AN ABSTRACT OF THE DISSERTATION OF

Molly M. De Marco for the degree of Doctor of Philosophy in Public Health presented

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Title: The Relationship between Income and Food Insecurity: The Role of Social

Support among Rural and Urban Oregonians.

Abstract approved:

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Sheryl Thorburn

Millions of U.S. households experienced hunger in 2005 and millions more

experienced food insecurity. Previous research indicates that low-wage work and little

social support contribute to food insecurity. Research also suggests that individuals

cope by finding alternate food sources and drawing on social support. Further,

researchers have found that rural residents face difficulties that many urbanites do not,

including lack of living-wage jobs, transportation, and nutrition assistance. However,

rural dwellers may possess support they can leverage in difficult times. This study

used mixed methods (i.e., quantitative and qualitative) to examine whether social

support moderates the relationship between income and food insecurity and whether

place of residence affects social support. First, a mail survey was conducted with a

stratified random sample of Oregonians (n=343, 34.4% response rate). Subsequently,

qualitative interviews (n = 25) were conducted with low-income or food insecure survey respondents to provide insight into these issues. Quantitative results indicate that lower income respondents were more likely to experience food insecurity. In general, social support did not moderate the relationship between income and food insecurity. When income was categorized using poverty guidelines, however, results suggested that emotional support, social network support, and organization membership may moderate this relationship. Specifically, respondents with incomes of ≤$19,999 were less likely to experience food insecurity in the presence of this support. However, small sample sizes in the ≤$19,999 income category resulted in unstable estimates of odds ratios (e.g., 4136.79). When income was recategorized to remedy this, the moderation disappeared. Additionally, place of residence had a significant association with only one social support measure, social network density. Rural respondents had less dense social networks than urban respondents. Place of residence was not a significant predictor of amount of social support via multivariate analysis. Several food insecurity contributors emerged from the qualitative study phase including ill health, unemployment, and having other expenses. Participants cited coping strategies such as use of alternate food sources, use of nutrition assistance, and drawing on social support. Although few significant quantitative results were found, qualitative findings suggest that developing nutrition interventions that build social support may lead to reduced food insecurity.

The Relationship between Income and Food Insecurity: The Role of Social Support

among Rural and Urban Oregonians

by

Molly M. De Marco

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APPROVED:

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Major Professor, representing Public Health

_____

Chair of the Department of Public Health

_____

Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of

Oregon State University libraries. My signature below authorizes release of my

dissertation to any reader upon request.

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Molly M. De Marco, Author

I wish to thank my fellow *Ten Rivers Food Web* board members and *St. Mary's Catholic Church Social Justice Commission Hunger & Food Security Committee* members for their support throughout this process and for teaching me so much about social justice, community food security, and the realities of food production. This dissertation is better because of their insights. I also wish to thank the clients of the *St. Vincent De Paul, Corvallis Food Pantry*, where I volunteered, for patiently answering all my questions as I strove to learn about what led them to seek emergency food assistance.

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CHAPTER 1. INTRODUCTION

The Universal Declaration of Human Rights, drafted in 1948, states that the

right to food is one of the most basic human rights (United Nations, 1998). This

statement is profound, yet food is a right that many in the United States take for

granted (Fitchen, 1997; Hamelin, Beaudry, & Habicht, 2002; Schwartz-Nobel, 2002).

Unfortunately, many in the U.S. are regularly unable to obtain an adequately nutritious

diet. This problem, known as food insecurity, increased for five consecutive years to

13.5 million U.S. households (11.9%), with 4.4 million U.S. households (3.9%)

experiencing food insecurity with hunger in 2004[1] (Economic Research Service

[ERS], 2004, 2005). By 2005, however, the rate of food insecurity among U.S.

households had decreased to 11.0%, although the rate of hunger remained unchanged

at 3.9% (ERS, 2006).

People in the U.S. experience food insecurity and hunger for a variety of

reasons, including poverty and low wage work, lack of social support, and lack of

access to grocery stores (Olsen, Anderson, Kiss, Lawrence, & Seiling, 2004). A

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[1] The United States Department of Agriculture (USDA) defines a household as "food
insecure" if that household is uncertain of having the ability to acquire enough food to
meet the needs of all household members due to scarce resources for food. A
household is defined as 'food insecure with hunger' if the household experiences food
insecurity severe enough so that one or more household members were hungry, at least
some time during the year, because they could not afford enough food (Anderson,
1990; Edwards & Weber, 2003; Olsen, 1999). Hereafter, the term "hunger" will be
used instead of "food insecurity with hunger" for ease of reading.

strong inverse relationship between income and food insecurity has been established

(Alaimo, Briefel, Frongillo, & Olsen, 1998; Economic Research Service, 2002).

Low-income individuals employ many strategies to cope with the possibility of

food insecurity (Ahluwalia, Dodds, & Baligh, 1998; Hoisington, Shultz, & Butkus,

2002; Schwartz-Nobel, 2002; Tarasuk, 2001). One of these coping strategies is the

utilization of social support (Gross & Rosenberger, 2005; Hoisington, Shultz, &

Butkus, 2002; Holben, McClincy, Holcomb, Dean, Walker, 2004). Furthermore,

living in a rural community has been shown to affect social support (Fischer, 1982).

Although rural living can be difficult due to lack of living-wage jobs, public

transportation, and nutrition assistance programs, rural dwellers often possess strong

community and family ties (Fischer, 1982; Hofferth & Iceland, 1998). Rural

individuals can leverage this social support in times of need (Olsen et al., 2004).

The primary purpose of this research was to identify whether social support

moderates the relationship between income and food insecurity. The secondary

purpose was to determine whether rural versus urban residence affects social support.

Oregon was the focus of the research because it is a unique state, having had the

highest rate of food insecurity during the late 1990s and early 2000s until 2004, when

it was the only state with a significant decline (Brown & Fournier, 2005; Edwards &

Weber, 2003). In this chapter, the prevalence of food insecurity and hunger is

described. In addition, the potential role of income, social support, and rural/urban

residence is introduced. Finally, the significance of the research is discussed and the

objectives are presented.

The Prevalence of Food Insecurity and Hunger

In 2005, 11.0% of U.S. residents were food insecure, and 3.9% had

experienced hunger within the previous 12 months (ERS, 2006). Rates of food

insecurity and hunger were higher for people living below poverty, Black and

Hispanic individuals, and single mothers and their children (ERS, 2006). Further, as

shown in Table 1.1, rates differed based on geographical location. In 2005, the rates of

food insecurity for households located in central cities (13.5%) and non-metro/rural

areas (12.0%) were higher than for households in the suburbs (8.7%) (ERS, 2006).

Rates of hunger were highest for households in central cities (5.1%) and lowest for

suburban areas (2.9%) (ERS, 2006).

Table 1.1. *2005 U.S. Regional Food Insecurity and Hunger Rates*

	National	Central City	Suburban	Non-metro/rural
Food Insecurity	11.0	13.5	8.7	12.0
Hunger	3.9	5.1	2.9	4.0

Source: ERS, 2006

This study focused on Oregon because of the state's unique pattern of food

insecurity and hunger. Oregon's rates of food insecurity and hunger consistently

ranked in the top 10 until 2004, when Oregon was the sole state with a statistically

significant decrease in rates (Brown & Fournier, 2005; Edwards & Weber, 2003; ERS,

2004). As shown in Table 1.2, U.S. food insecurity rates for 2005 were higher in non-

metro (12.0%) than metro areas (central cities and suburbs combined) (10.8%), which

is the same pattern seen in Oregon for the years 2002-2004 (ERS, 2006; Grussing &

Edwards, 2006). However, this Oregon metro/non-metro pattern reverses the pattern

seen for 1999-2001, in which metro Oregon (14.3%) had a higher food insecurity rate than non-metro Oregon (11.2%) (Edwards & Weber, 2003).

Table 1.2. *U.S. and Oregon Non-metro/Metro Rates of Food Insecurity and Hunger*

	1999-2001 Oregon metro[b]	1999-2001 Oregon non-metro	2002-2004 Oregon metro[c]	2002-2004 Oregon non-metro	2005 U.S. metro[a]	2005 U.S. non-metro
Food Insecurity	14.3	11.2	11.4	13.3	10.8	12.0
Hunger	5.2	5.2	4.1	3.2	3.8	4.0
% of food insecure with hunger	36.4%	46.4%	36.0%	24.1%	35.2%	33.3%

Source: [a] ERS, 2006 [b] Edwards & Weber, 2003 [c] Grussing & Edwards, 2006

The rates of hunger did decrease for both metro and non-metro Oregon from 1999-2001 to 2002-2004. In 1999-2001, hunger rates were identical in metro and non-metro Oregon (5.2%). However, by 2002-2004, metro Oregon (4.1%) had a higher rate of hunger than did non-metro Oregon (3.2%) (Edwards & Weber, 2003; Grussing & Edwards, 2006). Further, the 2002-2004 rate of hunger in non-metro Oregon was lower than the 2005 national metro and non-metro rates of hunger, while the 2002-2004 metro-Oregon hunger rate was higher than both the metro and non-metro 2005 hunger rates nationally. Of note, the Oregon metro food insecurity and hunger rates both decreased from 1999-2001 to 2002-2004, such that the percent of the food insecure who experienced hunger remained approximately equal (36.4% versus 36.0%), as shown in Table 1.2. Yet, in non-metro Oregon the food insecurity rate increased from 1999-2001 to 2002-2004, but the hunger rate decreased for the same time period, resulting in a decrease in the percent of food insecure who experienced hunger (from 46.4% to 24.1). Hence, these changing patterns of food insecurity in Oregon require further study.

The high hunger rates in Oregon have been attributed to high rates within two groups: 1) households expected to be vulnerable to food insecurity, such as those with no employed adults, those with adults who work only part-time or part-year, and those who have relocated in the last year; and 2) households not normally expected to experience food insecurity, such as those without an unemployed adult, those with adults who work full-time and full-year, and two-parent households (Edwards & Weber, 2003). In rural Oregon households, a high percentage of residents work part-year jobs, possibly accounting for the greater percentage of rural food insecure Oregonians experiencing hunger in 1999-2001 (Edwards & Weber, 2003).

In addition to the differences in food insecurity rates based on place of residence, other differences at the household level exist. In a national study, households that rent versus own their homes, those headed by African-Americans or Latinos, those in a central city versus other urban locations, those with more than two children, and those headed by a single mother are more likely to experience food insecurity (Bartfeld & Dunifon, 2003). Further, households with members 65 years or older, those headed by adults with at least a high school degree, those in non-metro areas, and those with higher incomes were less likely to experience food insecurity. In a parallel study looking at Oregon households, similar results were found between food insecurity and income, race, single headed households, educational attainment and age of the household head, and metro/non-metro residence (Bernell, Weber, & Edwards, 2006). Highlighting the non-metro results, as the percent of an Oregon county that is rural increased, the rate of food insecurity in that county decreased,

suggesting an inverse relationship between rurality and food insecurity in Oregon

(Bernell et al., 2006).

<div align="center">The Income and Food Insecurity Relationship</div>

Food insecurity is associated with income, poverty, education, employment,

and cost of living (Holben, McClincy, Holcomb, Dean, & Walker, 2004; Olsen &

Rauschenbach, 1997). A small body of research establishes the existence of a strong

inverse relationship between income and food insecurity (Alaimo et al., 1998; Bartfeld

& Dunifon, 2003; Bernell et al., 2006; ERS, 2002; Olsen & Rauschenbach, 1997;

Rose & Basiotis, 1995). For example, Alaimo and colleagues (1998) compared the

relationship between the household poverty index ratio[2] and food insecurity, finding

that food insecurity decreased as the poverty index ratio increased. Nord and

colleagues (2000) assessed the income/food insecurity relationship with a slightly

different measure of income, the income-to-poverty ratio[3]. These researchers found

that food insecurity decreased as the income-to-poverty ratio increased. Thus, in both

studies, households with lower incomes were more likely to experience food

insecurity.

<div align="center">The Moderating Role of Social Support</div>

The receipt of help imparted through social transactions has been termed social

support (Heaney & Israel, 2002). It can be exchanged in the form of emotional,

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[2] The poverty index ratio is the ratio of household income to the federal poverty level
multiplied by 100.
[3] The income-to-poverty ratio is the ratio of household income to the federal poverty
line for a given family size.

informational, or instrumental support and may be provided by intimate partners, relatives, friends, co-workers, acquaintances, and neighbors (Heaney & Israel, 2002). Consistent with Baron and Kenny's (1986) definition of a moderator as a variable with the ability to strengthen or change the direction of the relationship between a predictor and an outcome variable, relationships between numerous variables are moderated by social support. In particular, social support can provide protection against stressors such that a stressor's influence on well-being is diminished in the presence of social support (Aro, Nyberg, Absetz, Henriksson, & Lonqvist, 2001; Black, Cook, Murry, & Cutrona, 2005; Cobb, 1976; Hoard & Anderson, 2004; Israel, Farquhar, Schulz, James, & Parker, 2002; Lee, Koeske, & Sales, 2004; Strogatz et al., 1997). For example, studies have found that social support moderates the relationship between stress and mental health (Kohler, Anderson, Oravecz, & Braun, 2004), between poverty and negative parenting behaviors (Hashima & Amato, 1994), and between acculturative stress and physical and mental health (Lee et al., 2004).

Given the evidence that social support can moderate the relationships between income and health-related outcomes, social support may also moderate the relationship between income and food insecurity. However, the small number of existing studies that have explored social support in relation to food insecurity are qualitative in nature and do not specifically assess whether social support moderates the relationship between income and food insecurity (Ahluwalia, Dodds, & Baligh, 1998; Pierce, Sheehan, & Ferris, 2002). Still, researchers suggest that social support is often drawn upon to cope with the stress of food insecurity (Gross & Rosenberger, 2005;

Hoisington, Shultz, & Butkus, 2002; Holben, et al., 2004). Further, because of the differences in social support seen in rural versus urban regions, the moderating effect of social support could be key to understanding the lower rates of food insecurity in rural versus urban Oregon.

<center>The Impact of Rural/Urban Residence on Social Support</center>

Residing in a rural community may contribute to the experience of food insecurity for several reasons. These reasons include lack of living-wage jobs due to a limited number of local businesses, lack of access to education and low educational attainment, and lack of public transportation and child-care options to support those who do work (Blank, 2004; Deavers & Hoppe, 1992; Gentle, 2000; Holben et al., 2004). In addition, many rural communities do not have a supermarket or, if there is one, it often stocks a limited number of items at a higher cost (Morris, Neuhauser, & Campbell, 1992). Hence, rural residents often have to drive long distances to purchase food affordably (Morris et al., 1992; Stuff et al., 2004).

Still, positive aspects of living in such communities do exist. Rural residents have denser social support networks, measured by the number of individuals in a social network who know each other, and are more likely to exchange support with kin versus non-kin (Fischer, 1982; Hofferth & Iceland, 1998). Moreover, studies have found that urban residents have weaker community and family ties (Hofferth & Iceland, 1998; Onyx & Bullen, 2000). The stronger and denser social ties in rural areas may allow rural residents to maintain food security even in the presence of the hardships discussed above.

Significance of the Study

Proper nutrition is vital for the maintenance of optimal health. Poor diet is associated with major causes of morbidity and mortality such as cancer, diabetes, and cardiovascular disease through overweight and obesity (Cook, 2002; Klein et al., 2004; Morin, Stark, & Searing, 2004; Smith, 2004; Tarasuk, 2001; Vozoris & Tarasuk, 2003). Food insecure individuals are at greater risk for poor nutrition and, in turn, illnesses associated with poor diet (Cook, 2002; Tarasuk, 2001; Vozoris & Tarasuk, 2003). Attention to this issue is growing nationally. Objective #19 -18 of *Healthy People 2010*, a national health promotion and disease prevention initiative developed by the U.S. Department of Health and Human Services (HHS), states that food security among U.S. households must be increased from a baseline of 88% in 1995 to 94% by the year 2010 (U.S. DHHS, 2000).

The USDA and the HHS have taken the lead in educating the U.S. about the importance of proper nutrition through the release of the *2005 Dietary Guidelines for Americans* (USDA, 2005). The Guidelines recommend the consumption of a variety of nutrient-dense foods and beverages that limit the intake of saturated and trans fats, cholesterol, added sugars, salt, and alcohol. Adherence to this type of diet contributes to the maintenance of a healthy weight and protects against disease (USDA, 2005). Unfortunately, the food insecure are often unable to adhere to these dietary recommendations (Cook, 2002; Tarasuk, 2001; Vozoris & Tarasuk, 2003).

Food insecurity can have serious consequences, including the health effects of poor nutrition. Food insecurity can result in poor nutrition through over-nutrition with

unhealthy foods or under-nutrition (Cook, 2002). Under-nutrition poses problems throughout a person's lifecycle, but is most significant during key periods such as pregnancy, infancy, and end-of-life (Casey et al., 2005; Cook, 2002; Lewit & Kerrebrock, 1997; Sherman, 1997). Food insecurity can also result in over-nutrition with unhealthy foods causing overweight and obesity (Olsen, 1999; Townsend, Peerson, Love, Achterberg, & Murphy, 2001; Vozoris & Tarasuk, 2003). In addition to its nutritional implications, food insecurity has been associated with greater odds of high cholesterol, heart disease, metabolic syndrome, (Stuff, Casey, Connell, Champagne, Gossett, Harsha et al., 2006) and diabetes (Seligman, Bindman, Vittinghoff, Kanaya, & Kushel, 2007). Further, health status, defined by physical functioning, social functioning, bodily pain, mental health, and general health among others, was found to have an inverse relationship to food insecurity status (Holben, Barnett, & Holcomb, 2006).

Food insecurity has economic implications as well. Children in food insecure households are often sent to school hungry, which can lead to poor concentration (Casey et al., 2005). Inability to concentrate in school has been linked to delays in cognitive, behavioral, and physiological development (Casey et al., 2005; Cook, 2002). The decrease in the potential of already disadvantaged children contributes to the cycle of poverty (Casey et al., 2005; Cook, 2002; Lewit & Kerrebrock, 1997; Sherman, 1997).

This study has the potential to advance the knowledge in the field concerning the role of social support on the relationship between income and food insecurity. The

findings of this study may contribute to the design of more effective community-based programs and nutrition interventions that would address food insecurity by incorporating social support building activities.

Study Objectives

The present study had two objectives: (1) to determine whether social support moderates the relationship between income and food insecurity, such that this association is weakened in the presence of social support and (2) to determine how social support differs between urban and rural communities.

The following chapter reviews the literature to provide a background on food insecurity, income, social support, and the relationships between these variables. The subsequent chapter presents the research methods used to address the research objectives stated above. The results of the study are then presented. Last, the results are discussed, and recommendations for future research, public health implications, and conclusions are presented.

CHAPTER 2. LITERATURE REVIEW

This chapter begins with a review of the literature on food insecurity, including studies that have examined the determinants of food insecurity such as income, poverty, and housing costs. The next section examines how people cope with food insecurity. Then, social support, its theoretical foundations, how poverty and geographical location affect social support, and the effects of social support on health are discussed. The following section explores the relationships between social support, income, and food insecurity. Finally, a conceptual model for the current study is presented and research hypotheses are stated.

Food Insecurity

The problem of food insecurity in the United States is often overlooked because, unlike in developing countries, those struggling with food insecurity in the U.S. do not show obvious signs such as severe malnutrition and wasting (Fitchen, 1997; Rose & Basiotis, 1995). However, *Healthy People 2010*, a national health promotion and disease prevention initiative developed by the U.S. Department of Health and Human Services (U.S. DHHS, 2000), included the reduction of food insecurity as one of its objectives for the first time. The introduction of such an objective suggests that food insecurity has become a national public health priority (USDHHS, n.d.). Objective #19-18 of *Healthy People 2010* is to "increase food security among U.S. households and in so doing reduce hunger." Specifically, the goal is to increase food secure households from a baseline of 88% in 1995 to 94% by the

year 2010 (USDHHS, 2000). To reduce food insecurity, the issues of income disparities and lack of access to low-cost, nutritious foods need to be addressed.

<div align="center">*Determinants of Food Insecurity*</div>

Hunger and food insecurity are intimately connected to income, poverty, cost of living, transportation, educational attainment and employment (Holben et al., 2004; Olsen & Rauschenbach, 1997). The relationship between food insecurity and these factors is discussed below.

Income

Existing research has provided evidence of a strong inverse relationship between income and food insecurity (Alaimo et al., 1998; Bernell et al., 2006; Nord et al., 2003; Olsen & Rauschenbach, 1997). Alaimo and colleagues (1998) compared the relationship between food insufficiency, a slightly different measure than food insecurity defined as "the inadequate amount of food intake due to lack of resources" (Briefel & Woteki, 1992), and household income. They analyzed data from the National Health and Nutrition Examination Survey for 1988 through 1994. The experience of food insufficiency ranged from a high of 14% for households with a poverty index ratio (the ratio of household income to the federal poverty level multiplied by 100) of 130% or less to a low of 0.3% for those with a poverty index ratio of 350% or greater. Nord and colleagues (2003) analyzed data from the 2001 Current Population Survey (CPS) to assess the income and food insecurity relationship. They found that 23.6% of households with an income-to-poverty ratio (the ratio of household income to the federal poverty line for a given family size) less

than one were food insecure, and 12.9% of those households experienced hunger in 2001. When the income-to-poverty ratio increased to 1.85 or higher, only 3.6% of households experienced food insecurity, and 1.3% experienced hunger. Bernell and colleagues (2006) assessed food insecurity in Oregon utilizing the 2000 Oregon Population Survey. These researchers reported that in Oregon greater household income was linked to lower food insecurity. Specifically, they found that those with incomes in the first quintile were 11% more likely to experience food insecurity than those in the fifth quintile. In their analyses of food insecurity in residents of rural upstate New York, Olsen and Rauschenbach (1997) found that income was a key predictor of having sufficient household food supplies. In their study, households with incomes greater than $20,000 had more adequate food supplies. In another study, Rose and Basiotis (1995) utilized the 1989-1991 Continuing Survey of Food Intake by Individuals to assess the relationship between income and food insecurity. They found that household food insecurity ranged from a high of 9.4% for households at 130% of poverty or below to a low of 0.3% for households at over 350% of poverty.

