child care arrangements on food insecurity in households with children. To address the selection bias problem that arises from the fact that enrollment in different types of child care is not a random process, this study uses propensity scores techniques. The authors compare outcomes across five child care arrangement patterns: no non-parental care (i.e., exclusive parent care), relative care, non-relative care, center care, and Head Start. Our results demonstrate that for low income preschoolers, compared to no non-parental care, attending a child care center reduces the probability of both food insecurity and very low food security, relative care reduces the probability of food insecurity, and non-relative care increases the probability of very low food security.

Low Income Preschoolers' Non-Parental Care Experiences and Household Food Insecurity

Introduction

Rates of food insecurity in households with children have been increasing over the past decade (Fiese et al., 2011; Nord et al., 2010). Between 1998 and 2010, among households with children, rates of food insecurity have ranged from a low of 14.8% in 1999 to a recent high of 21.3% in 2009. In today's sluggish US economy, it is unlikely that these rates will decline. Living in a household without consistent access to adequate amounts of food is associated with a myriad of poor outcomes for children, ranging from health-related concerns to social-emotional and academic challenges. Without adequate food, child development and optimal functioning is compromised and if conditions of food insecurity persist, its harmful effects can accumulate.

The present study investigates the effects of low income children's non-parental care experiences, including exclusive parent care, on household food insecurity during the year prior to kindergarten entry. A considerable body of research examines children's non-parental care experiences and social and emotional well-being (Clement et al., 2004; Loeb et al., 2007; NICHD, 1998; 2001), behavioral functioning (Votruba-Drzal, Coley, Chase-Landsdale 2004), language and literacy (Gormley, Gayer, Phillips, & Dawson, 2005; NICHD, 2000), and 'school readiness' (Magnuson et al., 2004; NICHD, 2002). However, to our knowledge, there is no research that examines exclusive parental care, non-parental care experiences, and food insecurity in households with children. As discussed below, there are several reasons to expect that the two are associated.

Food Insecurity in Households with Children

The United States Department of Agriculture defines *food security* as "access at all times to

enough food for an active, healthy life" (p. 1; Nord, 2009). In 2010, 21.8% of households with children younger than 6 were categorized as *food insecure*; that is, during the preceding 12 months, these families did not have consistent access to enough food for an active, healthy life (Coleman-Jensen, Nord, Andrews, & Carlson, 2011). *Very low food insecurity* is a subcategory of food insecurity that captures disruption in typical eating patterns and a reduction in food intake due to a lack of money and other resources to obtain adequate amounts of food. It is characterized primarily by worry about food, lack of financial resources for food, and inadequate food stores to meet household needs. Among all U.S households with children, one percent reported conditions of very low food insecurity in 2010 (Coleman-Jensen et al., 2011).

Food insecurity is most prevalent in households with children, single-female headed households (35% in 2010), among Black, non-Hispanic (25%) and Hispanic households with children (26%) and families living in poverty, with rates of 9% for those with incomes above 185th FPL and rates at and above 39% for those living below the 185th FPL. Rates of *very low food insecurity* in households with children below the 185th FPL declined from 2.9% in 2009 to 2.1% in 2010. Household food insecurity also varies by urbanicity and census region, with rates highest inside of metropolitan areas in principal cities and in the south.

Household Food Insecurity and Children's Development

Starting early in life, food insecurity can have detrimental consequences. From a developmental perspective, it is believed that food insecurity has cumulative effects at different stages of development beginning in the prenatal period (Bhattacharya & Currie, 2004; Cook & Frank, 2008; Duncan, Brooks-Gunn & Klebanov, 1994; Pollit, 1994; Morgane, Austin-LaFrance, Bronzino, et al., 1993; Scholl, Johnson, 2000). During infancy, hunger has negative effects during the period of neurodevelopment. Controlled experiments with animals suggest

that hunger results in irreversible damage to brain development such as that associated with the insulation of neural fibers (Yaqub 2002). The damage associated with a lack of nutritional intake accumulated during the first 2 years of life includes susceptibility to infection and chronic disease, slowed cognitive development and physical growth, and a higher risk of delivering low-birth weight babies. During middle childhood, food insecurity is associated with poor school performance and academic achievement (Roustit, Hamelin, Grillo, Martin & Chauvin, 2010; Maluccio et al., 2006; Cook & Frank, 2008). Other non-health related problems include greater risk for school dropout, and reduced productivity during adulthood (Hoddinott, Beherman, Maluccio, Flores & Martorell, 2008).

Considerable evidence indicates that the effects of nutritional inadequacy can accumulate across childhood and compromise developmental potential. Our paper examines a common experience of childhood – routine, non-parental care such as that provided in community-based child care centers, the homes of relatives and non-relatives, and Head Start programs – and evaluates its role in household food insecurity (HFI) and very low food insecurity (VLFI) among a sample of children who are at elevated risk for HFI due to low income status.

Non-Parental Care and Household Food Insecurity

Upwards of 75% of preschool-aged children experience some form of non-parental care on a weekly basis (Iruka & Carver, 2006). There are several ways in which non-parental care experience can elevate or reduce the risk for food insecurity. For instance, children who attend child care full-time have upwards of 50 to 67% of their nutritional needs met therein (ADA, 2005); these are items that households need not provide thus allowing others greater access to nutritional resources in the home. A recent evaluation of the USDA's Child and Adult Care Food Program (CACFP) indicated that attending a CACFP-participating child care center,

although not including Head Start, was associated with maternal reports of more milk and vegetable consumption by low income preschoolers (compared to their non-CACFP child care center attending peers) and a slight, although not significant, reduction in risk for household food insecurity (Korenman, Abner, Kaestner, & Gordon, 2012).

Conversely, there are potential costs associated with non-parental care arrangements, such as fees, co-pays, and transportation that could strain the household budget and increase the risk of household food insecurity. Indeed, as income declines, the percent of the household budget spent on child care increases (Macartney & Laughlin, 2011), leaving less money to cover other essential expenses, such as food. However, depending on state programs and policies, some low income families may have access to reduced-cost and free sources of child care and pre-kindergarten that could both spare the family budget and provide needed meals and snacks.

This discussion of low income families' access to non-parental care arrangements further raises the possibility that different forms of child care may be differentially associated with the risk for household food insecurity. Low incomes families utilize numerous non-parental care arrangements that vary in terms of quality and fundamental reliability (Capizzano, Adams, & Sonenstein, 2000; Dowsett, Huston, & Imes, & Gennetian, 2008; Morrissey 2009; Usdansky & Wolf, 2008). Compared to families with incomes over 200% of the federal poverty level, families with incomes below are less likely to utilize center-based child care and more likely to have their children cared for by relatives (Capizzano et al., 2000). These forms of non-parental care differ in meaningful ways. For instance, compared with relative care arrangements, child care centers are more likely to be licensed and to employ staff with higher levels of education and less traditional beliefs about childrearing (Dowsett, et al., 2008). Past research suggests that the quality of licensed care exceeds that of unlicensed care (Gormley, 1991) and that caregiver

education and training is the means whereby program quality is conveyed to children and families (Howes, Philips, & Whitebook, 1992). Furthermore, although Head Start center-based programs are more organized and child-oriented in terms of the learning environment than other types of child care (Dowsett et al., 2008), they have more limited hours of operation per day, per week, and over the course of a year, thus appealing to different family needs.

