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**TIME POVERTY, WORK CHARACTERISTICS AND THE TRANSITION TO  
FOOD INSECURITY AMONG LOW-INCOME HOUSEHOLDS**

A Dissertation in

Rural Sociology and Demography

by

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## ABSTRACT

Food insecurity refers to a household's inability to provide adequate food for all adults and children. This study focuses on how work characteristics—number of hours worked, schedule of employment, and commuting distance—relate to the transition to food insecurity. It is theorized that availability of time for household food provisioning will be reduced by certain job characteristics. Inadequate time for food provisioning and other household tasks—time poverty—will likely increase the amount of money households spend on food. These increases in expenditures may increase the likelihood of transitioning to food insecurity among low-income households. Much food insecurity research has been cross-sectional; this study is unique in analyzing a panel data set utilizing discrete time Event History analysis to model the first observed transition to food insecurity. Data for the study come from the Family Life Project, a sample of low-income households with young children from nonmetropolitan and small metropolitan counties that are followed over three years of data collection. The results suggest that households with mothers working full-time are more likely to become food insecure than households with mothers not working, controlling for income and other characteristics. Role overload, or greater demands on mothers' time, is significantly related to households transitioning into food insecurity. The theoretical framework developed, suggesting that time for food provisioning is a vital resource that can reduce the likelihood of becoming food insecure, is supported by the Event History analysis. Theories regarding time availability and allocation have not before been applied to understand how food insecurity develops. This research provides an important theoretical and substantive contribution to the food insecurity literature in documenting the importance of time as a resource affecting households' transitions to food insecurity.

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## **Chapter 1**

### **Introduction**

Household food insecurity refers to an inability to provide adequate food for all household members. In 2007, 11.1 percent of U.S. households were considered food insecure (Nord, Andrews, and Carlson 2008:iii). Given economic conditions since 2007, food insecurity is likely to have become more problematic in the U.S. It is clear that food insecurity is related to income, and lower income households face a much higher likelihood of food insecurity than higher income households (Hamilton et al. 1997; Nord et al. 2008). But much of the variation in food insecurity is unexplained by income (Nord 2000; Rose 1999). Given recent economic downturns it is increasingly more important to identify factors that are related to becoming food insecure so that policies can better address food insecurity.

In this study, the characteristics of employment such as number of hours worked, employment schedule and commuting distance are hypothesized to affect the transition to food insecurity. It is theorized that availability of non-market time, especially time spent in household food provisioning, will be reduced by certain job characteristics. Theories focused on how the allocation of non-market time (Becker 1965) and being time-poor (Vickery 1977) affect household well-being are applied to understand how food insecurity develops. Lack of time for household work is expected to increase household food insecurity if low-income households have to purchase services such as child care and prepared meals that they cannot provide themselves because non-market time is

limited. Number of hours worked, employment schedules and commuting distances may relate to households being time-poor. Limitations on non-market time may prevent households from investing time in preparing low-cost meals at home. Preparing low-cost meals at home from scratch will reduce food costs and minimizing food costs will likely help to keep low-income households from becoming food insecure. Employment characteristics may increase time poverty and reduce time to prepare meals, resulting in a higher likelihood of becoming food insecure.

### **The Relationship between Work Characteristics, Time and Food Insecurity**

How might characteristics of employment such as hours worked, work schedule and commuting relate to becoming food insecure? Are demands on mothers' time significantly related to the likelihood of becoming food insecure? These are the primary research questions addressed in the following study using a panel data set of low-income families with young children. Hours worked and timing of those hours worked, as well as commuting distance, may affect transitions into food insecurity due to time available for home food preparation. There is little research on the factors associated with making a transition into or becoming food insecure<sup>1</sup>. Prior studies focus on characteristics associated with who is and who is not food insecure. Therefore, this study will make a contribution not only in developing a greater understanding of the relationship between

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<sup>1</sup> An exception is Wilde and Nord (2005). But, this study only considered change in food insecurity status across two measured time points using the CPS, and the paper focuses almost solely on the relationship between food stamps and food insecurity.

Wilde, P. and M. Nord. 2005. "The Effect of Food Stamps on Food Security: A Panel Data Approach." *Review of Agricultural Economics* 27:425-432.

work characteristics, time and becoming food insecure, but also in documenting characteristics that relate to the transition to food insecurity.

Market work may reduce the time available for home food production, thus resulting in higher prices paid for prepared food or food away from home (Rose 2007). Nonstandard hours, those outside the typical 8 am to 5 pm work day, may be particularly problematic for meal preparation because these nonstandard hours may interfere with family evening meals (Presser 2003). Being “time-poor” (Vickery 1977) may be an important dimension that affects household food insecurity as time is a valuable resource needed to reduce household food costs. Understanding more fully how time demands associated with employment characteristics may relate to households becoming food insecure is an important contribution to the food insecurity literature. Given pressing economic changes that may result in more families transitioning to food insecurity, this research is timely and will help to inform development of programs to alleviate food insecurity.

Prior research using U.S. Current Population Survey data indicates that having a household head engaged in multiple jobs or part-time work or varied hour work (employment where the minimum hours worked varies unsystematically from week to week) are related to higher odds of household food insecurity, each compared to full-time employment (Coleman-Jensen under review; Coleman 2006). Meanwhile, having a household head out of the labor force (who is not retired or disabled) relates to lower odds of food insecurity compared to a household head in full-time work, controlling for income and other characteristics. These previous findings are consistent with theories proposed in this study suggesting that the ability to invest time in at home food

preparation may reduce the likelihood of households becoming food insecure. Those not in the labor force may be able to invest more time in at home food preparation and by doing so are able to reduce their food budget. Meanwhile, working part-time, varied hours or multiple jobs may result in less time available for at home food preparation and increase the complexity of planning meals around varying time demands of work or nonstandard schedules.

Research with the Current Population Survey documenting the association between work forms and food insecurity contributes to understanding how work characteristics relate to food insecurity. However, the cross-sectional research does not explain the mechanisms underlying the relationship between employment and food insecurity when income is accounted for (Coleman-Jensen under review; Coleman 2006). The current research will help to explain and extend these earlier cross-sectional findings by incorporating more detailed measures of employment and time demands to study transitions into food insecurity.

This study also incorporates measures of distance commuted from home to work and childcare and distance from home to destinations such as grocery stores, government offices and schools for this primarily rural sample. Distances traveled to these locations and their potential relationship with food insecurity may also be explained by theory connecting time availability and food insecurity. Families living in rural areas may have longer commutes to work and childcare and may have to travel further to other locations, such as grocery stores, than more urban families. The longer travel distances will incur time costs that may also affect household food provisioning, thereby relating to households becoming food insecure. Commuting distances have not been incorporated

into other food insecurity research but they may be related to food insecurity, especially for rural households.

### **Study Contributions**

The current study extends prior work in at least five important ways. First, this study includes more detailed characteristics of employment, especially work schedule. Working a day shift versus a nonstandard shift may be an important factor in household food preparation that affects budgeting. Second, the research considers employment of both parents in a household because work decisions and food provisioning responsibilities may be made in combination between caregivers. The combination of work arrangements between caregivers (if more than one caregiver is present) may be more important than an individual's work arrangements. Third, the study utilizes panel data to understand what factors affect the transition to food insecurity. Documenting factors that relate to transitions into and out of food insecurity over time is an important contribution to the food security literature that has relied primarily on cross-sectional research. Most other research on food insecurity documents the characteristics that are related to the prevalence of food insecurity. This research differs by modeling the transition to food insecurity and documenting factors that relate to the likelihood of becoming food insecure. Fourth, the sample used is from nonmetropolitan and small metropolitan counties. Residents in these rural areas and small-towns may face special challenges related to travel distances to work, childcare, grocery stores and other locations that require substantial time. Travel distances are included in the data, which

will deepen understanding of how rural residence may affect transitions into food insecurity. Travel time will affect time for household food provisioning. Finally, the study includes an indicator of mothers' time demands, or role overload, to better document how perceptions of time availability relate to becoming food insecure. Time may be an important resource that households can use to avoid becoming food insecure. The current study tests the theory that non-market time, the availability of which is influenced by employment characteristics and distances traveled in a daily routine, is a resource vital for influencing transitions into food insecurity.

### **Dissertation Overview**

This section provides a brief overview of the dissertation. As has already been discussed, time allocation and time poverty theories are applied to develop a greater understanding of the associations between work characteristics, commuting distances, time demands and transitioning to food insecurity.

Data used for the study come from the Family Life Project which features a purposive sample of low-income households with young children from rural areas and small-cities in Pennsylvania and North Carolina. The sample is a birth cohort of young children and collects data on children and their families from the birth of the child until the child is age three.

Three main research questions are addressed. The research questions test the hypothesis that time is a resource that affects households' transitions into food insecurity. The association between time and becoming food insecure has not before been

considered. Number of hours worked, schedule of employment and commuting distance all may be associated with households becoming food insecure, but the relationship between these detailed work characteristics and households transitioning to food insecurity has not been studied. These factors will affect the availability of time for household food provisioning. The research questions are framed in understanding how characteristics relate to the transition to food insecurity. Transitions to food insecurity have not been studied in previous research. The research questions aim to fill these gaps in the food insecurity literature.

1. Controlling for income and other family characteristics, do work hours and work schedules relate to becoming food insecure? What specific combinations of work hours and schedules result in an increased likelihood of transitioning to food insecurity?
2. Do longer commuting distances between home, work and childcare increase the likelihood of a household becoming food insecure?
3. Do greater demands on time, as reflected by mother's responses to a role overload scale, relate to increased likelihood of the household transitioning to food insecurity?

Discrete time Event History models of the first observed transition to food insecurity are estimated. Results indicate the likelihood of becoming food insecure or transitioning to food insecurity between waves of data collection. The analysis models the transition to food insecurity rather than modeling being food insecure. Thus, the significant associations in the Event History models indicate factors related to becoming food insecure.

## **Defining Food Insecurity, Nonstandard Hours and Food Provisioning**

Several terms are vital to the topics at hand and should be defined early on. Food Insecurity is defined by USDA as households that “were, at times, uncertain of having, or unable to acquire, enough food for all household members because they had insufficient money and other resources for food” (Nord, Andrews, and Carlson 2004:3).

Nonstandard schedules refer to employment during night or evening shifts or rotating and irregular schedules (Presser 2003).

The terms food provisioning and food preparation are used throughout to describe all of the tasks and activities related to food and eating. These tasks include all of the activities necessary to feed a family such as meal planning and shopping for food, cooking and serving meals, consuming meals, and clean-up related to food and meals.

## **Dissertation Outline**

The contents of each of the chapters are briefly described below. Chapter 2 considers the theoretical mechanisms linking food insecurity, work characteristics and time for food provisioning. An in-depth literature review of the relevant predictors of food insecurity is included as well. How these are expected to relate to transitions into food insecurity is highlighted. Chapter two closes with hypotheses that follow from the theoretical synthesis and prior research. Chapter three describes the data used for the analysis and the Event History models. Chapter four provides a description of the sample and shows the prevalence of food insecurity in the sample and the percentage of the sample that becomes food insecure. Chapter five presents the Event History analysis



results predicting the transition to food insecurity. Chapter six discusses the findings and implications from the analysis. This final chapter also includes discussions of the limitations of the current analysis, potential policy implications of the study and directions for future research.

## Chapter 2

### **Theoretical Synthesis and Prior Research: Time Poverty and the Transition to Food Insecurity**

This chapter proposes a theoretical framework that links food insecurity and hours worked, work schedules and commuting distance. The hypothesized link between food insecurity and work characteristics, including commuting, is time. The availability of time and the allocation of time are theoretically important because time investment in at home meal preparation can reduce food costs compared to purchasing food away from home. Lower food costs may help protect low income families from becoming food insecure. Number of hours worked, schedule of employment, and commuting distance may affect food insecurity through the time available for at home meal preparation.

For low-income households in particular, non-market time is a valuable resource to reduce food insecurity. These households are unable to afford trading more money on prepared foods to save time. Low-wage jobs may lead to food insecurity if work hours, work schedules, or commuting prevent workers from investing adequate time in home food preparation to feed their families on a limited budget. Rural households may also face greater time costs involved in traveling to stores, schools and social service agencies; this travel time may also affect their transition to food insecurity. This chapter turns to the economic literature that considers time as similar to money as a resource that households spend. Households expend both time and money to produce meals, but so far food insecurity research has focused on the role of money.

This chapter starts with a brief discussion of the issues of food insecurity prevalence and food insecurity transitions. The theory section of the chapter begins by suggesting that non-market time, which is affected by employment and distances to key daily destinations, is a vital resource that may help prevent the transition to food insecurity and the lack of which may increase the likelihood of becoming food insecure. Then, theories regarding time allocation (Becker 1965) and the time-poor (Vickery 1977) are described in greater detail. The next section demonstrates the applicability of time theories to food insecurity by considering prior research linking food insecurity, food provisioning and work characteristics. Prior research suggests that work hours and schedules are important for household food provisioning. These findings show that time may be a vital yet unexplored resource in food insecurity research. Then theories of time are grounded in the realities of daily lives. Here the discussion focuses on gender and food provisioning, the time required for low-cost meal production, the relationship between employment and convenience consumption and rurality and food insecurity. Finally, the last section of the chapter considers other important factors that relate to food insecurity, such as income, family characteristics and human capital. While important, these characteristics associated with food insecurity are not the primary focus of this study of transitions to food insecurity.

### **Food Insecurity: Prevalence versus Transitions**

It is important to note that most prior research on food insecurity has focused on prevalence and predicting who is and who is not food insecure. But, this study focuses

on the factors that relate to who is more likely to experience a transition to food insecurity. By necessity, the theory and literature review draw on prior studies of prevalence. However, it is likely that the characteristics associated with being food insecure measured at a single point in time are also associated with the transition to food insecurity. For instance, households that are low-income are more likely to be food insecure than higher income households. It is reasonable to assume that low-income households are also more likely to make an initial transition into food insecurity than higher income households. Documenting factors related to transitions into food insecurity is an important aspect of this research because identifying factors related to becoming food insecure will aid in developing policy with the goal of preventing households from making a transition into food insecurity.

### **Introduction: Time, Employment, Food Provisioning and Food Insecurity**

Typically, in prior research on food insecurity, the link between food insecurity and work is income provided by employment. Earnings are a valuable resource provided by jobs and these earnings are related to the likelihood of food insecurity. But time is also an important resource that may relate to transitioning to food insecurity.

Employment may increase household earnings, but may decrease time available for household activities. Households can reduce their household food budget by investing time in preparing low-cost meals at home from scratch. They can also use time to reduce food costs by comparison shopping, cutting coupons and planning ahead to buy food when it is on sale. When time available for food provisioning is low, households may

spend more on food because they purchase food away from home, such as fast food, take-out or restaurant meals, and they have less time to spend finding sales and cutting coupons. Increased spending on food, which low-income families cannot afford, may result in food insecurity.

Employment can greatly reduce the amount of time available for households to invest in food provisioning. Number of hours worked is related to time available for household activities. In addition, schedule of employment will relate to time available for food provisioning, because most food provisioning activities occur in the evening. If adults are employed during evening shifts, households may have less time to spend reducing their food budget. Finally, time spent commuting from home to work and to childcare and time spent traveling to other locations such as grocery stores will also reduce the time available for food provisioning.

Time as a resource will likely affect food expenses more than other necessary expenses because food costs are malleable. Food spending is left to the discretion of the household and can be reduced or expanded as necessary. In contrast, most other household expenses are fixed in that they cannot easily be adjusted by the household, such as mortgage or rent payments and utility bills. Households can not easily reduce their costs for these bills when needed. Therefore, understanding how time affects food spending is particularly important for food insecurity. Certain work characteristics may decrease the time available for at home meal production and in turn increase the likelihood that a household will become food insecure.

A characteristic of employment that may be particularly apropos to families in rural areas and small cities is commuting. Long commuting distances between home,

work and childcare as well as other locations such as grocery stores, government buildings and doctor's offices will reduce the time available for both market and non-market work. Residents living in rural areas will have greater time-costs associated with traveling to work and grocery stores if they have to travel outside their community of residence to access these destinations.

The theory used to explain why work hours and work shifts and distance from home to work may relate to food insecurity is based on economic theories regarding household time allocation (Becker 1965) and being time-poor (Vickery 1977). Although grounded in economics, Becker's and Vickery's theories are relevant for sociological research. They emphasize that economic well-being, in this case food insecurity, is not based solely on income. In addition, theories of time implicitly and explicitly incorporate broader issues of family size and structure, residence and commuting, and trade-offs made between time spent in market and non-market activities. Further, by focusing on time allocations between paid work and home work, Becker and Vickery recognize that individuals serve multiple roles and functions. Food insecurity may result as a consequence of too many demands on one's time or role overload.

Becker's theory of time allocation and Vickery's theory of time poverty have been applied to understanding the time-cost of food production especially in relation to the Food Stamp program (Davis and You forthcoming; Rose 2007). They have not yet been extended to better understand the process by which households become food insecure. These theories suggest that, all else being equal, households with less time available for at home food production due to number of hours worked or shift of employment may be at greater risk for becoming food insecure than households that are

less time constrained. The less time constrained households can extend their food budget by investing less money and more time in low-cost meal preparation. On the other hand, time-poor households may rely on prepared foods or food away from home that are more expensive but require less time.

These economic theories of time as a resource are considered in more detail below. These theories are then applied to food insecurity and transitions into food insecurity and grounded in the realities of family housework, paid market work and residence.

### **Theoretical Foundation: Time Allocation and the Time-Poor**

Becker (1965) posits an economic theory of the allocation of non-working time. He suggests that because time spent in paid work is less than time spent in all other activities, “the allocation and efficiency of non-working time may now be more important to economic welfare than that of working time” (Becker 1965:493). The way in which individuals spend their non-working hours has implications for their economic well-being, especially as they make trade-offs between time investments and purchased services. Households are both consumers and producers; they combine both money and time to produce commodities such as meals.

Becker suggests that as time becomes more valuable, particularly as earnings increase, workers will be more likely to purchase services rather than invest valuable time in time-intensive activities such as food provisioning. The cost of household activities like cooking is not only the cost of the food ingredients, but also should include the cost

of the time required to do the cooking. It may make more sense economically to spend more time in paid work, less time in household tasks and pay a higher price for prepared household goods (i.e. food purchased and prepared away from home) or services (such as childcare) that are time intensive. For some workers, additional earnings may offset the higher prices paid for services that could have been done by the worker given a greater time investment.

Becker focuses primarily on households that can afford to purchase services because their earnings are high enough and their time is highly valued in terms of forgone earnings. However, arguments regarding time allocation can be extended to low-income households, the primary focus of this research, because with the advent of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) and Temporary Assistance to Needy Families (TANF), engagement in paid labor is essentially required for low-income single mothers. It seems that the value of forgone earnings may be somewhat irrelevant compared to the fact that employment and work hours are a necessity, even if wages are very low. Low-income households cannot simply choose to forgo low earnings to invest in non-market work at home. In low-income households, hourly earnings may not offset the greater cost for services such as buying food away from home. But, demands on time and pressure created by work hours, commuting and other tasks may result in paying more for prepared foods. These higher expenses may place households at greater risk for food insecurity and becoming food insecure. In this way, Becker's point that the allocation of non-working time is an essential aspect of economic well-being relates directly to household food insecurity.



Becker (1965) also suggests that time allocation is decided jointly among family members. According to Becker's theory, in a two parent household, the parent with greater earnings potential should invest more time in market work and less time in non-market work. The parent with lower earnings should do more of the household's time-intensive non-market work, such as childcare and food preparation. In reality it is unlikely that workers can easily choose how many hours to work. Moreover, household time allocation is gendered and rarely based on earnings. But, the important point from Becker is that the household context, rather than just an individual worker's time, should be considered. Therefore, the work activities of both mothers and fathers need to be included in considering food insecurity. Decisions regarding work hours and shifts may be made in combination between caregivers. However, as will be discussed in more detail later, generally women invest much more time in household activities like cooking, cleaning and childcare, than do men, regardless of hours worked outside the home. Therefore, women's work hours will likely have a greater effect on food provisioning than men's work hours.

Becker does not explicitly consider the case of single-mother households. But, if the theory is extended to these households, the allocation of time between paid work and unpaid work would likely be even more vital to household economic well-being because time would be even more valuable as a resource for single mother, single-earner households. Female headed households are more likely to be food insecure than all other household types even controlling for employment characteristics, household size, education and income (Coleman-Jensen under review). Becker's theory would suggest that this is because market and non-market time demands are especially high for single

mothers. Single mothers may invest limited incomes to purchase services such as child care and prepared foods that limit how far their income can go to feed their family. Lack of time may place female-headed families at greater risk for transitioning to food insecurity.

Becker's theory of the allocation of time and household well-being is extended by Vickery's theory of the time-poor that considers the amount of time available for non-market activities and differences in time across household types. Vickery (1977) poses a theory of the time-poor where time is considered a resource for household well being, just as income is a resource. A certain amount of home work time is required to maintain a basic standard of living. As income is required for survival, time is required to cook meals, care for children and purchase basic necessities. Lack of time for these activities will impact standard of living just as money would. Vickery explicitly considers differences in time resources between single-parent and two-parent households and between two-parent households with one earner and those with two earners.

To illustrate the theory, consider three households. Household A has two parents, one working outside the home and one not. Household B has a single mother that works outside the home. Household C has two parents that both work outside the home. Each household has two young children. Households A and C have the same income and both contain two adults and two young children. Yet, because household C has two working parents, they may be time-poor. They may not be able to provide childcare for their children while both parents are working, so must pay for childcare. In addition, two working parents may not have enough time to invest in low-cost at home meal preparation, so they may purchase food prepared away from home at a higher price. Any

money spent in purchasing services that would otherwise be provided free of charge by household members if they had time would increase the likelihood of becoming food insecure. Added expenses reduce the amount of money available for purchasing food and may increase the odds of becoming food insecure. The root cause of these increased expenditures may be lack of time for household members to provide these services. Likewise, Household B is time-poor because there is only one-parent that will likely need to pay for childcare while she is at work and may need to purchase other services as well. Household A would be the least time-poor because there are two adults and one parent is not in the labor force and so is able to provide essential household services like no-cost childcare and low-cost food preparation.

Vickery's theory of time poverty has been applied using 1985 American Time Use Survey data to estimate time poverty rates (Douthitt 2000). According to the 1985 American Time Use Survey 11 percent of full-time employed single-mother households were poor by the official poverty definition and 6 percent of employed married mother households were poor (it should be noted that this survey underrepresented poverty households in comparison to U.S. Census figures). It is assumed that households require a minimum of two hours per day for household production or maintenance activities. According to this standard, 37 percent of full-time employed single mothers were poor because they had less than two hours per day to invest in household maintenance. Meanwhile, 21 percent of employed married mothers were time poor. A higher percentage of working mothers are time poor if the benchmark is having at least eight hours per day for personal care including sleep. By this definition, 41 percent of single mothers and 33 percent of married mothers were time poor. A third conception of time

poverty is that combined home and market work must be less than 12.5 hours per day, leaving 11.5 hours per day for personal care activities. By this definition, 21 percent of single and 23 percent of married working mothers were time poor. These figures suggest that many mothers, particularly single-mothers, face time constraints that limit their ability to engage in necessary household tasks.

It is clear that many American women lack enough time each day to devote to employment, childcare, housework and meal preparation, let alone personal activities. To overcome these time constraints and ease demands women may reduce time spent in housework and meal preparation. Reducing time in meal preparation will likely mean increases in spending. If women do not have enough earnings to offset these higher expenditures they and their family may be at an increased risk of food insecurity and of becoming food insecure if their money runs low or runs out between pay periods.