Households experiencing food insecurity are usually living at or below poverty and are likely to face other hardships, such as difficulty paying rent, mortgage, utility bills, or for needed medical or dental care (Sherman, 2004). Living in poverty is also associated with poor housing, poor schools, poor sanitation, minimal health care, and poor nutrition (Brown & Sherman, 1995). However, there is not a "one-to-one correspondence" between food insecurity and poverty (Rose, 1999). Data from the 1995 Current Population Survey (CPS) demonstrated that only about 13.1% of

households categorized as living in poverty also experienced hunger, and only some of those who are hungry (50%) are living in poverty (Hamilton, Cook, Thompson, Buron, Frongillo, Olsen et al., 1997; Rose, 1999). Still, economic factors are primary determinants of food insecurity.

Cost of Housing

Aside from income, other economic factors contribute to food insecurity. The cost of housing can be particularly burdensome for families living at or near poverty. The Department of Housing and Urban Development (HUD) estimates that affordable housing should consume no more than 30% of household income (Center on Budget and Policy Priorities, 2003). According to an analysis of data from the 2003 American Housing Survey however, families living in poverty spent, on average, 64% of their income on housing (Sherman, 2004). Further, the Oregon Food Bank conducted a study of clients of its 18 affiliated food banks and found that 51% of respondents reported spending over 50% of their income on rent (Oregon Food Bank, 2004). These data suggest that housing costs are a substantial hardship for many of the poor. The need to spend such a large percentage of income on housing means there are fewer resources available for other expenses such as medical care and food. Conversely, homeowners are less likely to be food insecure (Bartfeld & Dunifon, 2003; Rose, 1999). Homeownership is a good proxy of asset wealth. People who own homes are likely to have more money to spend on food and to possess assets that can be borrowed against in times of financial crisis.

Lack of Transportation

Lack of public transportation is another potential barrier to food security and is more problematic for rural than urban households. A study conducted to determine the key predictors of food insecurity in rural Appalachia found that individuals without reliable transportation were 25.6 times more likely to experience food insecurity with hunger than those individuals with reliable transportation (Holben et al., 2004). An additional study with a rural sample found that those who lacked transportation were significantly more likely to experience food insecurity (Garasky, Morton, & Greder, 2006).

Other Factors

A few other factors have been found to be associated with food insecurity. Households with two or more children, those whose head is unmarried, or has less than a high school education, or with no one employed were more likely to experience food insecurity than other households (Bartfeld & Dunifon, 2003).

Coping with the Potential for Food Insecurity

People faced with the possibility of food insecurity employ creative ways to obtain enough food. In their study of parents using food pantries in Washington, Hoisington and colleagues (2002) found that participants utilized a variety of strategies to cope with food insecurity: comparison shopping to find the lowest-cost food; purchasing store-brand foods; using coupons; budgeting; buying and making food in bulk; preserving food; substituting powdered milk for fresh; substituting canned or frozen vegetables for fresh; eliminating meat from the diet; using filler

foods such as potatoes or noodles; and shopping with other families at multiple stores

to save on transportation costs. In their study of low income North Carolinians,

Ahluwalia and colleagues (1998) found that participants used government nutrition

safety net programs such as the Food Stamp Program or the Special Supplemental

Nutrition Program for Women, Infants, and Children (WIC); frequented food banks

and soup kitchens; participated in gleaning programs; gardened; scavenged; foraged;

and attempted to stretch food dollars to cope with the possibility of food insecurity.

For her book, *Growing Up Empty*, Schwartz-Nobel (2002) interviewed people across

the U.S. who were struggling with the possibility of food insecurity. She found that to

forestall food insecurity people would stagger bill paying so that the electricity bill

would be paid one month and the water bill the next, and parents would send children

to eat with relatives or reduce their food intake so that their children would have

enough to eat. Some men admitted to committing petty crimes such as breaking a

window to get arrested, knowing they would get fed in jail. Women reported

shoplifting food from supermarkets, collecting roadkill, and getting food from

dumpsters in extreme situations (Schwartz-Nobel, 2002). Hoisington and colleagues

(2002) have also reported that gardening, hunting, fishing, foraging, and raising meat

are common coping strategies in rural communities.

Many people draw on relationships with others to cope with food insecurity

(Gross & Rosenberger, 2005; Hoisington et al., 2002; Holben et al., 2004; Schwartz-

Nobel, 2002). Examples of coping strategies that draw on social relationships include

obtaining information from others about where to get food cheaply and how to apply

for food stamps and sending children to relatives' or friends' homes for meals (Schwartz-Nobel, 2002). This concept, termed social support, may be an important factor in coping with the possibility of food insecurity, although little social support literature focuses on food insecurity.

Because of the importance of social support to the present study, the next section describes social support. The section begins with a discussion of the history of social support and summarizes several other social relationship concepts to provide an understanding of the importance of social relationships. Then, a conceptual framework for social support is presented. Finally, the effects of social support on health and the relationship between poverty and social support are discussed.

Social Support

An enormous body of research on social support exists, dating back to the 1890s when Emile Durkheim suggested that the phenomenon of individuals migrating to industrialized cities to find work would lead to a breakdown in family, community, and work relationships (Berkman, Glass, Brissette, & Seeman, 2000). Durkheim proposed that this migration would diminish social resources within a community leading to increased suicide (Berkman et al., 2000). Other researchers have obtained similar findings among uprooted populations. In their study, Thomas and Znaniecki (as cited in Cohen, Underwood, & Gottlieb, 2000) found evidence of delinquent behavior in Polish immigrants to Chicago due, in part, to ruptured social ties. Park and Burgess (as cited in Cohen et al., 2000) found that those who must leave their communities for work can experience behavioral and social problems related to

decreasing community ties. Individuals who participate in their communities, however, experience better mental health than those who were more isolated, suggesting that those who are able to maintain social ties have better health outcomes (e.g. Bell, LeRoy, & Stephenson, 1982; review in Cohen & Wills, 1985; Miller & Ingham, 1979).

Early work on social support as a coping mechanism began in the 1970s (Zimet, Dahlem, Zimet, & Farley, 1988). Epidemiologists Cobb and Cassel made advances in the conceptualization of the role of social support in protecting against the negative health effects of stressful life events. Cobb (1976) conducted a systematic review of the early work on the health effects of social support from the 1940s to the 1970s. Based on this review, Cobb observed that individuals who interpreted relationships with others as signifying that they were loved, valued, and a part of a reciprocal exchange network were protected from negative health consequences. Cassel (1974), in his theoretical work on the stress and social support relationship, suggested that having a close person to confide in could protect the mental health of someone experiencing a stressful event. Researchers in the fields of psychology, epidemiology, nursing, sociology, and medicine have assessed numerous dimensions of social support providing convincing evidence that social support improves well-being (Berkman & Syme, 1979; Berkman & Glass, 2000; Baxter, Shetterly, Eby, Mason, Cortese, & Hamman, 1998; Cohen & Wills, 1985; Schaefer, Coyne, & Lazarus, 1981).

Researchers have developed ideas of how people relate to one another socially

that are distinct from social support (Letvak, 2002). These include coping theory

(Lazarus & Folkman, 1984), social comparison theory (Festinger, 1954; Buunk &

Gibbons, 1997), social learning theory (Bandura, 1962; Bandura & Walters, 1963;

Bandura 1969), and social competence theory (Rubin & Burgess, 2002; Rubin &

Rose-Krasnor, 1992). Coping theory states that when faced with a stressor, a person

will evaluate the stressor, his/her ability to manage that stressor, and her/his reactions

to it (Lazarus & Folkman, 1984). Active coping strategies may then be employed.

Coping strategies include problem management, calling on others, and emotional

regulation. These coping strategies can lead to positive outcomes such as emotional

well-being (Folkman, 1997; Lazarus & Folkman, 1984). Social comparison theory

asserts that people are motivated to self-evaluation and tend to do so by comparing

themselves to others (Festinger, 1954). This theory has been extended to health issues

through the observation that people tend to evaluate their risk of disease by comparing

their behaviors to those of others (Buunk & Gibbons, 1997). Social learning theory, a

precursor to social cognitive theory, suggests that people can learn by observing others

(Bandura, 1962). This theory holds that people do not need to be rewarded for

enacting certain behaviors, but can have behaviors reinforced by watching others

receive rewards for those behaviors. This phenomenon is called vicarious

reinforcement (Bandura, 1962; Bandura & Walters, 1963; Bandura 1969). Social

competence theory describes a person's ability to achieve goals through social

interactions while also maintaining positive social relationships (Rubin & Burgess,

2002). Those who possess high social competence enact socially acceptable behaviors such as friendliness, cooperativeness, and altruism (Rubin & Rose-Krasnor, 1992).

As discussed above, several researchers have developed concepts that draw on social relationships and suggest their importance. These concepts are distinct from the concept of social support, but aid in its understanding. The following section will review the dimensions of social support.

Dimensions of Social Support

Scholars have generally agreed that social support is a multidimensional concept (Throits, 1982). Social support is commonly measured by asking an individual to evaluate the amount of social support she/he receives, whether an individual perceives she/he is providing the same amount of social support that the receiver perceives she/he is receiving, and satisfaction with received support (Franks, Wendorf, Gonzalez, & Ketterer, 2004, Funch, Marshall, & Gebhardt, 1986; Sarason, Levine, Basham, & Sarason, 1983; Tardy, 1985; Zimet et al., 1988).

The most frequently assessed dimensions of social support are its function and structure (Berkman & Syme, 1979; Dean, Kolody, Wood, & Ensel, 1989; Heaney & Israel, 2002; Throits, 1985). Social support can have instrumental, emotional, or informational functions (Heaney & Israel, 2002; Lin et al., 1986). The structure of social support is based on sources: community, social network, and intimate partner (Berkman & Syme, 1979; Berkman, 2000; Heaney & Israel, 2002). The functions and structures of social support are discussed below.

Functions of Social Support

One function of social support is to aid in the achievement of tangible goals such as getting a job, finding someone to baby-sit, or having enough food for your family (Cohen et al., 2000; Lin et al, 1986). This function is called instrumental support (Cohen et al., 2000; Lin et al., 1986). Emotional support, also called expressive support, refers to support that allows the sharing of sentiments such as venting of frustrations and affirming one's own worth (Lin et al, 1986; Schaefer et al, 1981). Informational support is characterized by the exchange of information that can aid in the resolution of a problem (Cohen et al., 2000; House, 1981). Research on these social support functions is reviewed below.

Instrumental support. Instrumental social support, also known as material or tangible support, is characterized by the receipt and/or provision of tangible or economic resources (Heaney & Israel, 2002). Receipt of this type of social support has been linked to better health through a reduction of health risk factors (Schaefer et al., 1981). Examples of instrumental support include loans, gifts of money or goods, provision of services, and doing of chores or favors (Cohen et al., 2000). The majority of early work on social support placed less emphasis on instrumental support as compared with emotional support (Schaefer et al., 1981). Yet, when applying social support to the topics of hunger and poverty, the instrumental functions of social support are, arguably, of primary importance because instrumental support could directly assist individuals with obtaining food. For example, Schaefer and colleagues

(1981) observe that some stressful situations are more likely to be ameliorated by a loan or a service than by the offer of emotional support.

Emotional support. Emotional support is defined as a relationship between individuals, which is distinguished by intimacy, attachment, reassurance, and the ability to confide in and rely on each other (Heaney & Israel, 2002; Lin et al., 1986; Schaefer et al., 1981). Emotional support can include discussing feelings and sharing worries, indications of sympathy, approval, caring, expressions of concern, and acceptance (Wills & Shinar, 2000). Wills and Shinar suggest that individuals who are given emotional support judge threatening events as less stressful, have higher self-esteem, have reduced anxiety and depression, and are more likely to practice active coping in the face of stressors, when compared with those who do not have emotional support. In a longitudinal study of 45 – 64 year olds, Schaefer and colleagues (1981) found that emotional support was a significant predictor of depression such that as emotional support increased, depressive symptoms decreased. Emotional support could be used to cope with the stress of experiencing food insecurity or being at risk for food insecurity.

Informational support. Informational support involves the giving and receiving of information and advice to solve a problem (Schaefer et al., 1981). Informational support can also be used to provide feedback to an individual about his/her behavior, financial choices, or other issues (Schaefer et al., 1981). This information could influence health relevant behaviors and/or help one to avoid or minimize stress (Cohen et al., 2000). Information could also be provided about where to obtain needed

services such as medical care or nutrition assistance (Cohen et al., 2000). Individuals with larger networks of friends and relatives are more likely to receive the appropriate informational support required to solve a current problem (Cohen et al., 2000). With respect to addressing food insecurity, examples of informational support include helping others to learn where groceries can be purchased cheaply, how to apply for food stamps, or how to budget one's money throughout the month.

The social support functions have been shown to be beneficial in reducing depression and anxiety related to stressful events (Cohen et al., 2000; Wills & Shinar, 2000). Given the benefits that social support functions have had in these areas, social support could be beneficial for the reduction of food insecurity. A triad of sources can provide the above reviewed social support functions. These sources, defined collectively as a social support structure, are discussed below.

Social Support Structure

Social support structure is defined by sources of support (Berkman & Syme, 1979; Berkman, 2000; Funch, Marshall, & Gebhardt, 1986). The primary source of social support is an intimate partner, usually a lover or spouse (Coyne & De Longis, 1986; Lin et al., 1986). Intimate partner support is characterized by reciprocal and mutual exchanges of support and responsibility for the well-being of one's intimate partner(s) (Burman & Margolin, 1992; Lin et al., 1986). The second source of social support is the social network. A social network consists of relationships between kin, co-workers, and friends (Berkman, 2000). The third and most general source of social support is the community. Relationships between individuals and their communities

result in feelings of integration or belongingness (Green & Rogers, 2001). A review of the research on each source of social support follows.

Intimate partner support. Intimate partner support is the most proximal source of social support because it is characterized by the one-on-one provision of support through a relationship that is usually exclusive (Berkman & Syme, 1979; Burman & Margolin, 1992; Lin et al., 1986). The concept of intimate partner support is rooted in attachment theory (Berkman et al., 2000). John Bowlby coined the term "attachment theory" referring to the relationship between mothers and infants (Berkman et al., 2000). The theory of attachment proposes that the mother provides a secure base from which the infant can explore his/her environment safely (Berkman et al., 2000). Bowlby extended the theory of attachment to adulthood, suggesting that a secure marriage would provide spouses a solid base to explore the world and still have protection from stressors when necessary (as cited in Cohen et al., 2000). Several researchers have provided evidence supporting Bowlby's theory, finding that the presence of an intimate partner is protective against stress and illness and that another source of social support cannot comparably substitute for this source (Abbey, Andrews, & Halman, 1995; Braboy-Jackson, 1992; Burman & Margolin, 1992; Coyne & De Longis, 1986). However, another set of researchers found that social support from friends and family can substitute for intimate partner support (Michael, Colditz, Coakley, & Kawachi, 1999).

Braboy-Jackson (1992) conducted a study to assess the receipt of social support from spouses and friends by 700 urban residents. She found that perceived

support from a spouse lowered perceptions of all types of stressors (e.g., conflict between the role of parent and employee and strains such as economic difficulties) except for stress associated with physical health issues. Further, Braboy-Jackson found that support received from a spouse plays an important role in buffering the effects of stress. Similarly, Abbey and her coauthors (1995) found in their longitudinal study of social support among fertile and infertile couples that as intimate partner social support increased so did marital quality. Further, social support was found to moderate the relationship between stress and marital quality. In other words, their findings suggest a weaker relationship between social support and marital quality among those couples with high levels of stress.

The loss of spousal social support due to the death of a spouse has been linked to decreased vitality in women 65 years old and younger (Michael et al., 1999). However, this association was not seen for older women, possibly due to the more normative experience of widowhood among older women. Still, being single carries with it the highest risk to health as compared to other marital status groups, with no risk differential for single people living alone versus those living with others (Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000). Further, contrary to the findings of other researchers (Abbey et al., 1995; Braboy-Jackson, 1992; Burman & Margolin, 1992), a national study of nurses found that social support provided by friends, relatives, and confidants was an effective substitute for intimate partner social support (Michael et al., 1999). Moreover, a diverse set of social relationships, including individuals both within and outside one's socioeconomic group, appears to

be critical for well-being because a greater variety of social support - emotional,

tangible, and informational - can be provided (Fratiglioni et al., 2000).

Marriage does not guarantee the receipt of social support that is beneficial. In

fact, marital satisfaction may be key to the receipt of beneficial social support from an

intimate partner (see review by Coyne & DeLongis, 1986). Those who are unhappily

married are unlikely to experience the health benefits of intimate partner support.

Further, the context and type of stressor are key to understanding the effectiveness of

intimate partner social support. For example, stressors from situations that do not

involve the intimate partner, such as work stress, may not be effectively ameliorated

by support from one's intimate partner (Coyne & DeLongis, 1986). In work situations,

social support from co-workers may be more effective. Further, intimate partner

support can be taxing for those experiencing mental and physical health problems,

although financial stressors can be addressed capably through intimate partner support

(Coyne & DeLongis, 1986).

Social network support. A social network is defined in terms of its composition

and structure (the number of people involved and the number who know each other) or

by the nature of particular relationships (friendship or kinship) (Ahluwalia et al., 1999;

Aro, Nyberg, Absetz, Henriksson, & Lonnqvist, 2001; Brissette, Cohen, & Seeman,

2000; Hofferth & Iceland, 1998; Israel & Heaney, 2002; Schaefer et al., 1981).

Relationships often include those between intimate partners, close family members,

friends, neighbors, and social and religious group members (Berkman & Syme, 1979;

Cleak & Howe, 2003).

Social networks can be homogeneous or heterogeneous. Homogenous social networks are characterized by close, dense relationships between like persons, often family members (Lin, 1999). These usually strong ties aid individuals in coping with stressors (Briggs, 1998). This coping assistance is characterized by the exchange of money, emotional support, advice, and/or information and can buffer life stressors. Heterogeneous social networks usually consist of weaker ties to people of higher status (Briggs, 1998; Granovetter, 1973). These weaker relationships are likely to be more diverse, allowing for a wider array of support types, such as information and connections that are useful for improving economic status (Granovetter, 1973, 1995; Lin, 1999). Social networks often do not conform to geographical location or family and friend relationships entirely. Some social networks are based on communities of people who share common interests such as internet support groups or people who belong to national organizations (Wellman, 1988).

In addition to social network size, network density also contributes to the structure of a social network (Lin et al., 1986). Density refers to the extent of connectedness between individuals within a social network and is measured by asking a respondent how many individuals in her/his network also know each other (Lin et al., 1986). Frequency of contact within a social network can also be measured. Berkman and Syme (1979) measured frequency of contact along with network size and found that those with few friends and family or infrequent contact with them had higher mortality rates compared to people who had frequent contact with many friends and family.

Community social support. As opposed to intimate partner and social network

support, which are both measured by assessing relationships between individuals,

community social support is conceptualized and measured differently (Berkman &

Syme, 1979; Cleak & Howe, 2003; Krause & Shaw, 2002). Community social support

is usually discussed in terms of the ties individuals have to their communities. These

ties include participation in formal or informal groups (civic groups, school groups,

sports teams/clubs, service organizations, and/or political organizations), church or

temple membership, and/or use of social services (Berkman & Syme, 1979; Cleak &

Howe, 2003; Krause & Shaw, 2002). The extent of this involvement is a reflection of

an individual's connectedness (Lin et al., 1986). Community social support is

generalized in nature and not intended to help specific individuals (Berkman, 2000;

Berkman & Syme, 1979; Lin et al., 1986).

Researchers have measured support from a community in various ways.

Berkman and Syme (1979) measured community-level social support in adults, aged

30 – 69, in Alameda County, California by querying participants on church

membership and formal and informal group associations. The researchers found that

participants possessing community ties had lower mortality rates.

Cleak and Howe (2003) studied social networks and community involvement

in elderly Latinos and African Americans. They measured community-level social

support in the same manner as Berkman and Syme (1979) and found that participants

who reported high levels of community participation were more likely to utilize

informal supports such as help from friends and family. In contrast, those participants

who reported low community participation were more likely to rely on formal sources of support such as social service programs.

Krause and Shaw (2002) assessed social support received by elderly men and women (65 years and older) to examine whether receiving public assistance was associated with receiving support from informal sources such as friends and family. The authors utilized data from a national longitudinal study that measured instrumental, informational and emotional social support in elderly individuals both receiving and not receiving public assistance (for example, Food Stamps and Social Security Insurance) over the course of four years. They found a difference in receipt of informal social support based on both receipt of public assistance and gender. Specifically, male elders on public assistance tended to experience a decline in informal social support over the four years of the study, while female elders with public assistance tended to experience an increase in informal social support. Conversely, female elders without public assistance experienced a decrease in informal support, while male elders without public assistance experienced an increase in informal support over the four years of the study. A limitation of this study was that it did not measure any factors associated with being in poverty or needing public assistance; instead, the researchers used the receipt of public assistance as a proxy for poverty. Still, these findings indicate a complex relationship between poverty and social support.

Utilization of social services is another avenue for community social support (Berkman & Syme, 1979; Cleak & Howe, 2003; Krause & Shaw, 2002). Several

social service programs, both private and public, address food insecurity. In the private

sector, some of the most common nutrition assistance programs are soup kitchens and

food-banking operations such as America's Second Harvest (America's Second

Harvest, n.d). These private programs seek to address the symptoms of hunger and

food insecurity by providing food items and warm meals to those in need. In the

public sector, the USDA plays a key role in the administration of the nutrition

component of the federal government's assistance to the poor (USDA, 2004b). Among

a wide variety of USDA-sponsored programs, which include the Special Supplemental

Nutrition Program for Women, Infants, and Children (WIC) and The National School

Breakfast and Lunch Program, the Food Stamp Program (FSP) is the most well known

(USDA, 2000).