Thus, it is possible that the association between non-parental care and household food insecurity differs by primary arrangement type. Consequently, this paper evaluates the relationship between low income preschoolers' non-parental care arrangements and the risk for household food insecurity and very low household food insecurity.

Selection Bias in Non-Parental Care Arrangements

Selection bias occurs when the assignment of observations to one or several conditions, for example, assignment to a child care arrangement, occurs in a manner that leads to a correlation between child care and the outcome (household food insecurity) in the absence of child care. This problem arises because we cannot find the desired counterfactual. For example, if we want to know the effect of different types of child care arrangements on food insecurity, we would want to have information on food insecurity for children who were enrolled in different child care arrangements, and at the same time we would like to know what would have happened to these children if they were not enrolled in these types of child care arrangements. In other words, the desired counterfactual for a specific child is what would have been the food insecurity status for child "i" who was enrolled in child care "j", if he were not enrolled in child care "j". It is not possible that children were enrolled in one type of primary arrangement and at the same time were not. Using children who were not enrolled in that type of care arrangement as a comparison group does not correct for the bias, because children who were not enrolled can be

different in many characteristics from children who were enrolled. Thus, a simple comparison between these two groups does not solve the problem.

Selection bias not only reduces statistical power, but more importantly, it compromises the validity of inferences. Internal validity refers to inferences about whether the observed correlation between child care status and food security suggests a causal relationship between child care and food security. This can occur even though our study uses a randomized sampling strategy, because children were not randomly selected based on child care status.

Among the general population, several demographic characteristics of parents and households are associated with child care selection. For instance, an early study reported that children who attended child care centers had more educated mothers, mothers who were less likely to be employed, and parents who were more invested in their children's early reading and intellectual growth (Fuller, Holloway, & Liang, 1996). Maternal factors can also influence when youngsters begin child care; maternal age, education, and employment status, marital status, family size, and region all figure into child care decisions (Singer, Fuller, Keiley, & Wolf, 1998). Women who work during pregnancy and have no more than two children are more likely to enroll their child in child care before 1 year of age and women who are single-parents begin their children in child care at earlier ages than women who are married.

For low income populations, participation in particular forms of non-parental care is also non-randomly associated with several maternal and household characteristics. For instance, among the very poor, who are less likely to be employed (Cotter, England, & Hermsen, 2007), these arrangements may take the form of no-cost, part-day "intervention" programs that are not intended to support maternal employment (e.g., state-funded prekindergarten; Head Start). Indeed, in one study, Head Start was found to serve more disadvantaged children and families

when compared with other types of center-based child care (Dowsett, et al., 2008). For other low income households where parents are employed, non-parental care arrangements may take different forms depending on job characteristics. For example, if one's job has hours that change from day-to-day and week-to-week, formal care arrangements, such as community-based child care centers, may not suffice and less formal arrangements, such as relative care or non-relative, home-based care, might be used (e.g., Riley & Glass, 2002). For low wage workers with more 'traditional' jobs, that is employment that occurs during a regular daytime shift and does not vary from week-to-week, community-based child care centers, especially those that accept state child care subsidies and have reasonable co-pay requirements, may be selected. In sum, when controlling for selection bias, we will adjust for the fact that children from certain types of households are more likely to attend particular forms of child care.

Different parametric methods have been used in the literature to address selection bias: regression analysis, family fixed effects, instrumental variables, and propensity scores. Regression analysis yields valid causal estimates only if we are able to control for all confounding covariates and specify the regression model correctly. Empirically, this is highly unlikely because as more covariates are included in the regression, the main assumptions behind this estimation technique, linearity and additivity, may not hold.

As previously mentioned, selection bias occurs in a non-randomized sample because it is very difficult to find the desired counter-factual. A solution is to use family fixed effects by comparing a "treated" child in a family (f), in our case, child "i" who was enrolled in child care arrangement "j" with a "non-treated" child, in our case child "k" who was not enrolled in child care arrangement "j" within the same family. By comparing two children from the same family, we are able to control for family unobserved characteristics (parental tastes, preferences, beliefs,

attitudes, IQ, etc.). The literature on early childhood has previously used family fixed effects (Conley & Bennett, 2000; James-Burdumy, 2005; Waldfogel, Han, Brook-Gunn, 2002; Black, Devereux, Salavanes, 2004) but not in the context of solving the selection problem on child care arrangement. The reason why is because the sample is reduced to only the portion of the dataset for which there are multiple observations and varied child care arrangements per family. Our sample will be very limited because ECLS-B oversampled twins, but twin siblings tend to have the same type of care arrangement. Because of that, we don't attempt to use this method.

Another methodology that has been widely used in the economics literature is instrumental variables (James-Burdumy, 2005; Gelbach, 2002). This technique solves the selection bias problem by finding an exogenous variable called "instrument" that predicts the probability of enrollment on a child care arrangement and is at the same time randomly assigned with respect to the outcome (food insecurity). More importantly, the instrument must affect food insecurity only through its effect on child care arrangement. All these assumptions need to be satisfied for the instrument to be valid and for the technique to produce an unbiased estimate of the causal effect of child care arrangement on food insecurity. Finding an instrument that satisfy all these properties is very difficult; for that reason we did not use the instrumental variable technique in this study.

Propensity scores weighting is an alternative to the previous three approaches to correct for selection bias. This approach relies on weaker and therefore more likely parametric assumptions than regression and fixed effects techniques, and it is more robust to model misspecification (Rosebaun & Rubin, 1983; D'Angostino, 1990) in contrast to regression analysis. Under the assumption that the researcher can observe the main factors that influence the probability of selection into child care, propensity score weighting estimates the impact of child care

arrangement on food insecurity by creating a reweighted data set that better resembles the true correlations in the initial sample. In other words, if we find four children in our sample, one did not receive any day care, one received relative care, another received non-relative care and a fourth one received center care, with the same propensity score, then we could think of these four children as if they were "randomly" assigned to each group in the sense of being equally likely to be in any child care setting. Thus, this method solves the problem of finding the desired counterfactual.

For comparison purposes, we present results for both regression analysis and propensity scores. First, we control for a range of child, maternal, household, and regional factors associated with child care participation and household food insecurity. Second, we implement propensity score techniques to create the desired counterfactual. We use propensity score weighting, also known in the literature as inverse probability weighting. Model specifications for both approaches are discussed in the Methods section.