Douthitt (2000) concludes that social assistance programs may provide a disincentive for low-income single mothers to find employment because assistance is reduced along with time for household production and these income and time losses may not be compensated by earnings. Yet, paid employment is a necessity for most households which may be problematic for low-wage working mothers whose reduced time for home work is not made up by adequate earnings. They may face food insecurity if their earnings do not cover higher expenses resulting from time in paid work. Vickery (1977) suggests that households below a time poverty threshold will require more income to pay for services. Vickery's suggestion is supported by Douthitt's empirical analysis. This may explain in part why income and food insecurity are not as closely related as

expected. Yet, these ideas have not been applied to understand how food insecurity may develop, something that is considered next.

### **Applying Theories of Time Allocation and Time Poverty to the Transition to Food Insecurity**

Time poverty may be an important unexplored predictor of becoming food insecure. Households that are time poor may be at an increased risk of food insecurity because they have higher expenses for childcare and family meals. Thus, household budgets may be more constricted in time-poor households, with less to spend on food—an expenditure over which families have more control. Spending on food is left more to the discretion of the household than other fixed expenses. Other family expenses are directly associated with food expenditures. Families decrease food expenditures during cold winter months when their fuel costs for home heating increase (Bhattacharya et al. 2003). This finding suggests that families do have the ability to reduce their food costs as needed if their other expenses increase which may be problematic if food spending is reduced to low enough levels that households become food insecure. Food costs may be reduced by relying on stored food that was purchased at an earlier date. But, many low-income households may not have a lot of food on hand at home that they can rely on in times of need. Another way to reduce food costs is to prepare low-cost meals at home from scratch. This option may not be available if households are time-poor. In time-poor households that have added expenses for services such as childcare, households may have less to spend on food when their time poverty may in fact require that they spend more on food.

Further evidence for the applicability of time-poverty to household food insecurity is found when considering work hours and the likelihood of food insecurity. Considering only the working age, non-disabled population, households with an adult that is not in the labor force (not including those that are unemployed) are less likely to be food insecure than households with heads working full-time jobs controlling for income and other social and demographic characteristics (Coleman-Jensen under review). Presumably those that are not in the labor force are time rich because they are not investing time in market activities. The ability to use time for household food provisioning or other non-market activities that might otherwise be purchased may reduce the likelihood of food insecurity. Further, household heads that are not employed have more flexible schedules that may help them to be more efficient in household food provisioning activities, such as by grocery shopping during non-peak hours when stores are less busy or spending more time looking for sales or using coupons.

On the other hand, parents that are employed must plan household activities around the time demands of work (Roy, Tubbs, and Burton 2004). Women must prioritize paid work hours and follow employment schedules set by their employers, and then fit in demands of at home work around paid work hours and their work schedule (Hessing 1994). Employed mothers not only have less time to invest in food provisioning, but they have to complete household meal related tasks when they are not at work. But, planning and budgeting for household food provisioning and consumption take significant time and organization particularly if financial resources are limited (DeVault 1991). It may be difficult to fit food provisioning activities around work schedules because paid work limits the total time available for non-market work and

limits the time available to certain hours during the day. Therefore, this study not only considers time poverty simply in the amount of time available for household activities but also considers when non-paid work times are available.

Each hour is not created equal when time for food provisioning is considered. Meal preparation activities typically occur during a set period. Evening meals will likely be served between 5 and 8 pm and parents who work the evening shift are much less likely to eat dinner with their families (Presser 2003; Wight, Raley, and Bianchi 2008). If parents are not able to eat dinner with their families when they work during evening hours, preparing a time-intensive low-cost meal is unlikely and so more costly prepared food may be purchased. Especially when investigating food insecurity, the concept of time poverty should incorporate not only number of hours engaged in paid work, but must also include indicators of when work shifts occur.

Research on working age, non-disabled household heads indicates that households headed by individuals that work part-time, have a job where the minimum hours worked each week vary, or have multiple jobs are more likely to be food insecure than households with a full-time household head (Coleman-Jensen under review; Coleman 2006). Part-time workers are not more time poor than full-time workers, but they are likely to be in service or retail occupations that are often typified by nonstandard schedules. As noted above, working evening hours may make it particularly difficult to provide for and eat dinner with family members (Presser 2003; Wight et al. 2008). For these workers, the schedule of employment, rather than the number of hours worked, may be problematic.

In addition to the number of hours, and timing of those hours, the predictability of the available hours is likely to matter as well. Those household heads in multiple jobs or with varied hours may have difficulty in creating and adhering to a schedule that provides for efficient household food provisioning. Instability in household scheduling may be particularly problematic (Coleman-Jensen under review). Working multiple jobs may result in a complex schedule and workers may face difficulties in just getting from job to job. Under the circumstances, it may be especially challenging to fit in food provisioning and other household tasks alongside the demands of paid employment (Scott et al. 2004). Even getting to the grocery store may be an arduous task for low-income rural households that may not have easy access to grocery stores open twenty-four hours a day or may not have reliable transportation. In addition, accessing a local food bank or the food stamp or WIC office may be difficult if the household head is working when the offices are open or is unable to schedule and keep an appointment when work schedules change frequently. Therefore, the number of non-market hours available for food provisioning, the timing of those hours and the predictability of those hours may all be significant predictors of transitioning to food insecurity.

Finally, daily lives are framed within a geographic context and commuting distances between home, work and childcare place further time constraints on households. Longer commuting distances take time away from both market and non-market work. Time spent traveling between home, work, school and childcare places even more stress on mother's already limited time (Ames, Brosi, and Damiano-Teixeira 2006). Long travel distances are a barrier to having time to produce home-cooked meals (Devine et al. 2006). In addition, longer commutes include monetary costs in terms of



fuel and car maintenance or public transportation fees (if available). Thus, measures of distance to work and childcare are important considerations in understanding time allocation and food insecurity. In rural areas, simple activities like grocery shopping may require a greater time investment if food retailers are further from residents' homes than in more urban areas. More time spent traveling to work, to child care and/or to purchase basic necessities will exacerbate the effects of work hours in reducing the time available for food provisioning and will increase time poverty, in turn increasing the risk of becoming food insecure.

***Summary: Applying Theories of Time Allocation and Time Poverty to Food Insecurity***

This section highlighted the ways in which time theories apply to food insecurity. As discussed, these theories are consistent with prior research. To summarize, empirical research demonstrates that time theories relate to food insecurity through several mechanisms. First, families have greater control over food spending than over other fixed expenses. But, a way to reduce household food expenditures is by investing time in low-cost at home meal production. Time-poor households cannot allocate time to reducing food costs and so may be at increased risk for transitioning to food insecurity. Second, households headed by an individual who is out of the labor force are less likely to be food insecure, presumably because these household heads are able to invest the most time in lowering their food spending. Further, these households do not need to purchase services such as childcare. Time spent in home work will reduce expenses and food insecurity. Third, parents working during evening hours are less able to eat meals

with their families and also are less likely to have time to prepare home-cooked dinners. Households with unpredictable schedules, such as those working varied hours or multiple jobs, also are more likely to be food insecure. These findings highlight the importance of considering not only the number of hours available for non-market work, but when those hours are available. Fourth, time spent traveling to work or to purchase food will also reduce time for food provisioning. Rural households that have to travel longer distances to important locations may be more time poor. It is clear that time theories are applicable to food insecurity research and incorporating these theories will deepen understanding of how food insecurity develops. Further, determining how time as a resource relates to becoming food insecure will be helpful in developing policies to reduce food insecurity. Potential policy implications highlight the importance of grounding research relating time and food insecurity in the realities facing American families.

### **Grounding Theories of Time Allocation and Time Poverty in the Reality of U.S. Households**

The discussion above has noted the ways in which theories of time allocation and the time poor relate directly to the study of food insecurity. The section that follows grounds theories of time allocation and time poverty in the context of American households. First, gender and food provisioning is considered, followed by a discussion of the time required for low-cost meal preparation. The focus then turns to women's work hours and purchases of convenience foods. Finally, special challenges related to distance and rurality are considered. Where appropriate the theoretical foundations relating food insecurity to time allocation and time poverty are interwoven to explain in

greater detail how the previous studies relate to understanding transitions to food insecurity.

### ***Gender and Food Provisioning***

Theories of time allocation and time poverty could apply to both men and women. However, when considering consequences on food provisioning and food insecurity, women's time is likely to be a greater factor than men's time. Women spend more time than men in childcare and other housework including cooking. Men now do more housework and childcare than in decades' past, but women still spend substantially more time in cooking, cleaning and childcare activities. Men's total time in paid and unpaid work is less than women's total time in paid and unpaid work, so men's paid work hours do not explain the fewer hours they spend in unpaid home work. Relative to men, women have less free time (Sayer 2005). Therefore, this section focuses especially on women's time poverty and allocation of time in regard to food provisioning.

Women are more likely than men to be involved in all aspects of food provisioning including meal planning, shopping and food preparation (Harnack et al. 1998). Of those that are engaged in food provisioning, women spend more time than men. Perhaps the most up to date statistics on the amount of time spent in food related activities come from the 2007 American Time Use Survey. Among the civilian population age 15 and over, 64 percent of women and 37 percent of men engaged in food preparation and cleanup on an average day (Bureau of Labor Statistics 2009). The average amount of time spent in food preparation and cleanup was 0.28 hours for men

and 0.74 hours for women, including individuals that spent no time in the activity. Among those that did food preparation and cleanup, men spent an average of 0.75 hours per day, and women spent 1.17 hours per day. Women were also more likely to go grocery shopping, 10 percent of men and 15 percent of women shopped for food on an average day. The only food related activity in which men spent more time than women is consumption; men spent more time eating and drinking than did women.

Differences in time spent in food provisioning are even greater for married men and women with children. Even when both spouses work full time, women spend much more time in food preparation and cleanup, an average of 0.79 hours per day versus 0.32 hours for men (Bureau of Labor Statistics 2008).

There are also important differences in time spent in food preparation by income, work hours and presence of a partner (Mancino and Newman 2007). Men from lower income households spend less time in food preparation than men from higher income households regardless of employment status. For women, the opposite trend holds, time spent in food preparation decreases as household income increases. As expected, women's time spent in food preparation is lowest among full-time workers, and highest among nonworking women. Low-income women working full-time spent an average of 46 minutes per day in food preparation and clean-up, low-income women working part-time spent 56 minutes and nonworking low-income women spent 71 minutes. Interestingly, single women spend less time in food preparation than partnered women even controlling for the number of children in the household. Perhaps a male partner's food preferences, or the presence of another mouth to feed, results in partnered women spending more time cooking. Another possibility is that women with a partner spend

more time in food provisioning because their partner invests time in other household or childcare activities that enables the woman to spend more time cooking. Single women may spend less time cooking compared to partnered women simply because they are the most time poor and simply do not have time to invest in food provisioning.

Mancino and Newman (2007) model the number of hours spent in food provisioning and their study lends support to the idea that time availability has an effect on food provisioning. They find that variables associated with time resources, such as the presence of a partner and number of hours worked, have a greater effect on time invested in food preparation than do monetary resources.

These studies clearly show that women have a greater responsibility for household food provisioning than do men. Husbands or male partners do invest some time in household work, but women still bear the primary burden of housework, resulting in their so-called “second shift” of housework following paid work (Hochschild 2003). There is some evidence from qualitative interviews of rural families that the changing economy, particularly women’s involvement in shift work and nonstandard hours, has resulted in men being more involved in childcare and housework if they are home with children when women are not (Ames et al. 2006; Nelson and Smith 1999; Winson and Leach 2002). But, even in these households where men are doing more than they used to, women remain the primary family caregivers.

Therefore, it is appropriate to focus on women’s time and employment when considering the relationship between work arrangements and food insecurity. The figures reported from time diary studies show the average amount of time women spend in household food tasks, but these numbers do not reveal how much time is required to

prepare the most economical meals. The ability to reduce the money cost of household food consumption may be a vital predictor of households becoming food secure. In the next section, the time required to prepare low-cost meals is discussed.

### ***Time Required for Low-cost Food Preparation***

Preparing meals from scratch is thought to be more economical than preparing convenience foods at home or purchasing food away from home. The Thrifty Food Plan, on which the allocation of Food Stamp benefits is based, assumes that most meals are prepared at home and bases cost estimates on that assumption. In the 2006 revision to the Thrifty Food Plan, an effort was made to incorporate more convenience foods, “foods such as boxed macaroni and cheese, frozen vegetables, ready-to-serve breads and cereals, canned soups, chicken parts, canned dry beans, and boxed mashed potatoes” (p. 18); however, the revisions to the Thrifty Food Plan were constrained because the cost could be no more than the 2001-2002 plan adjusted for inflation (Carlson et al. 2007). Further, the convenience foods included still require time for at home food preparation. For example, canned beans are faster to prepare than bagged dry beans, but still require time to plan and incorporate into a meal. There remains no room in the Thrifty Food Plan budget for prepared food or food away from home. In addition, the requirement that the revised cost be no more than the previous plan adjusted for inflation suggests that the addition of potentially more expensive convenience foods was minimal at most.

If low-income households are able to invest the time necessary to obtain low-cost nutritious meals from food prepared at home, then the assumptions of the Thrifty Food

Plan are not problematic. But, research indicates that following the Thrifty Food Plan requires much more time than most households spend in food preparation. As has been discussed, there is a time-cost involved in at home meal preparation especially when preparing low-cost nutritionally adequate meals. Low-cost recipes that follow the USDA Thrifty Food Plan require more time than American households typically spend in home meal preparation (Davis and You forthcoming). According to Davis and You the median amount of time required to prepare Thrifty Food Plan recipes in USDA's recipe booklet is 35 minutes (0.58 hours). Note that this 35 minutes does not include time to shop for the ingredients needed or time needed to cleanup, and it is time needed to prepare just *one meal*. Meanwhile, the median amount of time per day women in the workforce spend in food prep and cleanup *for all meals* is 0.42 hours. For women not in the workforce, the median amount of time is 0.83 hours per day in food prep and cleanup (Davis and You forthcoming). As is clear from these figures, the amount of time working women spend in food preparation and cleanup in an entire day is about the amount of time to cook just one meal that follows the Thrifty Food Plan not including clean-up time. Low-income women that are not in the labor force spend more time in food preparation than all other women, yet they still spend less time per day than the average needed to prepare meals from the Thrifty Food Plan recipe book (Mancino and Newman 2007).

Davis and You suggest that the time input costs for food prepared at home, particularly if trying to prepare low-cost meals, is an incentive for households to purchase food away from home. For a Food Stamp participant following the Thrifty Food Plan, time input costs account for 53 to 63 percent of total at home food costs, depending on

the estimation procedure. These high time costs likely make the Food Stamp program less effective (Davis and You forthcoming). Here the tension between income resources and time resources is clear. Households that qualify for Food Stamps likely do not have the financial resources to regularly trade time for convenience foods. Making such a trade may result in food insecurity if the household budget is then stretched thin between pay days. Yet, these households also may not have time to prepare time-intensive meals, especially if the household is headed by a working single-mother.

It is clear that the assumptions of the Thrifty Food Plan do not mesh with the actual time investments of low-income households. Perhaps even more important, “government policy encourages low-income women to go out and work in the labor market, but it provides a food safety net, i.e., Food Stamps, for these working poor, assuming they will stay at home to cook from scratch” (Rose 2007:227). To determine how much time is required to produce low-cost meals, preparation and cooking time for all recipes provided in the Thrifty Food Plan suggested weekly meal plan were summed and averaged, resulting in a time estimate of 2.3 hours per day or 16.1 hours per week to prepare these meals. This time does not include clean-up or shopping. Rose finds that women who were employed spent only half this amount of time. Even women that were not working, were food secure, and received Food Stamps spent 13.9 hours per week in food preparation. Women with these characteristics are able to spend the most time in food provisioning, but even they did not invest as much time as required by the Thrifty Food Plan. These findings are important, because if the Thrifty Food Plan overestimates the amount of time households are able to invest in cooking, then Food Stamp benefits are too low. Households do not, in reality, make the trade-off between time and food



expense that is assumed in the calculation of Food Stamp benefits. Studies documenting the time necessary to prepare meals that comply with the Thrifty Food Plan are relevant for this study because these would be the most economical meals for low-income households to produce. The ability to reduce the household food budget by investing time to prepare such foods would likely help to reduce the risk of transitioning to food insecurity. However, time use data indicate that households are unable or unwilling to make this time versus money trade off, which may result in becoming food insecure if the household food budget is expended too quickly.

It is clear that most households do not invest enough time in cooking to take advantage of the lowest possible monetary food costs. The next section highlights several qualitative studies that investigate the effect of women's work hours on food choices, particularly purchasing prepared foods or food away from home. In addition, quantitative studies that consider the effect of women's work hours on convenience consumption are reviewed.

### ***Work Hours and Convenience Food Purchases***

An overview of the literature relating time scarcity and food choices reveals that there has been little direct research on the subject. Research that is available shows that lack of time is related to the reduction in time spent in food prep and the increased consumption of convenience foods and purchase of fast food (Jabs and Devine 2006). The few studies investigating the topic suggest that mothers' do appear to feel a tension between work demands and time for home food preparation. Mothers indicate that they

need to get mealtimes completed quickly so that they can get on to other tasks. Even working regular hours and getting home after 6 pm limited mothers' time and energy to prepare home-cooked meals (Jabs et al. 2007). Low-income parents identified many other specific sources of job stress that negatively affected food choices, such as overtime work, varied schedules, job insecurity, low pay, job inflexibility, and a long distance from home to work (Devine et al. 2006). Inflexible work schedules or working nights or evenings, in particular, conflict with family needs and are related to mothers' feelings of time scarcity for food provisioning (Jabs et al. 2007). Being a single parent or having a partner whose work schedule prevented him from helping at home or from being home at mealtimes were also identified as barriers to healthy home food choices (Devine et al. 2006).

The challenges for home food provisioning identified by parents often resulted in families relying on fast food or other food prepared away from home. Mothers working long hours, overtime, shift work or with inflexible schedules purchased take out, fast food, or ate out more often than mothers working fewer hours or with more flexible schedules (Devine et al. 2003). Erratic work schedules are also problematic for mothers' cooking time and result in a higher incidence of purchasing fast food (Jabs et al. 2007). Mothers working jobs with night, evening or rotating shifts may find themselves purchasing higher priced food to feed their families because they are unable to utilize lower cost but more time intensive meal options. As a result, household food expenditures may be higher than they would be given different work characteristics, and the increase in food spending may quickly deplete a food budget, leaving a family at higher risk for becoming food insecure.

Although mothers seem dissatisfied with eating out or purchasing prepared food to solve the problem of time constraints, there seem to be few other options. Low-income parents seem to cope with role overload between work and family demands by changing their expectations for food and eating. Rather than trying to change work or home conditions, mothers instead try to change their beliefs and expectations for family meals so as to reduce conflict between their roles as parents and workers (Devine et al. 2006). For low-wage workers with insecure jobs, there were few opportunities to change the demands of work. Mothers seemed to regret not being able to spend time preparing home cooked meals for their children and instead buying fast food. This adaptive strategy added other kinds of stress because they were not able to achieve what they thought were appropriate family meals. Some mothers tried to cope by lowering their expectations for family meals and reasoning that at least their kids had “something in their bellies” (Devine et al. 2006:2597). Some mothers tried to adapt their food provisioning strategies around work by preparing meals ahead of time, preparing enough at one time for more than one meal or shopping and preparing meals on non-work days. But, these mothers engaged in these activities at the expense of family time and/or personal time. Time is a limited resource and some mothers may be unwilling to sacrifice family or personal activities to adapt time-intensive food provisioning around work demands. Mothers may see changing expectations as the only viable means of dealing with role overload and too many demands on their time.

It seems, from qualitative research, that mothers do rely on convenience foods when work hours interfere with family life. Quantitative researchers have been interested for some time in the empirical link between women’s employment and purchases of time

saving devices and convenience food. Using structural equation models, Reilly (1982) finds an indirect relationship between wives' employment and convenience consumption. The intervening variable is role overload. Role overload occurs when there are too many demands on an individual and there is conflict between the different roles that the individual holds. For instance, a working mother may find that there is conflict between work demands and caregiving demands. Due to too many demands on the mother's time she resorts to purchasing convenience foods in order to reduce role overload. Reilly's findings regarding role overload are quite consistent with mothers' reactions to work and home responsibilities described in qualitative studies. Role overload is a measure of demands on time and is likely to be a good proxy for feelings of time poverty and may be important in predicting the transition to food insecurity.

Economic research finds strong support for the relationship between women's employment and purchases of prepared foods and food away from home. Wives' employment—full-time in particular—but, also part-time, relates to a higher share of the household food budget being spent at restaurants. In addition, wives' employment relates to a higher monetary cost per calorie for food eaten at home, likely due to an increased use of convenience or prepared foods (Horton and Campbell 1991). Another study finds that an increase in women's work hours increases household expenditures on prepared food purchased for home consumption, but has a greater effect on expenditures for food away from home. But, women's work hours have no effect on expenditures for food prepared from scratch at home (Nayga 1996). More recent research provides additional evidence for these earlier findings that working more hours is significantly related to eating out more often. An additional important finding is that those who say convenience

is very important when shopping for food are more likely to eat out, controlling for income, work hours and other factors (Binkley 2006).

The effect of work hours on purchasing convenience foods appears even greater for single mothers than married mothers. Single mothers spend less time in meal preparation and clean up than married mothers do and they are more likely to purchase meals prepared away from home (Zick, McCullough, and Smith 1996). Even controlling for work hours and income this finding holds. This again is likely due to time constraints on single mothers due to their many responsibilities.

Households are clearly making a trade off between time and money either implicitly or explicitly in their choices around household meals. Time poverty that results from women's employment seems to be a strong factor in the time-money trade off. How might the factors that affect food provisioning, especially related to time and access to food options relate specifically to food insecurity and becoming food insecure in rural households? The next section focuses on challenges to food preparation and budgeting that may result from rural residence.

### ***Rurality and Transitions into Food Insecurity***

Residence is an important factor related to food insecurity. Although rural households have lower food insecurity rates than central city households, they have higher food insecurity rates than suburban households (Nord et al. 2008). Rurality is important in part because caregivers living in rural areas may have to travel longer distances to work and to childcare, thereby exacerbating the effect of time at work. Many

nonmetropolitan or rural communities lack large food retailers and so cannot benefit from economies of scale in their local communities. As a result, low-income households face higher prices in local stores or higher travel costs for reduced prices elsewhere (Blanchard and Lyson 2002; Kaufman 1999). These rural food desert areas (places with limited access to grocery stores) are often typified by lower incomes and lower quality housing and have negative health consequences such as increased childhood obesity rates (Schafft, Jensen, and Hinrichs 2009). Lack of a vehicle may exacerbate any problems resulting from long travel distances. Inadequate transportation is a barrier for purchasing food and accessing services to reduce food insecurity (Briefel and Woteki 1992).

Having local groups working to reduce food insecurity and effective local responses, such as food banks, food pantries and soup kitchens, are related to a lower likelihood of experiencing food insecurity in small towns and rural areas (Morton et al. 2005). However, rural low-income households are much less likely to use food banks and meal programs than urban low-income households (Morton et al. 2008). This may be because rural areas do not have such resources and when they do, the nonmetropolitan emergency food systems are less institutionalized, are less well-funded and have weaker links to government agencies than do urban emergency food systems (Molnar et al. 2001). Often emergency food programs refer clients to government programs such as WIC and Food Stamps but weaker links between these programs and rural services that are often volunteer run means that rural residents may receive fewer referrals to important programs. These disadvantages are coupled with the fact that rural food pantries serve larger geographical areas and so rural residents generally have to travel further for emergency food assistance (Molnar et al. 2001). Rural low-income

households that are facing food insecurity may have less access to emergency food providers because they simply are not available locally, because the services are volunteer run and are only open for service a few hours per week or month, or because the distance traveled to these services is too costly in terms of time or money required for transportation.

Rural residents may also have less access to purchasing food away from home. Higher food spending that is related to purchasing fast food may be less of a factor in food insecurity in rural communities, because there is less access to fast food retailers. Controlling for income and number of hours worked, rural households have been found to be less likely than suburban households to eat fast food (Binkley 2006).