Food stamp receipt has an important relationship to food insecurity (Rose,

1999). Rose found that amount of food stamp benefits received by a household had an

inverse relationship with food insecurity, and that a decrease in the food stamp benefit

level was associated with an increase in food insecurity (Rose, 1999). Similarly, a

study evaluating the relationship between income and food insecurity showed that

food stamp program participation weakened the inverse relationship between income

and food insecurity (Bartfeld & Dunifon, 2003). The findings of both studies suggest

that food stamp participation is an important factor to consider in terms of community

social support (Bartfeld & Dunifon, 2003; Rose, 1999).

In summary, social support from three sources (intimate partner, social

network, and community) has been shown to improve well-being by helping

individuals cope with stressors. Given that support from these three sources has been shown to have positive effects on well-being, social support from these sources can reasonably be expected to reduce the possibility of food insecurity.

Synthesis of the Major Components of Social Support

Previous research on the structure and function of social support, reviewed above, has informed the conceptualization of social support for the present study. Researchers have generally conceptualized social support in terms of concentric circles to illustrate its structure (Ahluwalia et al., 1998, Berkman, 2000; Berkman & Syme, 1979; Boissevain, 1974; Lin et al., 1986). One of the first researchers to conceptualize the structure of social support as concentric circles was Jeremy Boissevain in his book, *Friends of Friends* (1974). According to Boissevain, an intimate partner fills the innermost circle, less intimate relationships with family and friends fill the next circles, and community relationships are in the outermost ring. Berkman (2000), in her work on social support, simplified Boissevain's zones into three circles: intimate partner, instrumental friends, and the community. Of particular relevance to the present study, researchers examining the coping strategies of low-income North Carolinians (n = 141) found that participants relied on three sources of social support to cope with food insecurity (Ahluwalia et al., 1998). Ahluwalia and colleagues (1998) conceptualized these sources as a set of concentric circles similar to Berkman (2000). The circle closest to the individual represents a close family member, such as a spouse. The middle circle refers to support from friends. The outermost circle reflects support from neighbors and acquaintances.

Figure 2.1 presents a conceptualization of social support that includes both sources and functions of social support, based on previous research. As shown, the primary source is the intimate partner, usually a spouse or lover. The secondary source is called social network support and consists of support from family members and friends. The outermost source, community support, refers to social support derived from neighbors, acquaintances, co-workers, and formal or informal group members. Social networks and intimate partners may provide all three social support functions: instrumental, emotional, and instrumental. In contrast, community support is provided and measured through faith community membership, informal or formal organization participation, and utilization of social services.

Figure 2.1. *Conceptualization of Social Support*

Individual

Community Support
- Faith community membership
- Organization membership
- Social service use

Social Network Support
- Instrumental
- Emotional
- Informational

Intimate Partner Support
- Instrumental
- Emotional
- Informational
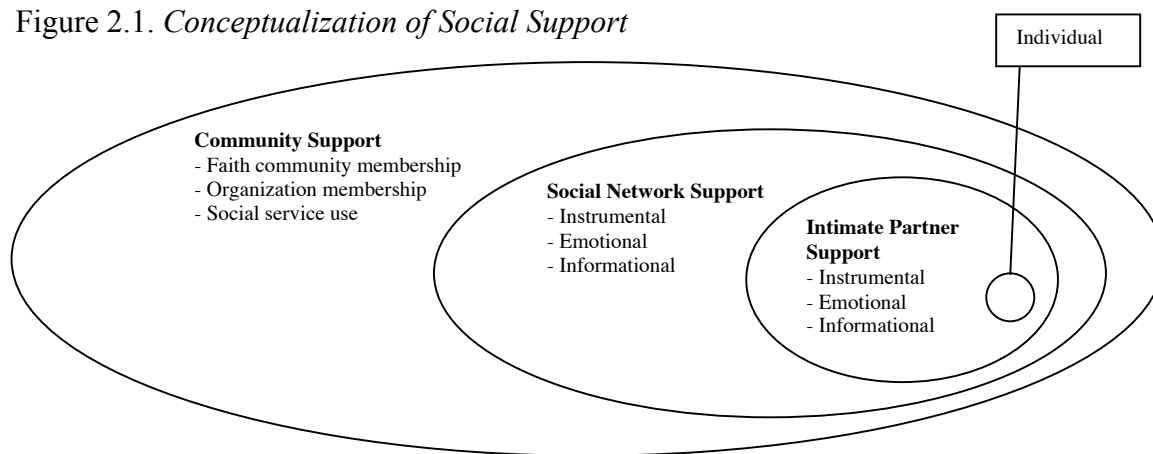
The Association between Social Support and Health

Social support may influence health in multiple ways. Although little research has examined the effects of social support on food insecurity, a large body of research has studied the impact of social support on other health-related outcomes. Researchers have found evidence for the main effects of social support (Israel, Farquhar, Schulz,

James, & Parker, 2002; Strogatz, Croft, James, Keenan, Browning, & Curtis, 1997).

Evidence has also been found for both the mediating and moderating role of social

support (Aro et al., 2001; Bender, Cook, & Kaslow, 2003; Black et al., 2005; Hashima

& Amato, 1994; Hoard & Anderson, 2004; Jou & Fukada, 1997; Lee et al., 2004).

This literature is summarized below.

The Main Effects of Social Support

Numerous researchers have evaluated whether social support has a direct effect

on outcomes such as depression, blood pressure, and problem-solving abilities (Israel

et al., 2002; Orthner, Jones-Sanpei, & Williamson, 2004; Strogatz et al., 1997). Israel

and colleagues (2002), in their cross-sectional study of mothers from Detroit, explored

the direct effects of social support on depressive symptoms. They found that social

support had a direct relationship with the experience of depressive symptoms. In the

presence of high levels of instrumental or emotional social support, fewer depressive

symptoms were experienced. In a cross-sectional study of low-income families, a

direct relationship was found between social support and problem-solving abilities

(Orthner et al., 2004). Families who were more likely to ask others for help had better

perceived problem-solving abilities compared to those who were less likely to ask for

help. Strogatz and colleagues (1997) evaluated the association between social support

and blood pressure in a sample of African Americans from North Carolina between

the ages of 25 and 50. The researchers found an inverse relationship between social

support and blood pressure. Those with higher levels of social support had lower

blood pressures.

The Mediating Role of Social Support

In the 1970s and 1980s researchers established the mediating role that social support plays between stressors and health outcomes (see reviews by Barraera & Ainseley, 1983; Leavy, 1983). More recently, numerous studies have examined the mediating role of social support on several different stressor and health outcome relationships. For example, Abbey, Andrews, and Halman (1995) conducted a longitudinal study of social support exchanged between intimate partners (n = 248). Abbey and colleagues found that social support mediated the relationship between stress and marital quality, such that couples who experienced more stress perceived less social support from their partner, and in turn, reported lower marital quality. Social support has also been found to mediate the relationship between childhood maltreatment and intimate partner violence (Bender et al., 2003). Bender and her coauthors demonstrated that the more severe the child abuse experienced, the less social support a woman perceived she had, which thereby increased the severity of the intimate partner violence she was likely to experience as an adult. Further, in a study of single mothers in China (n = 49), social support was found to mediate the relationship between self-esteem and life satisfaction, such that women with higher self-esteem were more comfortable getting support from others, which led, in turn, to greater reported life satisfaction (Choy & Moneta, 2002). In a study of 1106 Chinese elders, social support from the family was demonstrated to have a mediating effect on the relationship between source of income (family, welfare, or personal funds) and depression (Chou, Chi, & Chow, 2004). In other words, the more financially

independent an elder was from his/her family, the less social support he/she received, and, in turn, the greater the likelihood of depression. Social support has also been demonstrated to mediate the relationship between solidarity with family, friends, and co-workers and stress level, such that those with high levels of solidarity were more likely to report receiving social support, and thereby report less stress (Haslam, O'Brien, Jetten, Vormedal, & Penna, 2005). Finally, parents reporting higher levels of interparental conflict reported less social support and, in turn, lower academic achievement by their children (Unger, McLeod, Brown, & Tressel, 2000).

The Moderating Role of Social Support

Substantial literature exists assessing the role of social support as a moderator (Portney & Watkins, 2000). Researchers have hypothesized different mechanisms for the moderating role of social support. Social support can assist with coping in stressful situations by enabling an individual under stress to change a stressful situation, alter the situation's meaning, or change her/his response to it (Koeske & Koeske, 1991; Throits, 1986). Social support can also moderate the effects of stress by increasing control over a stressful situation or by increasing self-esteem (Pearlin, Lieberman, Menagahn, & Mullan, 1981).

Numerous researchers have examined social support in regard to the relationship between stressors and mental or physical health outcomes (Aro et al., 2001; Black et al., 2005; Hashima & Amato, 1994; Hoard & Anderson, 2004; Israel et al., 2002; Jou & Fukada, 1997; Lee et al., 2004; Parkes, 1986; Singh & Panday, 1990; Strogatz et al., 1997). The stressors studied include general stress (Jou & Fukada,

1997), the stress of living in poverty (Kohler et al., 2004), marital stress (Black et al., 2005), and acculturative stress (Lee et al., 2004). Some studies have found evidence for the moderating effect of social support, in which the influence of a stressor on a health outcome is diminished by the presence of social support (Black et al., 2005; Hashima & Amato, 1994; Jou & Fukada, 1997; Kohler et al., 2004; Lee et al., 2004; Parkes, 1986). Other studies, however, have been unable to provide evidence of the moderating effect of social support (Chou et al., 2004; Israel et al., 2002; Singh & Panday, 1990).

Black and colleagues (2005) examined whether social support from the community moderated the relationship between quality of intimate partner relationships and health status among rural African American women. They found that those with intimate relationships of poorer quality often had poorer health and that the link between poor quality of an intimate partner relationship and poor health status was stronger for women receiving less social support from the community.

A couple of studies have examined the interaction effects of income and social support on outcomes such as parenting style and depression. Hashima and Amato (1994) assessed whether social support moderated the relationship between income and negative parenting behaviors such as yelling, slapping, and lack of hugging or cuddling in a national sample of individuals in the U.S. They reported that social support did moderate the relationship between income and parenting behavior such that the presence of social support reduced negative parenting behavior among low-income families. Kohler and colleagues (2004) evaluated whether social support

played a moderating role in the relationship between economic stress and depression

in a sample of rural mothers from Maryland (n = 35). They found that, in the presence

of economic challenges, mothers with more social support were less likely to

experience depression than similar mothers with less social support. Taken together,

these findings suggest the existence of joint effects of income and social support.

Much of the literature assessing income and social support has done so within

impoverished populations. Therefore, the studies could not evaluate the relationship

between income and social support, instead they explored how impoverished people

experience social support and what happens in the presence and absence of such

support. These studies are reviewed in the following section.

The Experience of Social Support in Impoverished Populations

An inverse relationship between social support and poverty has been suggested

(Henly, Danziger, & Offer, 2005). Further, people in poverty may not experience the

same benefits from the social support available to them as those with higher incomes.

This benefit differential may be because, for example, people who are dealing with

low incomes often have family members and close friends who are also grappling with

this issue (Krause & Shaw, 2002). The phenomenon of low income people being

surrounded by others who are also low income has been termed the "pressure cooker

effect," suggesting a social support network in which all members are struggling with

the same stressors (Hobfoll, 1998). Hoard and Anderson (2004), in their study of

stress and depression in low-income fathers who were predominately African

American, found that those who reported the highest levels of social support also had

the highest levels of stress. The authors hypothesized that this finding could be attributed to the burden of demand placed on people due to the reciprocal nature of support from social network members. Many in poverty choose to isolate themselves instead of drawing on their social network because reciprocity would not be possible, but is often expected (Belle, 1982; Nelson, 2000). Belle (1982) reviewed studies of poverty from the 1970s and 1980s to evaluate the impact of poverty on social support among urban dwellers. She found that poverty both imposes considerable stress on individuals living under those conditions and harms their social support sources.

Those living in poverty are limited in the choices they can make about where to live and with whom (Belle, 1982; Duncan, 1999; Shipler, 2004). High crime, poor housing, and questionable personal safety often characterize neighborhoods where the poor can affordably reside (Belle, 1982; Duncan, 1999; Shipler, 2004). These conditions frequently lead to "negative networks" in which all members face similar stresses (Belle, 1982; Nelson, 2000). Moreover, because of high crime rates, many poor residents isolate themselves from the possibility of victimization and bad influences on their children. On the positive side, in reaction to impoverished living situations, some individuals create informal exchange networks to provide mutual aid as crises occur (Edin & Lein, 1997; Stack, 1974). Unfortunately, these mutual aid networks may serve to keep members at poverty level. Belle (1982) found that any wealth accumulated by a member of a social network was distributed throughout the network to those in need, keeping all at poverty level.

Although the strong ties between individuals in poverty can create more problems than solutions due to shared stressors and reciprocity obligations, weak ties to those on better financial footing can be beneficial (Nelson, 2000). Social support through this type of tie does not require the same level of reciprocity and provides those in poverty with sources of instrumental support in the form of financial aid and job placement (Granovetter, 1973; Nelson, 2000).

House (1987) notes in his work on social support and social structures that poverty appears to be an important determinant of the ability to form and sustain supportive social relationships. Individuals with higher incomes and more education generally have larger social networks, more frequent contact with network members, and more community involvement than people of lower socioeconomic status (Dohrenwend & Dohrenwend, 1970; Fischer, 1982; Moody & Gray, 1972; Mickelson & Kubzansky, 2003; Veroff, Douvan, & Kulka, 1981). However, Belle (1982) suggests that social support networks may, in fact, be more common in impoverished than in middle-class communities, because middle-class individuals rarely experience the need to share resources with other households due to the self-sufficiency of most middle-class households. Moreover, if middle-class households do find themselves in need they may choose not to seek help in order to save face among neighbors and friends (Belle, 1982; Schwartz-Nobel, 2002).

In another study of the effect of social support on impoverished individuals, Green and Rodgers (2001) explored the relationships between mastery (self-efficacy), stress, and three types of social support (instrumental, informational, and

belongingness) in 260 low-income, predominately African-American mothers in Pittsburgh, Pennsylvania. Data were collected through in-depth interviews at two time intervals with each woman. The authors found that a sense of belonging to a social network was an important determinant of access to other forms of social support, particularly instrumental support. Based on their findings, the authors suggested that instrumental support is particularly important for low-income families as it enables them to cope with poverty and the stress associated with burdensome financial trade-offs between various expenses like rent, health care, child care, and food.

Although those in poverty may have less social support or receive fewer benefits from the social support they do have, social support has been shown to have positive effects on the health of all people. The literature related to the effects of social support on health is reviewed below.

The Effects of Social Support on Health

Little research has been conducted on the relationship between social support and food insecurity, but existing research does suggest that receiving support from an intimate partner, a social network, and/or the community can have a positive effect on health (e.g., Berkman & Glass, 2000; Cohen et al., 2000). Generally, social support is thought to play a role in the risk for, progression of, and recovery from physical illness because social support influences certain behaviors such as exercise, nutrition, smoking, alcohol intake, sleep, and adherence to medical regimens (Cohen et al., 2000). The presence of social support has been shown to promote health through the reduction of psychological despair, increased motivation to take care of one's self,

increased suppression of the neuroendocrine response, and enhanced immune function

(Berkman & Glass, 2000; Cassel, 1976; Cohen, 1988; Cohen et al., 2000; Cohen &

Syme, 1985; Throits, 1985). Cassel (1976) was the first to posit that social support

plays a role in disease etiology by reducing an individual's vulnerability to the

negative effects of stress on health. Cassel, however, did not suggest any specific

health outcomes that could be improved by the presence of social support. Since then,

many researchers have studied the relationship between social support and health.

Most studies to date have looked at social support's relationship with mortality,

depression, and well-being, but have not examined its relationship with food insecurity

or hunger (Aro et al., 2001; Berkman & Glass, 2000; Berkman & Syme, 1979; Heaney

& Israel, 2002; House, 1988; Israel et al., 2002). Even so, it is important to review the

previous research on the association between social support and health, because it

informs the present study, which examines how social support effects food insecurity

as a health outcome.

The strength of social relationships predicts mortality for both men and women

in many populations (Berkman & Syme, 1979). This relationship is independent of

certain biomedical indicators of mortality risk such as self-reported chronic conditions,

physical activity, blood pressure, cholesterol level, respiratory function, and

electrocardiogram (Berkman & Syme, 1979; Michael et al., 1999). The health risks of

having low levels of social support are comparable in magnitude to the risks

associated with cigarette smoking, high blood pressure, and obesity (Michael et al.,

1999). These threats remain after controlling for common risk factors (for a review of longitudinal studies see House, Landis, & Umberson, 1988).

In their seminal study on social support and mortality mentioned previously, Berkman and Syme (1979) examined the three sources of social support (intimate partner, social network, and community) among adults residing in Alameda County, California. Intimate partner ties were measured by marital status (married versus single, divorced, separated or widowed). Social network ties were measured by asking: "How many close friends do you have?" "How many relatives do you have that you feel close to?" and "How often do you see these people each month?" To measure community ties, respondents were asked whether they belonged to a church or temple and whether they were members of formal or informal groups. These researchers found an inverse relationship between all sources of social support and mortality, such that those with stronger intimate partner, social network, or community support lived longer. Intimate partner and social network support, however, both had a stronger relationship to mortality than did community ties. Further, the association between social support and mortality held when controlling for self-reported physical health status, year of death, socioeconomic status, and health behaviors such as smoking, alcohol use, physical inactivity, obesity, minimal use of preventive health care, and a composite of all health behaviors.

Another group of researchers explored the association between social support and depression in a national sample (n = 1851) of Finnish women aged 48 to 50 (Aro et al., 2001). They measured social support in terms of number of friends, frequency

of meeting with friends, satisfaction with received support, satisfaction with intimate relationships, frequency of support given, and having someone close with whom problems could be discussed. All of the social support measures were found to be associated with depressive symptoms. Those women with fewer friends or who met friends less often reported a greater number of depressive symptoms. Conversely, women who reported more satisfaction with the social support they received and good or satisfactory intimate relationships reported fewer depressive symptoms. Lastly, women who reported not having someone with whom to discuss problems or were not asked by others for advice or help reported more depressive symptoms. In the study of depression in Detroit mothers discussed above, researchers found that those with more instrumental and emotional support experienced fewer depressive symptoms (Israel et al, 2002). Further, instrumental support was found to be the stronger predictor of the experience of depression as compared to emotional support. These findings suggest that social support from intimate partners and social networks may protect against depression.

Despite the large body of research assessing the effects of social support on health, little research has examined whether social support can moderate the relationship between income and food insecurity. Yet, evidence exists showing that social support is used to cope with food insecurity (Gross & Rosenberger, 2005; Hoisington et al., 2002; Holben et al., 2004). Further, one recent study assessed the affects of social support on food insecurity in two rural Iowa counties (Garasky et al., 2006). Garasky and colleagues found that those with higher social support were less

likely to experience food insecurity, although receipt of food from friends and family was not found to be a significant predictor of food insecurity.

A few studies have explored social support in relation to food insecurity qualitatively, but have not specifically assessed whether social support moderates the relationship between income and food insecurity (Ahluwalia et al., 1998; Pierce, Sheehan, & Ferris, 2002). Based on consistent findings concerning the moderating role of social support from past research, however, social support may moderate the relationship between income and food insecurity. Social support is not likely to play a mediating role on the relationship between income and food insecurity, because strong evidence exists for the inverse relationship between income and food insecurity. Moreover, evidence exists to suggest that even when controlling for social support, as income decreases the likelihood of food insecurity increases (Alaimo, Briefel, Frongillo, & Olsen, 1998; Nord et al, 2002; Olsen & Rauschenbach, 1997; Rose & Basiotis, 1995). Hence, the moderating role of social support could be key to understanding differing rates of food insecurity.

Food Insecurity and Social Support in Low Income Individuals

Of the few studies investigating the relationship between food insecurity and social support, no studies were found that examined whether social support moderates the relationship between income and food insecurity. In fact, the existing studies did not examine the relationship between income and food insecurity; instead, they examined food insecurity and social support in low-income individuals. Ahluwalia and colleagues (1998) conducted a qualitative study exploring the relationship between

social support and food insecurity. The authors conducted 16 focus groups in both

urban and rural counties in North Carolina with parents seeking or receiving public

assistance (n = 141). To assess food insecurity, each participant completed the

Community Childhood Hunger Identification Project Hunger Scale, an eight-item

survey that solicits information on such topics as skipping meals, reducing the size of

portions, and not having enough money for food. The authors defined social support as

"helpful functions performed or aid provided for a person by members of his or her

network, such as emotional, instrumental, and informational aid" (Ahluwalia et al.,

1998, p. 600). Many participants reported that either their income was not adequate or

public assistance was not sufficient to meet their food needs throughout the month and

that they relied on a social network for help getting enough to eat as a result. If their

social network was not able to provide the needed support, these individuals accessed

community resources such as churches and food pantries. Study participants reported

obtaining support from three different sources: extended family members, friends, and

neighbors/acquaintances. However, most reported seeking and receiving support

predominately from family. Although focus groups were held with rural and urban

residents separately, no attempt was made to ascertain whether perceptions of social

support differed based on urban/rural location.