Methods

Sample

Our sample comes from the Early Childhood Longitudinal Study Birth Cohort (ECLS-B). The ECLS-B includes a nationally representative sample of children born in 2001 and utilizes a multi-reporter, multi-method design to gather extensive information about children's home and educational experiences, including non-parental care, from birth through kindergarten entry. The ECLS-B contains a wealth of information including the core food security module, parent(s)' demographic background, family utilization of federal assistance (including SNAP and WIC), household income and composition, and detailed reports concerning the study child's non-parental care arrangements.

10,700 parents and children participated at study initiation, when target children were about 9-months- old. Subsequent data collections occurred when children where approximately 24 months of age (n=9,850 parents; 8,950 child assessments), 4-years-old (n=8,950 parents; n= 8,750 child assessments), and at kindergarten entry. The current study focuses on wave 3 of the ECLS-B, when children were, on average, 53 months of age (SD = 4; range: 44 to 65 months).

Because of our focus on the risk for household food insecurity, we restricted our sample for analysis to those with household incomes below the 185th percentile of the Federal Poverty Level. Data collection for wave 3 of the ECLS-B occurred between fall 2005 and spring of 2006, when the Federal Poverty Level for a family of four was $19,350. Our investigation considers 4,000 households with a focal child of preschool age.

Procedures

Data for the current study were gathered from parents via in-home, computer-assisted personal interviewing (CAPI) and with self-administered questionnaires (ECLS-B documentation). At wave 3, 95% of respondents were the focal child's mother or female guardian.

Focal Measures

Household food insecurity. The USDA's Core Food Security Module (CFSM) was administered at all waves of the ECLS-B (original cite). The CFSM includes 18 questions; questions 1 to 10 are for households in general and questions 11 to 18 are specifically for households that include children. Respondents indicate, sometimes with yes/no and other times with a 3-point scale that assesses frequency (i.e., often, sometimes, or never true in last 12 months) their access to adequate amounts of food. Sample items include: "The food that we bought just didn't last and we didn't have money to get more", "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?", and "In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food?". For the full battery of CFSM questions, see Fiese et al (2011) or Nord (2009).

Completed questionnaires yield 4 categories that define a household's food security status. When zero to two items of the total 18 are affirmatively endorsed, a household is categorized as food secure; when three to seven items are positively endorsed, a household is categorized as marginally food secure, when 8 to 12 items are scored affirmatively, a household is low food secure and when more than 13 or more items are endorsed, the household is categorized as very low food secure.

For the current study, we use household food security status from wave 3 as our focal dependent variable and household food security status from wave 2 as a lagged effect. To create our measure of *household food insecurity*, we combined households that were marginally food secure, low food secure, and very low food secure; for our measure of *very low food security*, we utilized only the very low food secure category. Both were then contrasted to households that were food secure.

Non-parental care arrangements. Respondents answered a series of questions about the target child's "regular" non-parental care experiences (not including occasional babysitters). For each type including Head Start, relative care in a home setting, non-relative care in a home setting, and care in a child care center, nursery school, or pre-kindergarten program, parents reported a range of information such as hours per week in each arrangement. The ECLS-B utilized these data to identify the primary non-parental care type based on the setting where children spent the most hours per week; this is the variable used in our analyses for primary non-

parental care type (i.e., relative care, non-relative care, center care, Head Start). If children spent equal time in multiple arrangements, "multiple arrangements" was coded and these cases were dropped from analyses (~ 2% of sample).

Covariates

Numerous covariates were included in our models to both account for anticipated relationships with household food insecurity and as a strategy to account for selection bias into child care program type. Specifically, we use household food insecurity and household very low food security from X2 (child age 24-months); child age, gender, race and health status; maternal age, educational attainment, employment and marital status; household composition (under 18 and over 18) and income; living in an urban area and census region. Table 1 presents these variables and shows how they were coded and subsequently used in data analyses.

Sample Weights

"Weights are used to adjust for disproportionate sampling, survey nonresponse, and non-coverage of the target population when analyzing complex survey data. The weights were designed to allow for estimation of population totals and to eliminate or reduce biases that would otherwise occur with unweighted analyses" (p. 127; NCES, 2009). For the current study, a sample weight computed for analyses including preschool parent data (e.g., household food insecurity), among other data types, was used (W3R0).

Analytic Approach and Model Specification

To address the possibility of selection into primary non-parental care setting, we use two methodological approaches to estimate the effects of child care decisions. First, logit models are used to predict odds for the measures of household food insecurity:

(1) $$Y_i = \alpha_i + C_i\beta + \lambda E_i + Z_i\delta + \varepsilon$$

Where Y_i indicates a measure of food security for household *i*, C_i identifies child care setting for household *i*, β is a vector of estimated coefficients associated with C, E_i denotes maternal employment, λ is a vector of estimated coefficients associates with E, Z_i includes demographic, household composition, and other characteristics that prior literature has indicated are associated with food security status, δ is a vector of estimated coefficients associated with Z, and ε is a normally distributed error term with constant variance and mean of 0.

We also use propensity score weighting as an additional technique for robustness checks. Propensity score weighting has recently become popular because it is easy to apply since it only requires a re-weighting of the data, and it achieves the lowest possible asymptotic variance (Li, Racine & Wooldridge, 2008). Under the assumption that the researcher can observe the main variables that influence the probability of selection, this method estimates the impact of a child care setting by creating a reweighted data set that better resembles the true correlations in the initial sample. As studies of early childhood interventions' dosage effects are often non-randomized, propensity score methods have been extended to include studies with multiple treatment groups in which participants receive different treatment dosages (e.g. non-care, relative care, non-relative care, center care and multiple arrangements). In other words, if we find four children in our sample, one did not receive any day care, one received relative care, another received non-relative care and a fourth one received center care, with the same propensity score, then we could think of these four children as if they were "randomly" assigned to each group in the sense of being equally likely to be in any child care setting.

A dose-response propensity score weighting method was first developed by Imbens (2002). This approach creates a reweighted data set that better resembles a randomized experiment.

Individuals are assigned larger (smaller) weights if their observed intervention status is underrepresented (overrepresented) given their covariates.

Implementation of propensity score weighting can be done in three simple steps. First, it begins with fitting a multinomial logistic regression model that predicts the probability of receiving a child care arrangement, given the covariates. This model is referred to as the treatment mechanism in the program evaluation literature. In this study, the probability of receiving non-care, relative care, non-relative care and center care is estimated using a multinomial logistic regression, controlling for child characteristics, family risk factors and neighborhood characteristics.