Aside from access to food and social services, another issue of distance is commuting and the time and financial costs of transportation. One study of urban TANF recipients finds that increases in transportation expenses are related to an increased likelihood of experiencing food insecurity, however once individual factors such as mental and physical health and domestic violence were added to the model, transportation was no longer a significant predictor of food insecurity (Heflin, Corcoran, and Siefert 2007). But, these findings may not relate to a rural and small-town sample that is not restricted to TANF participants. Rural and small town residents may have longer commutes than urban residents if they commute to work in larger towns and cities. Commuting distances and times have increased throughout the U.S. over the past few decades. Rural residents are especially likely to commute out of their county of residence (Tigges and Fuguitt 2003). A qualitative study of rural mothers found that women were strapped for time due to combining paid and family work and that their schedules were

complicated and time was reduced by long driving distance between home, employment, childcare and children's schools (Ames et al. 2006). These women often chose employment that was further away from home because jobs were better in terms of pay, schedule or providing benefits, but these better jobs incurred other costs in reducing time available for home work. Longer commutes will likely have effects on household food provisioning. Commuting will reduce time for meal preparation, and incur monetary costs for transportation, but may also increase access to lower-cost food retailers in more urban areas as well as provide easier access to convenience foods.

Other characteristics of nonmetro employment, besides commuting, may place households at an increased risk of becoming food insecure. Nonmetro workers receive a lower return in earnings for their human capital investments than do urban workers (McLaughlin and Perman 1991). Nonmetro workers are also more likely to become and to remain underemployed than their urban counterparts (Jensen et al. 1999). Further, nonmetro workers are more likely to be employed in nonstandard jobs—part-time, varied hour, and contingent work—than Central City or Suburban workers (McLaughlin and Coleman-Jensen 2008). Nonstandard jobs offer lower wages and less access to benefits like health insurance and pensions than do standard jobs, which may explain why half of nonmetro nonstandard workers are looking for other employment. Taken together, these studies suggest that the quality of rural employment may be lower than the quality of jobs in other residence areas. Lower quality jobs, with lower pay, less stability, and fewer benefits will likely place rural households at a greater risk for becoming food insecure.

A potential advantage of living in a rural community over an urban community is space to garden and cultivate food. Rural low-income households are more likely to



garden themselves or receive food from family's or neighbors' gardens than urban low-income households (Morton et al. 2008). However, such activities would clearly require time that may be limited. Also, gardening requires tools and financial inputs for seeds and plants that may be prohibitive for some households. Further, spending money on a garden may be an investment that does not result in the production of food depending on household skill, knowledge and time. Empirical research suggests that gardening is not significantly related to household food insecurity when other social and demographic factors are controlled (Morton et al. 2008; Olson et al. 1997). But, compared to being without a garden, households that garden consume more vegetables (Morton et al. 2008) and have a significantly larger household store of food that they can rely on in case of emergency (Olson et al. 1997).

Taken together the above research suggests that rural households may have greater time poverty than urban households due to greater commuting distances and longer travel distances to food retailers and emergency food services. Also, transportation may be a major problem for low-income rural households that do not have access to a vehicle because public transportation may be nonexistent. The particular constellation of challenges faced by rural households deserves special research attention. Greater time poverty due to longer commutes and other transportation barriers and lower quality local employment may place rural and small-town families at greater risk for transitioning to food insecurity.

***Summary: Grounding Theories of Time Allocation and Time Poverty in the Reality of U.S. Households***

The preceding discussion shows that theories regarding time allocation and time poverty and the potential link between work characteristics and food insecurity are well-grounded with empirical research, especially for women. These theories apply most to women because they are more likely to be involved in and spend more time doing household food provisioning activities than men. Further, research that documents the rather lengthy amount of time required to prepare low-cost meals is evidence that women likely have an incentive to save time by purchasing more convenient food options, even though they may be more costly. Finally, both qualitative and quantitative studies suggest that women who work, particularly those that work full-time, have a greater incentive than non-employed women to save time by spending more on convenience foods and food away from home. These greater food expenditures may lead to household food insecurity if household budgets are expended too quickly between paychecks. A means of saving money on food is spending more time in preparation, and some households may be too time-poor to spend such time in order to reduce household food costs.

**Other Household Characteristics Associated with Food Insecurity**

The next section highlights additional factors that are significantly related to food insecurity. The theoretical framework linking time and food insecurity should incorporate these other factors that have a documented relationship to food insecurity. If

time theories are consistent with these prior findings, their incorporation will strengthen the theory and its applicability to explaining households' transitions to food insecurity. The factors considered are income related, as well as individual and household characteristics including race, education and household structure. Some of these characteristics, such as household structure and number of children, will relate directly to mother's time demands. The availability of time is theoretically important for explaining these relationships such as the connection between single-mother households and food insecurity.

### **Financial Resources and Food Insecurity: Income, Savings and Health Insurance**

Food insecurity often results from a lack of resources. So far the theory and literature discussed have considered time resources. The relationship between financial resources and food insecurity is well documented by previous research. Lower income households are more likely to be food insecure than higher income households (Gundersen and Gruber 2001; Hamilton et al. 1997; Nord 2000; Nord et al. 2008; Rose 1999). However, the relationship between food insecurity and income is not perfect and much of the variation in food insecurity is left unexplained by income (Nord 2000; Rose 1999).

Beyond annual income, variability in both income and expenses are related to becoming food insecure as is access to savings. Unexpected added expenses or reductions in income are associated with becoming food insecure (Rose 1999). Also, households that have made the transition to food insecurity are more likely to have

sudden episodes of income loss and are less able to borrow money to make up for losses or high expenditures (Gundersen and Gruber 2001). Having savings is related to a significantly lower likelihood of becoming food insecure (Gundersen and Gruber 2001; Olson et al. 1997). Not having money to fall back on in case of emergency, either from family savings or from access to credit, places households at greater risk of becoming food insecure.

Variability in income may result from work characteristics, especially varied hour employment and temporary jobs. This is another way, besides time, that work characteristics may affect food insecurity. Further, money saving practices such as stocking up on food items when they are on sale or buying food in bulk (DeVault 1991) may not be appropriate for households with variations in earning. Households may find it unfavorable to place excess funds in food storage if those funds may be needed if a job loss or reduction in work hours is expected.

Food expenditures may be especially vulnerable to shocks in income and expenses because food expenses are discretionary as discussed above. When income drops or other expenses rise, food costs may be the “easiest” way to reduce household expenses because the cost is set by the household. In order to weather reductions in income or increases in expenses, households may reduce their food costs by relying on low-cost food, using up household stores of food, or reducing food consumption (DeVault 1991; Fitchen 1981). During cold winter months when fuel expenditures increase, low-income households spend less money on food (Bhattacharya et al. 2003), providing evidence that households may experience food insecurity as a result of variability in income or expenses.

Increased health care costs, especially for uninsured households, may result in a sudden increase in household expenses. Health care expenses may make a family more vulnerable to becoming food insecure. Difficulty paying medical bills is related to food insecurity (Olson et al. 2004). Households without health insurance are more likely to be food insecure than households with health insurance (Alaimo et al. 1998; Gundersen and Gruber 2001). Health insurance is often a benefit of employment, but nonstandard work arrangements often lack employer provided health insurance (Kalleberg 2001; Kalleberg, Reskin, and Hudson 2000; McLaughlin and Coleman-Jensen 2008). Therefore, it is important to control for health insurance access when considering the relationship between transitions to food insecurity and work characteristics.

Another consequence of inadequate health insurance is that families may not get medical care when they need it. Lack of healthcare may prolong illness and result in parents' inability to work and care for their families due to poor health. Chronic health conditions left untreated may limit parents' ability to provide for basic household needs and so may incur additional expenses necessary to purchase services such as prepared meals to provide for their families. Accessing free or low-cost health clinics or emergency room care will also have a greater time cost than visiting a doctor's office and may require traveling a considerable distance to find such care in rural areas. Thus, lacking health insurance may result in both direct and indirect financial and time costs that increase risks of becoming food insecure.

## **Individual and Household Characteristics Related to Food Insecurity**

Individual level characteristics of the household head relate to food insecurity. These also are likely to relate to risks of becoming food insecure. Those with low education are more likely to be food insecure than households headed by individuals with higher education (Coleman-Jensen under review; Jensen 2002; Olson et al. 2004). Minority headed households are more likely to be food insecure than whites (Coleman-Jensen under review; Nord et al. 2008). Greater risk of food insecurity among those with low educational attainment as well as minorities is consistent with their greater risk for experiencing poverty. Rather than education and race themselves being factors that relate to a household becoming food insecure, it is likely that other correlates of education and race relate to a household's transition to food insecurity. For example, adults with low education and racial and ethnic minorities are likely to be disadvantaged in the labor market. Their loss of a job or low wages may relate to transitions to food insecurity. These poor employment outcomes may have been affected by educational attainment or minority status.

Household structure characteristics are also important predictors of food insecurity. Married couple households are the least likely to experience food insecurity (Nord et al. 2008). According to time-poverty theories, married couple households are expected to have more time to invest in both market and non-market activities. Greater time available in these households may help reduce the likelihood of transitioning to food insecurity. Single mother households are more likely to report food insecurity than other households (Alaimo et al. 1998; Nord et al. 2008). Female headed households may be at

greater risk for becoming food insecure because they are time poor. Employed single mothers suggest that lacking a partner to help with household needs is an added barrier to investing time in at home food preparation (Jabs et al. 2007).

The persistent finding that female headed households have higher odds of food insecurity even when other factors, such as income and education are controlled (Alaimo et al. 1998; Coleman-Jensen under review; Nord et al. 2008) may be explained in part by time-poverty. Research finds that greater child support from non-resident fathers does not reduce the likelihood of food insecurity for children in single-mother households. Yet, when non-resident fathers visit their children in single-mother households more often, the children's households are less likely to be food insecure (Garasky and Stewart 2007), indicating that time may be as essential as money. Garasky and Stewart suggest that perhaps non-resident fathers provide in-kind support to their children through gifts or taking their children out to eat. Another explanation is that perhaps when non-resident fathers are visiting their children, the single mothers are more able to spend time in paid work or in reducing household expenses by spending more time in food preparation or other household activities that might otherwise be purchased. The ability to reduce household costs or increase time spent in paid work may reduce single-mothers households' likelihood of becoming food insecure.

The support of others, such as non-resident fathers, family, friends and neighbors, is important for reducing food insecurity, even if these others do not reside in the household (Garasky and Stewart 2007; Martin et al. 2004; Swanson et al. 2008). A sample of rural-low income mothers said that their mothers provided a safety net in providing food or money for groceries, if necessary (Swanson et al. 2008). Support from

mothers and grandmothers may help protect single mothers living in three generation households from experiencing food insecurity. Therefore, these households may be less likely to be or become food insecure than single mother households on their own.

Households with children, and young children in particular, have higher rates of food insecurity than households without children (Nord et al. 2008). Number of children will likely also affect food insecurity. More children will require more time spent in childcare and other household activities and may result in greater time poverty (Vickery 1977). However young children, infants and toddlers especially, will require more parental time devoted to childcare. Older children, especially teenagers, may help reduce household time pressures by helping with household food provisioning, housework or caring for younger siblings. Number of children is likely to relate to mother's role overload. As mother's role overload increases and as number of children increase, households may be more likely to become food insecure due to time-poverty and the added expenses caused by additional children.

Maternal depression has been linked to household food insecurity (Heflin, Siefert, and Williams 2005; Olson et al. 2004; Siefert et al. 2004; Vozoris and Tarasuk 2003). Depression may be an outcome of food insecurity, but depression may also exacerbate food insecurity especially as it affects mothers' ability to garner income and complete household activities including food provisioning. Research has documented the importance of controlling for indicators of mental health, especially depression, when considering the link between employment and food insecurity because depression is related to both employment outcomes and food insecurity (Heflin et al. 2007). Depression may also be linked to time poverty if depressive symptoms limit mothers'



time spent in household activities and limits their ability to engage in strategies that can reduce household food spending. Alternatively, time poverty and role overload may increase the likelihood of depression and have generally negative effects on mental and emotional health. Maternal depression is likely to increase the odds of a transition to food insecurity, especially as depression affects employment outcomes and the completion of household work. Alternatively, mothers that become food insecure may become more depressed.

### **Food Assistance Programs and Food Insecurity**

Food insecurity is more prevalent among households participating in food assistance programs such as Food Stamps and WIC (Special Supplemental Nutrition Program for Women, Infants, and Children) (Nord et al. 2008). However, it is not clear that households using these programs are more likely to be or become food insecure because of their participation. Accounting for selection into food assistance programs using simultaneous equation models, shows that Food Stamp participation does not increase household food insecurity (Gundersen and Oliveira 2001). Rather, it is likely that food insecurity predicts participation in food assistance programs because food insecure households need the assistance to feed their families. Panel data analysis of the CPS following households for two years (two waves of data) suggests that starting Food Stamp use is related to becoming food insecure (Wilde and Nord 2005). Households may become food insecure and then begin participating in the Food Stamp program. It has been suggested that including participation in these programs as predictors in the models

estimating food insecurity may bias the results because participation is likely an outcome of food insecurity (Nord 2009). In sum, there is certainly a correlation between food insecurity and food assistance use, but the direction of causality is unknown. It is unlikely that use of Food Stamps or WIC will cause a transition into food insecurity. It is likely that use of food assistance programs and food insecurity are correlated because households are food insecure or are likely to become food insecure and so they access food assistance.

### **Variations in Food Insecurity across States**

Differences in cost of living across states, especially housing costs, may affect food insecurity (Mammen, Bauer, and Richards 2009). Population composition, especially having a higher proportion of local income households, and local economic conditions also influence food insecurity at the state level (Edwards, Weber, and Bernell 2007). Differences across states in policies related to economic well-being and access to food assistance programs are also important for state food insecurity rates (Bartfeld and Dunifon 2006). Food insecurity is more prevalent in North Carolina than in Pennsylvania (Nord et al. 2008). The differences in prevalence between the two states may be due to population composition, especially differences in poverty rates and racial composition. Because the state contexts may differ in terms of policy, economic opportunities and cost of living, state of residence may be an important factor in affecting food insecurity. It is unclear that residence in a state will relate to transitioning to food insecurity. It is likely that state of residence may relate to transitions to food insecurity because state is a proxy

for policies and local economic conditions that influence the likelihood of becoming food insecure.

### **Summary: Significant Predictors of Becoming Food Insecure**

Factors other than time and work characteristics that relate to food insecurity were reviewed in this section. Financial resources have an obvious link to the likelihood of transitioning to food insecurity. Food insecurity is often a result of limited income. But other factors are related to food insecurity as well including education, race/ethnicity, family structure and maternal depression. These characteristics may also relate to the likelihood of becoming food insecure. In addition, policy affects food insecurity at the household level and across states. Some of the risk factors for food insecurity and becoming food insecure, especially being part of a single-mother household, are likely related to issues of time allocation and time poverty. Developing a greater understanding of time resources and implications for food insecurity will help to inform earlier findings on food insecurity. Hypotheses generated from this theoretical discussion and review are proposed next.

### **Hypotheses**

This analysis contributes to prior research on food insecurity in several ways. First, using panel data the transition to food insecurity is estimated whereas most other food insecurity research documents significant factors related to the prevalence of food

insecurity in a cross-section of households. Second, more detailed indicators of work characteristics are examined. And the relationship between paid work and time for household food provisioning is considered. Third, measures of distance traveled to work and other locations are included. Longer commuting distances will incur financial and time costs that may increase the likelihood of becoming food insecure. Fourth, mothers' feelings of time pressure or role overload are considered as a factor related to transitioning to food insecurity.

Hypotheses follow directly from the theory and prior research considered above. Although time poverty cannot be measured directly, greater time poverty is likely to increase the odds of becoming food insecure. The following hypotheses relate measurable factors to becoming food insecure through the factors' effects on time allocations and time poverty.

1. Controlling for income and other characteristics, households with caregivers spending more hours in paid employment will be more likely to become food insecure than households investing less time in paid work.
  - a. Mothers that are not employed will be less likely to become food insecure than those employed, because they can invest more time in food provisioning.
  - b. Mothers working full-time will be able to spend the least time in food provisioning and may experience the highest odds of becoming food insecure when income is controlled.
2. Households with mothers working nonstandard hours or rotating shifts will be more likely to become food insecure than households with mothers

working standard hours. Mothers working evening or irregular shifts will have greater difficulty planning meals, food shopping, and preparing meals and may not be home during primary dinner hours to prepare meals and eat with their families.

3. Longer travel distances between home, employment and childcare will relate to a greater likelihood of becoming food insecure. Long travel distances will have financial and time costs that reduce household resources.
4. Mother's role overload will be a significant predictor of becoming food insecure; mothers with greater demands on their time (higher role overload) will have higher odds of becoming food insecure.
  - a. Role overload will interact with work characteristics in affecting food insecurity. Some mothers may experience role overload from other pressures unrelated to employment. Non-working mothers with high role overload may face a greater risk for becoming food insecure than full-time working mothers with low role overload.
  - b. Role overload will also interact with distance traveled. Effects of travel distance may depend on role overload. For mothers that have high role overload, a relatively short commute may exacerbate time poverty and transitions to food insecurity.
5. Single-mother households without a secondary caregiver will be more likely to become food insecure than households with a secondary caregiver when income and household size are controlled. Time for food

provisioning and other household activities will be lowest among households with only one adult.

This chapter has provided a theoretical framework linking time allocation and time poverty to household food insecurity. Work characteristics, especially number of hours worked and schedule of employment, are important factors affecting non-market time availability. Number of hours worked and work schedules are likely to affect time for household food provisioning activities. Long commuting distances will reduce time available for at home meal preparation. Time as a resource is theorized to be an important factor that will affect food insecurity, but the two have not been empirically linked. The ensuing research fills the gap and helps to build a greater understanding of how food insecurity develops by linking factors that will affect transitions to food insecurity. Other significant predictors of food insecurity and how they likely relate to transitions to food insecurity were discussed as well, and these factors will be included in the analysis. The next chapter provides more detail about the Family Life Project Data and describes the methods and measures used in the study.

## **Chapter 3**

### **Family Life Project Data, Event History Methods and Measures**

This chapter provides a description of the data and methods used in the study and a description of the measures. The Family Life Project data are described first. Event History modeling is then explained. This section also provides information regarding the construction of the data file used for analysis. Finally, detail regarding the measures is given. The Event History models are described before the measures because understanding Event History analysis and the creation of the Event History file is essential for understanding how measures are constructed.

#### **The Family Life Project**

Data used in this study come from the Family Life Project. The mission of the Family Life Project is “to better understand how child characteristics, family life, and community support interact and contribute to the growth and development of young children” (<http://www.fpg.unc.edu/~flp/>). The study entails multiple phases. The first phase collected ethnographic information on the rural communities included in the study. The second phase sampled low-income families from three counties each in Pennsylvania and North Carolina and followed these families over three years of data collection. The third phase of the study is a continuation of the second phase where the families will be followed for an additional two years of data collection. All data used in these analyses

come from phase two of the study. This phase of the Family Life Project was supported by a grant from the National Institute of Child Health and Human Development (PO1-HD-39667), Lynne Vernon-Feagans and Martha Cox, PIs, with co-funding from the National Institute on Drug Abuse. The author gratefully acknowledges the Family Life Project (FLP) investigators for granting access to the data.

The FLP was principally designed to investigate child development outcomes within low-income rural and small-town families. However, there are also detailed measures of parent's employment and indicators related to food insecurity. The FLP is a panel data set that follows families from the birth of a target child. Therefore, it is a cohort study, following a group of children from birth. Three years of data are used in the current study. The data collection time points reference the age of the target child. Data for the current analysis were collected when the target children were aged 6, 15, 24, and 35 months. All waves of data that are currently available for analysis are used, except for data from 2 months, but data collection at this time point was limited and several key measures used here were not collected at 2 months. Next in this chapter, sampling of counties and families into the study is described followed by descriptions of the measures used in the study.



## **Sampling**

### *Sampling of Counties*

Information regarding the selection of counties for the FLP project and sampling of households was provided to the author by the FLP researchers and staff. The six counties for the study were selected on several factors. One was that they had to be representative of locations with rural poverty. The Pennsylvania counties are part of Appalachia which tends to have high levels of poverty among whites and the North Carolina counties reflect southern black poverty. The FLP investigators focused the study on families in small towns and the adjacent countryside. It was thought that these places represent the rural poor and deserved more research attention.

Beale codes or rural-urban continuum codes were used in selecting counties for the study. Beale codes are used to categorize counties on a scale from the most metropolitan to the most rural. Prior to 2003, counties were categorized into one of ten Beale codes. Three of these county types are included in this study, county types 3, 4, and 6. Beale codes 0 to 3 identify metropolitan counties. Metropolitan counties include a city or urbanized area of at least 50,000 people and total population of at least 100,000 (<http://www.ers.usda.gov/Briefing/Rurality/NewDefinitions/>). The remaining counties are nonmetropolitan counties, represented by Beale codes 4 through 9.

A Beale code of 3 identifies a metro county in a metro area of fewer than 250,000 people. Beale codes 4 and 6 are nonmetro counties. County type 4 represents counties adjacent to a metro area. County type 4 also must contain an urban population of 20,000 or more. County type 6 is also adjacent to a metro area and contains an urban population

of 2,500 to 19,999 (<http://www.ers.usda.gov/Briefing/Rurality/RuralUrbCon/>). Urban areas within nonmetro counties refer to population clusters and are defined by population density (<http://www.ers.usda.gov/Briefing/Rurality/WhatIsRural/>). Therefore, the study includes residents of small cities and mid-size and small towns and surrounding areas within nonmetropolitan and small metropolitan counties.

Demographic factors were also considered in selecting counties. These factors were having enough births to ensure adequate sample size in both states and having adequate racial diversity between Black and White households in North Carolina. Poverty was an additional factor in selecting counties. It was required that close to half of the children in a county were eligible for free and/or reduced price school lunch (180% of poverty).

Three contiguous counties were selected within each state that matched the Beale code county types and met demographic and poverty criteria for the study. Contiguous counties were chosen to reduce logistical problems and the cost of data collection. The counties included in the study are Wilson, Wayne and Sampson in North Carolina and Blair, Cambria and Huntingdon in Pennsylvania.

### ***Sampling of Families***

Participants were recruited from hospitals in the six study counties. If there was more than one hospital in a county, one hospital was randomly chosen. Mothers were screened for eligibility and asked if they were willing to participate while still in the hospital after the birth of the target child. In North Carolina, about a quarter of births

from the selected counties occurred in hospitals outside the county. Birth records were used to identify these families and they were recruited by telephone.

Sampling was purposive, with oversampling of low-income families (those below 200% of poverty or eligible for needs-based public assistance program) in both states and oversampling of black families in North Carolina. Households that did not speak English and households intending to move away from the area within three years were excluded. The FLP identified 5,471 mothers during sample recruitment from September 2003 to September 2004. Of these mothers, 28% were ineligible. Of the families that were eligible, 68% were willing to participate and of those 58% were selected to join the study. Selection into the study was based on sampling fractions to ensure that there was an oversample of low-income families in both states and that there was an oversample of Black families in North Carolina. Of those selected, 82% completed their first home visit (when the target child was 2 months old). The original sample size was 1,292 families, 519 in Pennsylvania and 773 in North Carolina (519 families in North Carolina were Black). Over three-quarters of participants (1,002) were low-income at the time of recruitment.

### **Sample Restrictions, Attrition, Missing Data and Weighting**

Three restrictions are placed on the sample for this study. Households that left the study after the 2 month interview and were not interviewed at subsequent waves are excluded, removing 42 families from the analysis. In addition, if the mother's response to the household food insecurity question is missing at all observations (6, 15, 24 and 35

months) the family is excluded, removing an additional 57 families. Finally, if the mother changes over the course of the study (meaning the target child begins living in a new household), the family is excluded, deleting an additional 49 families from the analysis. After these restrictions, the resulting sample size at 6 months is 1144 families.