Pierce, Sheehan, and Ferris (2002) also examined the relationship between

food security and social support among low-income individuals. They assessed

nutritional needs and social support perceived as helpful in a sample of low-income

elderly women (aged 75 to 90 years) living in government-subsidized housing in semi-

rural towns (n = 35). Focus groups and in-depth interviews were conducted. The authors defined social support as "help offered in response to an identified need" (Pierce et al., 2002, p. 39). To assess food insecurity, women were asked about their problems obtaining enough food. Participants indicated that they were provided with more instrumental than informational or emotional support in relation to food acquisition. Examples of instrumental support included help with shopping, transportation to a grocery store, and assistance with meal preparation. Informational support came in the form of education and advice, primarily in terms of dietary restrictions. Finally, emotional support was given in the form of encouragement and self-disclosure, i.e., the sharing of a similar situation. Participants cited more instances of instrumental support when discussing food security, which makes sense because tangible support like a loan may be more helpful in ameliorating food insecurity than emotional support (Schaefer et al., 1981).

Both of the above studies included only low-income participants. Hence the relationship between income and food security could not be assessed. Further, neither study explored whether those reporting higher levels of social support also reported less food insecurity. Three quantitative studies, however, have included social support as a predictor of food insecurity and found evidence of an inverse relationship between social support and food insecurity. The three are described below.

Tarasuk (2001) conducted a study of mothers between the ages of 19 and 49 years with children under the age of 15 years who had used a food pantry within the last year (n = 153). Although the primary purpose of the study was to assess the health

effects of hunger, social support was also assessed. Tarasuk measured social support

by asking about feelings of isolation, whether friends or family were available to help

in times of need, and about the presence of friends and family with whom they could

confide about any problems. Tarasuk measured hunger using the 18-item USDA Core

Food Security Module. She found that the odds of being food insecure with moderate

to severe hunger were much higher for women who reported being socially isolated.

Women who reported higher levels of perceived emotional and instrumental support

were less likely to experience hunger.

Vozoris and Tarasuk (2003) conducted a secondary data analysis using the

1996-1997 National Population Health Survey of Canada to examine level of

household food insecurity and associated household characteristics (n = 81,581).

Three items were utilized to assess food insecurity: 1) whether the household ever ran

out of money for food, 2) whether anyone in the household received food from a food

bank, and 3) whether the household always had enough food. Social support was

measured with four items: 1) whether the respondent had someone to confide in, 2)

whether the respondent had someone he/she could count on, 3) whether the respondent

had someone to give him/her advice, and 4) whether the respondent had someone to

make him/her feel loved. The researchers found that food insecure individuals had

greater odds of reporting poor social support.

Finally, Bartfeld and Dunifon (2003) included community social support in

their analysis of state and household-level predictors of food insecurity in the U.S.

They utilized residential stability (percentage of population living in the same

dwelling for at least five years) as a proxy of community social support because they hypothesized that higher levels of residential stability translated into greater numbers of community ties and stronger community social support. Food insecurity was measured using the 18-item USDA Core Food Security Module. States with higher percentages of their populations residing in the same dwelling for at least five years had lower rates of food insecurity. This study also assessed income in relation to food insecurity and found an inverse relationship between the two variables. They did not, however, examine the income and community social support interaction to determine whether community social support moderated the relationship between income and food insecurity.

<div align="center">Rural Conditions and Food Insecurity</div>

Rural communities often contend with problems that would seem likely to aggravate food insecurity. These problems include geographic isolation, lower educational attainment, and a unique economic structure where communities rely on only one or two industries (e.g. Blank, 2004; Parisi, McLaughlin, Grice, Taqunio, & Gill, 2003). Rural Oregon communities, however, have had lower rates of food insecurity than urban areas, even though nationally rural residents have higher rates of food insecurity than urban residents (USDA, 2002). One reason rural Oregonians may have been less likely to experience food insecurity is the existence of more or stronger social supports in rural communities. Studies examining whether rural communities' higher levels of social support are associated with decreased likelihood of food insecurity are lacking. Previous research, however, indicates that nationwide rural

areas experience unique economic hardship, higher rates of food insecurity, and stronger social support than urban areas. These issues are discussed below.

The Nature of Rural Communities

The unique economic structure of many rural communities contributes to poverty and food insecurity. Many rural regions depend on one or two industries to survive (Blank, 2004). When industries experience economic declines, rural regions can be severely affected. Blank (2004) suggests that because of the limited number of industries in rural communities, these regions are more susceptible to recessions. For example, many rural economies are based solely on extractive industries that exploit available natural resources such as coal, timber, fish, and rich soil. With the rise of the global marketplace, the demand for the resources gleaned through extractive industries has declined because businesses have relocated overseas to take advantage of cheaper costs of labor and natural resources (Parisi et al., 2003). These declines have resulted in a large loss of jobs, which has been disastrous for many rural communities. Educational opportunities to retrain for different jobs are often unavailable in rural areas (Blank, 2004; Parisi et al., 2003). As a result, many of the rural unemployed either take jobs in the service sector where the pay is much lower or leave the area to find employment (Blank, 2004; Kinsella, 2001). Those who stay face decreased incomes resulting in increased vulnerability to food insecurity. Rural Oregon communities have faced these same economic conditions (Gentle, 2000). For example, the downturn in the Oregon timber industry has had a major impact on rural workers.

Moreover, even when low income rural residents are able to obtain employment where they live, community resources, such as public transportation and child-care, are often limited (Blank, 2004; Weber et al., 2003). Rural residents without cars are unable to get to jobs that are not within walking distance, and most jobs in rural communities are not. Also, limited child-care options make it difficult for parents to work (Blank, 2004; Weber et al., 2003). These hardships often force rural residents to decrease or curtail work (Blank, 2004).

To add to the challenge of rural life, rural residents have lower educational attainment than their urban counterparts (Congressional Rural Caucus, 2001; Deavers & Hoppe, 1992). According to data from the 2000 U.S. Census, 59% of rural residents attained no more than a high school diploma compared with 48% of central city residents and 44% of suburban residents (Weber, Duncan, Whitener, & Miller, 2003). Lack of education is a barrier to obtaining the higher paying jobs available in rural communities.

A decrease in the number of higher paying jobs in rural communities, limited local retraining opportunities, less support services for workers, and lower educational attainment contribute to lower incomes that make food insecurity more likely (Blank, 2004; Parisi et al., 2003; Weber et al., 2003). In addition, rural communities face other conditions contributing to food insecurity that urban dwellers do not. These include few or no supermarkets in the community, supermarkets with a limited number of food items, and high prices for those food items (Garasky et al., 2006; Morris et al., 1992; Stuff et al., 2004).

In spite of the above discussed factors, in 1999 to 2001 rural Oregon households were less likely to experience food insecurity than urban Oregon households, possibly due to stronger community and family ties related to geographical proximity, as mentioned previously (Bartfeld & Dunifon, 2003; Bernell et al., 2006; Olsen et al., 2004). However, by 2002 to 2004 rural Oregon households were found to have a higher rate of food insecurity than their urban counterparts (Grussing & Edwards, 2006) suggesting that these relationships require further investigation.

Rural Social Support

Several studies suggest a difference in the nature of social support based on rural or urban residence (Fischer, 1982; Hofferth & Iceland, 1998; Mickelson & Kubzansky, 2003; Young, Russell, & Powers, 2004). Rural residents are more likely to report high levels of social support than are urbanites (Henly et al., 2005; Mickelson & Kubzansky, 2003). As compared to individuals in larger communities, those in rural towns have more and stronger ties to others (see review House et al., 1988). Moreover, although total size of a social network does not differ much between rural and urban communities, the composition of those social networks does indeed vary (Fischer, 1982).

Rural social networks are characterized by their denseness and composition. The number of people in a network who know each other (network density) is greater in rural areas than in urban areas (Kohler et al., 2004). Rural social networks are also more likely to be kin-based than are urban networks (Kohler et al., 2004). For

example, Hofferth and Iceland (1998) examined whether social exchanges between

kin and non-kin, patterns of giving and receiving, and amount of money involved

differed by urban and rural residence by analyzing data from the 1988 wave of the

national Panel Study of Income Dynamics. They found that rural families were

significantly more likely to exchange socially with kin exclusively, rather than with

both relatives and non-relatives. Rural residents who grew up in rural communities

were more likely to give money to relatives than were urban residents or rural

residents raised in urban communities. Rural residents who were raised in rural

communities were also more likely to receive aid from kin than were their urban

counterparts. These findings are similar to the findings of Fischer (1982) who

conducted a qualitative study to assess the social relationships of residents of

communities of various degrees of urbanization (n=1,050). Fischer found that urban

residents had social networks of friends while rural residents' social networks were

more likely to be comprised of kin. This difference in social network composition may

indicate that rural social ties are stronger, because rural residents have more intense

connections to family as compared to their urban counterparts.

Further, although the workplace is an important source of social network

support for urbanites, networks based on church membership are more important for

rural dwellers (Fischer, 1982). Another difference is that rural residents preferentially

seek support from family, friends, and the community and not from formal agencies.

Rural residents are less likely than urban residents to seek formal help such as public

assistance, due to stigma attached to receiving services and the lack of confidentiality inherent in rural living (Blank, 2004; Howland, 1995).

Rural and urban communities also differ in the community-level predictors of social support. Rural residents experience a stronger sense of community-belonging, solidarity, sense of place, and deeply shared values and identity when compared to their urban counterparts (Lev-Wiesel, 2003; Young, Russell, & Powers, 2004).

The above studies provide evidence for the presence of stronger social support in rural communities, indicating that although rural residents have many difficult conditions to contend with, social support may be one of their most important coping strategies.

Summary

Food insecurity has serious consequences, such as poor nutrition, which is associated with chronic disease and deficits in child development (Casey et al., 2005; Cook, 2002). Individuals in the U.S. experience food insecurity and hunger for a variety of reasons, including poverty and low wages, lack of social support, and lack of access to grocery stores (e.g., Davis, 1994; Olsen et al., 2004; Tarasuk, 2001; Vozoris & Tarasuk, 2003). A strong inverse relationship between income and food insecurity has been established (Alaimo et al., 1998; Nord et al., 2002; Olsen & Rauschenbach, 1997; Rose & Basiotis, 1995). Low-income individuals employ many coping strategies to obtain enough food for their families (Ahluwalia et al., 1998; Hoisington et al., 2002; Schwartz-Nobel, 2002; Tarasuk, 2001). One of these strategies is drawing on social relationships. Social support has been shown to

moderate the associations between numerous variables. In particular, research suggests that social support provides protection against the effects of stressors, such that the influence of a stressor on health and well-being is diminished (Black et al., 2005; Cobb, 1976; Hashima & Amato, 1994; Jou & Fukada, 1997; Lee et al., 2004; Parkes, 1986). Accordingly, social support may moderate the relationship between income and food insecurity. Furthermore, rural residents may have greater social support, contributing to rural/urban differences in food insecurity (Fischer, 1982; Olsen et al., 2004).

The primary objectives of the present study were to (1) determine whether social support moderates the relationship between income and food insecurity, such that this association is weakened in the presence of social support; and (2) determine how social support differs between urban and rural communities.

The conceptual model for this study is presented in Figure 2.2. Prior research suggests that as income decreases, the likelihood of experiencing food insecurity increases (Alaimo et al., 1998; Nord et al., 2002; Olsen & Rauschenbach, 1997; Rose & Basiotis, 1995). As shown, social support was hypothesized to moderate the relationship between income and food insecurity. More specifically, social support was expected to weaken the income and food insecurity relationship, such that individuals with low incomes and high levels of social support would be less likely to experience food insecurity than would low income individuals without high levels of social support. Finally, rural or urban residence was hypothesized to affect the structure and function of social support.

Figure 2.2. *Conceptual Model*
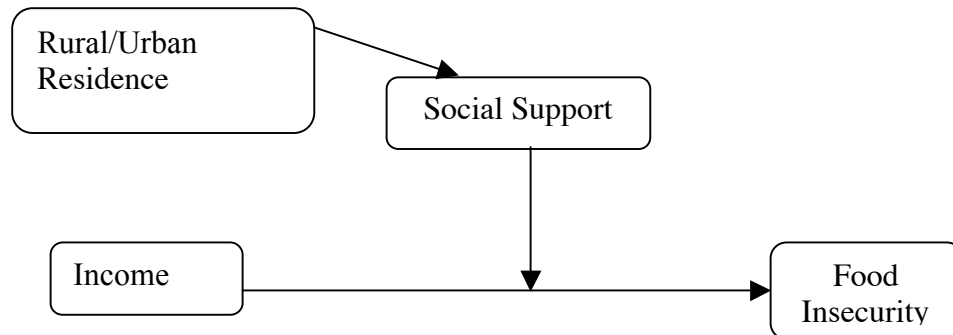
Based on the research objectives and conceptual model, the primary research hypotheses were as follows:

1) Social support moderates the relationship between income and food security,

2) The moderating effects of social support on the relationship between income and food insecurity differ by the function and structure of the social support received, and

3) The function and structure of social support differ based on rural or urban residence.

In addition, the study addressed exploratory research questions aimed at providing insight into the broader context surrounding the experiences of low income Oregonians. Because of their exploratory nature, hypotheses were not developed for these research questions. The exploratory research questions were 1) what are the experiences of low-income people around food security and insecurity and how do they perceive the role of social support? and 2) do the experiences and perceptions of

food insecurity and social support among low-income people differ based on rural or

urban residence?

CHAPTER 3. METHODS

Overview and Rationale

This study used mixed methods and was conducted in two phases. In the first phase, quantitative data were collected from a stratified random sample of working-age Oregonians via a mail survey. In the second phase, in-depth qualitative interviews were conducted with a subsample of survey respondents. Approval of the study procedures was obtained from the Oregon State University Institutional Review Board.

This study was driven by quantitative methods, but incorporated qualitative methods to provide a richer context and to help explain quantitative results. This approach of combining quantitative and qualitative methods is one of four mixed method models proposed by Steckler, McLeroy, Goodman, Bird, and McCormick (1992). The strength of this approach is that qualitative data can provide greater understanding of the results gleaned through quantitative methods and provide a richer context with which to view an issue. This approach has been used to study disparate topics such as physical activity promotion (Henderson, Ainsworth, Stolarzcyk, Hootman, & Levin, 1999), drug abuse (Deren, Oliver-Velez, Finlinson, Robles, Andia, Colon et al., 2003), and coping strategies of immigrant families (Reiboldt & Goldstein, 2000). These studies demonstrated that even though the purposes of qualitative and quantitative methods are different, they can be used to complement one another. Furthermore, Sale, Lohfeld, and Brazil (2002) argued that using quantitative and qualitative methods to complement one another is the best reason for employing

mixed methods, suggesting that quantitative data can be used to test hypotheses while qualitative data may be used to attach meaning to phenomena that differ based on respondents' social role and experiences. Other researchers agree that the study of complex relationships demands the use of mixed methods to fully understand and/or evaluate them (Steckler et al., 1992).

Some low-income individuals experience food insecurity while others do not (Rose, 1999). Several explanations for the relationship between income and food insecurity have been tested (Alaimo et al., 1998; Bartfeld & Dunifon, 2003; Bernell et al., 2006). The varied explanations suggest a complicated relationship between income and food insecurity, making the use of mixed methods appropriate. For the present study, a mail survey was conducted and quantitative data were analyzed to assess the hypothesized relationships between income, food insecurity, and social support. The qualitative data collected via in-depth interviews provided information on the meanings people attribute to the receipt of social support and the experience of food insecurity (Berg, 2004; Henderson et al, 1999). More specifically, the in-depth interviews collected qualitative data on the experiences of Oregonians who were low-income, food insecure, or both. These qualitative data provided an understanding of the issues from participants' perspectives, in their own words (Patton, 1990). The results of the two phases were additive in nature (Sale et al., 2002). In other words, mixed methods allowed the researcher to (1) determine the relationship between income, food insecurity, and social support and (2) to develop a greater understanding

of the coping strategies that Oregonians employed and the meanings they attributed to these strategies.

<div align="center">Phase One: Mail Survey</div>

In Phase One, a cross-sectional mail survey was conducted with a random sample of Oregon residents aged 18 to 64 years. The sample was stratified based on rural/urban residence, with a final sample size of 343. Data were collected on food insecurity, social support, income, and sociodemographic characteristics. A mail survey allowed for the collection of data from a large geographically diverse sample in a shorter period of time than face-to-face methods, was more cost-effective than face-to-face or telephone methods, and allowed respondents greater privacy than telephone or face-to-face methods (Dillman, 2000; Mangione, 1998).

<div align="center">*Target Population and Sample*</div>

The target population for Phase One was Oregonians between the ages of 18 and 64. As noted earlier, this research was conducted in Oregon because it is a unique state, having been among the states with the highest rates of food insecurity during the 1990s and the early part of this decade, until 2004 when Oregon was the only state with a statistically significant food insecurity rate decrease (Brown & Fournier, 2005; Edwards & Weber, 2003). Individuals 65 years and older were excluded because a unique and complicated relationship between income and food insecurity exists among people 65 and older. More specifically, individuals 65 and older are more likely to be receiving social security and retirement benefits and more likely to have lower household expenses than individuals less than 65 years of age (ERS, 2002). As a

result, many adults 65 and older have more income to purchase food and have lower rates of food insecurity than younger individuals who are unemployed (ERS, 2002). Individuals under the age of 18 were excluded because individuals in this age group do not often have financial responsibility for a household.

Sampling Design

For the present study, disproportionate stratified random sampling using systematic selection was employed to oversample Oregon residents living outside urban regions. This sampling design provided broader representation of residents across the state than would a simple random sample; in particular, it ensured that the sample included adequate numbers of rural residents (Fink, 2003; Trochim, 2002). This sampling strategy allowed for analyses to be conducted on data from the smaller (i.e., rural) strata (Trochim, 2002). To conduct stratified random sampling, Oregon census tracts were divided into two subgroups (strata): rural and urban census tracts. Census tracts with more than 10% of their geographic area contained within an urban growth boundary were considered urban. All others were considered rural census tracts.

Survey Sampling International (SSI) created the sampling frame necessary for the present study, using a large national database of U.S. households. The information included in the database was obtained from white-page telephone directories and supplemented with other proprietary sources (Survey Sampling International, 2006). For each stratum, SSI selected a random start from the sampling frame and then systematically selected, for example, every 10th household in the frame, depending on

the number of households to be drawn and the number in the frame (personal communication, J. Prestegaard, January 27, 2006).

The sample may be limited in several ways. First, although the household telephone service rate is very high (95%), the sample may have captured fewer low-income Oregonians because people with low incomes are less likely to have a phone (Belinfante, 2003). Also, individuals who had recently moved into Oregon may not have been included. In addition, due to mail forwarding, individuals who had recently moved out of the state may have been included even though they no longer resided in Oregon.

The Oregon census tract rural/urban designations and the number to be sampled in each stratum were provided to SSI. SSI selected 600 households from the 492 Oregon census tracts designated as urban and 600 households from the 263 Oregon census tracts designated as rural. SSI provided names and addresses in electronic format. In the survey directions, respondents were instructed to complete the survey only if they considered Oregon their usual place of residence, following U.S. Census procedures (K. Vaidya, personal communication, April 7, 2006). The resident in each selected household who was between 18 and 64 and last had a birthday was asked to complete the questionnaire (see Procedures on page 80 for further information).

Stratified random sampling has substantial benefits over simple random sampling. As a result of creating strata that are homogenous on one characteristic (i.e., rural/urban residence), less variance existed within groups. Less variance allowed for

more statistical precision in estimating population parameters (V. Lesser, personal

communication, October 13, 2005; Trochim, 2002).

Initially, 1200 mail surveys were sent, based on calculations taking into

account deliverable addresses (85%), percent of households where someone within the

18 to 64 year age range resided (90%) (J. Prestegaard, personal communication,

December 1, 2005), and likely mail survey response rate (50%) (Dillman, 2000).

Table 3.1 presents the sample size that was achieved for this study. Of the 1200 sent

out, 83 (6.9%) were returned undeliverable. Another 110 (9% of 1200) were sent to

households with no one under 65 years of age. The determination that 110 surveys

were sent to households where no one under 65 resided was made because either the

survey was returned with a note that no one within the required age group resided in

the household (61) or the survey was returned complete and screened out of the

sample based on birth date (49). Another ten surveys were returned with a note that

the addressee was deceased. Finally, one survey was returned because the address was

a business. These factors reduced the sample to 996; of these, 343 were completed for

a response rate of 34.3%. The sample included 166 rural respondents, 175 urban

respondents, and two respondents whose residence was unknown because they

removed their identification numbers. The final sample of 343 provided adequate

power for the analyses that were conducted (see Power Analysis on page 90).

Table 3.1. *Response Rate and Sample Size*

Sample Assumption	Number of individuals remaining
Initial Sample	1,200
Percent with deliverable addresses (93.1%)	1,117
Percent of households with at least one individual within the age-range, alive, and not a business (89%)	996
Response Rate (34.3%)	343

Survey Nonresponse Analysis

A nonresponse analysis was conducted to evaluate the amount of bias within the sample by comparing the sociodemographic characteristics of the sample to data from the 2005 American Community Survey used by the U.S. Census Bureau (2005) to make Oregon population estimates. The percentages of males and White/non-Hispanic Oregonians completing the present survey were roughly similar to Oregon population estimates from the 2005 U.S. Census American Community Survey. In contrast, the study respondents were on average ten years older compared to the estimate of the average age of Oregonians according to the U.S. Census. This difference may be partially attributable to the fact that the age-range for the present survey was truncated. Only those between 18 and 64 could complete the survey, and the U.S. Census estimated that 24% of Oregonians are below the age of 18. Those who completed the present survey were more likely to be married, have a college education, and be employed than the population estimates for Oregon as a whole (U.S. Census, 2005). Only slightly more respondents in the current study had a car as compared to the percent of Oregonians found to have a car by the U.S. Census (2005). In addition, church attendance among respondents was compared with data from the Glenmary Research Center (2002) on church membership by state. The percent of

respondents in the present study who attended a faith community was only slightly

higher than the percent of Oregonians found to attend faith communities in the

Glenmary Research Center study. This analysis suggested that the sample was biased

toward respondents with higher socioeconomic status; a finding that is not surprising

because research indicates that individuals of higher socioeconomic status are more

likely to complete surveys (Brown & Topcu, 2003; Turrell, 2000; Turrell, Patterson,

Oldenburg, Gould, & Roy, 2003).