Second, the estimated probabilities (propensity scores) generated by the multinomial logistic regression are used to construct the weight. Participants are assigned weights equal to the inverse of the predicted probability of receiving the dosage that they actually received. As a result, individuals with overrepresented intervention status, given their covariates, get smaller weights. For example, if child "A" received relative care and is overrepresented among all of those who received relative care, given the covariates; this child will get a smaller weight. Finally, we run logistic regressions to study the effects of child care arrangement on food insecurity, using the weights to control for selection bias.

Results

Predicting Household Food Insecurity: Primary Non-Parental Care Arrangement Type

Table 2 presents results from the logistic regression analysis (i.e., logit models) predicting household food insecurity with primarily non-parental care type and the child, maternal, and household covariates. As shown, after accounting for the covariate set, there were no significant

effects of relative care, non-relative care, center care, and Head Start, when compared with no non-parental care, on household food insecurity.

Sensitivity Analysis of Findings: Results from Propensity Score Weighting

We used a propensity score technique to control for the possibility of selection. We suspect that selection can bias our results because table 1indicates differences in socio-economic, demographic, family, and regional characteristics for each subgroup: no regular non-parental care, relative care, non-relative care, center care and Head Start. If children were randomly selected to participate in a particular form of child care, then children who are enrolled in center care should be similar to children who are enrolled in Head Start, relative, and non-relative care on measures of socio-economic, demographic, family and regional characteristics. However, that is not the case. Table 1 shows that the majority of Caucasian children are enrolled in center care, the majority of African-American children are enrolled in Head Start, while the majority of Hispanic children chose no non-parental care. We also observed that the most preferred type of care arrangement for the most educated mothers was center care, while for the least educated mothers, it was no non-parental care. Table 1 also shows that most not-employed mothers chose no regular non-parental care, while most of part-time and full-time employed mothers chose center-care. Of note is that most married mothers opted equally for no regular non-parental care or center-care as their primary type of arrangement. When looking at regions, the majority of families from the West opted for no regular non-parent care, while the majority of families from the Northeast, Midwest, and South opted for a center care arrangement. Finally, we observe that the highest average household income corresponds to those who chose center care, while the lowest household income corresponds to those who chose Head Start.

Because Table 1 presents a compelling case for selection bias, a propensity score for each household is generated from a multinomial logistic regression predicting type of child care arrangement from a set of covariates. We use the same socio-economic and demographic characteristics, family characteristics, and dummy variables for different regions, as described before. We also included state-level variables that can be theoretically or empirically associated with child care arrangement such state unemployment rate for women with children less than 6, citizen ideology; additional child characteristics were added including whether child birth was premature (= 1) and birth order (first-born = 1).

We then estimated the propensity scores. In our sample, results from the multinomial logistic regression predicting the probability of using a type of a child care arrangement (propensity scores) suggest that the higher the household income, the less likely a family is to use Head Start compared with using a Center Care arrangement. African American children are also more likely to utilize Head Start than child care centers. Mothers who did not complete high school are more likely to use relative care and no non-parental care than center care. Mothers who were employed full-time were less likely to use no non-parental care than child care centers, while the same group of full-time employed mothers was more likely to use relative care and non-relative care than center care. As shown in Table 3, several other differences emerged. The propensity scores generated from these multinomial logistic models were then used to create a reweighted dataset that simulates a randomized experiment.

Table 4 reports marginal effects of child care arrangement type on household food insecurity. For comparison purposes, the first three columns show the marginal effects, standard deviations and z-scores from the results presented in Table 2 for the effects of primary care arrangement type, compared with no non-parental care, on food insecurity. The next three columns show

similar indicators using a propensity score weighting technique. While the logistic regression analysis indicated no significant effect of type of primary care arrangement, the propensity score weighting results shows that child care center care reduces the probability of food insecurity by 6 percentage points, while relative care reduces the probability of food insecurity by 3 percentage points. Neither non-relative care nor Head Start show statistically significant effects.

Predicting Household Very Low Food Security: Primary Non-Parental Care Arrangement Type

As presented in Table 5, the logistic regression analysis predicting household very low food security shows significant marginal effects for child care center care and Head Start after controlling for the child, maternal, and household covariates. Specifically, compared with no non-parental care, attending a child care center reduces the probability of very low food security by three percentage points and attending Head Start reduces very low food security by two and a half percentage points.

Sensitivity Analysis of Findings: Results from Propensity Score Weighting

Table 6 reports marginal effects of child care arrangement on very low food security. Similar to Table 4, the first three columns show the marginal effects, standard deviations and z-scores for the effects of primary care arrangement types on very low food security using logistic regression analysis (as shown in Table 5). The next three columns show indicators using the propensity score weighting technique. Of interest is that utilizing child care center care reduces very low food security regardless of the analytical technique applied; similar, significant findings emerged from both the logistic regression analysis and the propensity score weighting although the propensity score technique attenuated the effects. Additionally, participating in Head Start showed a protective effect on very low food security when using a logistic regression analysis,

but this effect disappeared when correcting for selection bias. As observed in the descriptive statistics presented in Table 1, children from more disadvantaged households attend Head Start. Specifically, children with the youngest and the least educated mothers, as well as the lowest average household income among all types of non-parental care arrangements. Because these children are at greater risk, the effect of Head Start participation on very low food security emerged when using logistic regression analysis. However, after we controlled for selection on observable characteristics of children, households, and states and reweighted the sample to resemble a randomized process whereby children with similar characteristics were equally likely to use any type of child care arrangement, this effect faded away.

For families that utilize non-relative care, the opposite pattern occurred. Although the logistic regression analysis did not show an effect of this form of non-parental care on very low food security, results from propensity score weighting did. Specifically, using non-relative care, when compared with no non-parental care, increased the probability of very low food security by two percentage points. Unlike child care center care and Head Start, depending on state-level child care policies, non-relative care can be unlicensed and informal, thus creating less incentive to comply with best practices. Moreover, unlike relative care, when a family member cares for a child, the nature of the relationship and the potential for informal exchange of resources between kin, means that relatives may sacrifice their own very low food security for the well-being of a child relative, unlike a non-relative who does not have the same incentive

Discussion

Although upwards of 75% of 3-4 year old children spend time in non-parental care on a regular basis, we know very little about the influence of child care arrangement type on low income children's household food insecurity and very low food insecurity. This study

investigated the impact of non-parental care arrangements, including exclusive parental care, on household food insecurity and very low food insecurity. We used logistic regression analysis and propensity score weighting models to account for differential selection into child care arrangement types. Our analyses showed that nonrandom selection was biasing our results. After correcting for these factors, we found that utilizing child care from relatives and care in a child care center reduced the probability of food insecurity. Moreover, child care center care also reduced the probability of very low food security, while using care from non-relatives, such as home-based child care, increased the probability of very low food security. These results were statistically significant and intuitively meaningful.