The FLP sample has very low attrition, retaining 1,075 families at 35 months. A family is included in the analysis for all time points at which they were interviewed. For instance, if a family missed the 15 month interview but participated again at 24 months, they are included in the event history for each month in which they have non-missing data.

Missing data are not imputed using a statistical procedure. For some variables a separate category is included indicating missing data. The sample used for the analysis is restricted to cases with non-missing data on all variables used in the full multivariate models. Two exceptions regarding missing data are for the primary caregiver work variable and the distance to mother's work variable. Each of these variables had over 10 percent of cases with missing data. Rather than removing all of these cases, dummy variables indicating that data are missing on these variables are included. Ninety-two households are removed from the analysis due to missing data in the 6 month data collection. When the sample is restricted to cases with non-missing data<sup>2</sup>, the sample size at 6 months is 1,052 families.

Data are not weighted. Weights are generally used to make data representative of a larger population. The sample is representative of only a select group: low-income

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<sup>2</sup> Here non-missing data refers to having complete data on all variables for each wave that the family participated in the study. If a household had at least one complete wave of data they are included in the study.

households with a recent birth in six specific counties. Nevertheless, the FLP remains a valuable data source. The data have many qualities that make them particularly appropriate to the research questions at hand. First, because the data are longitudinal, the current study will help to deepen understanding of food insecurity in modeling households' first observed transition to food insecurity. Second, the data offer many variables not available in nationally representative data sets, particularly to study the hypotheses proposed here. These are role overload or time demands, detailed work characteristics, and distance information. Third, there are some factors related to living in small towns and rural areas that deserve special attention such as commuting distance and geographic isolation. The sample and data enable a focus on these issues. Finally, it is likely that some of the findings here will apply to other low income households in other states and urban areas. For example, if greater role overload is found to predict transitioning to food insecurity, it is likely that this finding would hold across family types and residence areas. Theories regarding time and food insecurity are not specific to this sample, but would extend to other populations as well.

This section has described the data used for the study and provided information regarding how the sample was selected. The next section provides an explanation of the Event History models used to test the proposed hypotheses. In addition, the creation of the Event History file required for analysis in SAS is considered so that the construction of measures described later is better understood. The section ends with a discussion of methodological implications for modeling the first transition to food insecurity.

### **Discrete Time Event History Analysis Methods**

Event History is a multivariate modeling technique used to model the time it takes for a transition from one status (such as food security) to another (food insecurity) to occur. In this case, the models are used to estimate a household's first transition to food insecurity following the birth of a child. Discrete time event history analysis is used to model the first transition to food insecurity following the birth of the target child. Discrete time event history models are used when time is not continuous but rather is measured as interval data. Intervals can be of unequal duration, as is the case with these data. These models utilize basic logistic regression but also include an indicator of duration to measure time at risk of experiencing the event, in this case food insecurity (Allison 1995).

For the analysis, the risk period for experiencing food insecurity began 6 months after the birth of the study's target child, when the variables of interest were first measured. Only those households who are food secure at the 6 month data collection are at risk of becoming food insecure at later waves of data collection. Therefore, the event history analysis focuses on transitions to food insecurity from 6 months after the birth of a child until that child is aged three years. While this risk period is somewhat arbitrary and defined by the data, it is a meaningful risk period because food insecurity is more common among households with young children (Nord et al. 2004).

## **Creation of Event History File in SAS**

All analyses were performed using SAS 9.1. To perform the discrete time event history models, a household-observation file similar to a person-year file was created in SAS. In this data file there is one observation for each family for each month that they were interviewed. A household provides one household-observation for each wave in which they participated in the study. A family that has data for all interviews and does not become food insecure will have three observations, one each from interviews conducted at 15, 24, and 35 months. The 6 month observation is used to determine households that are at risk for experiencing food insecurity. Households that were food insecure at the 6 month observation are not included in the event history analysis because it is unknown when the transition to food insecurity occurred for these households. The transition to food insecurity is modeled among households that were food secure at the 6 month observation.

Most of the predictors included in the analysis are time-varying as described in the measurement section that follows. A household's value on a given variable is not static but may change from wave to wave, and the variable is measured at each wave. Households are included in the analysis at each observation that they participated in the study. Households that left the study completely were considered right censored at the point they left the study. Once a household becomes food insecure they do not contribute further household-observations to the analysis because they have already transitioned to food insecurity for the first time since the birth of the target child.

### **Modeling the *First* Transition to Food Insecurity**

The event history analysis models the first transition to food insecurity. Households that are food insecure at the first observation (6 months) cannot be included in the analysis because it is unknown when they transitioned to food insecurity. Almost one-half of the households that are food insecure at any point during the observation period were food insecure at the first interval. These households are not included in the model of first transitions to food insecurity after the birth of the target child. This may bias the results if households that enter food insecurity earlier in the study, or prior to the start of data collection, are experiencing more severe food insufficiency. However, because the analysis models the transition to food insecurity, including these households does not add to the analysis because households already food insecure cannot make a first transition to food insecurity.

A logistic regression model predicting food insecurity at six months is included to show significant predictors related to a household being food insecure and to account for the fact that these households are not part of the event history models. These logistic regression models are included with the descriptive statistics because these are essentially selection models for the households that are food insecure at the 6 month observation. These logistic regression models allow for a comparison of households that are in the event history analysis compared to those that were already food insecure at the first observation at 6 months. The event history models are then shown to identify factors relating to the first observed transition to food insecurity among those households that were food secure at the 6 month data collection.



The previous sections of this chapter have described the data used for the study and the methods used. Event history models use panel data to model the first transition to food insecurity. These models necessitate the use of time-varying covariates. These measures are described in the next section.

### **Measures**

Next, the measures are described. First, primary and secondary caregivers are described. These are the terms used by the FLP to refer to the target child's parents. Measurement of the dependent variable, food insecurity, is then considered. The food insecurity variable used in this study is compared to the standard USDA food insecurity measure as a consideration of the validity of the FLP food insecurity measure. The key independent variables, employment, role overload and commuting distance are described next. The section ends with a description of the control variables included in the study.

#### **Primary and Secondary Caregivers Defined**

The terminologies used for the heads of household in the Family Life Project are primary and secondary caregiver. Generally the primary caregiver is the target child's biological mother. In a few cases the primary caregiver is the target child's grandmother (5 families, 0.48% of the sample). All primary caregivers are women. Throughout the paper, primary caregiver and mother are used interchangeably, although primary caregiver is technically correct. The secondary caregiver refers to someone living in

residence with the mother and child who the mother identifies as the secondary caregiver. Usually this is the mother's spouse or cohabiting partner. In some cases, this is the mother's mother or target child's grandmother. As mentioned previously, if the primary caregiver changes over the course of the study the family is excluded from the analysis. The secondary caregiver may change over the course of the three years of data collection. The family remains in the study whether or not the secondary caregiver changes.

Table 3-1 shows the characteristics of secondary caregivers at the 6 month interview. Most households, 82.62 percent (869 had a secondary caregiver out of all 1,052 families), had a secondary caregiver at 6 months; the remaining households were headed by single mothers living without another adult. The percentages listed in table 3-1 refer to percentages of households with a secondary caregiver. The majority of secondary caregivers were male (81.85%). At 6 months nearly 60 percent of secondary caregivers were spouses of the women in the study. Approximately 18 percent of secondary caregivers were women, and most of these women were mothers of the primary caregivers, or grandmothers of the target children in the study.

Table 3-1. Secondary Caregiver Gender and Relationship to Primary Caregiver at 6 Month Observation

	Percent Female	Percent Male	Total
Spouse	0.00	59.84	59.84
Cohabiting Partner	0.23	22.09	22.32
Parent	17.14	0.00	17.14
Grandparent	0.58	0.00	0.58
Unrelated Adult	0.12	0.00	0.12
Total	18.07	81.93	100.00

N = 869 (Number of families with secondary caregiver at 6 months)

## **Dependent Variable, Food Insecurity**

Food secure households have “access by all people at all times to enough food for an active, healthy life” (Nord et al. 2008:ii). By contrast food insecure households have “difficulty providing enough food for all their members due to a lack of resources” (Nord et al. 2008:iii). USDA defines food insecurity and provides national estimates of the condition using an 18 item measure of food insecurity. Unfortunately, the standard USDA food security measure is not available in the FLP data.

**Food insecurity is measured in this study by the primary caregiver’s response to a question about their ability to afford the food they need for their family. The statement and question reads: “*My family has enough money to afford the kind of food we need. Do you... Strongly Disagree, Disagree, Agree, Strongly Agree.*” Mothers responding that they strongly disagree or disagree are coded as food insecure.** The food insecurity measure was collected at 6, 15, 24, and 35 months. Even though limited to a one item measure of food insecurity, this one item does tap two main issues in the USDA food security questions, one is having enough food to eat and the second is diet quality or being able to afford balanced meals that would provide for healthy consumption.

An alternative measure of food insecurity is included in the Family Life Project. This measure (provided in the Appendix) consists of 6 items referring to food insecurity. This measure of food insecurity is *not* used for two reasons. One, the measure is only completed at three of the four observations (6, 24 and 35 month assessments). Second, and more importantly, these questions refer to relatively more severe food insecure

conditions. These questions were taken from the USDA Food Security Module but the questions only refer to severe food insecurity with hunger, recently termed very low food security (Nord et al. 2008). Very low food security means that “the food intake of some household members was reduced and their normal eating patterns disrupted because of the household’s food insecurity” (Nord et al. 2008:iii). The full USDA questionnaire is not available in the Family Life Project. Far fewer households experience food insecurity with hunger (very low food security) than food insecurity in general and most food insecurity research refers to households experiencing food insecurity in general rather than the more specific food insecurity with hunger. In 2008, 11.1 percent of U.S. households were food insecure, while 4.1 percent of households experienced food insecurity with hunger (very low food security) (Nord et al. 2008). Thus, the broad one item indicator of food insecurity is used for this analysis instead of the more restrictive hunger measure.

Although the one item food insecurity indicator used for the analysis is not the standard measure of food insecurity used by USDA in national surveys, it is significantly correlated with households in the sample participating in Food Stamp and WIC as shown in Table 3-2. Households that are coded as food insecure with the one-item measure (labeled FLP Food Insecurity Measure) are more often in need of and use food assistance programs than those that do not indicate food insecurity, indicating that they are less food secure. Also, the one item food insecurity measure is significantly correlated with the multiple item hunger measure.

The percentage of households experiencing food insecurity and hunger and participating in Food Stamps and WIC are also shown in Table 3-2. Only 12.6 percent of

the Family Life Project sample is food insecure at 6 months. This one-item measure likely underestimates food insecurity. Nationally, 29 percent of households with low-incomes (under 185 percent of poverty) were food insecure in 2007 (Nord et al. 2008). With a low-income sample, such as used here, more households are expected to be food insecure. A smaller percentage of households in the FLP sample are food insecure according to the hunger measure (7.4%) than according to the food insecurity measure.

Although the correlations between food insecurity and food assistance are significant, relatively few households indicate food insecurity compared to the number that utilize food assistance. This may explain in part why the correlations between the FLP food insecurity measure and participation in food assistance programs are lower than expected. Most of the sample participates in WIC (73.1%) and a large minority (42.1%) received Food Stamps at 6 months.

Throughout the remainder of the analysis and discussion, food insecurity refers to households that are food insecure according to the one item FLP food insecurity measure. Again, households with mothers that strongly disagree or disagree with the following statement, “*My family has enough money to afford the kind of food we need*” are considered food insecure.

Table 3-2. Correlations between Measures of Food Insecurity and Use of Food Assistance Programs and Percent Experiencing Food Insecurity and Participating in Food Assistance Programs at 6 Month Observation, Family Life Project

	Correlation Coefficient (N)				Percent of FLP Sample
	FLP Food Insecurity Measure	FLP Hunger Measure	Receives Food Stamps	Receives WIC	
FLP Food Insecurity Measure	1.00				12.5
FLP Hunger Measure	0.30***	1.00			7.4
Receives Food Stamps	0.06*	0.13***	1.00		42.0
Receives WIC	0.17***	0.14***	0.47***	1.00	73.1

\* Correlation Statistically Significant at  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$   
 N = 1,052

### **Key Independent Variables: Employment, Commuting Distance and Role Overload**

*Family Work Characteristics.* Family work characteristics refer to the combination of work arrangements between the primary and secondary caregiver. Because work choices and arrangements are likely to be made jointly between caregivers and because time for food preparation and other household activities may depend on the availability of other adults in the household, work characteristics of the primary and secondary caregiver were combined into one measure. In the creation of this variable, detail on mother's work took precedence over secondary caregiver's work. As discussed earlier, women more often engage in food preparation activities than men, especially in low-income households (Mancino and Newman 2007). Therefore, women's

employment, through its effect on time available for at-home food preparation, is likely to be more closely related to household food insecurity than men's employment.

Mother's work was divided into five categories based on number of hours worked and work schedule. Employment was defined first as full-time or part-time based on number of hours worked. *Full-time* employment refers to any job that is 35 hours per week or more. *Part-time* refers to any job that is less than 35 hours. Full-time and part-time are further divided by work shift. The *day shift* refers to working a set shift where most hours are between 8am and 4pm. A *nonstandard shift* refers to working a set shift where most hours are in the evening, night or early morning (between 4 pm and 8 am) or having a rotating shift or irregular shift. Rotating or irregular shifts mean that work hours are not set. The dichotomous indicator of number of hours worked (full-time/part-time) is combined with the dichotomous indicator of work shift (set day shift/nonstandard shift) to create *four mutually exclusive employment categories: full-time day shift, full-time nonstandard shift, part-time day shift, and part-time nonstandard shift*. A fifth category is *not employed*. The not employed category includes women that are not currently working for any reason; they may be unemployed or out of the labor force.

The secondary caregiver's employment categories are divided simply as having a full-time job with a set day shift, having a nonstandard job, or not working. Nonstandard employment includes all part-time employment regardless of shift and full-time employment with a nonstandard shift. *The secondary caregiver work categories are divided as follows: not employed, full-time day shift, nonstandard (part-time or full-time nonstandard shift), no secondary caregiver, no data on secondary caregiver employment.*

The FLP sample size restricts the number of categories that can be feasibly used to describe the combination of employment between the primary and secondary caregiver. Mother's work is hypothesized to have a greater influence on household food provisioning. Therefore it would be ideal to keep as much detail on mother's employment as possible when combined with secondary caregiver's employment. However, in some cases, work characteristics for mother's employment had to be combined across categories for the combined work measure. Sometimes work hours could not be distinguished by shifts when combined with secondary caregiver work. For example, the number of cases of a primary caregiver working full-time without a secondary caregiver was not large enough to distinguish primary caregivers by working a day or nonstandard shift. The small number of secondary caregivers that were not employed did not allow separation by mother's work characteristics resulting in a category for primary caregiver employed in any job with a secondary caregiver not employed. The resulting categories for the dummy variables are:

- Primary Not Employed - Secondary Full-time Day Shift (Reference)
- Primary Not Employed - Secondary Not Employed
- Primary Not Employed - Secondary Nonstandard
- Primary Not Employed - No Secondary
- Primary Not Employed - Secondary Missing
- Primary Full-time Day Shift - Secondary Full-time Day Shift
- Primary Full-time Day Shift - Secondary Nonstandard
- Primary Full-time - No Secondary
- Primary Full-time - Secondary Missing
- Primary Full-time Nonstandard Shift - Secondary Employed
- Primary Employed - Secondary Not Employed
- Primary Part-time Day Shift - Secondary Employed
- Primary Part-time - No Secondary
- Primary Part-time - Secondary Missing
- Primary Part-time Nonstandard Shift - Secondary Employed



Employment characteristics were collected at 6, 15, 24, and 35 months. Primary Not Employed - Secondary Full-time Day is the reference category because this group may invest the most time in food preparation and therefore be the most able to minimize their food budget by preparing home cooked meals. According to an analysis of the American Time Use Survey, women that are low-income, not working and who have a partner, invest the most time in food preparation compared to women with other income, work and partner combinations (Mancino and Newman 2007).

There is some missing data on secondary caregiver's employment characteristics. If the secondary caregiver was not available for an interview, no data were collected regarding their employment arrangements. At the 6 month interview, data were missing on secondary caregiver's employment for 19.5 percent of households. Due to the relatively small sample size removing these cases was undesirable. In an attempt to fill in missing work information for secondary caregivers, the following steps were taken. If secondary caregivers did not change between waves and information on work was available from an immediately prior or an immediately subsequent wave, then missing data were replaced with the work characteristics from the available data. However, after this procedure some missing data remained. The attempt to fill in missing information was not achieved for one of two reasons. In some cases with missing data, the secondary caregiver was different between waves. In other cases, data were also missing at the immediately prior or immediately subsequent wave. Using data from other waves was not desirable because these data points would be too far apart to make the assumption that work of the secondary caregiver would not have changed. After the procedure to fill in missing data, 14.26 percent of households still had missing data on secondary

caregiver employment at the 6 month wave. Both mother's and secondary caregiver's work, and their combination, are time varying and are measured at all observations (6, 15, 24, 35 months).

*Commuting Distance.* Mother's ability to spend time in food preparation depends not only on the number of hours worked and schedule of employment, but also on the time she must spend commuting from home to work and childcare. Therefore, variables indicating distance from home to work and childcare are included in the models. To create these variables, the family's home address was geocoded, along with work address and childcare address. Distances between these points were calculated using Environmental Science Research Institute (ESRI) Street Map Pro Data. This is the most complete street network dataset available, with information on all types of roads including interstates and neighborhood streets. Therefore, these distances are not the shortest distance between two points, but the distance given a specific travel route generated using the street networks. The author gratefully acknowledges the Geographic Information Analysis Core at Penn State's Population Research Institute for their programming assistance. Yosef Bodovski and Carla Shoff geocoded all work and childcare addresses, calculated the distances used for this study and also provided important explanations for how the variables were constructed.

Distances from home to primary caregiver work, distance from home to childcare, distance from primary caregiver work to childcare and distance from home to secondary caregiver work were estimated. For this analysis, distance from home to mother's work and distance from home to childcare and distance from mother's work to childcare were added together. Thus, a variable was created of mother's total commuting distance.

These distances were measured in miles. Because many mothers are not employed, using distance as a continuous variable was highly skewed due to zero miles for many of the households. Therefore distance is included in the analysis as a set of dummy variables. Also, about ten percent of households have missing data on distance to work because either the mother did not provide a work address, or the address was insufficient to allow for geocoding. It was undesirable to exclude ten percent of households from the analysis. A dummy variable is included in the analyses indicating that mothers had missing data on work distance.

Among mothers with distance data, the mean total distance traveled was 13 miles and twenty-five percent of mothers had a total travel distance of 17 miles or more. Fifteen or more miles was deemed as high on the distance variable. Greater than zero but less than 15 was deemed low on the distance variable. Categories are also included for zero distance for those that work from home or were not working, and a category indicating missing distance data. Some mothers that do not work have a non-zero value on the commuting distance variable because they use childcare and the distance from home to childcare is included. If mothers work but do not use childcare, their work distance is included in the combined variable and the distances from home to childcare and work to childcare are given a value of zero. If mothers had valid data on distance from home to work but no data on distance to childcare, the work distance was still included and distance to childcare was set to zero. There are some missing data on childcare because childcare addresses were only collected if children were in childcare for ten or more hours per week.

In alternative analyses (not shown), commuting distance was included as a continuous variable, but it was not significant. Coding commuting distance into a categorical variable was preferred because missing data could be included as a separate category. The commuting distance variables are available for all waves.

***Role Overload (demands on time).*** The role overload scale is used as an indicator of demands on time and feeling that there are too many demands. Feelings of role overload may relate to time for food preparation. The role overload scale was originally used to understand the relationship between wives' employment and convenience consumption (Reilly 1982). A modified, shorter version of the scale is used in the current study. It consists of six items that are shown below in Box 3-1. The items all refer to time pressure or being able to do all the tasks required. Responses range from 1 – Strongly Agree to 5 – Strongly Disagree. All items are reverse coded and then summed. The sum of the items is used in the analysis, the summed score ranges from 6 to 30. A higher score indicates greater role overload or more demands on time. The sum score is time varying and the measure is collected from the primary caregiver at 6, 15, 24, and 35 months.

### **Box 3-1. Role Overload Scale**

#### **Role Overload Scale Items:**

1. There are too many demands on my time.
2. I need more hours in the day to do all the things which are expected of me.
3. I can't ever seem to get caught up.
4. I don't ever seem to have any time for myself.
5. Sometimes I feel as if there are not enough hours in the day.
6. I seem to have to over-extend myself in order to be able to finish everything I have to do.

#### **Responses to Role Overload Scale Items:**

1. Strongly Agree
2. Mildly Agree
3. Neither Agree or Disagree
4. Mildly Disagree
5. Strongly Disagree

#### **Scoring Role Overload Scale:**

The primary caregiver responses for each item are reverse coded and then all items are summed. A higher sum score indicates greater role overload, or more demands on time.

### **Control Variables: Income, Savings and Health Insurance**

*Family Income.* Family income is measured using the income to poverty ratio.

Income from all sources is combined and the total income is compared to the federal poverty threshold for each household's size and composition in the given year that the family was interviewed for each wave. A poverty ratio of one indicates that the family's income is at the federal poverty threshold, above one indicates their income is above

poverty and a value less than one indicates their income is below poverty. The income to poverty ratio was calculated for each wave of data collection (6, 15, 24, and 35 months), using the poverty thresholds for the year of the interview.

***Money in Bank Accounts.*** At the 6 month interview families were asked about assets. The money in bank accounts variable includes money in all bank accounts (checking and savings) held by the family. The variable is continuous and is measured in thousands of dollars. The variable is top-coded at 40,000. This information was only collected at 6 months and is included in the analysis but is not time-varying.

***Access to Health Insurance.*** Families are differentiated in the analysis by whether or not members have access to health insurance. Health insurance can be from any source, such as employer provided or needs-based government sponsored health insurance programs. If the primary and secondary caregiver and target child all have insurance the family is coded one on the health insurance variable. If one or more family members do not have health insurance they are coded zero. Health insurance information is included from 6, 15, 24, and 35 months.

### **Control Variables: Family Characteristics**

***Family Structure.*** The family structure variable is based on the secondary caregiver's relationship to the primary caregiver. There are four family structure categories used in the descriptive statistics: married couple, cohabiting, three generation or other family and single mother (no secondary caregiver). Married couple families are legally married and living with one another. Cohabiting households are those where the

primary caregiver identifies the secondary caregiver as her live-in partner. The three generation or other family category consists mostly of primary caregivers living with their mothers and also includes primary caregivers living with their grandmothers (as shown in Table 3-1). This set of dummy variables is time varying and is measured at each wave of data collection.

The set of family structure dummy variables is used in the descriptive statistics. However, because the work variable includes whether or not a secondary caregiver is present, the full set of family structure dummy variables cannot be included in the model with the work characteristics dummies. The work variable identifies single mother households because some of the dummy variables refer to households without a secondary caregiver. In the multivariate models a single dummy variable is included to distinguish married couples from all other households.

***Secondary Caregiver Gender.*** A dummy variables is included indicating whether the secondary caregiver is female or if there is no secondary caregiver or a male secondary caregiver. This dummy variable is given a value of one if the secondary caregiver is a woman. A value of zero is assigned for all other households. Therefore, households without a secondary caregiver and those with a male secondary caregiver are all in the reference category. Given differences in time spent in food preparation by women and men, female secondary caregivers may reduce the likelihood of food insecurity by spending time preparing low-cost food. Secondary caregivers in the three generation or other family category are all women. Secondary caregiver gender is included in the descriptive statistics and in the multivariate models and is time-varying.

***Household Size.*** Three variables are used to measure household size. These are: number of adults, number of children age 5 and under, and number of children over age 5 up to age 17. These are all continuous variables. The number of adults refers to the number of household members aged 18 and above. Some households have no adults, because some mothers are less than 18. There are two variables for number of children based on the age of the child. It is important to distinguish between younger and older children because younger children require more time devoted to child care. Older children may help reduce caregiver burden by assisting with household tasks. All the measures for family size are time varying and are measured at 6, 15, 24, and 35 months.