Instrumentation

The survey instrument was designed to take approximately 15 minutes to

complete. It consisted of four main sections: 1) food procurement and eating habits, 2)

social support, 3) community characteristics, and 4) sociodemographics. In addition, a

final section asked respondents for their contact information for the purpose of

recruiting participants for Phase Two. The design of the survey was developed with

guidance from Dillman's (2000) seminal work on mail surveys. Further, in addition to

the dissertation committee, experts in the fields of public health, poverty, food

insecurity, psychometrics, and social support reviewed earlier drafts of the survey and

provided feedback on how it could be improved. A list of the experts who reviewed

the survey and their areas of expertise can be found in Appendix A. A reading-level

assessment was also conducted utilizing the Flesch-Kincaid reading assessment that is

part of the Microsoft Word version X for Mac word processing software (Microsoft

Corporation, 2001). The reading-level of the survey was sixth grade. The survey was

designed so that response categories were generally precoded. The survey instrument

is included in Appendix B. A description of the study measures follows.

Measures

Food procurement. Survey items concerning food procurement included whether

respondents maintained a garden, used private nutrition assistance, hunted, fished,

foraged, or scavenged for food. These items were based on prior research suggesting

that those with low incomes used such strategies to keep food on the table (Ahluwalia

et al., 1998; Hoisington et al., 2002). A sample item was: "Does anyone in your

household have a food-producing garden either at home or as part of a community

garden?" Response categories were (1) no, neither; (2) yes, a garden at home; (3) yes,

a plot at a community garden; and (4) yes, both a home garden and a community

garden plot.

Food Insecurity. Food insecurity was measured with the U.S. Department of

Agriculture Food Security Core Module (USDA, 1999). The Food and Nutrition

Service of the U.S. Department of Agriculture and the National Center for Health

Statistics developed the first version of the Core Module in 1994 (Carlson et al., 1999;

Reeder, 2000). The Core Module was revised over the years based on critiques

provided by experts in the field (Carlson et al., 1999). A final version was pilot-tested

as a supplement to the U.S. Census' April 1995 Current Population Survey (CPS)

(Carlson et al., 1999). A nonlinear factor analysis technique called a Rasch

measurement model was employed to ascertain the number of items to be included in

the final instrument (Hamilton et al., 1997). The results of the analysis indicated that

the majority of the food security items fit a unidimensional measurement scale based on the root mean square residual (RMSR) statistic (Carlson et al., 1999; Hamilton et al., 1997). Core Module internal consistency reliability was assessed using the Spearman-Brown Split Halves Reliability Estimate (.852), Rulon's Split-Halves Reliability Estimate (.878), and Cronbach's alpha (.743) (Bickel et al., 2000; Hamilton et al., 1997). To assess construct validity, responses to the food security questions were compared to the same respondents' responses to income and food expenditure questions. The relationships were in the expected directions with food insecurity decreasing as both income and food expenditures increased (Hamilton et al., 1997; USDA, 1997).

The Core Module consists of 18 questions. Eight questions, however, referred only to households with children and could be excluded without any loss in precision (M. Nord, personal communication, February 2, 2006). The remaining 10 items were used in the present study. Two sets of items had 3-point scales. One set of items on a 3-point scale had the following question stem: "In the past 12 months, have you experienced any of the following food situations?" The items were (a) worry whether your food would run out before you had money to buy more; (b) food that you bought just didn't last, and you didn't have money to get more; and (c) you couldn't afford to eat balanced meals. Response categories were (a) never, (b) sometimes, and (c) often. An example of an item with a different 3-point scale was: "In the last 12 months, did you ever cut the size of your meals or skip meals because there wasn't enough money for food?" Response categories were (a) almost every month (b) some months, and (c)

only one or two months. Responses for both sets of questions were dichotomized. For the first set, "often" and "sometimes" were collapsed and coded as "yes"; "never" was coded as "no". For the other set, "almost every month" and "some months" were collapsed and coded as "yes," and "only one or two months" was coded as "no." The answers to these 10 items were summed to create a food insecurity scale. Based on the scaling procedure developed by the USDA, individuals with zero to two affirmative responses to the 10 items were categorized as food secure, individuals with three to five affirmative responses were categorized as food insecure without hunger, and individuals with six to ten affirmative responses were categorized as food insecure with hunger (Bickel, Nord, Price, Williams, & Cook, 2000; Carlson, Andrews, & Bickel, 1999). Because the percent of respondents categorized as food insecure with hunger was less than 8%, a binary outcome variable was created to reflect food security status by combining the food insecure and food insecure with hunger categories. The dichotomous categories were food secure = 0 and food insecure = 1.

The reliability and validity of the food insecurity scale were assessed for the present study, as described below.

Reliability. The 10-item food insecurity scale had high internal consistency reliability. The reliability coefficient was .91, based on a Cronbach's alpha via Kuder-Richardson 20 formula for dichotomous items (Pallant, 2001).

Validity. For the present study, the construct validity of the food insecurity scale was evaluated based on recommended procedures (Netemeyer, Bearden, & Sharma, 2003; Singleton & Straits, 2005). First, correlations were conducted with two

related variables to assess convergent validity. Second, differences among known groups on the food insecurity scale were assessed.

The correlations (unweighted) between the food insecurity scale and the use of any private nutrition assistance program (food pantry, soup kitchen, or gleaning organization) and the use of any public nutrition assistance program (Food Stamp Program, WIC, School Lunch, or School Breakfast) were calculated, because food insecurity has been found to be associated with use of these programs in previous research (Ahluwalia et al., 1998; Vozoris & Tarasuk, 2003). Only moderate correlations were expected because even though the concepts are related, they do not measure the same construct (Singleton & Straits, 2005). The correlations between the food insecurity scale and private nutrition assistance use (.38) and public nutrition assistance use (.31) provided support for adequate validity for the food insecurity scale with this sample.

Another method of assessing construct validity is to evaluate differences among known groups that are expected to differ on the measure of interest (Netemeyer, Bearden, & Sharma, 2003; Singleton & Straits, 2005). The groups compared to assess the construct validity of the food insecurity scale were (a) unemployed versus employed respondents, (b) respondents who did not own versus those who did own a home, and (c) respondents who spent more than 30% of their income on housing versus those who spent 30% or less. Table 3.2 displays the number of respondents in each known group, the mean food insecurity score and the standard deviation for each group, and the results of the independent samples t-tests. As

expected, respondents who were unemployed, did not own a home, or spent more than

30% of their income on housing had higher scores on the food insecurity scale, where

higher scores indicated more problems obtaining enough food.

Table 3.2. *Comparison of mean number of affirmative answers to the Food Insecurity Scale between known-groups to assess validity of the Scale*

Known group validity test	Unique Group[a]			Comparison Group			t	p	Validity support
	n	Mean	SD	n	Mean	SD			
Employment	71	1.65	2.69	257	.67	1.85	3.57	<.001	Supported
Homeownership	46	2.89	3.23	280	.58	1.68	7.36	<.001	Supported
Percent of income spent on housing	78	2.12	2.99	223	.44	1.38	6.63	<.001	Supported

Note: Data are unweighted.
[a] The unique groups are unemployed, did not own a home, and over 30% of income spent on housing.

The results of the known-group validity tests for the food insecurity scale provided

further evidence for the validity of the measure with this sample.

Social Support. The following social support measures were developed from

many sources, because no preexisting social support instrument included measures

assessing all social support domains included in the present study. As a result, the

psychometric properties of the scales discussed below were not available from

previous research.

Social support from an intimate partner. The measures of social support from

an intimate partner were adapted from a large body of previous work on social support

(Berkman & Syme, 1979; Cohen et al., 2000; Dean et al., 1989; Heaney & Israel,

2002; Lin et al., 1986; Throits, 1985). The survey included four questions about

support from an intimate partner. The first question was "In the past 4 weeks, how

often did your intimate partner show that he/she loved and cared for you?" Response

categories (on a 5-point scale) were (a) never, (b) once a month, (c) once a week, (d)

once every two days, and (e) once a day or more. The remaining three items had the same question stem: "How much do you agree that your intimate partner is someone who…" The three items were (a) you can really talk to about things that are important to you, (b) you can count on for understanding and advice, and (c) you can rely on for practical things such as help with chores?" Response categories (on a 5-point scale) were (a) strongly disagree, (b) disagree, (c) neither agree/disagree, (d) agree, and (e) strongly agree. A scale score was created by calculating the mean of the four items for each respondent resulting in a scale with a range of zero to four.

Social support from a social network. Social network support was measured in several ways using items adapted from previous studies of social support (Berkman & Syme, 1979; Cohen et al., 2000; Dean et al., 1989; Heaney & Israel, 2002; Lin et al., 1986; Throits, 1985). Social network support was measured by first asking the following questions (a) How many friends do you feel close to? (b) How many of your close friends are also friends with each other? and (c) How many relatives do you feel close to? Respondents were asked to write in a number for each question. Social network size was calculated by totaling the number of close friends and close family reported. Network density, the extent to which one's network members also have ties to each other, was calculated by dividing the number of close friends who know each other by the total number of close friends. Network density had a range of zero to one. Next, respondents were asked to choose the four people (not including the intimate partner) closest to them and specify how often they had contact with each one. Response categories (on a 5-point scale) were (a) once a month or less, (b) twice a

month, (c) once a week, (d) once every two days, and (e) once a day or more. Network frequency was calculated by summing the frequency of contact with each close friend or family member.

The three social support functions emotional, informational, and instrumental, were measured only from close friends and relatives (a social network) and not an intimate partner. To measure the three functions of social support received from a social network, respondents were asked "Thinking about the friends and relatives you feel close to, how often can you rely on them for the following?" Four items measured each of the three social support functions for a total of 12 items. As an example, one of the emotional support items was "To make you feel he/she cares about you." One of the informational support items was " To suggest some action you should take to deal with a problem you were having." Finally, one of the instrumental support items was "To give you money or other resources such as food." Response categories (on a 5-point scale) for all 12 items were (a) never, (b) rarely, (c) sometimes, (d) often, and (e) always. One scale was created for each of the social support functions by calculating the mean for the set of four items for each respondent, resulting in a scale with a range of zero to four. A total social network support scale that included all of the informational, instrumental, and emotional items was calculated by taking the mean of all 12 items for each respondent. This scale also had a range of zero to four.

Combined intimate partner and social network support. A scale of social support received from an intimate partner and a social network was calculated using the responses to the four intimate partner support items and the 12 social network

support function items. The mean of the 16 items was calculated for each respondent. This scale also had a range of zero to four.

Community social support. Items measuring community social support also came from prior studies (Abbey, Andrews, & Halman, 1995; Berkman & Syme, 1979; Braboy-Jackson, 1992; Krause & Shaw 2002; Newsom et al., 2000; Stokes, 1985). Community social support was measured using the following items (a) How long have you lived in your current town?; (b) Do you regularly (at least once a month) attend a church, temple, mosque, or synagogue?; and (c) Are you a member of a formal or informal organization in your community (such as local government, Rotary, Elks, Parent and Teacher Association (PTA), sports teams)? These three items were treated as separate measures.

Although the social support scales did not have a prior psychometric history, the reliability and validity of the scales were assessed for the present study, as described below.

Reliability. Internal consistency reliability for the various social support scales was estimated by computing Cronbach's alpha coefficients (Pallant, 2001). The variances of the items in each scale were approximately equal, so standardized alphas were generated (Acock, 2006). As indicated in Table 3.3, these coefficients, ranging from .86 to .97, demonstrated high internal consistency.

Table 3.3. *Internal Consistency Reliability of Social Support Scales*

Scale	Number of items in scale	Cronbach's α
Social support functions from social network		
Emotional support	4	.90
Informational support	4	.94
Instrumental support	4	.86
Social support structures		
Intimate partner support	4	.97
Social network support	12	.95
Total support from intimate partner & social network	16	.91

Validity. Validity was assessed for the scale of combined social support from an intimate partner and a social network. The scale consisted of 16 items whose response categories ranged from zero to four. For the present study, the construct validity of the social support scale was evaluated in two ways based on recommendations by Netemeyer and colleagues (2003) and Singleton and Straits (2005). First, correlations were conducted with several related variables to assess convergent validity. Second, differences among known groups on the social support measure were assessed.

The correlations between the social support scale and faith community attendance, family size, and frequency of social contact were calculated (unweighted). High correlations between these variables were not expected because they do not measure the same concept, but they are conceptually related (Singleton & Straits, 2005). Positive correlations were found between the social support scale and faith community attendance (.18), family size (.21), and frequency of social contact (.22) providing support for adequate validity for the social support scale.

Results of the second type of validity assessment, known-group validity tests, follow. The known groups compared were (a) respondents at or below 185% of

poverty versus those above, (b) respondents who lived alone versus those who lived

with others, and (c) respondents who did not attend a faith community versus those

who did. The number of respondents in each group, the social support scale score and

standard deviation for each group, and the results of the independent samples t-test

assessing the differences between group means are shown in Table 3.4. As expected,

those who were below 185% of poverty, lived alone, or did not attend a faith

community had significantly lower scores on the social support scale indicating less

social support. This known-group validity assessment provided further support for the

validity of the social support scale.

Table 3.4. *Comparison of mean amount of social support between known-groups to assess validity of the Social Support Scale*

Known group validity test	Unique Group[a]			Comparison Group			t	p	Validity support
	n	Mean	SD	n	Mean	SD			
Poverty level	53	2.33	.79	273	2.74	.82	3.33	<.001	Supported
Household type	38	2.06	.97	293	2.76	.76	5.14	<.001	Supported
Faith community attendance	221	2.58	.86	110	2.89	.72	3.24	<.001	Supported

Note: Data are unweighted.
[a] The unique groups are those below 185% of poverty, those who lived alone, and those who did not attend a faith community.

Income. The income question was worded as follows: "Which of the following

categories would best describe your total household income before taxes for 2005?"

The response categories were: (a) less than $5000, (b) $5,000 – 9,999, (c) $10,000 to

14,999, (d) $15,000 to 19,999, (e) $20,000 to 24,999, (f) $25,000 to 29,999, (g)

$30,000 to 34,999, (h) $35,000 to 39,999, (i) $40,000 to 44,999, (j) $45,000 to 49,999,

(k) $50,000 to 74,999, and (l) $75,000 or higher.

Income was a key variable in this study, and one that is often skipped. Study respondents who fail to provide an answer to a key study question are often not included in data analysis. Although people with low incomes are less likely to complete and return surveys, people with higher incomes are the most likely to skip an income question (Turrell, 2000). Employing certain data collection, question format, and question wording methods can minimize income non-response (Galobardes & Demarest, 2003; Turrell, 2000). A number of these methods were employed in the present study. First, the proposed study used a mail survey. The typical income non-response rate for a mail survey is approximately 10% (Turrell, 2000). This income non-response rate is generally lower than that for telephone (12.8% – 35.9%) or face-to-face surveys (7.2% - 38%) (Turrell, 2000). Second, a closed-category income question that provided income ranges to choose from was used. Research has shown that this format results in less non-response than open-ended items asking respondents to write an exact income amount (Turrell, 2000). Finally, immediately before respondents were asked the income question, they were told why it was important to gather income information and that the information would be kept strictly confidential. This assurance has been shown to increase response to income questions (Turrell, 2000).

The income variable was collapsed based on the 2006 poverty guidelines for a family of four such that the first income category ($19,999 or less) was approximately 100% of poverty or less, the second income category ($20,000 to 39,999) was approximately 101% to 200% of poverty, and the third income category ($40,000 or

more) was approximately 200% of poverty or more. Dummy variables were created for each level of the variable, with the third category ($40,000 or more) being the referent.

A poverty level dummy variable was created. Using The Women, Infant, and Children (WIC) Income Eligibility Guidelines for 2005-2006, respondents were categorized as at or below 185% of poverty using their household size and the midpoint of the income category they selected. The dummy variable was coded so that 1 = at or below 185% of poverty and 0 = above 185% of poverty.

Sociodemographics. Standard questions were used to assess respondents' gender and household size. Age was calculated by subtracting respondents' date of birth from their survey completion date. Age was then categorized into three groups: under the age of 35, 35 to 49 years, and 50 years or more (referent category). Educational attainment was measured by asking "What is the highest level of education you have completed?" Question response categories were (a) less than a high school diploma, (b) high school diploma or GED, (c) vocational, trade, or business school, (d) some college, (e) college graduate, and (f) graduate degree or other professional degree. The educational attainment variable was collapsed into three categories: high school degree/GED or less, some college or vocational training, and college degree or more. Dummy variables were created with college degree or more as the referent category.

Employment status was determined by asking "What is your current employment status?" Question response categories were (a) employed full-time/ full

year, (b) employed part-time/ full year, (c) employed full-time/part-year, (d)

employed part-time/part-year, (e) self-employed, (f) unemployed, but looking for

work, (g) unemployed/not in labor force, and (h) retired. Employment status was then

collapsed into two categories: unemployed and employed. A dummy variable was

created with employed as the referent category.

Race/ethnicity was measured following the Office of Management and Budget

(OMB) guidelines (Office of Management and Budget, 1997). The ethnicity question

was "Are you Hispanic or Latino?" Race was measured with the following question:

"What is your race? (Circle all that apply)." Response categories were (a) American

Indian or Alaska Native, (b) Asian, (c) Black or African American, (d) Native

Hawaiian or Other Pacific Islander, and (e) White. The majority of the respondents

were White/non-Hispanic, so a dummy variable was created from the race and

ethnicity variables using guidelines from Acock (2006) with 1 = White/non-Hispanic

and 0 = Other.

Current marital status was measured by asking "Are you currently (a) single,

never married; (b) divorced; (c) separated; (d) widowed; (e) married; or (f) living

alone, but have a boyfriend/girlfriend, husband/wife, or lover. A dummy variable was

created with 1 = currently married and 0 = not currently married. Respondents were

also asked whether they rented or owned a home, how much rent or mortgage they

paid, whether they had a car in working condition, and their usual mode of

transportation. A dummy variable was created for homeownership such that 1 =

homeowner and 0 = not a homeowner. Another dummy variable was created for

possession of a vehicle in working order with 1 = had a car and 0 = did not have a car. Using the item about the percentage of income paid for rent, a dummy variable for affordable housing was created with 1 = more than 30% of income goes to housing and 0 = 30% or less of income goes to housing. The 30% criterion was used because it is the cut-off that the federal government uses in its definition of affordable housing (U.S. Department of Housing & Urban Development, 2007).

Social service utilization. Social service utilization was measured with the following item: "Within the past 12 months has anyone in your household used any of the following social services?" Response categories were Food Stamps, Medicaid/Oregon Health Plan, Temporary Aid to Needy Families (TANF), Social Security Insurance (SSI), WIC, Federal School Lunch Program, Federal School Breakfast Program, and Section 8 or other subsidized housing program.

The final questions on the survey instrument asked for respondent contact information, for the purpose of recruiting participants for Phase Two. Respondents were asked whether they were willing to participate in an in-depth interview to provide information on their experiences with food insecurity and social support. If they were interested, they were instructed to provide contact information.

Pilot Testing

The survey was pilot tested with 23 individuals (3 men, 20 women) of various ages, ethnicities, and incomes from both rural and urban areas including the following: employees and students in an academic department at Oregon State University (5); Benton County residents who participated in a gleaning program (8); and hospital

employees (8); and rotary club members (2) in Siskiyou County, California. These individuals were given the instrument and asked to complete it and provide feedback in writing by responding to the following questions (a) How long did the survey take to complete?, (b) Did you find any of the questions on this survey confusing? If so, which questions?, (c) What was confusing about those questions?, (d) Did you find any of the skip patterns confusing, and (e) Did you find any of the questions on this survey offensive? If so, which questions? The survey was revised based on the feedback received.

Procedures

A brief pre-notification postcard was mailed to the 1,200 names in the initial sample four days before the first mailing of the survey. This pre-notification postcard informed the respondents that a survey would be arriving shortly, that it was important, and that a response would be greatly appreciated (Dillman, 2000). Use of a pre-notification card has been shown to increase response rates by 4 to 6% (Dillman, 2000). The text of this pre-notification postcard can be found in Appendix C.

Next, a cover letter, which included informed consent information, and the survey instrument were mailed to the initial sample. In the cover letter, the resident who was between the ages of 18 and 64 and had most recently had a birthday was asked to retain the cover letter for her/his records and complete the survey. The return of the completed survey served as consent to participate in the study. The text of the cover letter can be found in Appendix D. Respondents were asked to return the completed survey by folding it so that the return address showed and taping the edges

together. A one-dollar bill was included as a small incentive for participating in the

survey. Inclusion of a small incentive has been shown to increase response rates by

12%, which is higher than response rate improvements associated with the promise of

a larger incentive once the completed survey is returned (Dillman, 2000; Mangione,

1998).

Surveys were assigned identification numbers. Returned surveys, both

completed and uncompleted, were tracked so that respondents who had returned their

surveys would not receive follow-up communication. This procedure made the

surveys confidential, but not anonymous. Research has not found a difference in

response rates between confidential versus anonymous surveys, possibly because

participants do not fully understand the difference (Mangione, 1998). As suggested by

Dillman (2000), potential respondents who received surveys and either did not fall

within the age range (18 to 64 years) or chose not to complete the survey were asked

to return the survey. Individuals returning surveys because no one in the household

fell within the specified age range were asked to note this on their returned survey.