Because propensity score techniques simulate random assignment to child care arrangement type, the questions that remain concern what is known about the different types of child care and how they may be linked with risk for household food insecurity. For example, child care center utilization could protect households from food insecurity and very low food security because they are more reliable sources of non-parental care, typically operate full-day and full-year, and are more likely to participate in programs such as the Child and Adult Care Food Program. Because of these characteristics, children may have regular access to meals and snacks that do not need to be provided at home and, in turn, reduce parental worry about food stores at home, such as that which characterizes very low food security. Additionally, the selection bias associated with child care center utilization, at the program level, could prove to be a source of support to households. That is, if all families who utilize child care centers are characterized by higher levels of maternal education and household income, this constellation of social capital could translate into tangible sources of support that protect again inadequate access to food (e.g., Small, 2009). For instance, families who use the same child care center might share information

about free or low-cost food resources, take turns with extended day child care if parents need to work late, or maintain social relationships outside of the child care center that involve shared food preparation and meals, among other activities.

Family use of relative care also revealed itself to protect against more general food insecurity, although for reasons that are likely very different from child care center care. Although relative care is not as reliable as center care, is mostly unlicensed and unregulated, and rarely if ever has access to the Child and Adult Care Food Program, the power of kinship, a phenomenon far beyond the goals of this study, could underlie the extent to which relative care protects against food insecurity. For example, there could be some form of kinship exchange taking place that benefits both parties, such as trading-off care of each other's children. Additionally, in some states, it is possible to disburse child care subsidies to relatives who undergo a simple screening and registration process. Such an arrangement may cover the costs associated with providing meals and snacks for children that need not be provided at home.

With the exception of non-relative care, no other forms of non-parental care were associated with greater risk for very low food security. Although these findings are interesting, they must be taken with caution due to the small sample size. Use of non-relative care can take various forms, which makes it a challenge to speculate about underlying mechanisms that link it with increased risk for food insecurity. Non-relative care could mean the person who lives across the street and helps out or it could mean the formal home-based child care program near one's place of employment. Non-relative care, however, presumably means a small group of children and one or possibly two adults and may not necessarily have the same potential for instrumental support and kinship exchange as discussed previously.

Limitations

Despite the considerable strengths of using the ECLS-B (i.e., its sample size, design, and methods), this study has limitations that need to be acknowledged before discussing the policy implications. As mentioned above, the subsample of low-income children who use non-relative care was small. Even when the sample size was bigger than what is recommended for statistical inferences, some caution may be used.

In addition, it is important to note that propensity score weighting assumes that all characteristics that are driving selection into different forms of non-parental care are observable by the researcher and have been included in the statistical models. Thus, our results could be biased if any additional variables that are confounded with child care arrangement or food insecurity were excluded. It is important to note, however, that we meticulously reviewed the literature when considering our covariates for this analysis, accounting for most if not all of what previous studies have found to impact selection of child care arrangement. However, it is possible that unobserved factors such as supply-side factors including child care access and affordability at the local level, as well as demand-side factors including parental tastes and beliefs, may also explain selection into type of child care arrangement.

Policy Implications

This study makes several contributions to the emerging literature on the influence of child care on food insecurity and very low food security and point to new targets for intervention. It specifically provides evidence that attending child care centers as a primary form of non-parental care is an important factor to consider for reducing both food insecurity and very low food security. This empirical evidence suggests the need for policy and programmatic efforts to increase low income families' access to child care centers themselves and the nutrition and food programs that can be provided therein.

Further research can help identify the specific influences of children's non-parental care arrangements, particularly in child care centers. Although highly common among young children, little is known about the mechanisms through which center arrangements are affecting food insecurity and very low food security. The more we understand the influences of child care on children's food security, the more effective targeted interventions in fighting hunger will be.

References

Bernal, R. (2008). The effect of maternal employment and child care on children's cognitive development. *International Economic Review*, 49, 1173-1209.

Bernal, R., & Keane, M.P. (2010). Quasi-structural estimation of a model of childcare choices and child cognitive ability production function. *Journal of Econometrics*, 156, 164-189.

Bhattacharya, J., Currie, J, and Haider, S. (2004). Poverty, food insecurity, and nutritional outcomes in children and adults. *Journal of Health Economics* 23:839-862.

Blaylock, J.R., & Blisard, W.N. (1995). Food security and health status in the United States. *Applied Economics*, 27, 961-966.

Capizzano, J., Adams, G., & Sonenstein, F. (2000). Child care arrangements for children under 5: Variations across states. Findings from the 1999 survey of America's Families, Series B, no. B7. Washington DC: Urban Institute.

Clements, M., Reynolds, A., & Hickey, E. (2004). Site-level predictors of school and social competence in the Chicago child-parent centers. *Early Childhood Research Quarterly, 19*, 273-296.

Coleman-Jensen, A., Nord, M., Andrews, M., & Carlson, S. (2011). Household food security in the United States in 2010. ERR-123, U.S. Department of Agriculture, Economic Research Service.

Cook, J., and Frank, D. (2008). Food security, poverty, and human development in the United States. *Annals of the New York Academy of Science*, 40: 1-16.

Cotter, D., England, P., & Hermsen, J. (2007). Moms *and jobs: Trends in mothers' employment and which mothers stay home*. A fact sheet from Council on Contemporary Families. http://www.contemporaryfamilies.org/work-family/momsjobs.html.

D'Agostino Jr., R. B. (1998). Propensity Score Methods for Bias Reduction in the Comparison of a Treatment to a Non-Randomized Control Group. *Statistics in Medicine*, 17, 2265-2281.

Dowsett, C., Huston, A., & Imes, A. (2008). Structural and process features in three types of child care for children from high and low income families. *Early Child Research Quarterly, 23*(1), 63-93.

Duncan, J., Brooks-Gunn, J., and Klebanov, P. (1994). Economic deprivation and early childhood development. *Child Development* 65: 296-318.

Fiese, B., Gundersen, C., Koester, B., & Washington, L. (2011). Household food insecurity: Serious concerns for child development. *Social Policy Report, 25*(3), 1-26.

Fuller, B., Holloway, S. D., & Liang, X. (1996). Family selection of child-care centers: The influence of household support, ethnicity, and parental practices. *Child Development, 67,* 3320-3337.

Gelbach, Jonah. (2002). Public schooling for young children and maternal labor supply. *American Economic Review* 92, 1:307–22

Gormley, W., Gayer, T., Phillips. D., & Dawson, B. (2005). The effects of universal pre-k on cognitive development. *Developmental Psychology, 41*(6), 872-884.

Gormley, W. (1991). State regulations and the availability of child-care services. *Journal of Policy Analysis and Management, 10*(1), 78-95.

Hoddinott, J., Beherman, J., Maluccio,J., Flores, R., and Martorell, R. (2008). Effect of a nutrition intervention during early childhood on economic productivity in Guatemalan adults. *The Lancet*, 371 (9610): 411-416.