#### **Control Variables: Primary Caregiver Characteristics**

***Race/Ethnicity.*** The sample primarily consists of families that are white or black. Less than two percent of the sample is from some other race or ethnic group. In the analysis white (non-Hispanic) is the modeled category, and black/other is the reference group. This variable is determined by the race/ethnicity to which the primary caregiver identified herself at initial recruitment into the study. The variable does not change over time.

***Education.*** Education is included as a single dummy variable. The variable is assigned a value of one if *either* the primary or secondary caregiver has a college degree (associates, bachelors or higher). A more detailed education variable for the primary caregiver was included in earlier analyses, but none of the categories was significant, so



the single dummy variable was included for parsimony. Education is time-varying and measured at each wave.

***Primary Caregiver Age.*** Primary caregiver's age is a continuous measure of age in years that is time-varying. Age squared was included in some analyses but was not significant. The relationship is not curvilinear with age.

***Maternal Depression.*** An indicator of maternal depression is included. The scale used to measure depression changed over the course of the study. At 6 and 15 months, the BSI-18 (Brief Symptom Inventory 18) was used (Derogatis 2000). The BSI-18 includes three subscales, somatization, anxiety and depression. The six items referring to depression are used in this study. The CES-D (Center for Epidemiologic Studies Depression Scale), a more detailed depression indicator was used at the 24 and 35 month assessments (Radloff 1977). This scale consists of twenty items all related to depression. Because the BSI-18 and CES-D range of scores are different due to the different number of items, standardized scores are used in the analysis where the mean is set to zero with a standard deviation of one.

### **Control Variables: Food Access**

***Distance to Nearest Grocery Store.*** Distance to the nearest grocery store is a continuous variable measured in kilometers and is measured at 6, 15, 24 and 35 months. The nearest grocery store is the nearest supermarket to the participant's home identified by GIA core staff. Convenience stores are not considered grocery stores. It is unknown

where the respondent usually shops. However, the variable is useful in identifying the distance to the closest possible supermarket.

***Gardening.*** At 6 months primary caregivers were given the statement: “Growing food and gardening are very important in my family.” If respondents indicated “very true of me” or “somewhat true of me” they are defined as gardening being important to their family. Households that did not say gardening was important are the reference category. This variable is not time varying because it was only included in the six month interview.

***Access to Vehicle.*** At 6 months primary caregivers are asked if they or another member of their family owns a car, truck or van that the primary caregiver can use. Respondents indicating that she or a family member owns a vehicle are coded as one on the access to vehicle variable. This variable is not time varying.

***Food Assistance.*** In the literature review it was noted that the relationship between food assistance and food insecurity is unclear. It is likely that participation in food assistance programs is often a result of transitioning to food insecurity. Including food assistance as a predictor in the multivariate models may distort the findings because food assistance is actually an outcome of food insecurity (Nord 2009). As such, food assistance is not included in the analysis. The relationship between food insecurity and participation in Food Stamps and WIC in the FLP sample was discussed previously in the food insecurity measures section. Participation in Food Stamps and WIC was measured in each wave of the study.

**Control Variables: Residence**

*State of Residence.* The sample consists of families from North Carolina and Pennsylvania. Families that moved out of these states were removed from the study. In the analyses, North Carolina is the reference category. State of residence is important to control because it is likely to affect the household through differences in state policies, cost of living and local economic conditions. The variable is constant over time, based on the respondent's state of residence at recruitment into the study.

*Geographic Isolation.* A geographic isolation variable is constructed using distance data from home of residence to important community and business locations such as schools, hospitals, the county seat, and nearest gas station. The geographic isolation variable is the mean of the distances from home to each location. The log of the variable is used. The variable is measured at 6, 15, 24 and 35 months.

This goals of this chapter were threefold, to describe the Family Life Project Data, introduce the Event History Analysis and explain the measures used in the analysis. The next chapter gives a greater understanding of the FLP sample by providing descriptive statistics. In addition, the prevalence of food insecurity across FLP households is considered in Chapter 4.

## Chapter 4

### Sample Characteristics and Prevalence of Food Insecurity

This chapter provides descriptive statistics about the Family Life Project sample. Tables are used to show the distribution of the sample across the measures used in the study. Additionally, the prevalence of food insecurity is discussed. This chapter describes the sample in two ways. First, the sample characteristics at the 6 month interview and the prevalence of food insecurity at 6 months are described. Second, the characteristics of households that are food secure at 6 months are described. Households that are food secure at the 6 month observation are at risk for becoming food insecure in the Event History analysis. The characteristics of households that transition to food insecurity after 6 months are described as well. The description of these households is based on their Time 1 characteristics; for the FLP sample Time 1 characteristics were measured at 6 months.

The chapter begins with a focus on the sample characteristics at the 6 month interview. Then a logistic regression model is presented that predicts the likelihood of food insecurity for households at the six month observation. This is essentially a selection model and predicts the characteristics of households that are food insecure early in the study. These households' transition to food insecurity is not modeled in the event history analysis because they are already food insecure. The logistic regression model is predicting the characteristics of households that are selected out of the Event History analysis because they are already food insecure. Next, the percentage of households that

are food insecure across observations is considered to show the prevalence of food insecurity across waves of the study. Finally, the characteristics of households that are included in the Event History analysis are described.

### **Description of Sample and Food Insecure Households at 6 Month Observation**

The 6 month FLP sample distribution across each of the categorical variables is shown in Table 4-1. There are 1,052 households with complete data at 6 months. The modal work category is having a primary caregiver that is not employed and a secondary caregiver working a full-time day shift. At 6 months, 14.64 percent of families fall in this category, which is the reference category in the Event History models. The next highest percent of families, 10.74, have a mother working full-time with a day shift and a secondary caregiver working full-time with a day shift. The fewest families (2.95%) are in the category of primary caregiver working part-time with secondary caregiver's work data missing.

A minority of mothers, 15.21 percent, have a combined commuting distance of 15 or more miles. Most mothers work relatively close to their home, 39 percent of mothers have a combined distance from home to work, home to childcare and work to childcare of less than 15 miles. Nearly 35 percent of mothers have no commuting distance because they do not work and do not use childcare. Eleven percent of mothers have missing data on commuting distance.

Most households (68.82%) have health insurance for both parents and the target child; still close to one-third of families have one or more members that are uninsured.

The modal household structure category is married couple family, nearly half of FLP households were married at 6 months. Eighteen percent of households were cohabiting, meaning that the secondary caregiver was identified as the mother's live-in partner. About 15 percent are in three generation or other family households. About 17 percent were headed by single mothers. About 68 percent of households have a male secondary caregiver. About 15 percent have a female secondary caregiver.

The majority of families in the FLP are white (59.41%). About 39 percent are black. A small number of households identify themselves as an 'other' race or ethnic group. These households are combined with black households in the multivariate models. About 72 percent of households do not have a primary or secondary caregiver with a college degree. Just over a quarter of households (26.33%) say that gardening is important to their family. Just over 85 percent of households own a vehicle. About 57 percent of households in the FLP sample live in North Carolina.

The second column of Table 4-1 shows the percentage of households that are food insecure for each of the given characteristics. There is wide variation in the percentage of households that are food insecure across the work combination categories. The highest percentage food insecure (24%) is for households with a primary caregiver employed full-time without a secondary caregiver. Primary caregivers working with a secondary caregiver not working also have a high prevalence of food insecurity (23.64%). Primary caregivers that are not employed with secondary caregivers working full-time with a day shift (the reference category) have a food insecurity prevalence of 16.88 percent. The lowest percentage of households that are food insecure is for households with primary caregivers working part-time day shift and an employed secondary caregiver (5.63%) and

for households with both a primary caregiver and secondary caregiver working full-time with a day shift (6.19%).

Somewhat surprisingly, families with primary caregivers commuting longer distances (15 or more miles) had a lower percentage of food insecurity (10.63%) than families with shorter commuting distances. Perhaps this is related to commuting longer distances to find “better” jobs. About 13 percent of households with commuting distances of less than 15 miles are food insecure.

Turning to the control variables, a higher percentage of households without health insurance are food insecure (16.16%) than those with health insurance (10.91%). Food insecurity is more prevalent among single-mother households (18.58%) than other household types. Food insecurity is lowest among married couple households (10%). Food insecurity is more prevalent among households with a female secondary caregiver (13.38%) than with a male secondary caregiver (10.81%). Among race and ethnic groups, food insecurity is most common among “other” groups (16.67%) than among blacks (14.43%) or whites (11.20%). Food insecurity is more common among households without a college degree holder (14.46%) than among households with higher educational attainment (7.72%). Food insecurity is slightly less prevalent among households that garden (11.2%) than among those that do not garden (13.03%). About 13 percent of households are food insecure whether or not they have a vehicle. A higher percentage of North Carolina households are food insecure (14.74%) than Pennsylvania households (9.6%).

Table 4-1. Sample Distribution and Percentage of Households Food Insecure by Given Characteristic Across Categorical Variables at Family Life Project 6 Month Wave

	Sample Distribution (%)	Percentage Food Insecure
Food Insecure	-	12.55
Family Employment Characteristics		
Primary Not Employed - Secondary Full-time Day Shift	14.64	16.88
Primary Not Employed - Secondary Not Employed	6.27	15.15
Primary Not Employed - Secondary Nonstandard	9.51	10.00
Primary Not Employed - No Secondary	8.94	15.96
Primary Not Employed - Secondary Missing	7.22	9.21
Primary Full-time Day Shift - Secondary Full-time Day Shift	10.74	6.19
Primary Full-time Day - Secondary Nonstandard	3.80	7.50
Primary Full-time - No Secondary	4.75	24.00
Primary Full-time - Secondary Missing	4.09	9.30
Primary Full-time Nonstandard Shift - Secondary Employed	4.37	6.52
Primary Employed - Secondary Not Employed	5.23	23.64
Primary Part-time Day Shift - Secondary Employed	6.75	5.63
Primary Part-time - No Secondary	3.71	17.95
Primary Part-time - Secondary Missing	2.95	12.90
Primary Part-time Nonstandard Shift - Secondary Employed	7.03	9.46
Total Commuting Distance (Mother's Work and Childcare combined)		
15+ miles	15.21	10.63
0 < Miles < 15	39.07	13.38
0 Miles	34.69	13.42
No Work Distance Data	11.03	9.48
Health Insurance		
Primary, Secondary and Child have Health Insurance	68.82	10.91
One or more do NOT have Health Insurance	31.18	16.16
Family Structure		
Cohabiting	18.44	12.89
Three Generation or Other Family	14.73	13.55
Married	49.43	10.00
Single Mother	17.40	18.58
Secondary Caregiver Gender		
Male	67.68	10.81
Female	14.92	13.38
No Secondary Caregiver	17.40	18.58
Race/Ethnicity		
Black	38.88	14.43
White	59.41	11.20
Other	1.71	16.67
Education		
Neither Primary nor Secondary has College Degree	71.67	14.46
Primary or Secondary has College Degree	28.33	7.72



Table 4-1. Continued

Gardening		
Gardening is Important to Family	26.33	11.19
Gardening is Not Important to Family	73.67	13.03
Access to Vehicle		
Member of Household Owns Vehicle	85.17	12.50
No Member of Household Owns Vehicle	14.83	12.82
State of Residence		
Pennsylvania	42.59	9.60
North Carolina	57.41	14.74
N = 1,052		

Table 4-2 shows the mean for the sample and the mean for households that are food insecure at the 6 month wave for the continuous variables included in the study. The mean of the role overload scale is 20.92 for the overall sample. The mean score for food insecure households is somewhat higher, 22.86, indicating that they perceive greater demands on their time than households that are not food insecure. The mean income to poverty ratio for the sample is 1.85. Households that are food insecure have a lower mean income to poverty ratio (1.39) than does the overall sample. The median values for the income to poverty ratios are somewhat lower than the mean values, 1.46 for all households and 1.13 for food insecure households (not shown). Households that are food insecure, on average, also have less money in bank accounts (\$570) than do households in the overall sample (\$2,030). These mean values for amount in bank accounts is somewhat skewed by some households with large savings. The median values are much lower, 0.15 (\$150) for all households and 0.03 (\$30) for food insecure households. Standard deviations indicate that there is much greater variation in the amount of money in bank accounts in the overall sample than among food insecure households.

The average number of adults in food insecure households (2.07) is slightly lower than the overall sample (2.12). The mean number of young children is slightly higher for

food insecure households (1.59) than the overall sample (1.56). The mean number of older children is also higher among food insecure (0.84) than all households (0.65). The mean age of the primary caregiver is about 27 for both food insecure households and the entire sample. The depression scale is standardized so for the whole sample, the mean is zero with standard deviation of one. Food insecure households score higher on the depression scale (are more depressed) than the overall sample with a mean of 0.43.

Distance to the nearest grocery store is slightly lower for food insecure households than the sample. The sample as a whole travels an average of 2.29 kilometers to a grocery store while food insecure households travel an average of 2.03 kilometers. The mean of the log of geographic isolation is similar between the sample and food insecure households (1.50).

Table 4-2. Sample Mean and Mean of Food Insecure Households on Continuous Variables at Family Life Project 6 month Observation

	Overall Sample (N = 1052)			Food Insecure Households (N = 132)		
	Mean	Standard Deviation	Minimum to Maximum	Mean	Standard Deviation	Minimum to Maximum
Role Overload (Time Demands)	20.92	6.48	6 – 30	22.86	6.24	6 – 30
Poverty Ratio	1.85	1.66	0 – 16.49	1.39	1.11	0 – 5.99
Money in Bank (in Thousands of Dollars)	2.03	5.23	0 – 40	0.57	1.71	0 – 15
Number of Adults Age 18 and Over	2.12	0.82	1 – 7	2.07	0.75	1 – 4
Number of Children Less Than Age 5	1.56	0.68	1 – 4	1.59	0.69	1 – 3
Number of Children Age 5 to 17	0.65	0.91	0 – 6	0.84	1.06	0 – 5
Primary Caregiver's Age	26.50	5.96	14.70 – 58.20	26.62	5.92	15.98 – 42.67
Depression Scale (Standardized)	0.00	1.00	-0.69 – 5.41	0.43	1.36	-0.69 – 5.41
Distance to Nearest Grocery Store (Km)	2.29	2.83	0.02 – 20.02	2.03	2.35	0.07 – 11.79
Log of Geographic Isolation	1.49	0.73	-0.21 – 3.19	1.50	0.69	0.06 – 2.93

### **Logistic Regression Models Predicting the Likelihood of Food Insecurity at 6 Months**

Table 4-3 shows the logistic regression models predicting food insecurity at 6 months. Logistic regression models are used to identify relevant predictors of food insecurity at 6 months because households that are food insecure at 6 months are not included in the Event History models. There is an important distinction between the logistic regression models and discrete time Event History models. The logistic regression models are based on prevalence of food insecurity at one time point, or which families are food insecure and which are not. These families could have been food insecure for several years or they could have experienced food insecurity for the first time at the 6 month interview. The event history models are based on those families that transitioned from food security to being food insecure from one wave to the subsequent wave, or which families become food insecure from one wave to the next. Those households that are already food insecure at 6 months likely include the chronically food insecure—perhaps the worst off of those who are food insecure.

Table 4-3 shows the logistic regression models predicting the likelihood of food insecurity at the 6 month observation. Model 1 includes the set of dummy variables combining primary and secondary caregiver's work with role overload, commuting distance and the financial characteristics variables. This model shows the effect of work without the other controls. Income must be included with work because controlling for income means that the effect of work on food insecurity relates to work form rather than wages. Households with mothers not employed and secondary caregivers in nonstandard

jobs (part-time jobs or full-time with a nonstandard shift) are 53 percent less likely to be food insecure than the reference category of primary caregivers not working and secondary caregivers working full-time at a day shift. Households with a mother not employed and no data on the secondary caregiver's work are 56 percent less likely to be food insecure than the reference category. Mothers working part-time day shifts with an employed secondary caregiver are 65 percent less likely to be food insecure than households with a mother not working and a secondary caregiver in a full-time day shift. These last two findings are only marginally significant ( $p < 0.10$ ).

Also in Model 1, role overload is significantly related to food insecurity. Each additional point on the role overload scale is associated with a 7 percent higher likelihood of being food insecure. This is quite a large effect even though the coefficient appears small because a one point increase on the role overload scale means that a mother responding just one degree higher (i.e. giving a response of "strongly agree" instead of "mildly agree") to just one question would be 7 percent more likely to become food insecure. Each additional thousand dollars in bank accounts at 6 months is associated with 15 percent lower odds of being food insecure. Commuting distance, poverty ratio and access to health insurance are not significantly associated with food insecurity. In alternative models (not shown) distance was included as a continuous variable, and was not significant.

In Table 4-3 all control variables are included to predict food insecurity in Model 2. When all controls are included, the same work categories remain significantly associated with food insecurity. Households with a mother not working and a secondary caregiver in a nonstandard job, households with a mother not employed and no data on

secondary caregiver's work, and households with a mother working part-time during the day shift are all significantly less likely to be food insecure than households with mothers not working and secondary caregivers working full-time during the day shift. In the full model, role overload remains significant. Higher role overload relates to a greater likelihood of being food insecure. The coefficient for money in bank accounts remains the same from Model 1 to Model 2. The only other control variable that is statistically significant is depression. A household where the mother scores one standard deviation above the mean on the depression score is 31 percent more likely to become food insecure.

Model 3 in Table 4-3 is the reduced model. To obtain these results, each nonsignificant variable was removed from the full model systematically one by one. The least significant variable (with a p-value closest to one) was removed first, until only significant predictors remained in the model. In the reduced model, the work categories significant in the full model remain significantly associated with food insecurity. In addition, households with both a mother and secondary caregiver working a full-time job during the day shift are less likely to be food insecure than households with a mother not working and secondary caregiver in a full-time day shift job. Having a mother working full-time during a nonstandard shift and a secondary caregiver employed is associated with a household having a 69 percent lower likelihood of being food insecure. The coefficients for role overload and money in bank accounts are the same as they were in the full model.

As variables that were not significant were removed from the model, some other controls became significantly associated with food insecurity. In Model 3, number of

children age 5 to 17 is significantly related to food insecurity. Each additional child raises the odds of food insecurity by 22 percent. The effect of maternal depression remains similar from the full model to the reduced model. State of residence is significant in the reduced model, but was not in the full model. Households living in Pennsylvania are 33 percent less likely to be food insecure than households living in North Carolina.

Models including an interaction between employment categories and role overload were also estimated. None of the interaction terms were significant so these models are not shown. Interactions between role overload and distance to work were also estimated. This interaction was not significant either.

It is important to note that the 6 month logistic regression models serve as somewhat of a selection model. The model is predicting households that are food insecure at the beginning of the study. These households are in effect selected out of the Event History analysis because their transition to food insecurity was not observed. The logistic regression model helps to distinguish households that are in the Event History analysis and those who are not because they are already food insecure.

Table 4-3. Logistic Regression Models Predicting Food Insecurity at 6 Month Observation, Family Life Project Data

	Model 1: Work, Role Overload, Distance and Income Model		Model 2: Full Model		Model 3: Reduced Model	
	Parameter Estimate	Odds Ratio	Parameter Estimate	Odds Ratio	Parameter Estimate	Odds Ratio
Intercept	-2.54***		-3.37***		-2.44***	
<u>Key Independent Variables</u>						
Employment (Reference: primary not working, secondary full-time day shift)						
Primary Not Employed - Secondary Not Employed	-0.27	0.76	-0.1	0.91	-0.21	0.81
Primary Not Employed - Secondary Nonstandard	-0.75*	0.47	-0.78+	0.46	-0.82*	0.44
Primary Not Employed - No Secondary	-0.22	0.80	-0.2	0.82	-0.46	0.63
Primary Not Employed - Secondary Missing	-0.81+	0.44	-0.96*	0.38	-0.98*	0.38
Primary Full-time Day Shift - Secondary Full-time Day Shift	-0.79	0.46	-0.81	0.45	-0.96*	0.38
Primary Full-time Day Shift - Secondary Nonstandard	-0.65	0.52	-0.66	0.52	-0.78	0.46
Primary Full-time - No Secondary	0.22	1.25	0.13	1.14	0.04	1.04
Primary Full-time - Secondary Missing	-0.65	0.52	-0.57	0.56	-0.65	0.52
Primary Full-time Nonstandard Shift - Secondary Employed	-1.12	0.33	-1.05	0.35	-1.18+	0.31
Primary Employed - Secondary Not Employed	0.24	1.27	0.2	1.22	0.17	1.19
Primary Part-time Day Shift - Secondary Employed	-1.06+	0.35	-1.07+	0.34	-1.09+	0.34
Primary Part-time - No Secondary	-0.02	0.98	0.07	1.07	-0.17	0.85
Primary Part-time - Secondary Missing	-0.30	0.74	-0.35	0.71	-0.31	0.74
Primary Part-time Nonstandard Shift - Secondary Employed	-0.60	0.55	-0.55	0.58	-0.62	0.54
Role Overload	0.07***	1.07	0.05**	1.05	0.05**	1.05
Total Commuting Distance (Reference: 15+ miles)						
0 Miles	0.00	1.00	0.01	1.01		
No Work Distance Data	-0.19	0.82	-0.18	0.83		
0 < Miles < 15	0.00	1.00	0.04	1.05		



Table 4-3. Continued

Financial Characteristics

Poverty Ratio	-0.06	0.94	-0.04	0.96		
Money in Bank Account at 6 months	-0.16*	0.85	-0.16*	0.85	-0.16*	0.85
Primary, Secondary and Child have Health Insurance	-0.31	0.73	-0.29	0.75		

Family Characteristics

Primary Caregiver Married			0	1.00		
Secondary Caregiver Female			0.26	1.29		
Number of Adults			-0.04	0.96		
Number of Children Less than Age 5			0.06	1.06		
Number of Children Age 5 to 17			0.16	1.17	0.20*	1.22

Primary Caregiver Characteristics

White			0.23	1.26		
Primary or Secondary has college Degree			-0.13	0.88		
Primary Caregiver Age			0.03	1.03		
Primary Caregiver Depression Scale			0.27**	1.31	0.26**	1.30

Food Access

Distance to Grocery Store			-0.06	0.94		
Gardening is Important to Family at 6 months			-0.12	0.88		
Member of Household owns Vehicle at 6 months			0.31	1.36		

Residence

Pennsylvania			-0.43	0.65	-0.40+	0.67
Log of Geographic Isolation			0.16	1.17		

-2LL	730.64	709.26	717.31
Likelihood Ratio (df)	64.03 (21)	85.41 (35)	77.36 (19)
R <sup>2</sup> <sub>L</sub>	8.06	10.75	9.73

+ p < 0.10, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

N = 1,052

### **Food Insecurity across Observations**

Tables 4-1 and 4-2 described the Family Life Project sample at the 6 month observation. Table 4-3 showed logistic regression models predicting the likelihood of food insecurity at 6 months. But, the focus of the study is households' transitions to food insecurity at the 15, 24 or 35 month observation. Table 4-4 shows the percentage of households that are food insecure over waves of the Family Life Project. The first column shows the percentage of households that are food insecure for the first time for each observation (the household transitions to food insecurity between the prior and the current wave). At 6 months, 12.55 percent of families were food insecure. At 15 months, 6.84 percent were food insecure for the first time (they became food insecure between the 6 month observation and the 15 month data collection). At 24 months, 4.18 percent had become food insecure for the first time. At 35 months, 2.38 percent had become food insecure for the first time. The last row of Table 4-3 shows that 25.95 percent of households in the sample experience food insecurity at some point over the course of the study. The percentage of households that are ever food insecure is much higher than the percentage that becomes food insecure at a single observation. About half of households that are ever food insecure are food insecure at the first observation (12.55% of all households).