Following recommendations by Dillman (2000), two weeks after the first

mailing of the surveys, a reminder postcard was mailed to all non-respondents. This

postcard expressed appreciation for responding and asked potential respondents who

had not yet completed or returned the survey to do so (Dillman, 2000). The reason for

expressing appreciation was that the survey and the reminder card may have crossed in

the mail. Dillman (2000) argues that sending such a reminder can further increase

response rates by 15 to 25%; the reminder postcard for this study, however, only

increased the response rate an additional 1-2%. The reminder postcard text can be

found in Appendix E.

Two weeks after the reminder postcard was sent, a second survey was mailed

to non-respondents. The cover letter for this survey reiterated the importance of

completing and returning the survey. A copy of this cover letter can be found in

Appendix F.

Data Management and Preparation

All completed surveys were pre-coded and checked for errors such as missed

skip patterns or more than one answer to an item. Decision rules were developed

concerning how to deal with errors. For example, individuals with more than one

answer to a question had that data point coded as missing unless the correct answer

was apparent because, for example, one answer had been crossed out. Data were then

entered into Nearly Perfect Data Entry (Barchard & Pace, n.d.), an Excel program.

This program allowed both the validation of entered data via double entry and the

setting of limits on each entry field to reduce the chance of data entry errors. The data

were then imported into SPSS (SPSS, Inc., Chicago, IL) for data screening.

Data Screening

Frequency distributions and descriptive statistics were generated for all study

variables to check for outliers, which may identify data entry errors that were not

caught during the double entry process. All variables were screened to assess their

distributions. Most were already categorical variables. Because of non-normal

distributions or because variable categories contained few cases, some continuous

variables were categorized and some categorical variables had their categories

collapsed. Decisions were made as to how to collapse categories based on their

distributions and prior research on the topic. When the literature did not suggest an

obvious break for a particular variable, unadjusted odds ratios predicting food

insecurity status were examined to aid in determining what categories to create. For

example, age was collapsed in different ways with two or three categories. The three-

category age variable was chosen because differences were found between the three

levels. In preparation for the multivariate analysis, a variance inflation factor (VIF)

table was created for all variables to assess multicolinearity (Acock, 2006; Tabachnick

& Fidell, 2001). No evidence was found for multicolinearity. Missingness was also

assessed for all variables, and all were found to have <10% missing data. The

dependent variable for the multiple linear regression, which combined social support

from an intimate partner and social network, was screened for normality. Although the

variable was found to slightly deviate from normality, the sample size for this analysis

was large enough that a small deviation from normality would not make a substantive

difference in the analysis (Tabachnick & Fidell, 2001). Further, based on the plot of

the residuals and predicted dependent variable scores for the social support scale, the

assumptions of linear regression, normality, linearity, and homoscedasticity were met

(Acock, 2006; Tabachnick & Fidell, 2001).

Data Analysis

 Weighting. Three sets of weights were created for each case to account for the

complex sampling design. First, a sampling weight was created at the strata-level

(rural and urban) to account for the different sampling fractions created when conducting disproportionate stratified random sampling (Trochim, 2002). The weight was created by dividing the number of household records in the urban or rural sampling frame by the number of records selected, which was 600 from the rural and 600 from the urban sampling frame. To account for nonresponse, a second weight was created by dividing the number of deliverable surveys by the number of completed surveys for the rural strata and for the urban strata separately. Last, a household weight was created for each case to account for the number of residents in each household who met the criteria for completion of the survey. This weight was created by dividing the number of people in the household between the ages of 18 and 64 by one, which indicated the one person who did complete the survey. After weights were created for each case, the three weights were multiplied together resulting in a final weight used in analysis (V. Lesser, personal communication, March 14, 2007). Except where noted, all data presented are weighted.

Descriptive analysis. Means for continuous variables (e.g., household size) and percentages for categorical variables (e.g., gender, race/ethnicity, marital status, employment status, educational attainment, and income) were generated to describe the sample. Means and proportions of sociodemographic variables were also generated to describe the food secure and food insecure subsamples. Further, food insecurity and hunger rates were calculated for the full sample and for rural and urban Oregonians separately.

Bivariate analysis. To evaluate the association between food insecurity and sociodemographic variables, simple regressions were conducted because the weights used to account for the sampling design did not allow for t-test and χ^2 analyses (Sribney, 2005). Bivariate relationships between food insecurity status and social support measures were assessed similarly.

Analyses conducted to answer each research question follow.

Primary research hypothesis analysis. Hierarchical multiple logistic regression was used to assess whether social support moderated the relationship between income and food insecurity, following the procedure described by Baron and Kenny (1986) and employed in other studies of social support (e.g., Chou et al., 2004; Hashima & Amato, 1994; Lee et al., 2004; Lin & Ensel, 1989). The dependent variable was food insecurity status. To be able to assess whether the interaction of income and social support improved the fit of the model to the data using postestimation measures, both a constrained and a full model were produced. The constrained model contained two blocks of independent variables, one that included sociodemographic variables and a second that had the main effects of income and the combined social network and intimate partner social support scale. The full model consisted of three blocks. The first two blocks were identical to those of the constrained model. The interaction terms of income and the combined social network and intimate partner social support scale were included in the third block of the full model. The sociodemographic variables included in the first block were those determined to have significant bivariate associations with food insecurity at $p < 0.1$.

The block χ^2 statistics were reported, as well as the odds ratios, 95% confidence intervals, and Wald statistic p-values for all predictors for the full model. The results of the constrained model were not reported as they were identical to blocks one and two of the full model.

Statistical significance of the income and social support interaction term would provide support for the hypothesis that social support moderates the relationship between income and food insecurity, such that the association between income and food insecurity would be weakened in the presence of social support (Cohen, Cohen, West, & Aiken, 2003; Koeske & Koeske, 1991).

Several post estimation measures were reported to allow for comparison of the full and constrained models. First, the likelihood ratio (LR) χ^2 test was reported to allow for the evaluation of the coefficients. The LR test is a test of the hypothesis that all coefficients except the intercept are equal to zero and is computed by comparing the log likelihoods of the full and constrained models (Long & Freese, 2006). If the LR test comparing the full model to the constrained model is not statistically significant, the inclusion of interaction effects does not improve the fit of the model. Measures of goodness of fit for the full and constrained models were also reported. The McFadden's Adjusted R^2, a Pseudo R^2 statistic, which makes adjustments based on the number of parameters included in the model, was reported. McFadden's Adjusted R^2, based on the likelihood function, is akin to the adjusted R^2 computed when running a linear regression and is useful for comparing the log likelihoods across models (Long & Freese, 2006). However, unlike the R^2 for linear regression,

McFadden's R^2 does not denote the proportion of variance in the outcome variable explained by the predictors. Instead, McFadden's R^2 for logistic regression denotes the strength of association between the outcome and the predictors (Tabachnick & Fidell, 2001). A McFadden's R^2 value between .2 and .4 suggests a highly satisfactory strength of association between the outcome and predictor variables (Hensher & Johnson, 1981, as cited in Tabachnick & Fidell, 2001). The difference between the McFadden's R^2_{full} and McFadden's $R^2_{constrained}$ was calculated to determine whether the full model improved the model fit in comparison to the constrained model.

The Bayesian Information Criterion (BIC), a measure of goodness of fit that uses the log likelihood estimates of the models while accounting for sample size and model complexity (Long & Freese, 2006), was also reported. The smaller the BIC, the better the fit of the model to the data. The BICs for the full and constrained models were compared to assess which is smaller and thus which model is a better fit for the data (Long & Freese, 2006). The absolute value of the difference between the BIC for the constrained and the full models was also examined. Long and Freese (2006) suggest the following criteria for examining the differences in BIC values between models: values of 0 to 2 provide weak support for the constrained model, values of 2 to 6 indicate positive support for the constrained model, values of 6 to 10 provide strong support for the constrained model, and values greater than 10 indicate very strong support for the constrained model.

Secondary research hypothesis 2a analysis. This research hypothesis was assessed in the same way as the primary research hypothesis except that the

moderating effects of the individual structures and functions of social support were tested separately based on procedures detailed by Aiken and West (1991). More specifically, hierarchical multiple logistic regression analyses were conducted to produce both a constrained and a full model separately for each of the seven social support measures: the three social support functions, social network support, intimate partner support, and the two measures of community support (faith community attendance and organization membership). The constrained model contained two blocks of independent variables, one that included sociodemographic variables and a second that had the main effects of income and the social support measure of interest. The full model included three blocks. The first two blocks were identical to those in the constrained model. The interaction terms of income and the social support measure were included in the third block of the full models.

The block χ^2 statistics were reported, as well as the odds ratios, 95% confidence intervals and Wald statistic p-values for all predictors for the full model. Again, the results of the constrained models were not shown because they were identical to the results of blocks one and two for the full model. A p-value of $< .05$ for an interaction term indicated that the social support measure included in that interaction term moderated the relationship between income and food insecurity, when controlling for the main effects of income and the social support measure.

Again, the same post estimation measures were reported to compare the constrained and the full models as was described for the Primary Research Hypothesis

(see pages 86 and 87 for a description). Some of the models have different sample sizes due to variation in item nonresponse.

For the analyses of both the primary research hypothesis and hypothesis 2a, an original set of models for all eight social support measures were run with the income variable categorized based on the 2006 federal poverty guidelines for a family of four. The categories were (a) ≤ 19,999 (100% of poverty or below), (b) $20,000 - $39,999 (101-200% of poverty), and (c) ≥ $40,000 (over 200% of poverty). Evidence for moderation of the relationship between income and food insecurity was found for three of the eight measures of social support (emotional support, social network support, and organization membership) with this income categorization. However, possibly because of the small number of respondents in the lowest income category (n=34, unweighted), the odds ratios for the main effects of the lowest income category in the presence of their interactions were very large. To remedy this problem, a different income categorization was used; these income categories were (a) ≤ $34,999, (b) $35,000 - 74,999, and (c) ≥ $75,000. The three models that used the income categorization based on the poverty guidelines and provided evidence of moderation of the relationship between income and food insecurity are presented along with all eight models that employed the new income categorization.

Secondary research hypothesis 2b analysis. To test the secondary research hypothesis of whether the function and structure of social support differ based on rural versus urban residence, several analyses were conducted. First, to describe the amount of social support possessed by urban and rural Oregonians, means were computed for

continuous variables (number of close friends, number of close relatives, residential tenure) and percentages for categorical variables (faith community attendance and organization membership). To evaluate the statistical significance of the differences in measures of social support between rural and urban dwellers, simple regressions were conducted, because the weights used to account for the sampling design did not allow for t-test and χ^2 analyses (Sribney, 2005). For the continuous dependent variables, such as number of friends and number of relatives, simple linear regressions were conducted using rural residence, an indicator variable, to predict the various social support measures. For the dichotomous dependent variables, such as faith community attendance and organization membership, simple logistic regression was used.

Multivariate linear regression analysis was also conducted to control for other variables that might be masking rural/urban differences in social support. The dependent variable, the combined social network and intimate partner social support scale, was regressed on sociodemographic variables that had significant bivariate associations with social support at p < .1, or that prior research suggested were important (Bartfeld & Dunifon, 2003; Blank, 2004; Dohrenwend & Dohrenwend, 1970; Fischer, 1982; Moody & Gray, 1972; Mickelson & Kubzansky, 2003; Veroff et al., 1981). The unstandardized (B) and standardized beta (β) coefficients and p-values for all independent variables were reported.

Power Analysis

A power analysis was conducted to determine whether the sample size provided adequate power to perform the various statistical analyses discussed above.

For these estimates, an alpha (two-tailed) of .05 was assumed. Analyses were performed using the Power and Precision computer package (Borenstein, Rothstein, & Cohen, 2000), as well as information from Cohen (1992). A sample size of 343 was found to be sufficient for the analyses conducted. To calculate the power available for the logistic regression analysis, poverty level was used as the independent variable, because Power and Precision requires that a dichotomous independent variable be used. For example, to calculate power when using logistic regression with one primary independent variable, the researcher must specify two pieces of information; 1) the proportion of those in the sample that fall within each level of the categorical independent variable (poverty level), and 2) the percent of respondents expected to have a "success" on the dependent variable (being food insecure) for each level of the categorical independent variable (poverty level). The two levels of the dichotomous independent variable are "at or below 185% of poverty" and "above 185% of poverty." Of the total sample, 14.96% were at or below 185% of poverty and 85.04% were above 185% of poverty. The food insecurity rate for the respondents at or below 185% of poverty was 56.04% and 7.92% for the respondents above 185% of poverty. With these independent variable proportions and their food insecurity rates, the sample size of 343 provided 100% power. Using multiple linear regression with 15 independent variables, we have 100% power to detect an R^2 of .15 (corresponding to a medium effect size) with a sample size of 343. Hence, we have sufficient power to detect medium effects in analyses with the sample of 343 respondents.

Phase Two: Qualitative Interviews

In-depth interviews were conducted with 11 urban and 14 rural Oregon residents who were either low-income, food insecure, or both (n = 25). Participants were asked about their experiences being low-income, how they coped, whether they had experienced food insecurity, and about social support. Interviews were conducted from December of 2006 through February of 2007.

Sample Recruitment

Per the suggestion of Patton (1990), potential cases were identified from those who completed quantitative surveys in Phase One. As noted earlier, the last portion of the Phase One instrument asked if respondents were willing to participate in an in-depth interview about their responses. Individuals were told that participation was voluntary and that compensation would be provided. The type of compensation was not specified. They were asked to supply contact information (telephone or e-mail address) and the best day and time to contact them. As described below, potential interviewees were selected from those survey respondents who indicated their willingness to be interviewed.

Sampling Strategy

Several sampling strategies were used to select interview participants from all those who completed mail surveys and indicated their willingness to be interviewed. The selection of participants was based on the criterion that they could provide information pertinent to the research questions, as Patton has suggested (1990). Potential participants were judged able to provide pertinent information if they were

either low-income, food insecure, or both. Numerous researchers have recommended this participant selection strategy for qualitative research, because information rich cases are much more likely to provide information that will inform the research questions (Berg, 2004; Patton, 1990, Sale et al., 2002; Yin, 1989). This strategy was particularly appropriate for the present study. Individuals who either were food insecure or had been in the past possessed a wealth of experiences that contributed to the elucidation the relationships between income, food insecurity, and social support.

Answers to the income, household size, and the food insecurity scale items were used to categorize respondents as low-income and food insecure. Participants were categorized as low-income if their income was 185% or less of the federal poverty guideline for a given household size, because this eligibility criterion is used for several nutrition assistance programs (e.g. WIC). An equal number of rural or urban residents who were low income, food insecure, or both and had indicated a willingness to be interviewed were selected (n = 38). Based on the aforementioned criteria, four groups of participants were created (rural food secure, rural food insecure, urban food secure, urban food insecure).

All selected respondents were contacted by e-mail or telephone. They were informed of the purpose of the interview, provided with information on how they were to be compensated for their time (a $20 gift certificate to a local grocery store), and asked if they were still willing to participate. The text for this telephone or e-mail contact can be found in Appendix G. If the participant agreed to be interviewed, an appointment was scheduled. Of the initial 38 individuals who met the criteria and

indicated on the survey that they were willing to be interviewed, 25 were successfully interviewed. The categories of the 25 participants are illustrated in Table 3.5.

Table 3.5. *Phase Two Participant Categories*

	Rural	Urban
Food secure	2	3
Food insecure	12	8

Of the 38 initially identified participants, 13 were not interviewed for one of two reasons. Ten potential participants failed to respond to numerous queries to set up an interview. The other three potential participants missed their scheduled interview and did not respond to attempts to reschedule.

Instrumentation

The in-depth interview guide was developed using interview questions from two studies: the Rural Families Speak Multi-State Longitudinal Research Project (Bauer et al, 2005) and an ethnography of hunger in rural Benton County, Oregon (Gross & Rosenberger, 2005). Questions about employment, income, expenses, food insecurity, social support, transportation, and community were included in the interview script. Other interview questions were related to food procurement, ease of getting to a grocery store, prices at that store, and whether the store carried fresh fruit and vegetables, as suggested by prior research (Jetter & Cassady, 2005; King, Leibtag, & Behl, 2004). A copy of the guide is included in Appendix H.

To assess question flow and whether questions were understandable and not offensive, the interview guide was pilot tested with two low-income individuals known to the researcher.

Procedures

Once scheduled, interviews were conducted in a place convenient for the participant, such as a library, senior center, or Boys and Girls Club. Prior to the interview, participants were informed of the purpose of the study and that participation was voluntary, asked if they would be willing to have the interview audio recorded, and told that the audio recording and transcript would be kept confidential. Participants were asked to sign a consent form and were furnished with a copy. A copy of the consent form can be found in Appendix I. All interviews were audio recorded. The interviews lasted between 45 and 75 minutes. At the end of each interview, participants received their grocery store gift certificate and were asked to sign a receipt. The audio recording of each interview was transcribed. Each interview transcript was reviewed for accuracy.

Data Analysis

To explore the qualitative research questions, transcripts were analyzed by finding common themes and sub-themes in a process discussed further below. The research questions were as follows:

1. What are the experiences of low-income people around food security and insecurity and what is the role of social support?

2. Do the experiences and perceptions of food insecurity and social support among low-income people differ based on rural or urban residence?

The interview transcripts were analyzed according to the content analysis procedure suggested by Berg (2004) and assisted by the use of the qualitative data analysis

software, MAX.qda (Verbi GmbH, Marburg, Germany). Seven steps were followed to analyze the qualitative data. First, the research questions were revisited to confirm what explanations were sought. Next, potential themes and subthemes were developed based on a review of the literature, research questions, and interview questions. Three main themes emerged from this review: contributors to food insecurity, coping strategies, and mechanisms for reducing food insecurity. The subthemes included social support structures and functions, alternate food sources, transportation, housing, public and private assistance, education, and employment. Third, an initial review of the transcripts was conducted to ascertain whether themes and subthemes were still relevant. Fourth, a list of the themes, subthemes, and rules for coding text were created. Then, data from each transcript was coded and sorted into corresponding themes or subthemes using the MAXqda2 software (VERBI GmbH, Marburg, Germany). Survey transcripts were coded by two researchers. Each researcher individually coded half of the transcripts. They then each reviewed the coding done by the other researcher. Finally, the researchers compared coding and reconciled any discrepancies. Sixth, the number of items of data in each theme and subtheme was reviewed to ascertain the relative magnitude and to look for patterns. Patterns must be supported by at least three occurrences of the same idea (Berg, 2004). Finally, conclusions were drawn by considering the patterns found, in light of previous research, the research questions, and the conceptual model for the present study (for a description see page 56).

CHAPTER 4. RESULTS

The first section of this chapter reports the results of the mail survey conducted

to test the moderating role of social support on the relationship between income and

food insecurity and whether social support differs based on place of residence. The

second section provides the results of the qualitative interviews conducted to explore

the experiences of low-income people around food security and insecurity, the role of

social support, and whether experiences differ based on place of residence.

Section One: Mail Survey

This section begins with a description of survey respondents'

sociodemographic and social support characteristics and unadjusted associations of

sociodemographic characteristics with food insecurity. Next, the rates of food

insecurity for respondents overall and the rural and urban subgroups are presented.

Results of the analysis of whether social support has a moderating effect on the

relationship between income and food insecurity and whether the effect differs by

social support function and structure are then reported. Results of the relationship

between sociodemographic variables and food insecurity follow. Finally, the

differences in social support based on urban and rural residence are examined.

Respondent Characteristics

Sociodemographic Characteristics

Table 4.1 presents the socidemographic characteristics of the survey

respondents. Over half of the respondents were between the ages of 50 and 64 years.

Almost half were male. The majority of respondents were White/non-Hispanic, had at

least some college education, were employed, and were currently married. Almost three-quarters of respondents had annual household incomes of $40,000 or more (over 200% of poverty) and slightly over one-third had incomes of $75,000 or more. Similarly, most respondents were homeowners and spent 30% or less of their income on housing. The average household consisted of about three people. Almost all respondents reported having a vehicle in working condition. Most respondents resided in an urban census tract.

Table 4.1. *Respondent Sociodemographic Characteristics and Unadjusted Associations with Food Insecurity*

Characteristic	Total n[a] (n=343)	Overall %	Food Secure (n = 286)	Food Insecure (n = 48)	Unadjusted OR (95% CI)[b]
Age in years					
18-34	31	9.38%	8.81%	14.12%	2.54(0.77, 8.34)
35-49	123	38.50%	36.82%	51.59%	2.22(1.04, 4.76)*
50-64	189	52.13%	54.37%	34.29%	Referent
Male	161	48.51%	53.49%	18.78%	0.20(0.09, 0.45)***
Race/Ethnicity					
White/non-Hispanic	305	87.54%	87.68%	88.33%	1.06(0.33, 3.41)
Other	34	12.46%	12.32%	11.77%	Referent
Education					
≤ High school degree	77	23.51%	20.41%	40.00%	5.30(2.07, 13.57)**
Some college or vocational training	123	35.05%	33.91%	43.12%	3.44(1.40, 8.47)**
≥ College graduate	140	41.44%	45.68%	16.90%	Referent
Employment status					
Unemployed	74	20.58%	16.10%	46.62%	4.55(2.11, 9.81)***
Employed	263	79.42%	83.90%	53.38%	Referent
Current marital status					
Married	240	75.05%	79.03%	54.00%	0.31(0.15, 0.65)**
Not married	100	24.95%	20.97%	46.00%	Referent
Household income based on poverty level					
≤$19,999 (≤100% of poverty)	34	8.50%	4.05%	33.48%	18.77(6.00, 58.82)***
$20,000-39,999 (101-200% of poverty)	70	19.50%	17.13%	31.85%	4.23(1.67, 10.67)**
≥ $40,000 (>200% of poverty)	226	72.00%	78.82%	34.68%	Referent
Household income					
≤$34,999	86	23.38%	16.42%	62.16%	28.35 (6.34, 126.73)***
$35,000-74,000	131	40.20%	41.70%	32.25%	5.79 (1.20, 27.93)*
≥$75,000	113	36.42%	41.88%	5.59%	Referent
Homeownership					
Yes	285	84.76%	90.80%	52.24%	0.11(0.05, 0.25)***
No	50	15.24%	9.20%	47.76%	Referent
Percent of income for housing					
>30%	79	25.18%	20.22%	55.92%	5.01(2.27, 11.04)***
≤30%	230	74.82%	79.78%	44.08%	Referent
Mean household size (SE)	---	3.05 (0.09)	3.02 (0.09)	3.16 (0.30)	1.08(0.78, 1.50)
Car in working condition					
Yes	321	95.20%	98.35%	76.65%	0.06(0.02, 0.17)***
No	18	4.80%	1.65%	23.35%	Referent
Geographic location					
Rural	166	28.69%	28.95%	26.38%	0.88(0.45, 1.71)
Urban	175	71.31%	71.05%	73.62%	Referent

Note: All data are weighted except for the total ns for each variable. OR = odds ratio, CI = confidence interval
[a]Some numbers do not add up to the total sample because of nonresponse.
* p<.05, **p<.01, ***p<.001 according to the Wald test of significance.