Howes, C., Phillips, D., & Whitebook, M. (1992). Thresholds of quality: Implications for the social development of children in center-based care. *Child Development, 63,* 449-460.

Iruka, I. U. & Carver, P.R. (2006). *Initial results from the 2005 NHES early childhood program participation survey (NCES 2006-075).* U.S. Department of Education. Washington, DC: National Center for Education Statistics.

James-Burdumy, S. (2005). The effect of maternal labor force participation on child development. *Journal of Labor Economics*, 23, 177-211.

Korenman, S., Abner, K. S., Kaestner, R., & Gordon, R. A. (2012). The Child and Adult Food Care Program and the nutrition of preschoolers. *Early Childhood Research Quarterly*.

Li, Q., Racine, J.S. & Wooldridge, J.M. (2008). Estimating average treatment effects with continuous and discrete covariates: The case of Swan-Ganz catheterization. *American Economic Review: Papers & Proceedings,* 98(2), 357-362.

Loeb, S., Bridges, M., Bassok, D., Fuller, B., & Rumberger, R. (2007). How much is too much? The influence of preschool centers on children's social and cognitive development. *Economics of Education Review, 26,* 52-66.

Macartney, S., & Laughlin, L. (2011). Child care costs in the Current Population Survey's Annual Social and Economic Supplement (CPS ASEC): A comparison to SIPP. SEHSD Working Paper Number 2011-1. US Census Bureau.

Magnuson, K., Meyers, M., Ruhm, C., & Waldfogel, J. (2004). Inequality in preschool education and school readiness. *American Educational Research Journal, 41*, 115-157.

Maluccio JA, Hoddinott J, Behrman J, Martorell R, Quisumbing A, Stein AD. (2006). *The impact of an experimental nutritional intervention in childhood on education among Guatemalan adults*. Washington DC: International Food Policy Research Institute.

Morrissey, T. (2009). Multiple child-care arrangements and young children's behavioral outcomes. *Child Development, 80(*1), 59-76.

National Center for Education Statistics. (2009). *ECLS-B Longitudinal 9-Month to Kindergarten 2007 Restricted-Use Data File and Electronic Codebook.* Washington, DC: Author.

NICHD Early Child Care Research Network. (1998). Early child care and self-control, compliance, and problem behavior at twenty-four and thirty-six months. *Child Development, 69,* 1145-1170.

NICHD Early Child Care Research Network. (2000). The relation of child care to cognitive and language development. *Child Development, 71,* 958-978.

NICHD Early Child Care Research Network. (2001). Child care and children's peer interactions at 24 and 36 months: The NICHD study of early child care and youth development. *Child Development, 72,* 1478-1500.

NICHD Early Child Care Research Network. (2002). Early child care and children's development prior to school entry: Results from the NICHD study of early child care and youth development. *American Educational Research Journal, 39,* 133-164.

NICHD Early Child Care Research Network & Duncan, G. (2003). Modeling the impacts of child care quality on children's preschool cognitive development. *Child Development,* 74, 1454-1475.

Nord, M., Coleman-Jensen, A., Andrews, M., & Carlson, S. (2010). Household food security in the United States, 2009. Economic Research Report No. 108. Rerieved from United States Department of Agriculture website: http://www.ers.usda.gov/Publications/ERR108/ERR108.pdf.

Pollit, E. (1994). Poverty and child development: relevance of research in developing countries to the United States. *Child Development* 65: 997S-1001S.

Riley, L. A., & Glass, J. L. (2002). You can't always get what you want: Infant care preferences and use among employed mothers. *Journal of Marriage and Family, 64,* 2-15.

Rosenbaum, P. R., & Rubin, D.B. (1983). The Central Role of Propensity Score in Observational Studies for Causal Effects. *Biometrica,* 70, 41-55.

Roustit,C,, Hamelin, A.M., Grillo, F., Martin, J., and Chauvin, P. (2010). Food Security: Could School Food Supplementation Help Break Cycles of Intergenerational Transmission of Social Inequalities? *Pediatrics*. 126(6): 1174-1181.

Scholl, T., and Johnson, W. (2000). Folic acid: influence on the outcome of pregnancy. *Medical Journal of Clinical Nutrition,* 71:1295S-1303S.

Singer, J. D., Fuller, B., Keiley, M. K., & Wolf, A. (1998). Early child-care selection: Variation by geographic location, maternal characteristics, and family structure. *Developmental Psychology, 34(5),* 1129-1144.

Small, M. L. (2009). *Unanticipated gains: Origins of network inequality in everyday life.* Oxford University Press: Oxford, England.

Usdansky, M. L., & Wolf, D. A. (2008). When child care breaks down: Mothers' experiences with child care problems and resulting missed work. *Journal of Family Issues, 29(9),* 1185-1210.

Votruba-Drzal, E., Coley, R., & Chase-Lansdale, L. (2004). Child care and low-income children's development: Direct and moderated effects. *Child Development, 75*(1), 296-312.

Yaqub, S. (2002). *Chronic poverty: scrutinizing estimates, patterns, correlates, and explanations*. CPRC Working Paper 21. Manchester: IDPM, University of Manchester.

Table 1. Household Food Insecurity, Sample Characteristics, and Features of Non-Parental Care by Primary Non-Parental Care Arrangements (sample restricted to households below 185% Federal Poverty Level; wave 3/preschool unless otherwise noted)