The second column in Table 4-3 shows the percentage of households that are food insecure at each observation month regardless of whether they were food insecure at earlier observations. Here the percentages of households that are food insecure are higher than in the first column because many households are food insecure at more than one

observation. However, the percentage of households that are food insecure at any one time does decline somewhat as the study continued.

Table 4-4. Percentage of Families Food Insecure with Family Life Project Food Insecurity Measure

	Percent Food Insecure for the First Time (N = 1052)	Percent Food Insecure at Each Observation (N*)
6 Months	12.55	12.55 (1052)
15 Months	6.84	10.95 (1014)
24 Months	4.18	10.44 (977)
35 Months	2.38	8.39 (965)
Ever Food Insecure	25.95	

\*N is restricted to households with valid data at 6 months.

Table 4-5 shows the number of households entering and exiting food insecurity across the waves of the study. There are more households exiting food insecurity at the 15, 24 and 35 month waves than entering food insecurity. This table highlights the fact that food insecurity is not a constant condition. Rather, most households that become food insecure are food insecure for a relatively short duration. However, a minority of households do experience food insecurity over multiple waves, these may be considered the chronically food insecure. Note that this table only shows a first entry into and first exit from food insecurity. Many of these households are likely to experience future spells of food insecurity.

Food insecurity is similar to poverty in that many households may become poor but only experience poverty for a short duration. The proportion of households experiencing poverty at any given time is much smaller than the proportion of households

that will ever experience poverty because households that become poor will often transition out of poverty. But households that experience one spell of poverty are likely to experience multiple spells of entry and exit into poverty (Rank and Hirschl 1999; Rank and Hirschl 2001; Stevens 1999).

Even though food insecurity, like poverty, may be a temporary condition for some households, reducing the likelihood of households becoming food insecure remains an important policy prerogative and research topic. There are documented negative mental and physical health effects of food insecurity for both adults and children. Households experiencing food insecurity, even for a few months, are at greater risk for experiencing these poor outcomes. Members of food insecure households have lower quality diets and consume fewer nutrients as a result of their food insecurity (Bhattacharya, Currie, and Haider 2004; Dixon, Winkleby, and Radimer 2001; Rose and Oliveira 1997). Unhealthy diets resulting from food insecurity are linked to a higher likelihood of obesity (Bhattacharya et al. 2004). Food insecurity is also related to poorer health, increased morbidity and increased mortality among adults (Siefert et al. 2004; Stuff et al. 2004; Vozoris and Tarasuk 2003). Children in food insecure households have poorer health (Alaimo et al. 2001) and poorer school outcomes (Dunifon and Kowaleski Jones 2003) than food secure children. Food insecurity is related to mental health as well. As discussed previously, food insecurity is related to a greater likelihood of being depressed (Heflin et al. 2005; Siefert et al. 2004; Vozoris and Tarasuk 2003). This short review of negative outcomes related to food insecurity is not exhaustive but it points to the importance of reducing both the number of households transitioning into food insecurity and the overall prevalence of food insecurity. There are serious consequences to

experiencing food insecurity. Researching factors related to household's transitions to food insecurity and applying the findings to reduce the likelihood of households becoming food insecure are vital to prevent the ill effects associated with food insecurity.

Table 4-5. Number of Households Entering and Exiting Food Insecurity across Waves of the Family Life Project

Wave	Total Number of Households	Number of Households Food Insecure	Number First Time Observed Food Insecure	Number Exiting Food Insecurity from Prior Wave	Net Change in Number Food Insecure	Number Food Secure Exiting Sample from Prior Wave	Number Food Insecure Exiting Sample from Prior Wave
6 months	1052	132					
15 months	1014	111	72	91	-19	36	2
24 months	977	102	44	50	-6	34	3
35 months	965	81	25	43	-18	9	3

### **Description of Sample of Households Food Secure at 6 months and Households that Become Food Insecure at 15, 24 or 35 months**

Tables 4-6 and 4-7 describe the sample of households included in the Event History analysis. They are described based on their Time 1 characteristics, their characteristics from the 6 month interview. Table 4-6 shows the distribution of households that are food secure at 6 months across the categorical variables. There are 920 households that are food secure at 6 months; these are the households whose transition to food insecurity is modeled in the Event History analysis. The numbers shown here do NOT include households that were food insecure at 6 months because these households are not included in the Event History analysis. The second column in Table 4-6 shows the percentage of households that become food insecure at later waves in the study. As shown in Table 4-6, 15.33 percent of households have an observed transition to food insecurity, they become food insecure at 15, 24 or 35 months.

The sample distribution of all households at risk for becoming food insecure, as shown in the first column in Table 4-6 are described first. The two most common work forms for food secure households at 6 months are having a mother not working and a secondary caregiver in a full-time day shift (13.92%) and having both a primary and secondary caregiver working a full-time day shift job (11.52%). The least common work category is a primary part-time worker and no data on the secondary caregiver. About 16 percent of all households at Time 1 have a commuting distance of 15 or more miles. About 39 percent commute more than zero but less than 15 miles.

Just over 70 percent of food secure households at 6 months have health insurance. About half of the sample is married at the 6 month interview. Cohabiting households are the next most prevalent (18.37%). A majority of households have male secondary caregivers (69.02%). About 15 percent have female secondary caregivers. About 60 percent of households have a white mother, while about 38 percent of households have black mothers. About 70 percent of households are without a college degree holder. Gardening is important to 27 percent of households. Most households have access to a vehicle (85%). About 56 percent of households that are food secure at 6 months are from North Carolina, while 44 percent are from Pennsylvania.

The percentage of households that become food insecure at 15, 24, or 35 months is shown in the second column in Table 4-6. Their transition to food insecurity is modeled in the Event History analysis. Focusing on column two (the percentage of households that become food insecure), the highest percentages of households that become food insecure across employment characteristics are those having a primary caregiver working full-time with no secondary caregiver (23.68%) and a primary caregiver not working with no secondary caregiver (22.78%). The percentage of households transitioning to food insecurity is slightly higher for primary caregivers with a commuting distance of zero miles (16.46%).

Somewhat surprisingly a greater percentage of families with health insurance become food insecure compared to families that do not have health insurance (15.97% vs. 13.82%, respectively). Transitioning to food insecurity is more common among single-mother households (21.48%) than all other family types. Transitioning to food insecurity is less common among families with a male secondary caregiver (12.91%) than among



families with a female secondary caregiver or no secondary caregiver. A higher percentage of black households become food insecure (21.71%) than white households (11.71%). Transitioning to food insecurity is more common among households with low education (16.59%) than those with a college degree (12.36%). There are only small differences in the percentage of households that become food insecure based on whether or not they garden. A greater percentage of households that do not have a vehicle become food insecure (17.65%) than those with a vehicle (14.92%). North Carolina families become food insecure more commonly than Pennsylvania families (18.64% become food insecure vs. 11.11%).

It is important to note that because most of the variables used in the analysis are time varying, household characteristics at 6 months may not be the same as characteristics at later waves when households actually transition to food insecurity. For instance, in Table 4-6, no households that have a mother working full-time with missing data on secondary caregiver's work at 6 months became food insecure later in the study. However, work characteristics change over the course of the study. There are households in the primary full-time – secondary missing work category when they become food insecure at later waves. Even though characteristics change over the course of the study, it is useful to document characteristics of households before they make the transition to food insecurity.

Table 4-6. Sample Distribution of all Households at Risk for Becoming Food Insecure (households included in Event History models) and Percentage of Households that Become Food Insecure at 15, 24 or 35 Months by Given Characteristic Across Categorical Variables, Family Life Project (Characteristics measured at 6 months)

	Sample Distribution of all Households at Risk for Becoming Food Insecure (%)	Percentage that Become Food Insecure at 15, 24 or 35 Months
Food Insecure	-	15.33
Family Employment Characteristics		
Primary Not Employed - Secondary Full-time Day Shift	13.92	16.41
Primary Not Employed - Secondary Not Employed	6.09	12.50
Primary Not Employed - Secondary Nonstandard	9.78	20.00
Primary Not Employed - No Secondary	8.59	22.78
Primary Not Employed - Secondary Missing	7.50	20.29
Primary Full-time Day Shift - Secondary Full-time Day Shift	11.52	12.26
Primary Full-time Day - Secondary Nonstandard	4.02	5.41
Primary Full-time - No Secondary	4.13	23.68
Primary Full-time - Secondary Missing	4.24	0.00
Primary Full-time Nonstandard Shift - Secondary Employed	4.67	18.60
Primary Employed - Secondary Not Employed	4.57	19.05
Primary Part-time Day Shift - Secondary Employed	7.28	13.43
Primary Part-time - No Secondary	3.48	15.63
Primary Part-time - Secondary Missing	2.93	7.11
Primary Part-time Nonstandard Shift - Secondary Employed	7.28	10.45
Total Commuting Distance (Mother's Work and Childcare combined)		
15+ miles	15.54	13.29
0 < Miles < 15	38.70	16.29
0 Miles	34.35	16.46
No Work Distance Data	11.41	11.43
Health Insurance		
Primary, Secondary and Child have Health Insurance	70.11	15.97
One or more do NOT have Health Insurance	29.89	13.82
Family Structure		
Cohabiting	18.37	9.47
Three Generation or Other Family	14.57	19.40
Married	50.86	14.32
Single Mother	16.20	21.48
Secondary Caregiver Gender		
Male	69.02	12.91
Female	14.78	19.85
No Secondary Caregiver	16.20	21.48
Race/Ethnicity		
Black	38.04	21.71
White	60.33	11.71
Other	1.63	0.00

Table 4-6. Continued

Education		
Neither Primary nor Secondary has College Degree	70.11	16.59
Primary or Secondary has College Degree	29.89	12.36
Gardening		
Gardening is Important to Family	26.74	14.63
Gardening is Not Important to Family	73.26	15.58
Access to Vehicle		
Member of Household Owns Vehicle	85.22	14.92
No Member of Household Owns Vehicle	14.78	17.65
State of Residence		
Pennsylvania	44.02	11.11
North Carolina	55.98	18.64

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N = 920

Table 4-7 displays the means for the continuous variables for households that are food secure at the 6 month wave (920 households) and also shows the mean for households that become food insecure at 15, 24, or 35 months (141 households). The mean role overload score for all households that are food secure at 6 months is 20.64. The mean is slightly higher for households that become food insecure (22.68). The poverty ratio is higher for the overall sample than for the households that become food insecure (mean of 1.91 vs. 1.45). The overall sample also has more money in bank accounts on average than households that become food insecure. The mean number of adults is higher in all households (2.13) than in households that become food insecure (1.04). There is a mean of 1.55 young children for all households and a mean of 1.64 for those that become food insecure. Households that become food insecure have a higher mean number of older children (0.82) than all households food secure at 6 months (0.62). Primary caregiver's mean age is about 27 for the overall sample and for the households that become food insecure. The mean depression score is higher for households that

become food insecure, than for all households food secure at 6 months. The mean distance traveled to the nearest grocery store is lower for households that become food insecure (2.07) than for all households (2.32). The mean of the log of geographic isolation is the same for all households that are food secure at 6 months and for those that become food insecure at later waves (1.49).

Table 4-7. Means of all Households at Risk for Becoming Food Insecure (households included in Event History models) and Means of Households that become Food Insecure at 15, 24 or 35 Months for Continuous Variables, Family Life Project (Characteristics measured at 6 months)

	All Households at Risk for Becoming Food Insecure (N = 920)			Households that Become Food Insecure at 15, 24 or 35 Months (N= 141)		
	Mean	Standard Deviation	Minimum to Maximum	Mean	Standard Deviation	Minimum to Maximum
Role Overload (time)	20.64	6.46	6 – 30	22.68	6.08	6 – 30
Poverty Ratio	1.91	1.71	0 – 16.49	1.45	1.23	0 – 5.75
Money in Bank (in thousands of dollars)	2.24	5.53	0 – 40	1.37	4.64	0 – 40
Number of Adults Age 18 and Over	2.13	0.83	1 – 7	2.04	0.8	1 – 5
Number of Children Less Than Age 5	1.55	0.68	1 – 4	1.64	0.66	1 – 4
Number of Children Age 5 to 17	0.62	0.88	0 – 6	0.82	1.01	0 – 4
Primary Caregiver's Age	26.49	5.97	14.70 – 58.20	26.93	6.6	15.88 – 58.20
Depression Scale (standardized)	-0.04	0.94	-0.69 – 4.80	0.34	1.22	-0.69 – 4.80
Distance to Nearest Grocery Store	2.32	2.90	0.02 – 20.02	2.07	2.48	0.09 – 13.19
Log of Geographic Isolation	1.49	0.74	-0.21 – 3.19	1.49	0.73	-0.12 – 3.19

This chapter, *Sample Characteristics and Prevalence of Food Insecurity*, described the sample in two ways. Characteristics for the entire sample at six months were provided. Also, characteristics of the sample of households that were food secure at 6 months were discussed. Households that were food secure at six months were described separately because these are the households at risk for transitioning to food insecurity. Along with the sample characteristics, the percentage of households that were food insecure at 6 months and the percentage of households that transitioned to food insecurity later in the study were considered. Also, the prevalence of food insecurity across each wave of data collection was discussed. The next chapter details the Event History results that model the transition to food insecurity.

## Chapter 5

### **Event History Results: Predicting the Transition to Food Insecurity**

This chapter shows and discusses the results of the Event History analysis predicting the transition to food insecurity. As discussed in the methods section in Chapter 3 and the sample description in Chapter 4, households that are food insecure at the six month observation cannot be included in the Event History analysis because it is unknown when the family made the transition to food insecurity. Therefore the Event History analysis predicts the transition to food insecurity at the 15, 24 or 35 month interview for households that were food secure at the 6 month interview.

### **Discrete Time Event History Analysis: Predicting the Transition to Food Insecurity**

The discrete time Event History models are displayed in Table 5-1. These models predict a household's first observed transition to food insecurity. As mentioned earlier, only households that were food secure at the 6 month data collection are included in the analysis. There are 2,556 household-observations in the Event History Analysis. The household-observation file is weighted more heavily by households that never become food insecure. For example, a household that does not become food insecure during the study will contribute three household-observations (15, 24 and 35 months). A household that becomes food insecure at 15 months will have only one household-observation (15 months). Households that become food insecure remain in the sample for an average of

21 months. Households that do not become food insecure remain in the sample longer, 33 months on average. Households also leave the sample due to attrition from the study.

Four models are displayed in Table 5-1. The first model includes the key independent variables and financial characteristics variables. This model is included to show the effect of work characteristics, commuting distance and role overload without other controls; however, to ensure that the effect of work is not due to wages, income variables are included in the model. The full model with all controls is displayed next, followed by a reduced model with only statistically significant controls. Model 4 includes work, commuting distance and financial characteristics. The difference between Model 4 and Model 1 is that role overload is removed in Model 4. The relationship between work characteristics and becoming food insecure is hypothesized to relate to reductions in time available for food provisioning. But, controlling for role overload may account for much of the variance in becoming food insecure that is related to time. Therefore, in this final model, role overload is removed to see the relationship between work characteristics and employment without controlling for role overload.

Turning first to Model 1 in Table 5-2 the relationship between the key variables and transitioning to food insecurity is observed while controlling for financial characteristics. In Model 1, the intercept is -3.70 and is significant. The intercept is the likelihood of becoming food insecure at the 35 month wave for a household that has values of zero on all variables (2.47%). Households are significantly less likely to become food insecure at 24 months than at 35 months, according to the dummy variables indicating the wave of data collection. In each of the models, the intercept is significant



and negative and households are less likely to become food insecure at the 24 month observation than at the 35 month observation.

The dummy variables for wave of data collection indicate the duration at risk for becoming food insecure and the outcome variable indicates a transition from food secure to food insecure. These are two important differences (among others) between discrete time Event History and basic logistic regression to remember when interpreting the results: an indicator of duration at risk and an outcome variable identifying a transition. Also, most of the covariates are time varying.

In Model 1, two work combinations are marginally significantly associated with food insecurity; they have p-values between 0.05 and 0.10. Households with a mother working full-time with no secondary caregiver are 184 percent more likely to become food insecure than households with a mother not working and a secondary caregiver working a full-time day shift. Households with a mother working a full-time nonstandard shift and a secondary caregiver employed in any job are 222 percent more likely to become food insecure. These two marginally significant differences suggest that mothers working full-time have higher odds of transitioning to food insecurity than mothers that are not working. These findings are consistent with the hypothesis that mothers working more hours, especially full-time, have less time for household food provisioning and are more likely to become food insecure. The effects of employment are not due to differences in income because they are controlled. Further, the findings run counter to the expected effects of employment based only on earnings. Here mothers working more hours are *more* likely to become food insecure likely because they face time constraints on household food provisioning.

Also in Model 1, role overload is significantly related to the transition to food insecurity. Mothers with higher role overload scores are more likely to become food insecure (coefficient = 0.07). For each point higher a mother scores on the role overload scale her household's likelihood of becoming food insecure increases by 7 percent. This suggests that as mothers have more demands on their time their likelihood of becoming food insecure increases. Even though the coefficient appears small, this is a large effect because a one-point change is for example, the difference between choosing "strongly agree" and "mildly agree" for one item on the role overload scale. A mother that indicates the highest role overload (a score of 30) will be 63 percent more likely to become food insecure than a mother that has the mean score of 21. The 63 percentage likelihood is calculated by multiplying the 7 percent per unit increase by 9 units (30 minus 21).

In Model 1, the income to needs ratio is significantly associated with becoming food insecure and the relationship is negative. Those with lower incomes are more likely to become food insecure. Alternatively, higher income households are less likely to become food insecure. Money in bank accounts at 6 months and access to health insurance are not significantly related to becoming food insecure.

Commuting distance is not significantly associated with the transition to food insecurity in Model 1 or any of the subsequent models. In alternative analyses (not shown) total commuting distance was included in the model as a continuous variable, but it was not significant. Also, models were estimated where mothers distance from home to work was included alone instead of adding distance to childcare. Mothers work distance was not statistically significant.

The full model is displayed in Table 5-2, Model 2. One difference in coefficients between Model 2 and Model 1 is that having a mother working a full-time job without a secondary caregiver is no longer significantly related to transitioning to food insecurity when other factors are controlled. The coefficient for the work combination of mother working full-time at a nonstandard shift and an employed secondary caregiver is smaller in the full model. But these households are still over 200 percent more likely to become food insecure than households with a mother not working and a secondary caregiver working a full-time day shift. The difference between these household types is likely due to having a mother with less time for household tasks because she is working full-time and working nonstandard hours that may specifically interfere with dinner preparations.

In Model 2, the full model, higher role overload remains associated with a greater likelihood of becoming food insecure. Each one point higher a mother scores on the role overload scale is associated with a 5 percent increase in the likelihood of becoming food insecure. The income to needs ratio also remains significant.

Also in Model 2, number of children age 5 to 17 is related to food insecurity. Each additional child increases the odds of transitioning to food insecurity by 18 percent. Mother's score on the depression scale is also related to food insecurity. Mothers that score one standard deviation above the mean are 47 percent more likely to become food insecure. Distance to nearest grocery store is marginally significant. But the direction of the coefficient is somewhat surprising. For each additional kilometer to the nearest grocery store, a household's odds of becoming food insecure decrease by 7 percent.

Model 3 is the reduced form of the full model. Variables that were not significant in the full model were removed one by one according to their p-values. Variables with p-

values closest to one were removed first. As nonsignificant controls were removed from the model, state of residence emerged as a significant predictor of food insecurity. Households residing in Pennsylvania are 31 percent less likely to become food insecure than households in North Carolina. In the reduced model, the coefficients for role overload, poverty ratio, number of children age 5 to 17 and maternal depression remain similar to the full model. In the reduced model, the coefficient for mothers working a full-time job during nonstandard hours with an employed secondary caregiver is somewhat smaller than in the full model, but these households are still more likely to become food insecure than the reference category of mothers not working and secondary caregivers in a full-time day shift. One additional change in the reduced model is that distance to grocery store is no longer significant. When the log of geographic isolation was removed from the model, distance to grocery stores was no longer significant.

Model 4 is the same as Model 1 except that it excludes role overload and the commuting distance variables. Because work is hypothesized to relate to becoming food insecure due to reducing time available for non-market activities like food provisioning, controlling for role overload may account for some of the effect of employment characteristics in as far as they relate to time. However, removing role overload from the analysis does not result in more work categories becoming significantly related to the transition to food insecurity. Mothers working full-time jobs during a nonstandard shift with an employed secondary caregiver are now significantly more likely to become food insecure than the reference category for work, at conventional levels of significance ( $p < 0.05$ ). Households with mothers working full-time jobs without a secondary caregiver remain marginally significantly more likely to become food insecure than households

with mothers not working and secondary caregivers working full-time during a day shift.

It appears that in this sample controlling for role overload does not change the relationship between work characteristics and food insecurity.

Table 5-1. Event History Models Predicting First Transition to Food Insecurity with Family Life Project Data

	Model 1: Work, Role Overload, Distance and Income		Model 2: Full Model		Model 3: Reduced Model		Model 4: Work and Income (Role Overload and Distance Removed)	
	Parameter Estimate	Odds Ratio	Parameter Estimate	Odds Ratio	Parameter Estimate	Odds Ratio	Parameter Estimate	Odds Ratio
Intercept	-3.70***		-4.06***		-3.25***		-2.07***	
Observation (wave) (Reference: 35 months)								
15 months	0.13	0.90	0.13	0.91	0.13	0.90	0.16+	0.96
24 months	-0.35***	0.56	-0.35**	0.56	-0.36***	0.55	-0.36***	0.57
<u>Key Independent Variables</u>								
Employment (Reference: primary not working, secondary full-time day shift)								
Primary Not Employed - Secondary Not Employed	-0.05	0.95	0.09	1.09	-0.07	0.94	-0.02	0.98
Primary Not Employed - Secondary Nonstandard	0.37	1.45	0.37	1.44	0.35	1.42	0.39	1.47
Primary Not Employed - No Secondary	0.31	1.36	0.47	1.60	0.18	1.20	0.28	1.33
Primary Not Employed - Secondary Missing	0.02	1.02	0.02	1.02	-0.13	0.88	-0.01	0.99
Primary Full-time Day Shift - Secondary Full-time Day Shift	0.46	1.58	0.35	1.42	0.28	1.33	0.37	1.44
Primary Full-time Day - Secondary Nonstandard	0.29	1.34	0.17	1.18	0.10	1.11	0.15	1.16
Primary Full-time - No Secondary	0.61+	1.84	0.65	1.91	0.39	1.48	0.50+	1.65
Primary Full-time - Secondary Missing	-0.15	0.86	-0.28	0.76	-0.42	0.66	-0.22	0.80
Primary Full-time Nonstandard Shift - Secondary Employed	0.80+	2.22	0.74+	2.09	0.61+	1.83	0.70*	2.02
Primary Employed - Secondary Not Employed	0.35	1.42	0.39	1.48	0.23	1.25	0.29	1.33
Primary Part-time Day Shift - Secondary Employed	0.59	1.81	0.55	1.74	0.46	1.58	0.43	1.53
Primary Part-time - No Secondary	0.30	1.35	0.39	1.48	0.16	1.17	0.20	1.22
Primary Part-time - Secondary Missing	-0.51	0.60	-0.69	0.50	-0.79	0.45	-0.51	0.60

Table 5-1. Continued

Primary Part-time Nonstandard Shift - Secondary Employed	-0.11	0.89	-0.06	0.94	-0.10	0.90	-0.16	0.86
Role Overload (time demands)	0.07***	1.08	0.05***	1.05	0.05***	1.05		
Total Commuting Distance (References: 15+ miles)								
0 Miles	0.08	1.08	0.01	1.01				
No Work Distance Data	-0.23	0.80	-0.25	0.78				
0 < Miles < 15	0.06	1.06	0.01	1.01				
<u>Financial Characteristics</u>								
Poverty Ratio	-0.29***	0.75	-0.25**	0.78	-0.21**	0.81	-0.26**	0.77
Money in Bank Account at 6 months	-0.04	0.96	-0.04	0.96			-0.04	0.96
Primary, Secondary and Child have Health Insurance	0.03	1.04	0.02	1.02			0.09	1.10
<u>Family Characteristics</u>								
Primary Caregiver Married			0.30	1.35				
Secondary Caregiver Female			0.20	1.22				
Number of Adults			-0.05	0.95				
Number of Children Less than Age 5			0.01	1.01				
Number of Children Age 5 to 17			0.16*	1.18	0.20**	1.22		
<u>Primary Caregiver Characteristics</u>								
White			-0.04	0.96				
Primary or Secondary has college Degree			0.16	1.17				
Primary Caregiver Age			0.02	1.02				
Primary Caregiver Depression Scale			0.38***	1.47	0.38***	1.46		
<u>Food Access</u>								
Distance to Grocery Store			-0.07+	0.93				
Gardening is Important to Family at 6 months			-0.15	0.86				
Member of Household owns Vehicle at 6 months			0.31	1.36				
<u>Residence</u>								
Pennsylvania			-0.31	0.73	-0.38*	0.69		
Log of Geographic Isolation			0.15	1.16				

Table 5-1. Continued

-2LL	1527.44	1466.60	1482.21	1569.13
Likelihood Ratio (df)	100.73 (23)	161.57 (37)	145.96 (21)	59.04 (19)
$R^2_L$	6.19	9.92	8.96	3.63

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+ p < 0.10, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Number of Household-Observations = 2556



### **Additional Analyses**

Several other models were also estimated. The models shown were also estimated including a dummy variable indicating when missing data on secondary caregivers' employment was filled-in using data from previous or subsequent waves. This dummy variable was not significant so it was removed from the analysis.