The means and proportions of the selected socidemographic characteristics for the food secure and food insecure subgroups are displayed in Table 4.1 for comparison. In addition, Table 4.1 displays the unadjusted odds ratios and 95% confidence intervals from the bivariate analyses used to determine the associations between food insecurity and the sociodemographic characteristics. Respondents who were male, currently married, homeowners, or had cars in working condition were significantly less likely to be food insecure. Respondents between the ages of 35 and 49 had significantly greater odds of experiencing food insecurity compared to those 50 to 64. When compared to respondents who had a college degree or more education, those with lower levels of education had significantly greater odds of being food insecure. Further, compared to those who were employed, those who were unemployed had significantly greater odds of experiencing food insecurity. Respondents who had incomes below $40,000 (less than 200% of poverty) were significantly more likely than those with incomes over $40,000 to be food insecure. In addition, those with incomes below $75,000 were significantly more likely to experience food insecurity. Finally, respondents who paid more than 30% of their income for housing were significantly more likely to be food insecure.

Amount of Social Support

Table 4.2 summarizes the various social support measures for the study respondents overall and for the food secure and food insecure subgroups separately. Looking at the social support measures overall, respondents reported, on average, approximately the same number of close friends and close relatives. On average, a

little over half of respondents' close friends were also friends with each other (i.e.,

network density). Of the social support functions, respondents reported more

emotional than informational or instrumental support. Respondents reported a high

level of intimate partner support. Less than half of respondents regularly attended a

church, temple, mosque, or synagogue or participated in formal or informal

community organizations, such as the PTA or sports teams.

Table 4.2. *Amount of Social Support Overall and by Food Insecurity Status, and Unadjusted Associations between Food Insecurity and Measures of Social Support*

Characteristic	Overall (n = 343) Mean (SE) or percent	Food Secure (n = 286) Mean (SE) or percent	Food Insecure (n = 48) Mean (SE) or percent	Unadjusted OR (95% CI)
Number of close friends	7.13(0.90)	7.67(1.06)	4.30(0.70)	0.92(0.83-1.03)
Number of close relatives	7.14(0.56)	7.59(0.66)	4.74(0.60)	0.92(0.85-0.99)*
Social network size	14.28(1.26)	15.29(1.49)	9.05(0.89)	0.94(0.89-0.99)*
Frequency of social contact	12.20(0.23)	12.07(0.24)	13.21(0.62)	1.10(0.98-1.23)
Network density	0.56(0.04)	0.55(0.04)	0.64(0.13)	1.22(0.71-2.09)
Social network support functions				
Emotional support	2.89(0.05)	2.89(0.06)	2.91(0.14)	1.03(0.71-1.49)
Informational support	2.72(0.05)	2.70(0.06)	2.84(.16)	1.19(0.78-1.80)
Instrumental support	2.28(0.07)	2.30(0.08)	2.20(0.20)	0.93(0.69-1.26)
Social support structure				
Intimate partner support	3.03(0.09)	3.13(0.09)	2.52(0.24)	0.75(0.60-0.93)**
Social network support	2.63(0.05)	2.63(0.06)	2.65(0.15)	1.03(0.79-1.51)
Social network & partner support	2.72(0.05)	2.74(0.05)	2.62(0.13)	0.82(0.54-1.25)
Faith community attendance	37.13%	37.31%	33.43%	0.84(0.39-1.81)
Organization membership	31.95%	30.29%	36.21%	1.31(0.59-2.90)
Residential tenure in years	17.66 (0.90)	17.68(0.93)	15.46(2.91)	0.99(0.95-1.02)

Note: All data are weighted.
* p<.05, **p<.01 according to the Wald test of significance.

The unadjusted odds ratios from the analyses conducted to determine the

association between food insecurity and various social support measures are also

shown in Table 4.2. Statistically significant associations between food insecurity

status and three social support measures were found. Food insecurity was associated

with a smaller social network and fewer close relatives. Further, food insecurity was

associated with less intimate partner support.

Food Insecurity Status of Respondents

As shown in Table 4.3, the food insecurity without hunger rate for this study

was 6.76%, while 7.68% had experienced hunger, for a total of 14.44% food insecure

either with or without hunger. The remaining 85.56% of respondents were food

secure. Fewer rural than urban respondents were food insecure (13.33% versus

14.89%). Of the rural respondents who were food insecure, a greater percentage were

food insecure with hunger, while urban food insecure respondents were split

approximately evenly between food insecurity with and without hunger. Of those

respondents living at or below 185% of poverty, 56.04% are food insecure compared

to only 7.92% of those above 185% of poverty (data not shown).

Table 4.3. *Sample Food Insecurity and Hunger Rates by Rural and Urban Residence*

	Total Sample	Urban	Rural
Food insecurity without hunger	6.76%	7.30%	5.40%
Hunger	7.68%	7.58%	7.95%
Total	14.44%	14.89%	13.33%
Percent of food insecure experiencing hunger	53.19%	50.91%	59.64%

Research Hypothesis 1.

Social support moderates the relationship between income and food insecurity.

The results of the hierarchical multiple logistic regression analysis conducted

to determine whether social support moderates the relationship between income and

food insecurity are shown in Table 4.4. The first block with the sociodemographic

variables contributed significantly to the model as demonstrated by the significant

block Wald χ^2. The significant relationships between sociodemographic variables and food insecurity are presented at the end of the results section for Hypothesis 2a because 1) they are similar across the models for hypotheses 1 and 2a, and 2) they are not the main focus of this study (see pages 126 and 127). Based upon the block Wald χ^2 test ($\chi^2_{(3)}$ = 8.52, p<.05), the second block, which includes the main effects of income and total social support, also contributed significantly to the model. Further, one income category had a significant association with food insecurity; respondents with incomes of $34,999 or less were more likely to experience food insecurity. However, the block Wald χ^2 test for the third block alone ($\chi^2_{(2)}$ = 1.02, p>.05), suggested that the interactions between income and total social support did not improve the fit of the model to the data.

Table 4.4. Moderated Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Total Social Support (N = 286)

Characteristic	Block 1[a]		Block 1 and 2[b]		Block 1, 2, and 3[c]	
	OR	95% CI	OR	95% CI	OR	95% CI
Male	0.41	(0.15, 1.15)	0.39	(0.14, 1.06)	0.37	(0.14, 1.00)
Currently married	1.51	(0.49, 4.65)	2.57	(0.74, 8.98)	2.58	(0.76, 8.77)
Age						
18-34 years	1.96	(0.33, 11.51)	1.87	(0.32, 11.10)	1.64	(0.30, 9.02)
35-49 years	3.23	(0.98, 10.58)	4.44	(1.32, 14.91)*	4.01	(1.14, 14.05)*
Education						
≤ High school degree	4.37	(1.33, 14.32)*	3.71	(0.97, 14.13)	3.82	(0.99, 14.76)
Some college or vocational training	1.55	(0.48, 4.95)	1.48	(0.46, 4.76)	1.51	(0.47, 4.88)
Unemployed	14.34	(4.06, 50.67)***	11.40	(3.33, 39.03)***	10.49	(3.16, 34.79)***
Homeowner	0.08	(0.02, .28)***	0.10	(0.03, .33)***	0.11	(0.03, .36)***
>30% of income for housing	8.68	(2.94, 25.65)***	6.16	(2.11, 17.97)**	5.97	(2.09, 17.10)**
Car in working condition	0.11	(0.02, .57)**	0.23	(0.04, 1.33)	0.22	(0.04, 1.25)
Rural residence	1.09	(0.43, 2.79)	0.95	(0.36, 2.50)	0.96	(0.36, 2.57)
Income						
≤$34,999			8.13	(1.47, 45.02)*	1.38	(0.06, 33.22)
$35,000-74,999			2.84	(0.42, 19.12)	1.16	(0.02, 65.71)
Total Social Support			0.73	(0.40, 1.32)	0.47	(0.14, 1.61)
Income ≤$34,999 x Total Social Support					2.07	(0.46, 9.30)
Income $35,000-74,999 x Total Social Support					1.47	(0.27, 7.94)
Wald χ^2 for the additional block	64.73***		8.52*		1.02	
df for the block	11		3		2	

Note: the reference groups are female, not currently married, ≥ 50 years, ≥ college graduate, employed, does not own a home, ≤30% of income on housing, has no car, urban, and income ≥ $75,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
* p<.05, **p<.01, ***p<.001 for the Wald Statistic.

Following the hierarchical logistic regression analyses, post estimation analyses were conducted to assess how well the models fit the data by comparing the full and the constrained models. Table 4.5 presents the results for the LR χ^2 test, McFadden's Adjusted R^2 and the BIC for the constrained and the full models. The LR test comparing the full model to the constrained model is not statistically significant indicating that the inclusion of interactions does not improve the fit of the model. McFadden's Adjusted R^2 suggests a moderate strength of association between those variables included in both the full and the constrained models and food insecurity. However, the addition of the interactions in the full model does not contribute to the overall model (the difference between the McFadden's R^2_{full} and McFadden's

$R^2_{constrained}$ is only .014). Further, the BIC statistic is smaller for the constrained model than for the full model, and the difference between the values (10.62) provides very strong evidence that the model without interactions fits the data better than does the model that includes the interactions.

Table 4.5. *Measures of Fit for Regression Models including Total Social Support*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	109.27(14)***	0.338	210.16
Full Model	109.97 (16)***	0.324	220.78
LR test comparing models	0.70(2)	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not.
LR = Likelihood Ratio.
***p<.001

The findings of the test of the primary research hypothesis suggest that total support did not play a moderating role in the relationship between income and food insecurity. These findings are summarized in Table 4.26, which can be found on page 128. Next, we turned to whether individual functions and structures of social support have a moderating role.

Research Hypothesis 2a.

The moderating effects of social support on the relationship between income and food insecurity differ by the function and structure of the social support received.

The results of the hierarchical logistic regression analyses examining the moderating effects of the functions of social support are presented, followed by the results of the analyses to test the moderating role of social support structures. After each regression analysis, post estimation analyses are presented. In addition, the results of the models for the three measures of social support (emotional support, social network support, and organization membership) for which evidence of

moderation was found when income was categorized based on federal poverty guidelines are presented.

<center>*Social Support Functions*</center>

Emotional Support

The results of the hierarchical logistic regression analysis conducted to determine whether emotional support from a social network moderates the relationship between income and food insecurity are shown in Table 4.6. The first block with the sociodemographic variables contributed significantly to the model as demonstrated by the significant Wald χ^2 (see pages 126 and 127 for results of the relationships between food insecurity and sociodemographic variables). As suggested by the block Wald χ^2 ($\chi^2_{(3)}$ = 8.54, p<.05), the second block, which included the main effects of income and emotional support, also contributed significantly to the model. Further, one income category was associated with food insecurity; respondents with incomes of $34,999 or less were more likely to experience food insecurity. However, as suggested by the block Wald χ^2 ($\chi^2_{(2)}$ = 0.78, p>.05), the third block with the interactions between income and emotional support did not improve the fit of the model to the data.

Table 4.6. *Moderating Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Emotional Support (N = 287)*

Characteristic	Block 1[a] OR	95% CI	Block 1 and 2[b] OR	95% CI	Block 1, 2, and 3[c] OR	95% CI
Male	0.41	(0.15, 1.15)	0.33	(0.11, 1.00)*	0.34	(0.11, 1.01)
Currently married	1.51	(0.49, 4.66)	2.31	(0.72, 7.48)	2.4	(0.74, 7.77)
Age						
18-34 years	1.98	(0.34, 11.64)	1.72	(0.31, 9.59)	1.76	(0.34, 9.19)
35-49 years	3.27	(1.00, 10.75)	4.24	(1.30, 13.86)*	4.14	(1.27, 13.45)*
Education						
≤ High school degree	4.48	(1.37, 14.60)*	3.76	(0.99, 14.27)	3.53	(0.86, 14.50)
Some college or vocational training	1.59	(0.50, 5.06)	1.45	(0.45, 4.74)	1.47	(0.44, 4.90)
Unemployed	14.26	(4.01, 50.70)***	11.66	(3.39, 40.07)***	11.42	(3.34, 39.07)***
Homeowner	0.08	(0.03, 0.28)***	0.09	(0.03, 0.31)***	0.11	(0.03, 0.34)***
>30% of income for housing	8.77	(2.96, 26.01)***	5.87	(2.01, 17.10)**	5.71	(2.00, 16.28)**
Car in working condition	0.11	(0.02, 0.57)**	0.24	(0.04, 1.32)	0.24	(0.05, 1.25)
Rural residence	1.1	(0.43, 2.82)	0.93	(0.36, 2.44)	0.95	(0.36, 2.55)
Income						
≤$34,999			8.58	(1.49, 49.44)*	3.28	(0.20, 52.49)
$35,000-74,999			3.14	(0.44, 22.19)	0.74	(0.01, 41.66)
Emotional Social Support			0.71	(0.43, 1.17)	0.5	(0.23, 1.12)
Income ≤$34,999 x Emotional Social Support					1.49	(0.54, 4.12)
Income $35,000-74,999 x Emotional Social Support					1.71	(0.43, 6.81)
Wald χ² for the additional block	64.62***		8.54*		0.78	
df for the block	11		3		2	

Note: the reference groups are female, not currently married, ≥ 50 years, ≥ college graduate, employed, does not own a home, ≤30% of income on housing, has no car, urban, and income ≥ $75,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
* p<.05, **p<.01, ***p<.001 for the Wald Statistic.

As shown in Table 4.7, the LR test comparing the full model to the constrained model is not statistically significant, indicating that the inclusion of the interaction terms of emotional support and income do not improve the fit of the model. McFadden's Adjusted R^2 indicates a satisfactory strength of association between the variables in both the full and the constrained models and food insecurity, but the addition of the interactions does not improve the fit of the model to the data (the difference between the McFadden's R^2_{full} and McFadden's $R^2_{constrained}$ is only 0.015). The BIC statistic is smaller for the constrained than the full model, and the difference between the values (10.86) provides very strong evidence that the model without interactions fits the data better than does the model that includes the interactions.

Table 4.7. *Measures of Fit for Regression Models including Emotional Social Support*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	110.09(14)***	0.341	209.56
Full Model	110.54 (16)***	0.326	220.42
LR test comparing models	0.45(2)	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not.

LR = Likelihood Ratio.

***p<.001

Emotional Support with Income Categorization based on Poverty Guidelines

With income categorized based on federal poverty guidelines, emotional

support was found to play a moderating role on the relationship between income and

food insecurity. Hence, the results of this analysis are presented in Table 4.8 below.

The first block with the sociodemographic variables contributed significantly to the

model as demonstrated by the significant Wald χ^2. As suggested by the Wald χ^2 for

the second and third blocks alone, neither the inclusion of the main effects of income

and emotional support ($\chi^2_{(3)} = 6.48$, p>.05) nor the inclusion of the interactions

between income and emotional support ($\chi^2_{(2)} = 4.15$, p>.05) improved the fit of the

model to the data. However, the interaction of income at or below $19,999 and

emotional support was significant, indicating that emotional support did have a

moderating role such that the relationship between income and food insecurity was

weakened in the presence of emotional support (see columns 5 and 6 in Table 4.8). In

other words, respondents with incomes at or below $19,999 were less likely to

experience food insecurity in the presence of emotional support. However, small

sample sizes in the ≤$19,999 income category resulted in very large estimates of odds

ratios (e.g., 4136.79).

Table 4.8. *Moderated Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Emotional Support and Income Categories based on Poverty Guidelines (N = 287)*

Characteristic	Block 1[a] OR	95% CI	Block 1 and 2[b] OR	95% CI	Block 1, 2, and 3[c] OR	95% CI
Male	0.41	(0.15, 1.15)	0.31	(0.10, 0.97)*	0.26	(0.07, 0.94)*
Currently married	1.51	(0.49, 4.66)	2.78	(0.76, 10.20)	2.26	(0.68, 7.54)
Age						
18-34 years	1.98	(0.34, 11.64)	1.36	(0.23, 7.88)	1.78	(0.38, 8.46)
35-49 years	3.27	(0.99, 10.75)*	4.06	(1.16, 14.26)*	3.88	(1.15, 13.11)*
Education						
≤ High school degree	4.48	(1.37, 14.60)*	4.56	(1.34, 15.58)*	3.73	(0.99, 13.97)*
Some college or vocational training	1.59	(0.50, 5.06)	1.53	(0.46, 5.13)	1.49	(0.45, 4.88)
Unemployed	14.26	(4.01, 50.70)***	10.91	(3.15, 37.76)***	10.75	(3.05, 37.93)***
Homeowner	0.08	(0.02, 0.2)***	0.08	(0.02, 0.31)***	0.07	(0.02, 0.26)***
>30% of income for housing	8.77	(2.96, 26.01)***	6.97	(2.44, 19.92)***	6.32	(2.22, 17.99)**
Car in working condition	0.11	(0.02, 0.57)**	0.20	(0.02, 2.09)	0.15	(0.01, 2.35)
Rural residence	1.10	(0.43, 2.82)	0.85	(0.31, 2.28)	0.63	(0.22, 1.79)
Income						
≤$19,999			7.47	(1.13, 49.44)*	4136.79	(3.62, 4728019)*
$20,000-39,999			1.82	(0.65, 5.12)	1.79	(0.07, 43.93)
Emotional Support			0.70	(0.42, 1.15)	0.79	(0.41, 1.53)
Income ≤$19,999 x Emotional Support					0.11	(0.01, 0.98)*
Income $20,000-39,999 x Emotional Support					1.00	(0.36, 2.75)
Wald χ² for the additional block	64.62***		6.48		4.15	
df for the block	11		3		2	

Note: The reference groups are female, not currently married, ≥ 50 years, ≥ college graduate, employed, does not own a home, ≤30% of income on housing, has no car, urban, and income ≥ $40,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
* p<.05, **p<.01, ***p<.001 for the Wald Statistic

As shown in Table 4.9, the LR test comparing the full model to the constrained model is not statistically significant, indicating that the inclusion of the interaction terms of emotional support and income do not improve the fit of the model. McFadden's Adjusted R^2 indicates a satisfactory strength of association between the variables in both the full and the constrained models and food insecurity, but the addition of the interactions does not improve the fit of the model to the data (no difference is seen between the McFadden's R^2_{full} and McFadden's $R^2_{constrained}$). The BIC statistic is smaller for the constrained than the full model, and the difference

between the values (7.37) provides strong evidence that the model without interactions

fits the data better than does the model that includes the interactions.

Table 4.9. *Measures of Fit for Regression Models including Emotional Support with Income Categorization based on Federal Poverty Guidelines*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	108.84(14)***	0.336	210.78
Full Model	112.82 (16)***	0.336	218.15
LR test comparing models	3.95(2)	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not.
LR = Likelihood Ratio.
***p<.001

Informational Support

The results of the hierarchical logistic regression analysis examining whether

informational support from a social network moderates the relationship between

income and food insecurity are shown in Table 4.10. The first block with the

sociodemographic variables contributed significantly to the model as demonstrated by

the significant Wald χ^2 (see pages 126 and 127 for the results of the associations

between food insecurity and sociodemographic variables). As suggested by the block

Wald χ^2 ($\chi^2_{(3)}$ = 9.64, p<.05), the second block that included the main effects of

income and informational support also contributed significantly to the model. One

income category was found to be associated with food insecurity; respondents with

incomes of $34,999 or less were more likely to experience food insecurity. However,

the block Wald χ^2 ($\chi^2_{(2)}$ = 1.72, p>.05) for the third block indicates that the interaction

between income and informational support did not improve the fit of the model to the

data.