	Full Sample (n=4000)		**No regular Non-Parental Care (n=1050;26%)**		**Relative Care (n=600; 15%)**		**Non-Relative Care (n=200; 5%)**		**Center-Care and Multiple Arrangements (n=1200; 32%)**		**Head Start (n=950; 23%)**	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
X2 HH Food Insecure	650	15.9%	200	18.2%	100	15.8%	50	15.4%	150	13.3%	150	16.6%
X3 HH Food Insecure	1000	25.1%	300	27.2%	150	27.0%	50	22.1%	250	21.0%	250	27.0%
X2 HH Very Low FS	100	2.5%	0	0.0%	0	0.0%	0	0.0%	50	2.0%	50	3.0%
X3 HH Very Low FS	250	6.3%	100	9.5%	50	0.0%	0	0.0%	50	4.2%	50	5.3%
Child Age (months)	53.05 (4.2)		52.61 (4.5)		52.68 (4.1)		53.0 (4.3)		53.42 (4.1)		53.25 (4.1)	
Child Gender (Male)	2050	51.2%	500	48.0%	300	53.3%	100	55.2%	650	52.5%	500	51.1%
Child Race												
White	1200	29.3%	350	35.0%	150	23.1%	100	40.0%	400	32.0%	200	21.1%
Black	950	23.2%	150	15.0%	150	23.1%	50	20.0%	300	24.0%	300	31.6%
Hispanic	1150	28.0%	350	35.0%	200	30.8%	50	20.0%	300	24.0%	250	26.3%
Asian	250	6.1%	50	5.0%	50	7.7%	0	0.0%	100	8.0%	50	5.3%
Other	550	13.4%	100	10.0%	100	15.4%	50	20.0%	150	12.0%	150	15.8%
Child Health (1 - 5)	4.20 (.9)		4.23 (.9)		4.20 (.8)		4.25 (.9)		4.21 (.9)		4.14 (.9)	
Maternal Age (years)	30.29 (7.1)		30.62 (6.9)		28.72 (6.7)		30.26 (7.5)		31.09 (7.2)		29.89 (7.0)	
Maternal Education												
Less than HS	1050	26.5%	400	37.5%	150	26.3%	50	19.4%	200	18.3%	250	28.2%
High School (HS)	1700	42.9%	400	39.9%	250	46.7%	100	48.4%	500	40.1%	450	46.8%
Some college	1000	25.2%	200	17.3%	150	22.6%	50	27.7%	400	31.0%	200	21.6%
College & above	300	7.6%	50	5.3%	50	4.4%	0	4.6%	150	10.6%	50	3.5%
Maternal Employment												
Not Employed	1500	38.1%	650	62.6%	100	16.7%	0	0.0%	400	33.3%	350	38.9%
Looking for Employment	350	8.9%	100	12.1%	50	8.3%	0	0.0%	100	8.3%	100	11.1%

Part-time Employment	700	17.8%	100	11.5%	150	25.0%	50	25.0%	250	20.8%	150	16.7%
Full-time Employment	1350	34.3%	150	13.8%	300	50.0%	150	75.0%	450	37.5%	300	33.3%
Marital Status (Married)	1950	48.9%	600	58.2%	250	39.2%	100	41.1%	600	50.8%	400	44.1%
Household Composition												
Residents under age 18	2.79 (1.3)		3.10 (1.4)		2.63 (1.3)		2.70 (2.7)		2.65 (1.2)		2.8 (1.3)	
Residents over age 18	2.12 (0.9)		2.19 (0.9)		2.35 (1.2)		1.85 (0.8)		2.04 (0.9)		2.02 (0.9)	
Household Income ($)	21458 (12010)		22021 (12096)		21697 (11948)		23173 (12286)		22748 (12382)		18585 (10887)	
Urban Status	3200	80.4%	800	80.0%	500	82.3%	200	81.7%	1000	83.2%	700	75.6%
Region												
Northeast	550	13.7%	100	9.5%	50	8.3%	50	25.0%	200	16.0%	150	15.0%
Midwest	850	21.1%	200	19.0%	150	25.0%	50	25.0%	250	20.0%	200	20.0%
South	1650	41.0%	450	42.9%	200	33.3%	50	25.0%	550	44.0%	400	40.0%
West	1050	26.1%	300	28.6%	200	33.3%	50	25.0%	250	20.0%	250	25.0%

Note: For continuous variables, the mean is shown under the "frequency" column and the standard deviation is shown in parentheses.

Table 2- Predicting Household Food Insecurity with Non-Parental Care Factors: Marginal Effects
Sample restricted to households below 185% of the Federal Poverty Level

	dF/dx	Std. Err.	z	P>z	
Household Food Insecurity Wave 2	0.306	0.030	10.920	0.000	***
Primary Care Arrangement					
Relative care	-0.005	0.032	-0.150	0.885	
Non-relative care	-0.045	0.043	-0.990	0.323	
Center care	-0.043	0.026	-1.590	0.111	
Head Start	-0.009	0.027	-0.320	0.749	
Household income (logs)	-0.034	0.014	-2.400	0.016	**
Child age in months	-0.001	0.002	-0.250	0.800	
Child race					
Black	-0.029	0.028	-1.020	0.306	
Hispanic	-0.039	0.026	-1.450	0.146	
Asian	-0.087	0.034	-2.240	0.025	**
Other	0.053	0.041	1.350	0.176	
Child is male	0.019	0.019	0.980	0.325	
Child health (1=poor, 5=excellent)	-0.029	0.011	-2.650	0.008	***
Maternal age (years)	0.001	0.002	0.820	0.410	
Maternal education					
Less than HS	0.026	0.024	1.100	0.273	
Some college	-0.008	0.025	-0.330	0.743	
College or above	-0.013	0.047	-0.270	0.790	
Maternal employment					
Full-time jobs	0.038	0.025	1.500	0.134	
Part-time jobs	-0.016	0.028	-0.570	0.569	
Looking for a job	0.079	0.036	2.330	0.020	**
Marital status (married)	-0.022	0.022	-0.990	0.320	
Number of household members <18	0.009	0.008	1.120	0.263	
Number of household members >18	-0.047	0.012	-3.840	0.000	***
Urban area	0.049	0.026	1.810	0.071	*
Missing values for urbanicity	0.022	0.065	0.350	0.724	
Midwest	-0.031	0.034	-0.880	0.379	
South	0.006	0.033	0.190	0.850	
West	0.013	0.036	0.360	0.718	
Wald Chi-squared=	217.470		n=3,900		
Probability >Chi-squared=	0.000				

* p< .1, ** p<.05, *** p<.01

Notes: Primary care arrangement: No non-parental care is omitted group; Child race: White is omitted group; Maternal education: high school is omitted group; Maternal employment: not employment is omitted group; Region: northeast is omitted group. Sampling weights are used.

Table 3 - Predicting the Probability of Child Care Arrangement Type using a Multinomial Logistic Approach