Other models involved estimating interactions between role overload and work combinations and interactions between commuting distance and work combinations. An alternative model estimated an interaction between access to a vehicle and commuting distance. However, none of these interactions were significant and so these models are not shown.

In alternative models primary caregiver work and secondary caregiver work were included as separate sets of dummy variables. Work characteristics were not combined between caregivers. However, mother's work was not significant whether or not secondary caregiver employment was controlled. The models were estimated several ways using different work characteristics as the reference category, but there were no significant relationships between mothers' employment and becoming food insecure. Secondary caregiver's work characteristics were also not significantly related to becoming food insecure. These models are not shown. The combination of primary and secondary caregivers' employment appears to be a better predictor of becoming food insecure. This is consistent with theory suggesting that households make decisions around work and time allocations jointly.

### **Differences between Prior Research and Study Findings**

Family structure characteristics that were found to be significantly related to prevalence of food insecurity in prior research are not significant here. For example, married couple households are typically considered less likely to be food insecure than other household types, but marital status is not significant in these analyses. This insignificant relationship may obtain for four reasons. First, these models include greater detail on caregiver's employment than do most other food insecurity studies. The effect of marriage on food insecurity likely relates at least in part to the work arrangements of spouses. When work combinations between spouses are included as predictors, the relationship between food insecurity and household structure may differ. The greater detail on employment characteristics may also explain why education was not significantly related to becoming food insecure. Second, the effect of family structure, and other variables, may differ in a sample of low-income households with a recent birth living in rural and small-town areas from a nationally representative sample. The process whereby households become food insecure may differ in a subgroup of the population compared to the population as a whole. Third, the event history models are predicting the first observed transition to food insecurity. Most studies on food insecurity estimate the likelihood or prevalence of food insecurity at one point in time using a cross-section. In this sample more chronically disadvantaged households, such as single-mother households, may have already been food insecure at the start of the study (at 6 months) and so their transition is not modeled here. Selecting these more disadvantaged households out of the analysis may have resulted in fewer significant differences in the

Event History analysis. Fourth, there were relatively few transitions to food insecurity modeled in the Event History analysis. This may explain in part the limited significant results.

### **Summary of Findings**

Across all four models in Table 5-2 role overload is consistently associated with becoming food insecure. Mothers with higher role overload and greater demands on their time have households that are more likely to become food insecure. This finding is consistent with the theoretical framework developed in chapter 2 that mothers who lack time for household food provisioning may be at higher risk for becoming food insecure. This is an important result to highlight because the relationship between time as a resource and becoming food insecure has not been explored in prior research.

Other findings significant across models were as follows. First, households with mothers working full-time during a nonstandard shift and secondary caregivers employed in any job were more likely to become food insecure than households with mothers not working and secondary caregivers working full-time during the day-shift. Second, households with a lower income to poverty ratio are more likely to become food insecure than households with more income. Third, number of older children is significantly related to becoming food insecure, the more children in a household the higher the likelihood of becoming food insecure. Fourth, mothers that score higher on the depression scale are more likely to become food insecure. Fifth, sample participants

from Pennsylvania are less likely to become food insecure than participants from North Carolina.

The chapter also discussed reasons for differences between the current study and prior research. Findings from the Event History analysis indicate that an increase in demands on mothers' time is associated with significantly higher odds of transitioning to food insecurity. This is an important theoretical and empirical contribution to the food insecurity literature that role overload, or time poverty, is significantly associated with household food insecurity. The next and final chapter discusses the results and considers limitations of the study, policy implications and contributions of the research.

## Chapter 6

### Discussion and Conclusions

In this final chapter the study hypotheses provided in Chapter 2 are reviewed with a focus on whether they are supported by the findings. Then contributions of the research are considered. This section has two parts, first considering the theoretical and empirical contributions regarding time poverty and its association with the transition to food insecurity, and second, noting the importance of documenting factors related to becoming food insecure. Limitations of the study are considered in the third section. Then policy implications are discussed. Finally, the chapter ends by discussing directions for future research.

### Support for Hypotheses

#### *Hypothesis 1*

Controlling for income and other characteristics, households with caregivers spending more hours in paid employment will be more likely to become food insecure than households investing less time in paid work.

- a. Mothers who are not employed will be less likely to become food insecure than those employed, because they can invest more time in food provisioning.
- b. Mothers working full-time will be able to spend the least time in food provisioning and may experience the highest odds of becoming food insecure when income is controlled.

There was some support for hypothesis 1. In the full and in the reduced Event History models the only work category that was significantly different from the reference category of a mother not working and a secondary caregiver in a full-time day shift job was the category of a mother working a full-time nonstandard shift job with the secondary caregiver employed. Mothers working full-time nonstandard shifts were in households that were more likely to become food insecure. Hypothesis 1a was only partially supported because mothers working part-time were not significantly more likely to become food insecure than mothers not working. Part-time workers may have employment that allows enough time and flexibility to meet the demands of household food provisioning. Hypothesis 1b was only partially supported because only mothers working full-time during nonstandard hours had significantly higher odds of becoming food insecure, while those working standard hours did not.

The particular work category that is significant is quite meaningful, even though the hypothesis was only partially supported. It may be that in terms of food provisioning, mothers working full-time during a nonstandard shift are the most time poor because they are working full-time during evening and night or irregular shifts. Not only do they have the least time overall for food provisioning (because they work full-time) but their shift may interfere with preparing dinner for their families. The theory developed in chapter 2 would suggest that mothers in this particular work situation, working full-time during nonstandard hours, would be the most time poor and have the most difficulty with meal provisioning. This finding provides support for the theory proposed.

### *Hypothesis 2*

Households with mothers working nonstandard hours or rotating shifts will be more likely to become food insecure than households with mothers working standard hours. Mothers working evening or irregular shifts will have greater difficulty planning meals, food shopping, and preparing meals and may not be home during primary dinner hours to prepare meals and eat with their families.

There was partial support for hypothesis 2 as well. Mothers working full-time during nonstandard shifts were more likely to become food insecure than the reference category of mothers not working. But, mothers working part-time during nonstandard shifts were not more likely to become food insecure. As noted above, it is likely that mothers working full-time during nonstandard hours have the greatest difficulty providing household meals and so these mothers in particular may have greater food spending that increases their likelihood of becoming food insecure.

### *Hypothesis 3*

Longer travel distances between home, employment and childcare will relate to a greater likelihood of becoming food insecure. Long travel distances will have financial and time costs that reduce household resources.

Hypothesis 3 was not supported. None of the distance variables—commuting distance, distance to nearest grocery store and geographic isolation—was significantly related to the transition to food insecurity. As will be discussed in the limitations section below, this may have been because there was little variation on the distance variables and overall the distances from home to key destinations were relatively short in this sample. Many women had a zero value on the commuting distance variables because they simply did not commute to work or childcare.

#### *Hypothesis 4*

Mother's role overload will be a significant predictor of becoming food insecure; mothers with greater demands on their time (higher role overload) will have higher odds of becoming food insecure.

- a. Role overload will interact with work characteristics in affecting food insecurity. Some mothers may experience role overload from other pressures unrelated to employment. Non-working mothers with high role overload may face a greater risk for becoming food insecure than full-time working mothers with low role overload.
- b. Role overload will also interact with distance traveled. Effects of travel distance may depend on role overload. For mothers that have high role overload, a relatively short commute may exacerbate time poverty and transitions to food insecurity.

Hypothesis 4 was supported. Across all of the Event History models, role overload was a strong predictor of the transition to food insecurity. As role overload increased the likelihood of becoming food insecure also increased. This relationship was even stronger than the relationship between income and becoming food insecure (as evidenced by role overload having a p-value of 0.001 and poverty ratio having a p-value of 0.01 in the full and reduced Event History models). The theoretical framework linking time availability and the transition to food insecurity receives strong support.

Hypotheses 4a and 4b were not supported. There were not significant interactions between role overload and work form or role overload and distance. But, the main effect of role overload was robust and consistent with the proposed theory.

#### *Hypothesis 5*

Single-mother households without a secondary caregiver will be more likely to become food insecure than households with a secondary caregiver when income and household size are controlled. Time for food provisioning and other household activities will be lowest among households with only one adult.



Hypothesis 5 was not supported. Mothers without a secondary caregiver were not more likely to become food insecure than mothers with a secondary caregiver (in the work combination variable). In models not shown, where mothers' and secondary caregivers' work arrangements were entered separately, household structure was also included in the model. In these models, single-mother households were not significantly more likely to become food insecure than married couple households. It may be that household structure is related to the prevalence of food insecurity but not the transition to food insecurity. Also, in this sample of low-income households, the relationship between household structure and food insecurity may not be the same as in the overall population.

One indicator of family structure was significant, the number of children age 5 to 17. As the number of children increases so does the likelihood of transitioning to food insecurity. This may be related to time poverty. Children ages 5 to 17 may reduce the time available for household food provisioning as parents spend time transporting their children to and from school and other activities. Also, these children may have more demanding food preferences that could be more costly and time intensive for parents.

## **Contributions**

### **Time Poverty and the Transition to Food Insecurity**

Perhaps the most important contribution of this dissertation research is in linking mother's time demands and the transition to food insecurity. This contribution is both theoretical and substantive. The food insecurity literature has not focused on time as an

important resource that households can use to reduce their risk of becoming food insecure. This study has synthesized economic theory, which suggests that the availability and allocation of non-market time affects household economic well-being with prior research on food insecurity. This theoretical framework leads to the hypothesis that lacking time for household food provisioning will increase the likelihood of becoming food insecure. The hypotheses and theoretical framework are supported by the analysis. Mother's time demands or role overload are significantly associated with households' transitions to food insecurity.

A theory linking time and food insecurity is an important contribution to the food insecurity literature. It goes beyond the obvious link between income and food insecurity. Further, considering time as resource helps to explain the income – food insecurity paradox where some low-income households are able to maintain food security while some higher income households are not. Only 37.7 percent of low-income households (income below 100% of poverty), but 5.5 percent of moderate income households (income above 185% of poverty) are food insecure (Nord et al. 2008). This is not to trivialize the large minority of low-income households that are food insecure. But, it could be expected that a much higher percentage of low-income households would be food insecure. After all, the federal poverty thresholds are calculated such that those households below poverty are expected to have too little to meet their basic food needs and other expenses. Researchers have wondered at this paradox. Savings, sudden expenses or sudden decreases in income that are not captured in annual income measures are also related to food insecurity (Gundersen and Gruber 2001). Yet, these explanations for the income – food insecurity paradox still focus on financial factors. The

explanations presented here go beyond income factors. This theoretical development helps to explain previous findings and extend understanding of how food insecurity develops.

Time poverty may explain why some moderate income households experience food insecurity. But, time poverty in general is likely to be more important for low-income families. Higher income families may successfully deal with time poverty by purchasing food away from home, paying for high-quality childcare and using a home cleaning service. If incomes are high enough to purchase these services without exceeding the household budget then time poverty is not a concern for these families. It is among low-income families that cannot afford to purchase meals out, to pay for quality childcare, or hire a cleaning service where time poverty may have a detrimental effect on family functioning, standard of living and food insecurity. Time and money are resources that can be traded to maintain an adequate standard of living. But when both time and money are low households may simply be unable to maintain food security. This suggests that there may be an interaction between income and role overload. There may be less of an association between food insecurity and role overload among high income households. But among moderate income and especially low-income households high role overload may be a stronger predictor of food insecurity. This interaction should be explored in a sample with greater income variation. The current sample, with primarily low-income households does not contain enough variation in income to fully explore this interaction.

Finding that a lack of time or too many demands on time relates to becoming food insecure is relevant for developing policies to reduce both the prevalence of food

insecurity and the likelihood that households will become food insecure. In the current economy, economic means of reducing food insecurity such as reducing unemployment and increasing incomes may be difficult to implement. In May 2009, the national unemployment rate reached 9.4 percent (Bureau of Labor Statistics 2009). Policy makers aiming to reduce food insecurity will likely be unable to reduce food insecurity by focusing on economic factors alone. Further, households themselves may have little control over financial matters, like job losses and gas prices, which affect their likelihood of becoming food insecure. However, families may be able to implement small changes that reduce their household food budgets by spending food preparation time more efficiently. And policy makers and social service workers can encourage families to implement such changes. For example, USDA can supplement their Thrifty Food Plan recipe book with a booklet of tips and tricks for easy ways of reducing food costs that require little extra time. These issues will be considered further in the implications section of this chapter.

### **Being versus Becoming Food Insecure**

Another important contribution of the study is in focusing on the *transition* to food insecurity. Understanding factors that are related to becoming food insecure is essential to create policy to prevent food insecurity or reduce the likelihood of becoming food insecure. Up to now it was unknown whether the factors related to currently being food insecure are the same or similar to the factors related to becoming food insecure. This research provides some evidence that characteristics of households that relate to

being food insecure also relate to becoming food insecure, especially income and maternal depression. However, other factors, especially marital status and education, are not related to the transition to food insecurity. These factors may be significant predictors of becoming food insecure if they were measured as change variables that identified transitions between waves, similar to how the food insecurity outcome variable is measured. It may be that a change in household structure, such as a union dissolution and formation of a single-mother household, would relate to becoming food insecure. But, simply being in a married couple or single-mother household may not relate to the transition to food insecurity. It is reasonable to expect that variables would have a similar relationship to being and becoming food insecure, but this is an empirical question that deserves further research.

In the current study, the number of households making the transition to food insecurity declines over the course of the data collection. The sample also had increases in mean household income and more women entered the labor force as data collection progressed. In this particular sample, household well-being appeared to improve over time. This may be a function of the particular point in the lifecourse when these families were studied. Over time more mothers worked and increased their income. Also, households may have adjusted successfully to their recent childbirth and change in household size and expenses, thus reducing the incidence of transitions to food insecurity as children aged.

Panel data analysis covering a wider swath of the lifecourse and following families for longer is necessary to understand how the likelihood of transitioning to food insecurity varies over the lifecourse. Also, the frequency of food insecurity spells and

cycling in and out of food insecurity could be assessed. This study is an important first step in studying changes in food security status, namely an initial observed transition to food insecurity.

The goal of federal food assistance policy should be to not only reduce the prevalence of food insecurity but also to reduce the likelihood that a household will become food insecure. Developing policies to reduce the likelihood that a household will become food insecure requires further research to understand relevant factors related to the transition to food insecurity in a national sample. Potential directions for this research are discussed in the future research section later in this chapter.

### **Limitations**

There are several limitations to the current study. One is that the standard USDA food security measure could not be used. A one-item indicator of food insecurity was used. This single item likely underestimated the prevalence of food insecurity in the sample. This limitation suggests that the findings of this study are the lower-bound estimates. If food insecurity were not underestimated there would be more transitions to model and there would likely be more significant associations between food insecurity and the predictor variables. Using the one-item indicator of food insecurity available in the FLP may explain in part why few of the variables used in the analysis were significantly related to becoming food insecure.

Another limitation of the study is its sample. The sample is somewhat small. But, the sample size itself becomes problematic when coupled with missing data on key

independent variables like secondary caregiver's employment and commuting distance data. Coupled with missing data, the sample size may be too small for the analysis at hand. There were relatively few transitions to food insecurity to model. A larger sample with less missing data would likely have made the analysis more robust. With a larger sample, the work combination categories may have greater significance. Many of the coefficients are in the hypothesized direction and are relatively large in magnitude but do not reach statistical significance. Also, the work combination categories could have had greater detail if there were more cases to divide across work category cells.

Along with work characteristics and the transition to food insecurity, another key focus of the study is distance traveled to employment and other destinations. These factors were not significantly related to becoming food insecure. There may be too little variation in residential location in the sample to relate distance and becoming food insecure. The sample consisted of small metropolitan and nonmetropolitan counties. Although the sample consisted of some households from nonmetropolitan counties, all of the counties were adjacent to metropolitan counties. The commuting distance and geographic isolation scores indicate that the majority of the households live in close proximity to both jobs and key community locations. The theory that needing to spend more time driving to work, buying groceries, visiting government offices or other destinations may be supported by research with a sample that includes more variation in residential location and proximity to key destinations. Residents of nonmetro counties that are not adjacent to metro counties (county types not included in the FLP) are likely to have to travel further for employment and to obtain other essential goods and services. If

these residents had been included in the study, hypotheses regarding time spent in travel or commuting may have been supported.

### **Policy Implications**

There are several potential policy implications of the study. The main contribution of the research is in identifying role overload as an important factor related to the transition to food insecurity. This leads to policy recommendations for federal food assistance and emergency food providers. As noted in the theory and literature review, federal Food Stamp allocations are based on the assumption that food will be prepared at home from scratch. Vickery (1977) cogently notes that the Thrifty Food Plan (the estimated costs of a family's minimum level of food expenditures) was actually derived on the model of a two parent family with two children having one earner and one stay at home parent (mother) who is assumed to spend extensive time in food preparation. When the Thrifty Food Plan is adjusted for household size and composition, it is not adjusted for time availability. A single mother household with the same number of children is thought to require less money because she does not have a partner requiring food. But, she is likely to have far less time to invest in household food provisioning than the two-parent family with one earner. This single mother is not only responsible for all domestic tasks including food provisioning, but also responsible for earning an income through employment.

Further, not only does the assumption of having a stay at home mother disadvantage single mothers but it also disadvantages married mothers who are in the



labor market. A majority of married mothers, even those with infants, are now in the labor force (Cohany and Sok 2007). Yet, the assumptions of the Food Stamp program benefit allotments have not kept pace with the increased labor force participation of women. Nor has the Thrifty Food Plan kept pace with other policy, namely the Personal Responsibility Work Opportunity Reconciliation Act of 1996, which requires low-income single mothers to work or to be in school.

The labor force participation of women, including mothers, has increased substantially as a result both of social change and welfare policy. Yet, men's time spent in household tasks has not increased at the same rate as women's time in household tasks has declined. Women's reduced time in household tasks has not been compensated for by men. The problem of household food provisioning is also a problem of gender. If men spent more time in household tasks, women's role overload could be alleviated. Moreover, if men *and* women were spending equal time in food provisioning, households might reduce their food costs and their risk for becoming food insecure. Promoting gender equality may reduce time poverty within households and may in turn reduce the likelihood of becoming food insecure. Yet, it is difficult to induce social change in gender roles through government policy. But, as men have not kept up with social change, the Food Stamp program has not been responsive to women's labor force participation and resulting time poverty. The deficiencies of the Food Stamp program can be corrected by changes in policy.

Further, Food Stamp program policies have not changed to match other policies affecting low-income households. An unintended policy consequence of TANF may be increased food insecurity if mothers have little time to invest in food provisioning. The

Food Stamp program and welfare reform (TANF) were created during separate historical time periods and the assumptions about families that underlay these two programs are at odds. The Food Stamp program should be amended by recognizing that the assumptions that households have a stay at home mother with time to prepare meals is no longer valid. Food Stamp benefits should be adjusted to recognize that mothers in the labor market cannot invest extensive time to prepare especially low cost meals and by necessity will have higher food expenditures.

Research documenting the extensive time investment needed to prepare low-cost meals (Davis and You forthcoming; Rose 2007) and the findings here that role overload is related to transitions to food insecurity provide strong evidence that Food Stamp benefits should be adjusted to allow for the purchase of more prepared or convenience foods. It is unfortunate that Food Stamp benefit levels are linked to the federal poverty threshold. This makes Food Stamp allocations overly politicized. The ability to make Food Stamps responsive to the needs of low-income families is also reduced. The context of American families has changed a great deal since Food Stamps were first created. The increase in single-mother families and the increase in female labor force participation have reduced women's time to spend in household food provisioning. Food Stamp benefit levels should reflect these changes.

Food Stamp benefits should be decoupled from the Thrifty Food Plan and poverty thresholds. Federal poverty thresholds could continue to be based on the Thrifty Food Plan to maintain congruency in poverty estimates. However, a new food plan could be created by USDA to specifically calculate Food Stamp allotments based on the reality that few American households have extensive time to invest in household food

preparation. Increasing Food Stamp allotments would not only increase the amount of money recipients could spend on food, but it may also allow single-mothers in particular to more easily meet the demands of providing earned income, caring for children and maintaining a household. Also, given that time-poor households require more money to meet their basic needs (Vickery 1977), households above 130 percent of poverty (the cut off for Food Stamp eligibility) may need Food Stamps if they are time poor. The 130 percent of poverty income threshold for food stamps may be too low for single parent families and families with two working parents because these households likely do not have enough time to reduce their food costs. Of course, even if Food Stamp benefit levels and allotments did not impact the federal poverty line, raising allotments and the income qualification would raise federal spending, something that may be untenable to politicians and taxpayers.

Aside from increasing Food Stamp levels, USDA could do other less costly things to help families that are strapped for time and have low-incomes. USDA's Thrifty Food Plan recipe book is an important start in encouraging families to minimize their food budgets (USDA Center for Nutrition Policy and Promotion 2000). However, as has already been noted in prior research, these recipes are too time intensive (Davis and You forthcoming) and require more time than families have to spend in food provisioning. USDA could revise these recipes or add others that are prepared quickly. Publications devoted specifically to preparing low-cost meals with little time could be developed as well. The Thrifty Food Plan recipe book contains some tips such as preparing large meals and then freezing leftovers for a later date. Families may not realize how much time and money can be saved with such strategies. Highlighting both the time and cost

savings in easily understood and meaningful ways may make families more likely to adopt such strategies.

In addition, USDA should focus on the distribution of such materials to households that need them. Websites may not be useful for many low-income households. Distribution of recipes and time saving advice through Food Stamp and WIC offices, as well as food pantries and food banks would be helpful. Households seeking food assistance do utilize recipes provided at food pantries. Households seem to find recipes more useful if they are easily understood, require few ingredients, require few cooking tools and if the recipe is verbally explained to them (author's own experiences working in food pantries). Nutrition and food buying education programs have proved successful at reducing food insecurity among participating households (Dollahite, Olson, and Scott-Pierce 2003). Programs focused specifically on helping families reduce food provisioning time while maintaining low food costs may also help to reduce and prevent food insecurity.

In short, households that are food insecure or facing the prospect of becoming insecure would benefit from learning strategies to save time and money in preparing household meals. Families may realize that purchasing convenience foods and restaurant meals are more expensive, but may not know how or if they can solve the problem of too little time for preparing meals while reducing food costs. Reducing work hours or changing jobs are unlikely options for solving this problem. Helping families overcome time poverty will not only help to prevent transitions to food insecurity but also help families to reduce the emotional stress and strain of feeling like they are providing inappropriate meals for their children.

### **Future research**

This study points to several fruitful areas of future research. Continued research with the Family Life Project should focus on understanding how changes in work characteristics relate to the transition to food insecurity. Because change is modeled with the Event History analysis (going from food secure status to food insecure status) it may be important that the predictors also identify change. Instead of including indicators for the work characteristics at each wave of the study, indicators of change in work characteristics between waves could be included. For instance, it may be more important that a mother increased her work hours by going from working part-time at 15 months to working full-time at 24 months than just that she worked full-time at 24 months. Changes in work characteristics may be important factors for becoming food insecure. Future research should identify changes in work characteristics (number of hours worked and work schedule) between waves and use these change variables to predict a transition to food insecurity. The sample size will likely limit the amount of detail on change that can be included in such analyses. Considering work changes for mothers only may be necessary instead of including change for both mother and secondary caregiver employment. Along with including indicators of changes in mother's work characteristics, other change indicators could include role overload, income, family size and presence of secondary caregiver. Here again changes in these predictors between waves may be more important for predicting transitions to food insecurity than current characteristics.

Future research should investigate the hypotheses studied here with a national sample. The Panel Study of Income Dynamics (PSID) now includes the USDA food security measure. This panel data set also includes indicators of employment and family structure over time. This data source would be useful for studying work schedules and number of hours worked in a larger nationally representative sample. There may be a stronger relationship between work characteristics and the transition to food insecurity in the PSID sample than in the FLP sample. The PSID includes all families, not just families with young children like the FLP, so there will be more mothers working. Also, with a larger and more varied sample, greater detail on employment may be included. In addition, other household and individual characteristics and their association with the transition to food insecurity could be studied. This would be an important direction for future research. As already mentioned, identifying predictors of *transitions* to food insecurity is important for policy development. It is likely that the PSID has a large enough sample size that exits from food insecurity could be modeled as well. Understanding factors that relate to households transitioning out of food insecurity (becoming food secure) would also guide policy development by focusing on how food insecure households can more quickly become food secure.

If the role overload scale or other measures related to time allocation were included in the PSID this would be another fruitful area for research. Role overload is likely to be especially relevant in a low-income sample that cannot afford to purchase expensive prepared meals. But, it would be interesting and informative to examine the relationship between food insecurity and role overload in a national sample.

Another area for further research is continued investigation of distance traveled to important locations and the relationship to food insecurity. Of nonmetro counties, only nonmetropolitan counties that were adjacent to metropolitan counties were included in the FLP. Nonadjacent nonmetropolitan counties should be studied to more fully understand the relationship between distance and becoming food insecure. Rural areas where residents live further from grocery stores, such as the Great Plains (Morton and Blanchard 2007) as well as central cities that lack large grocery stores may show a stronger relationship between distance traveled to grocery stores and other destinations. Distances traveled to social services or government offices may be especially problematic for low income households in large counties in western states. Future research should investigate the relationship between distances traveled and the transition to food insecurity in regions that are typified by longer commutes and greater dispersion of stores. In short, the findings regarding distance and the transition to food insecurity should not be taken to mean that distance is not important. Rather, research needs to be continued in this area to understand how distance relates to becoming food insecure in different geographic contexts. There also may be an interaction between distance and income where distance is more problematic for low-income families. With nationally representative samples, analyses should include an interaction between income and distance traveled to important destinations to better understand the relationship between distance and food insecurity.

Finally, the theoretical foundation of time allocation and time poverty, household food provisioning and the onset of food insecurity received support from the Event History analysis. Future studies should also test hypotheses based on the theory

developed here. To do so would require the inclusion of measures of time demands or role overload in other data sets. The role overload scale used here included only six items but was closely related to the transition to food insecurity. Also, measures of household costs and expenses such as money spent on food of various types (i.e. basic food ingredients, prepared meals, fast food and meals out), child care costs, transportation expenses and other household costs should also be included in future studies. By including these measures, the hypotheses regarding higher expenditures for mothers with high role overload could be directly tested. The role overload scale and indicators of household expenses should be included in national data sets that include food insecurity measures, especially the PSID, to enable continued research on this topic.

### **Conclusion**

This study helps to further develop the food insecurity literature in several ways. First, the study advances a theoretical framework to understand why food insecurity may occur, due to time poverty and effects on food provisioning. Second, the study turns from a focus on relevant predictors of the prevalence of food insecurity to begin understanding relevant predictors of the transition to food insecurity. Third, the findings and limitations of the current study point to several areas for future research with nationally representative samples including continued study of role overload, distance and transitions between food security statuses. Fourth, several policy implications flow from the findings of this study. These especially center on the Food Stamp program and tensions between food assistance programs and welfare policies.



Understanding the complexity of factors that relate to households' transitions to food insecurity have only just begun. The findings of the current study are interesting and build on previous research but perhaps they are most important because they point to additional research and policy avenues to pursue that will deepen understanding of and help to prevent transitions to food insecurity.

**Appendix**  
**Family Life Project Measures and Scales**

**Hunger Measure**

**Items:**

1. At any time in the past 12 months, did you or other adults in your household cut the size of your meals or skip meals because there wasn't enough money for food?
2. In the past 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?
3. At any time in the past 12 months, did you cut the size of any of [Target Child's] meals because there wasn't enough money for food?
4. At any time in the past 12 months, did [Target Child] skip a meal because there wasn't enough money for food?

*If Yes to 4:*

Did this happen in only 1 or 2 months, some months but not every month, or almost every month?

5. At any time in the past 12 months, was [Target Child] hungry but you just couldn't afford more food?

**Responses for each Item:**

0. No
1. Yes

**Scoring:**

If the primary caregiver answers “yes” to any item, the family is given a one on the hunger variable.

## References

- Alaimo, K., R.R. Briefel, E.A. Frongillo, Jr., and C.M. Olson. 1998. "Food Insufficiency Exists in the United States: Results for the Third National Health and Nutrition Examination Survey (NHANES III)." *American Journal of Public Health* 3:419-426.
- Alaimo, K., C.M. Olson, E.A. Frongillo, Jr., and R.R. Briefel. 2001. "Food Insufficiency, Family Income, and Health in US Preschool and School-Aged Children." *American Journal of Public Health* 5:781-786.
- Allison, P.D. 1995. *Survival Analysis Using SAS: A Practical Guide*. Cary, NC: SAS Institute Inc.
- Ames, B.D., W.A. Brosi, and K.M. Damiano-Teixeira. 2006. "'I'm Just Glad My Three Jobs Could Be During the Day': Women and Work in a Rural Community." *Family Relations* 55:119-131.
- Bartfeld, J. and R. Dunifon. 2006. "State-Level Predictors of Food Insecurity among Households with Children." *Journal of Policy Analysis and Management* 25:921-942.
- Becker, G.S. 1965. "A Theory of the Allocation of Time." *The Economic Journal* 75:493-517.
- Bhattacharya, J., J. Currie, and S. Haider. 2004. "Poverty, Food Insecurity, and Nutritional Outcomes in Children and Adults." *Journal of Health Economics* 23:839-862.
- Bhattacharya, J., T. DeLeire, S. Haider, and J. Curie. 2003. "Heat or Eat? Cold-Weather Shocks and Nutrition in Poor American Families." *American Journal of Public Health* 93:1149-1154.
- Binkley, J.K. 2006. "The Effect of Demographic, Economic, and Nutrition Factors on the Frequency of Food Away from Home." *The Journal of Consumer Affairs* 40:372-391.
- Blanchard, T. and T. Lyson. 2002. "Access to Low Cost Groceries in Nonmetropolitan Counties: Large Retailers and the Creation of Food Deserts." in *Rural Diversity Conference*. Available at: <http://srdc.msstate.edu/measuring/ruraldiversity.htm>.

- Briefel, R.R. and C.E. Woteki. 1992. "Development of Food Sufficiency Questions for the Third National Health and Nutrition Examination Survey." *Journal of Nutrition Education* 24:24S-28S.
- Bureau of Labor Statistics. 2008, "ATUS News Release: Married Parents' Use of Time, 2003-2006", Retrieved May 12, 2009, (<http://www.bls.gov/news.release/pdf/atus2.pdf>).
- . 2009. "The Employment Situation, May 2009." Bureau of Labor Statistics News, United States Department of Labor, Washington, DC.
- . 2009, "Table A-1. Time spent in detailed primary activities and percent of the civilian population engaging in each detailed primary activity category, averages per day by sex, 2007 annual averages", Retrieved May 12, 2009, ([http://www.bls.gov/tus/tables/a1\\_2007.pdf](http://www.bls.gov/tus/tables/a1_2007.pdf)).
- Carlson, A., M. Lino, W.-Y. Juan, K. Hanson, and P.P. Basiotis. 2007. "*Thrifty Food Plan, 2006*. (CNPP-19)." U.S. Department of Agriculture, Center for Nutrition Policy and Promotion.
- Cohany, S.R. and E. Sok. 2007. "Trends in Labor Force Participation of Married Mothers of Infants." *Monthly Labor Review* February:9-16.
- Coleman-Jensen, A.J. under review. "Working for Peanuts: Food Insecurity among Nonstandard Workers' Households." *Journal of Family and Economic Issues*.
- Coleman, A.J. 2006. "Defining Food Insecurity Status: A Consideration of U.S. Households 'At Risk for Food Insecurity'." Master's Thesis, Agricultural Economics and Rural Sociology, The Pennsylvania State University.
- Davis, G.C. and W. You. forthcoming. "The Time Cost of Food at Home: General and Food Stamp Participant Profiles." *Applied Economics*.
- Derogatis, L. 2000. *Brief Symptom Inventory 18*. Minneapolis, MN: NCS Pearson, Inc.
- DeVault, M. 1991. *Feeding the Family: The Social Organization of Caring as Gendered Work*. Chicago: The University of Chicago Press.
- Devine, C.M., M.M. Connors, J. Sobal, and C.A. Bisogni. 2003. "Sandwiching it in: Spillover of Work onto Food Choices and Family Roles in Low- and Moderate-Income Urban Households." *Social Science and Medicine* 56:617-630.
- Devine, C.M., M. Jastran, J. Jabs, E. Wethington, T.J. Farrell, and C.A. Bisogni. 2006. "'A Lot of Sacrifices': Work-family Spillover and the Food Choice Coping Strategies of Low-wage Employed Parents." *Social Science and Medicine* 63:2591-2603.

- Dixon, L.B., M.A. Winkleby, and K.L. Radimer. 2001. "Dietary Intakes and Serum Nutrients Differ between Adults From Food-insufficient and Food-sufficient Families: Third National Health and Nutrition Examination Survey, 1988-1994." *Journal of Nutrition* 131:1232-1246.
- Dollahite, J., C. Olson, and M. Scott-Pierce. 2003. "The Impact of Nutrition Education on Food Insecurity among Low-Income Participants in EFNEP." *Family and Consumer Sciences Research Journal* 32:127-139.
- Douthitt, R.A. 2000. "'Time to do the Chores?' Factoring Home-Production Needs into Measures of Poverty." *Journal of Family and Economic Issues* 21:7-22.
- Dunifon, R. and L. Kowaleski Jones. 2003. "The Influences of Participation in the National School Lunch Program and Food Insecurity on Child Well-Being." *Social Service Review* 77:72-92.
- Edwards, M.E., B. Weber, and S. Bernell. 2007. "Identifying Factors that Influence State-Specific Hunger Rates in the U.S.: A Simple Analytic Method for Understanding a Persistent Problem." *Social Indicators Research* 81:579-595.
- Fitchen, J. 1981. *Poverty in Rural America: A Case Study*. Prospect Heights, IL: Waveland Press, Inc.
- Garasky, S. and S.D. Stewart. 2007. "Evidence of the Effectiveness of Child Support and Visitation: Examining Food Insecurity among Children with Nonresident Fathers." *Journal of Family and Economic Issues* 28:105-121.
- Gundersen, C. and J. Gruber. 2001. "The Dynamic Determinants of Food Insufficiency." Pp. 91-109 in *Second Food Security and Measurement Research Conference*, vol. 2, edited by M. Andrews and M. Prell. Washington, D.C.: Economic Research Service.
- Gundersen, C. and V. Oliveira. 2001. "The Food Stamp Program and Food Insufficiency." *American Journal of Agricultural Economics* 83:875-887.
- Hamilton, W.L., J.T. Cook, W.W. Thompson, L.F. Buron, E.A. Frongillo, Jr., C.M. Olson, and C.A. Wehler. 1997. "Household Food Security in the United States in 1995: Summary Report of the Food Security Measurement Project." United States Department of Agriculture, Food and Consumer Service, and Office of Analysis and Evaluation.
- Harnack, L., M. Story, B. Martinson, D. Neumark-Sztainer, and J. Stang. 1998. "Guess Who's Cooking? The Role of Men in Meal Planning, Shopping, and Preparation in U.S. Families." *Journal of the American Dietetic Association* 98:995-1000.

- Heflin, C.M., M.E. Corcoran, and K.A. Siefert. 2007. "Work Trajectories, Income Changes, and Food Insufficiency in a Michigan Welfare Population." *Social Service Review* 37:3-25.
- Heflin, C.M., K. Siefert, and D.R. Williams. 2005. "Food Insufficiency and Women's Mental Health: Findings from a 3-Year Panel of Welfare Recipients." *Social Science and Medicine* 61:1971-1982.
- Hessing, M. 1994. "More than Clockwork: Women's Time Management in their Combined Workloads." *Sociological Perspectives* 37:611-633.
- Hochschild, A.R. 2003. *The Second Shift*. New York: Penguin.
- Horton, S. and C. Campbell. 1991. "Wife's Employment, Food Expenditures, and Apparent Nutrient Intake: Evidence from Canada." *American Journal of Agricultural Economics* 73:784-794.
- Jabs, J. and C.M. Devine. 2006. "Time Scarcity and Food Choices: An Overview." *Appetite* 47:196-204.
- Jabs, J., C.M. Devine, C.A. Bisogni, T.J. Farrell, M. Jastran, and E. Wethington. 2007. "Trying to Find the Quickest Way: Employed Mothers' Construction of Time for Food." *Journal of Nutrition Education and Behavior* 39:18-25.
- Jensen, H.H. 2002. "Food insecurity and the Food Stamp Program." *American Journal of Agricultural Economics* 84:1215-1228.
- Jensen, L., J. Findeis, W.-L. Hsu, and J. Schachter. 1999. "Slipping Into and Out of Underemployment: Another Disadvantage for Nometropolitan Workers?" *Rural Sociology* 64:417-438.
- Kalleberg, A.L. 2001. "Evolving Employment Relations in the United States." Pp. 187-206 in *Sourcebook of Labor Markets: Evolving Structures and Processes*, edited by I. Berg and A. L. Kalleberg. New York: Plenum Publishers.
- Kalleberg, A.L., B.F. Reskin, and K. Hudson. 2000. "Bad Jobs in America: Standard and Nonstandard Employment Relations and Job Quality in the United States." *American Sociological Review* 65:256-278.
- Kaufman, P.R. 1999. "Rural Poor have Less Access to Supermarkets, Large Grocery Stores." *Rural Development Perspectives* 13:19-26.
- Mammen, S., J.W. Bauer, and L. Richards. 2009. "Understanding Persistent Food Insecurity: A Paradox of Place and Circumstance." *Social Indicators Research* 92:151-168.

- Mancino, L. and C. Newman. 2007. "Who has Time to Cook? How Family Resources Influence Food Preparation, Economic Research Report Number 40." United States Department of Agriculture, Economic Research Service.
- Martin, K.S., B.L. Rogers, J.T. Cook, and H.M. Joseph. 2004. "Social Capital is Associated with Decreased Risk of Hunger." *Social Science and Medicine* 58:2645-2654.
- McLaughlin, D.K. and A.J. Coleman-Jensen. 2008. "Nonstandard Employment and Contingent Work in the Nonmetropolitan U.S." *Rural Sociology* 73:631-659.
- McLaughlin, D.K. and L. Perman. 1991. "Returns vs. Endowments in the Earnings Attainment Process for Metropolitan and Nonmetropolitan Men and Women." *Rural Sociology* 56:339-65.
- Molnar, J.J., P.A. Duffy, L. Claxton, and C. Bailey. 2001. "Private Food Assistance in a Small Metropolitan Area: Urban Resources and Rural Needs." *Journal of Sociology and Social Welfare* 28:187-209.
- Morton, L.W., E. Bitto, M. Oakland, and M. Sand. 2005. "Solving the Problems of Iowa Food Deserts: Food Insecurity and Civic Structure." *Rural Sociology* 70:94-112.
- Morton, L.W., E.A. Bitto, M.J. Oakland, and M. Sand. 2008. "Accessing Food Resources: Rural and Urban Patterns of Giving and Getting Food." *Agriculture and Human Values* 25:107-119.
- Morton, L.W. and T.C. Blanchard. 2007. "Starved for Access: Life in Rural America's Food Deserts." Rural Realities Volume 1, Issue 4, Rural Sociological Society.
- Nayga, R.M., Jr. 1996. "Wife's Labor Force Participation and Family Expenditures for Prepared Food, Food Prepared at Home, and Food Away from Home." *Agricultural and Resource Economic Review* 25:179-186.
- Nelson, M.K. and J. Smith. 1999. *Working Hard and Making Do: Surviving in Small Town America*. Berkeley, CA: University of California Press.
- Nord, M. 2000. "Does it Cost Less to Live in Rural Areas? Evidence from New Data on Food Security and Hunger." *Rural Sociology* 65:104-125.
- . 2009. Personal Communication. March 9, 2009. Washington, D.C.
- Nord, M., M. Andrews, and S. Carlson. 2004. "Household Food Security in the United States, 2003, Food Assistance and Nutrition Research Report Number 42." United States Department of Agriculture, Economic Research Service.
- . 2008. "Household Food Security in the United States, 2007." Economic Research Report Number 66, U.S. Department of Agriculture, Economic Research Service.

- Olson, C.M., K. Anderson, E. Kiss, F.C. Lawrence, and S.B. Seiling. 2004. "Factors Protecting Against and Contributing to Food Insecurity among Rural Families." *Family Economics and Nutrition Review* 16:12-20.
- Olson, C.M., B.S. Rauschenbach, E.A. Frongillo Jr., and A. Kendall. 1997. "Factors Contributing to Household Food Insecurity in a Rural Upstate New York County." *Family Economics and Nutrition Review* 10:2-17.
- Presser, H.B. 2003. *Working in a 24/7 Economy: Challenges for American Families*. New York: Russell Sage Foundation.
- Radloff, L.S. 1977. "The CES-D Scale: A Self-report Depression Scale for Research in the General Population." *Applied Psychological Measurement* 1:385-401.
- Rank, M.R. and T.A. Hirschl. 1999. "The Likelihood of Poverty across the American Adult Life Span." *Social Work* 44:201-216.
- . 2001. "Rags or Riches? Estimating the Probabilities of Poverty and Affluence across the Adult Life Span." *Social Science Quarterly* 82:651-669.
- Reilly, M.D. 1982. "Working Wives and Convenience Consumption." *Journal of Consumer Research* 8:407-418.
- Rose, D. 1999. "Economic Determinants and Dietary Consequences of Food Insecurity in the United States." *Journal of Nutrition* 129:517S-520S.
- . 2007. "Food Stamps, the Thrifty Food Plan, and Meal Preparation: The Importance of the Time Dimension for US Nutrition Policy." *Journal of Nutrition Education and Behavior* 39:226-232.
- Rose, D. and V. Oliveira. 1997. "Nutrient Intakes of Individuals from Food-Insufficient Households in the United States." *American Journal of Public Health* 87:1956-1961.
- Roy, K.M., C.Y. Tubbs, and L.M. Burton. 2004. "Don't have No Time: Daily Rhythms and the Organization of Time for Low-income Families." *Family Relations* 53:168-178.
- Sayer, L. 2005. "Gender, Time and Inequality: Trends in Women's and Men's Paid Work, Unpaid Work and Free Time." *Social Forces* 84:285-303.
- Schafft, K.A., E.B. Jensen, and C.C. Hinrichs. 2009. "Food Deserts and Overweight Schoolchildren: Evidence from Pennsylvania." *Rural Sociology* 74:153-177.
- Scott, E.K., K. Edin, A.S. London, and R.J. Kissane. 2004. "Unstable Work, Unstable Income: Implications for Family Well-Being in the Era of Time-Limited Welfare." *Journal of Poverty* 8:61-88.



- Siefert, K., C.M. Heflin, M.E. Corcoran, and D.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.
- Stevens, A.H. 1999. "Climbing Out of Poverty, Falling Back In: Measuring the Persistence of Poverty Over Multiple Spells." *Journal of Human Resources* 34:557-588.
- Stuff, J.E., P.H. Casey, K.L. Szeto, J.M. Gossett, J.M. Robbins, P.M. Simpson, C. Connell, and M.L. Bogle. 2004. "Household Food Insecurity is Associated with Adult Health Status." *Journal of Nutrition* 134:2330-2335.
- Swanson, J.A., C.M. Olson, E.O. Miller, and F.C. Lawrence. 2008. "Rural Mothers' Use of Formal Programs and Informal Social Supports to Meet Family Food Needs: A Mixed Methods Study." *Journal of Family and Economic Issues* 29:674-690.
- Tigges, L.M. and G.V. Fuguitt. 2003. "Commuting: A Good Job Nearby?" Pp. 166-176 in *Challenges for Rural America in the Twenty-First Century*, edited by D. L. Brown and L. E. Swanson. University Park, PA: Penn State Press.
- USDA Center for Nutrition Policy and Promotion. 2000. "Recipes and Tips for Healthy, Thrifty Meals (CNPP-11)." U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, Washington, DC.
- Vickery, C. 1977. "The Time-Poor: A New Look at Poverty." *The Journal of Human Resources* 12:27-48.
- Vozoris, N.T. and V.S. Tarasuk. 2003. "Household Food Insufficiency is Associated with Poorer Health." *Journal of Nutrition* 133:120-126.
- Wight, V.R., S.B. Raley, and S.M. Bianchi. 2008. "Time for Children, One's Spouse and Oneself among Parents Who Work Nonstandard Hours." *Social Forces* 87:243-271.
- Wilde, P. and M. Nord. 2005. "The Effect of Food Stamps on Food Security: A Panel Data Approach." *Review of Agricultural Economics* 27:425-432.
- Winson, A. and B. Leach. 2002. *Contingent Work, Disrupted Lives: Labour and Community in the New Rural Economy*. Buffalo: University of Toronto Press.
- Zick, C.D., J. McCullough, and K.R. Smith. 1996. "Trade-offs between Purchased Services and Time in Single-parent and Two-parent Families." *The Journal of Consumer Affairs* 30:1-23.

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#### SELECTED PUBLICATIONS

- Coleman, A.J. 2008. “Book Review: *Welfare Reform in Persistent Rural Poverty: Dreams, Disenchantments, and Diversity*.” *Rural Sociology* 73(3): 487-490.  
Coleman-Jensen, A.J. “U.S. Food Insecurity Status: Toward a Refined Definition.” *Social Indicators Research*. Forthcoming. (Available through Springer Online First)  
Demi, M.A., A.J. Coleman-Jensen and A.R. Snyder. “The Rural Context and Secondary School Enrollment: An Ecological Systems Approach.” *Journal of Research in Rural Education*. Forthcoming.  
McLaughlin, D.K. and A.J. Coleman-Jensen. 2008. “Nonstandard Employment in the Nonmetropolitan United States” *Rural Sociology* 73(4): 631-659.  
Snyder, A.R., D.K. McLaughlin, and A.J. Coleman-Jensen. “The New, Longer Road to Adulthood: Schooling, Work and Idleness among Rural Youth.” Carsey Institute Reports on Rural America. Durham, NH: Carsey Institute, University of New Hampshire. Forthcoming.