	No non-parental care			Relative care			Non-relative care			Head Start		
	Coef.	SE		Coef.	SE		Coef.	SE		Coef.	SE	
Household income (logs)	0.03	0.07		-0.07	0.08		0.02	0.10		-0.13	0.07	*
Child age in months	-0.06	0.01	***	-0.04	0.01	***	-0.04	0.02	**	-0.03	0.01	***
Child race												
Black	-0.21	0.14		0.05	0.15		-0.28	0.19		0.46	0.14	***
Hispanic	0.26	0.13	**	0.23	0.15		0.16	0.18		0.56	0.13	***
Asian	-0.13	0.21		0.34	0.29		-0.57	0.35		-0.05	0.22	
Other	-0.22	0.19		0.26	0.22		-0.14	0.24		0.06	0.18	
Child is male	-0.13	0.09		0.02	0.10		-0.08	0.13		0.01	0.09	
Child health (1=poor, 5=excellent)	-0.01	0.06		-0.04	0.06		-0.10	0.08		-0.04	0.06	
Maternal age (years)	0.00	0.01		-0.03	0.01	***	0.01	0.01		-0.01	0.01	
Maternal education												
Less than HS	0.42	0.12	***	0.29	0.13	**	0.16	0.17		0.12	0.12	
Some college	-0.19	0.12		-0.36	0.13	***	-0.27	0.15	*	-0.37	0.12	***
College or above	-0.46	0.20	**	-0.75	0.24	***	-0.63	0.32	**	-0.81	0.29	***
Maternal employment												
Full-time jobs	-0.95	0.12	***	0.81	0.13	***	1.13	0.17	***	-0.15	0.11	
Part-time jobs	-0.80	0.14	***	0.69	0.15	***	0.64	0.20	***	-0.27	0.14	*
Looking for a job	-0.38	0.16	**	0.26	0.19		0.00	0.32		0.02	0.16	
Marital status (married)	0.00	0.11		-0.19	0.12		-0.06	0.14		-0.11	0.11	
# of household members <18	0.18	0.04	***	0.05	0.05		0.12	0.06	**	0.07	0.04	*
# of household members >18	0.11	0.05	*	0.27	0.06	***	-0.12	0.08		0.08	0.06	
Urban area	-0.35	0.13	**	-0.34	0.15	**	-0.27	0.18		-0.46	0.13	***
Missing values for urban area	-0.37	0.31		-0.24	0.31		-0.87	0.41	**	-0.71	0.31	**
Midwest	0.61	0.23	***	0.43	0.25	*	-0.03	0.29		-0.03	0.23	
South	0.38	0.24		0.22	0.25		-0.25	0.32		0.09	0.24	
West	0.56	0.23	**	0.43	0.23	*	0.50	0.30	*	0.27	0.22	

Premature delivery	0.21	0.17		-0.27	0.17		-0.02	0.19		0.07	0.16
Child first born	0.01	0.12		0.01	0.13		0.29	0.16	*	-0.02	0.11
Center is licensed to receive CCDF	0.02	0.11		-0.12	0.13		-0.45	0.16	***	-0.04	0.11
State Unemployment Rate for Women with child<age 6	0.00	0.02		0.01	0.02		0.03	0.02		0.01	0.02
Citizen ideology	0.00	0.01		0.00	0.01		-0.01	0.01		0.00	0.01
Mother worked 12 months prior to birth	-0.05	0.10		0.08	0.12		-0.07	0.14		-0.02	0.11
Constant term	2.57	1.41	*	1.85	1.46		-0.75	1.94		2.04	1.38
Wald Chi-squared= 708.3 (n=3900) Probability> chi2= 0.00											

Notes: Primary care arrangement: Center care is omitted group; Child race: White is omitted group; Maternal education: high school is omitted group; Maternal employment: not employment is omitted group; Region: northeast is omitted group.

Table 4 – Marginal effects of child care arrangement on Household Food Insecurity, with and without selection correction

	Without Selection correction			Selection correction, PSW			
	dF/dX	S.E.	z	dF/dX	S.E.	z	
Primary Care Arrangement							
Relative care	-0.005	0.032	-0.150	-0.025	0.009	-2.772	***
Non-relative care	-0.045	0.043	-0.990	-0.017	0.013	-1.338	
Center care	-0.043	0.026	-1.590	-0.042	0.007	-6.028	***
Head Start	-0.009	0.027	-0.320	0.010	0.008	1.206	

* p< .1, ** p<.05, *** p<.01

Notes: Primary care arrangement: No non-parental care is omitted group. This table reports marginal effects and regressions control for household food insecurity in the previous wave, child's age, child's gender, child's race, child's health, maternal age, maternal education, maternal employment, marital status, household composition, household income, urban area, and region.

Table 5- Predicting Household Very Low Food Security with Non-Parental Care Factors, Marginal Effects, Sample restricted to households at or below 185% of the Federal Poverty Level

	dF/dx	Std. Err.	z	P>z	
Household Very Low Food Security Wave 2	0.243	0.056	6.760	0.000	***
Primary Care Arrangement					
Relative care	-0.010	0.014	-0.670	0.503	
Non-relative care	-0.020	0.015	-1.090	0.274	
Center care	-0.030	0.010	-2.590	0.010	**
Head Start	-0.025	0.009	-2.360	0.018	**
Household income (logs)	-0.013	0.006	-2.180	0.030	**
Child age in months	0.001	0.001	0.780	0.438	
Child race					
Black	-0.026	0.010	-2.440	0.015	**
Hispanic	-0.029	0.012	-2.350	0.019	**
Asian	-0.022	0.011	-1.590	0.112	
Other	0.005	0.016	0.330	0.739	
Child is male	-0.008	0.008	-0.980	0.325	
Child health (1=poor, 5=excellent)	-0.013	0.005	-2.600	0.009	***
Maternal age (years)	0.001	0.001	2.320	0.020	**
Maternal education					
Less than HS	0.012	0.012	1.030	0.305	
Some college	0.007	0.013	0.600	0.548	
College or above	-0.005	0.020	-0.240	0.811	
Maternal employment					
Full-time jobs	0.020	0.014	1.540	0.124	
Part-time jobs	-0.008	0.013	-0.540	0.592	
Looking for a job	0.030	0.020	1.790	0.073	*
Marital status (married)	-0.015	0.010	-1.470	0.142	
Number of hh members <18	0.002	0.004	0.620	0.537	
Number of hh members >18	-0.015	0.006	-2.410	0.016	**
Urban area	0.022	0.010	1.940	0.052	*
Missing values for urbanicity	0.032	0.041	0.950	0.340	
Midwest	0.011	0.019	0.610	0.539	
South	0.018	0.016	1.160	0.248	
West	0.017	0.020	0.930	0.350	
Wald Chi-squared=	113.470		n=3,900		
Probability >Chi-squared=	0.000				

* p< .1, ** p<.05, *** p<.01

Notes: Primary care arrangement: No non-parental care is omitted group; Child race: White is omitted group; Maternal education: high school is omitted group; Maternal employment: not employment is omitted group; Region: northeast is omitted group. Sampling weights are used.

Table 6 - Marginal effects of child care arrangement on Household Very Low Food Security, with and without selection correction

	Without Selection correction				Selection correction, PSW			
	dF/dX	S.E.	z		dF/dX	S.E.	z	
Primary Care Arrangement								
Relative care	-0.010	0.014	-0.670		-0.004	0.004	-1.118	
Non-relative care	-0.020	0.015	-1.090		0.013	0.006	2.334	**
Center care	-0.030	0.010	-2.590	**	-0.010	0.005	-2.195	**
Head Start	-0.025	0.009	-2.360	**	0.000	0.003	0.114	

*p< .1, ** p<.05, ***p<.01

Notes: Primary care arrangement: No non-parental care is omitted group. This table reports marginal effects and regressions control for household food insecurity in the previous wave, child's age, child's gender, child's race, child's health, maternal age, maternal education, maternal employment, marital status, household composition, household income, urban area, and region.