Table 4.10. *Moderated Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Informational Social Support (N = 287)*

Characteristic	Block 1[a] OR	95% CI	Block 1 and 2[b] OR	95% CI	Block 1, 2, and 3[c] OR	95% CI
Male	0.41	(0.15, 1.15)	0.39	(0.14, 1.11)	0.43	(0.16, 1.11)
Currently married	1.51	(0.49, 4.66)	2.17	(0.65, 7.22)	2.07	(0.64, 6.72)
Age						
18-34 years	1.98	(0.34, 11.64)	1.59	(0.25, 10.30)	1.77	(0.30, 10.32)
35-49 years	3.27	(1.00, 10.75)	4.24	(1.26, 14.23)*	3.97	(1.23, 12.84)*
Education						
$\leq$ High school degree	4.48	(1.37, 14.60)*	3.82	(1.01, 14.44)*	3.2	(0.78, 13.12)
Some college or vocational						
training	1.59	(0.50, 5.06)	1.64	(0.48, 5.57)	1.52	(0.44, 5.29)
Unemployed	14.26	(4.01, 50.70)***	11.94	(3.43, 41.50)***	11.42	(3.26, 40.08)***
Homeowner	0.08	(0.02, 0.28)***	0.11	(0.03, 0.38)**	0.15	(0.05, 0.46)**
>30% of income for housing	8.77	(2.96, 26.01)***	5.71	(1.98, 16.47)**	5.4	(1.98, 14.74)**
Car in working condition	0.11	(0.02, 0.57)**	0.23	(0.04, 1.35)	0.23	(0.04, 1.23)
Rural residence	1.1	(0.43, 2.82)	0.98	(0.36, 2.70)	1.03	(0.37, 2.87)
Income						
$\leq$\$34,999			8.07	(1.50, 43.46)*	2.66	(0.15, 48.35)
\$35,000-74,999			2.4	(0.38, 15.27)	0.05	(0.0001, 20.78)
Informational Social Support			1.07	(0.61, 1.88)	0.61	(0.18, 2.03)
Income $\leq$\$34,999 x						
Informational Social Support					1.63	(0.43, 6.22)
Income \$35,000-74,999 x						
Informational Social Support					3.98	(0.51, 31.41)
Wald χ^2 for the additional block	64.62***		9.64*		1.72	
df for the block	11		3		2	

Note: the reference groups are female, not currently married, $\geq$ 50 years, $\geq$ college graduate, employed, does not own a home, $\leq$30% of income on housing, has no car, urban, and income $\geq$ \$75,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
* p<.05, **p<.01, ***p<.001 for the Wald Statistic.

As shown in Table 4.11, the LR test comparing the full model and constrained model is not statistically significant, indicating that the inclusion of the interaction of informational support and income does not improve the fit of the model. McFadden's Adjusted R^2 suggests a moderate strength of association between the variables included in both the full and the constrained models and food insecurity. However, the addition of the interaction term in the full model does not contribute to the overall model (the difference between the McFadden's R^2_{full} and McFadden's $R^2_{constrained}$ is only .005). Further, the BIC statistic is smaller for the constrained than for the full model, and the difference in values (8.57) provides strong evidence that the model without interactions fits the data better than does the model with the interactions.

Table 4.11. *Measures of Fit for Regression Models including Informational Social Support*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	108.63(14)***	0.335	211.02
Full Model	111.37 (16)***	0.330	219.59
LR test comparing models	2.75(2)	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not.
LR = Likelihood Ratio.
***p<.001.

Instrumental Support

The results from the hierarchical logistic regressions conducted to evaluate the moderating role of instrumental support from a social network on the relationship between income and food insecurity are shown in Table 4.12. As shown, the block with the sociodemographic variables contributed significantly to the model as demonstrated by the significant Wald χ^2 (see pages 126 and 127 for the results of the relationships between food insecurity and sociodemographic variables). Based upon the block Wald χ^2 ($\chi^2_{(3)}$ = 8.84, p<.05), the second block, which includes the main effects of income and instrumental support, also contributed significantly to the model. Further, one income category was found to be associated with food insecurity; those with incomes of \$34,999 or less were more likely to experience food insecurity. However, the block Wald χ^2 ($\chi^2_{(2)}$ = 0.88, p>.05) for the third block alone indicates that the interactions between income and instrumental support did not improve the fit of the model to the data.

Table 4.12. *Moderated Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Instrumental Social Support (N = 287)*

Characteristic	Block 1[a] OR	Block 1[a] 95% CI	Block 1 and 2[b] OR	Block 1 and 2[b] 95% CI	Block 1, 2, and 3[c] OR	Block 1, 2, and 3[c] 95% CI
Male	0.41	(0.15, 1.15)	0.40	(0.15, 1.09)	0.39	(0.14, 1.04)
Currently married	1.51	(0.49, 4.66)	2.29	(0.71, 7.38)	2.37	(0.74, 7.64)
Age						
18-34 years	1.98	(0.34, 11.64)	1.74	(0.31, 9.76)	1.66	(0.33, 8.51)
35-49 years	3.27	(1.00, 10.75)	4.19	(1.28, 13.69)*	3.94	(1.23, 12.65)*
Education						
≤ High school degree	4.48	(1.37, 14.60)*	3.58	(0.94, 13.68)	3.81	(0.97, 14.93)
Some college or vocational training	1.59	(0.50, 5.06)	1.44	(0.46, 4.51)	1.56	(0.48, 5.14)
Unemployed	14.26	(4.01, 50.70)***	10.79	(3.17, 36.68)***	9.84	(3.14, 30.82)***
Homeowner	0.08	(0.03, 0.28)***	0.10	(0.03, 0.33)***	0.11	(0.03, 0.35)***
>30% of income for housing	8.77	(2.96, 26.01)***	6.26	(2.13, 18.37)**	5.93	(2.06, 17.13)**
Car in working condition	0.11	(0.02, 0.57)**	0.24	(0.05, 1.23)	0.23	(0.04, 1.23)
Rural residence	1.10	(0.43, 2.82)	0.97	(0.37, 2.51)	0.96	(0.37, 2.47)
Income						
≤$34,999			8.47	(1.55, 46.38)*	3.79	(0.40, 36.39)
$35,000-74,999			2.73	(0.43, 17.25)	1.47	(0.12, 17.58)
Instrumental Social Support			0.81	(0.55, 1.18)	0.55	(0.24, 1.26)
Income ≤$34,999 x Instrumental Social Support					1.62	(0.59, 4.43)
Income $35,000-74,999 x Instrumental Social Support					1.47	(0.50, 4.35)
Wald χ² for the additional block	64.62***		8.84*		0.88	
df for the block	11		3		2	

Note: the reference groups are female, not currently married, ≥ 50 years, ≥ college graduate, employed, does not own a home, ≤30% of income on housing, has no car, urban, and income ≥ $75,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
* p<.05, **p<.01, ***p<.001 for the Wald Statistic.

As shown in Table 4.13, the LR test for the full model compared to the constrained model is not statistically significant, indicating that the inclusion of the interaction of instrumental support and income does not improve the fit of the model. McFadden's Adjusted R^2 indicates a satisfactory strength of association between the variables in both the full and the constrained models and food insecurity. Yet, the addition of the interaction terms in the full model does not further improve the fit of the model (the difference between the McFadden's R^2_{full} and McFadden's $R^2_{constrained}$ is only .015). The BIC statistic is smaller for the constrained versus the full model. Further, the difference in BIC values between the full and constrained models (10.87)

provides very strong evidence that the model without interactions fits the data better

than does the model including the interactions.

Table 4.13. *Measures of Fit for Regression Models including Instrumental Social Support*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	109.63(14)***	0.339	210.02
Full Model	110.07 (16)***	0.324	220.89
LR test comparing models	0.44(2)	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not.
LR = Likelihood Ratio.
***p<.001

Social Support Structure

A series of hierarchical logistic regression models were conducted to assess the

relationship of social support structures to food insecurity. Specifically, four sets of

analyses were conducted: one for intimate partner support, one for social network

support, and two for community support (faith community attendance and

organization membership).

Intimate Partner Support

The results from the hierarchical logistic regression analysis examining the

moderating role of intimate partner support are shown in Table 4.14. The

sociodemographic block was found to contribute significantly to the model as

demonstrated by the significant block Wald χ^2 (see pages 126 and 127 for results of

individual variables). The block Wald χ^2 for the second block ($\chi^2_{(3)} = 7.86$, p<.05),

which included the main effects of income and intimate partner support, indicates that

the block contributed significantly to the model. As with previous models, an

association was found between one income category and food insecurity. Respondents

with incomes of $34,999 or less were more likely to experience food insecurity.

However, the block Wald χ^2 for the third block alone ($\chi^2_{(2)} = 2.55$, p>.05)

demonstrated that the interactions of income and intimate partner support failed to

improve the model's fit.

Table 4.14. *Moderated Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Intimate Partner Support (N = 274)*

Characteristic	Block 1[a]		Block 1 and 2[b]		Block 1, 2, and 3[c]	
	OR	95% CI	OR	95% CI	OR	95% CI
Male	0.42	(0.15 1.22)	0.47	(0.16, 1.38)	0.47	(0.15, 1.44)
Currently married	1.36	(0.45, 4.14)	2.38	(0.55, 10.36)	2.38	(0.61, 9.32)
Age						
18-34 years	1.92	(0.31, 11.85)	1.77	(0.27, 11.57)	1.78	(0.30, 10.63)
35-49 years	3.22	(0.98, 10.66)	4.50	(1.30, 15.58)*	4.59	(1.24, 16.99)*
Education						
≤ High school degree	5.01	(1.49, 16.86)**	4.36	(1.03, 18.53)*	3.86	(0.88, 16.99)
Some college or vocational training	1.84	(0.57, 5.89)	1.85	(0.54, 6.33)	1.51	(0.44, 5.19)
Unemployed	12.37	(3.51, 43.63)***	10.59	(2.95, 37.95)***	11.82	(3.16, 44.25)***
Homeowner	0.08	(0.02, 0.27)***	0.10	(0.03, 0.33)***	0.10	(0.03, 0.32)***
>30% of income for housing	7.13	(2.42, 20.97)***	5.35	(1.82, 15.69)**	5.77	(1.97, 16.92)**
Car in working condition	0.11	(0.02, 0.61)*	0.23	(0.04, 1.39)	0.22	(0.04, 1.19)
Rural residence	1.12	(0.43, 2.89)	1.03	(0.39, 2.73)	1.03	(0.39, 2.74)
Income						
≤$34,999			6.52	(1.15, 37.05)*	1.47	(0.09, 24.77)
$35,000-74,999			2.52	(0.40, 15.88)	2.76	(0.13, 59.10)
Intimate Partner Support			0.85	(0.54, 1.34)	0.63	(0.22, 1.79)
Income ≤$34,999 x Intimate Partner Support					1.73	(0.52, 5.73)
Income $35,000-74,999 x Intimate Partner Support					0.99	(0.29, 3.42)
Wald χ^2 for the additional block	64.03***		7.86*		2.55	
df for the block	11		3		2	

Note: the reference groups are female, not currently married, ≥ 50 years, ≥ college graduate, employed, does not own a home, ≤30% of income on housing, has no car, urban, and income ≥ $75,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
* p<.05, **p<.01, ***p<.001 for the Wald Statistic.

As shown in Table 4.15, the LR test comparing the full model to the

constrained model is not statistically significant. In other words, the inclusion of the

interaction terms of intimate partner support and income does not improve model fit.

McFadden's Adjusted R^2 suggests a satisfactory strength of association between the

variables in both the full and the constrained models and food insecurity, but the

addition of the interactions in the full model does not further improve the model fit

(the difference between the McFadden's R^2_{full} and McFadden's $R^2_{constrained}$ is only

0.007). The BIC statistic for the constrained model is smaller than for the full model,

and the difference in values (8.83) provides strong evidence that the model without

interactions fits the data better.

Table 4.15. *Measures of Fit for Regression Models including Intimate Partner Social Support*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	102.92(14)***	0.322	207.67
Full Model	105.31 (16)***	0.315	216.50
LR test comparing models	2.40(2)	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not.
LR = Likelihood ratio
***p<.001

Social Network Support

The results of the hierarchical logistic regression analysis evaluating the

moderating role of support from a social network on the relationship between income

and food insecurity can be found in Table 4.16. As with the prior analyses, the

sociodemographic block contributed significantly to the model as demonstrated by the

significant block Wald χ^2 (see pages 126 and 127 for the results of individual

variables). Based on the block Wald χ^2 ($\chi^2_{(3)}$ = 8.63, p<.05), the second block alone,

which included the main effects of income and social network support, contributed

significantly to the model. Respondents with incomes of $34,999 or less were more

likely to experience food insecurity. However, the block Wald χ^2 for the third block

alone ($\chi^2_{(2)}$ = 0.89, p>.05) demonstrated that the inclusion of the interactions between

income and social network support did not improve the model fit.

Table 4.16. *Moderated Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Social Network Support (N = 287)*

Characteristic	Block 1[a] OR	95% CI	Block 1 and 2[b] OR	95% CI	Block 1, 2, and 3[c] OR	95% CI
Male	0.41	(0.15, 1.15)	0.37	(0.13, 1.04)	0.37	(0.14, 1.02)
Currently married	1.51	(0.49, 4.66)	2.37	(0.73, 7.75)	2.47	(0.76, 8.03)
Age						
18-34 years	1.98	(0.34, 11.64)	1.80	(0.31, 10.47)	1.83	(0.35, 9.63)
35-49 years	3.27	(1.00, 10.75)	4.26	(1.29, 14.15)*	4.09	(1.23, 13.55)*
Education						
≤ High school degree	4.48	(1.37, 4.60)*	3.58	(0.94, 13.66)	3.49	(0.87, 13.99)
Some college or vocational training	1.59	(0.50, 5.06)	1.45	(0.45, 4.66)	1.50	(0.44, 5.11)
Unemployed	14.26	(4.01, 50.70)***	11.30	(3.32, 38.43)***	11.02	(3.35, 36.24)***
Homeowner	0.08	(0.03, 0.28)***	0.10	(0.03, 0.32)***	0.11	(0.04, 0.36)***
>30% of income for housing	8.77	(2.96, 26.01)***	5.97	(2.05, 17.37)**	5.61	(2.00, 15.71)**
Car in working condition	0.11	(0.02, 0.57)**	0.23	(0.04, 1.27)	0.23	(0.04, 1.23)
Rural residence	1.10	(0.43, 2.82)	0.93	(0.35, 2.47)	0.95	(0.35, 2.53)
Income						
≤$34,999			8.53	(1.53, 47.68)*	2.92	(0.19, 44.36)
$35,000-74,999			2.86	(0.43, 19.19)	0.56	(0.01, 31.76)
Social Network Support			0.79	(0.48, 1.31)	0.50	(0.18, 1.40)
Income ≤$34,999 x Social Network Support					1.67	(0.50, 5.63)
Income 35,000-74,999 x Social Network Support					2.00	(0.41, 9.68)
Wald χ^2 for the additional block	64.62***		8.63*		0.89	
df for the block	11		3		2	

Note: the reference groups are female, not currently married, ≥ 50 years, ≥ college graduate, employed, does not own a home, ≤30% of income on housing, has no car, urban, and income ≥ $75,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
*p<.05, **p<.01, ***p<.001 for the Wald Statistic.

As shown in Table 4.17, the LR test comparing the full model to the constrained model is not statistically significant, indicating that including the interactions of income and social network support does not improve the model fit. McFadden's Adjusted R^2 indicates a satisfactory strength of association between the variables in both the full and the constrained models and food insecurity. However, McFadden's R^2 also indicates that the addition of the interactions in the full model does not improve the model fit (the difference between the McFadden's R^2_{full} and McFadden's $R^2_{constrained}$ is only .014). The BIC statistic also provides very strong evidence that the model without the interactions (the constrained model) fits the data

better than does the model with the interactions (the full model) because the BIC is smaller for the constrained model and the difference between the BIC values is 10.64.

Table 4.17. *Measures of Fit for Regression Models including Social Network Support*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	109.24(14)***	0.338	210.41
Full Model	109.91(16)***	0.322	221.05
LR test comparing models	0.68(2)	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not.
LR = Likelihood ratio.
***p<.001

Social Network Support with Income Categorization based on Poverty Guidelines

With income categorized based on federal poverty guidelines, social network support was found to play a moderating role on the relationship between income and food insecurity. Hence, the results of this analysis are presented in Table 4.18 below. The sociodemographic block contributed significantly to the model as demonstrated by the significant Wald χ^2. The block Wald χ^2 for the second and third blocks alone demonstrate that neither the main effects of income and social network support ($\chi^2_{(3)}$ = 5.33, p>.05), nor the interactions between income and social network support ($\chi^2_{(2)}$ = 4.76, p>.05) improved the model fit. However, social network support was found to play a moderating role such that the relationship between income and food insecurity was weakened in the presence of social network support (see columns 5 and 6 in Table 4.18). In other words, respondents with incomes at or below $19,999 were less likely to experience food insecurity in the presence of social network support. However, small sample sizes in the ≤$19,999 income category resulted in very large estimates of odds ratios (e.g., 738.93) for the main effect of income in the presence of its interaction with social network support.

Table 4.18. *Moderated Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Social Network Support and Income Categories based on Poverty Guidelines (N = 287)*

Characteristic	Block 1[a] OR	95% CI	Block 1 and 2[b] OR	95% CI	Block 1, 2, and 3[c] OR	95% CI
Male	0.41	(0.15, 1.15)	0.35	(0.12, 1.01)	0.31	(0.10, 0.94)*
Currently married	1.51	(0.49, 4.66)	2.81	(0.78, 10.12)	2.77	(0.78, 9.88)
Age						
18-34 years	1.98	(0.34, 11.64)	1.41	(0.23, 8.57)	2.36	(0.50, 11.06)
35-49 years	3.27	(1.00, 10.75)	4.03	(1.16, 14.10)*	3.95	(1.19, 13.14)*
Education						
≤ High school degree	4.48	(1.37, 14.60)*	4.32	(1.27, 14.67)*	3.91	(1.09, 14.00)*
Some college or						
vocational training	1.59	(0.50, 5.06)	1.52	(0.45, 5.09)	1.40	(0.41, 4.82)
Unemployed	14.26	(4.01, 50.70)***	10.48	(3.09, 35.56)***	10.33	(3.03, 35.18)***
Homeowner	0.08	(0.02, 0.28)***	0.09	(0.02, 0.33)***	0.07	(0.02, 0.29)***
>30% of income for housing	8.77	(2.96, 26.01)***	7.03	(2.47, 20.03)***	6.23	(2.23, 17.40)***
Car in working condition	0.11	(0.02, 0.57)**	0.19	(0.02, 1.98)	0.13	(0.01, 1.44)
Rural residence	1.10	(0.43, 2.82)	0.86	(0.31, 2.36)	0.64	(0.22, 1.88)
Income						
≤$19,999			7.73	(1.16, 51.44)*	738.93	(4.13, 132187.3)*
$20,000-39,999			1.94	(0.71, 5.34)	1.76	(0.09, 32.47)
Social Network support			0.80	(0.50, 1.30)	0.88	(0.46, 1.71)
Income ≤$19,999 x Social						
Network Support					0.16	(0.03, 0.97)*
Income $20,000-39,999 x						
Social Network Support					1.03	(0.37, 2.85)
Wald χ² for additional block	64.62***		5.33		4.76	
df for the block	11		3		2	

Note: The reference groups are female, not currently married, ≥ 50 years, ≥ college graduate, employed, does not own a home, ≤30% of income on housing, has no car, urban, and income ≥ $40,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
*p<.05, **p<.01, ***p<.001 for the Wald Statistic.

As shown in Table 4.19, the LR test comparing the full model to the constrained model is not statistically significant, indicating that including the interactions of income and social network support does not improve the model fit. McFadden's Adjusted R^2 indicates a satisfactory strength of association between the variables in both the full and the constrained models and food insecurity. However, McFadden's R^2 also indicates that the addition of the interactions in the full model does not improve the model fit (the difference between the McFadden's R^2_{full} and McFadden's $R^2_{constrained}$ is only .005). The BIC statistic also provides evidence that the model without the interactions fits the data better than does the model with the

interactions, because the BIC is smaller for the constrained model and the difference

between the BIC values is 8.48.

Table 4.19. *Measures of Fit for Regression Models including Social Network Support with Income Categories based on Poverty Guidelines*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	107.82(14)***	0.331	211.83
Full Model	110.66(16)***	0.327	220.31
LR test comparing models	2.84(2)	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not.
LR = Likelihood ratio.
***p<.001

Community Support: Faith Community Attendance

The results of the hierarchical logistic regression analysis examining the

moderating role of faith community attendance are shown in Table 4.20. The

socidemographic block contributed significantly to the model as indicated by the

significant block Wald χ^2 (see pages 126 and 127 for results of individual variables).

Based on the block Wald χ^2 ($\chi^2_{(3)}$ = 8.97, p<.05), the second block, which included the

main effects of income and faith community attendance, also contributed significantly

to the model. Those with incomes of $34,999 or less are more likely to experience

food insecurity. However, the block Wald χ^2 for the third block alone ($\chi^2_{(2)}$ = 0.53,

p>.05), demonstrates that the inclusion of the interactions does not improve the fit of

the model to the data.

Table 4.20. *Moderated Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Faith Community Attendance (N = 287)*

Characteristic	Block 1[a] OR	Block 1[a] 95% CI	Block 1 and 2[b] OR	Block 1 and 2[b] 95% CI	Block 1, 2, and 3[c] OR	Block 1, 2, and 3[c] 95% CI
Male	0.41	(0.15, 1.16)	0.39	(0.14, 1.08)	0.39	(0.14, 1.07)
Currently married	1.49	(0.48, 4.62)	2.14	(0.63, 7.33)	2.19	(0.63, 7.57)
Age						
18-34 years	1.99	(0.34, 11.70)	1.75	(0.30, 10.09)	1.67	(0.28, 9.97)
35-49 years	3.30	(1.01, 10.84)*	4.33	(1.32, 14.20)*	4.27	(1.29, 14.12)*
Education						
≤ High school degree	4.41	(1.36, 14.34)*	3.69	(1.00, 13.68)	3.60	(1.01, 12.83)*
Some college or vocational training	1.60	(0.50, 5.08)	1.63	(0.48, 5.52)	1.61	(0.47, 5.56)
Unemployed	14.09	(3.97, 50.07)***	11.76	(3.43, 40.34)***	11.94	(3.38, 42.16)***
Homeowner	0.08	(0.03, 0.28)***	0.11	(0.03, 0.37)***	0.10	(0.03, 0.35)***
>30% of income for housing	8.78	(2.95, 26.10)***	5.78	(2.00, 16.72)**	5.97	(2.00, 17.78)**
Car in working condition	0.11	(0.02, 0.56)**	0.22	(0.04, 1.28)	0.22	(0.04, 1.26)
Rural residence	1.08	(0.42, 2.77)	0.94	(0.35, 2.50)	0.93	(0.34, 2.51)
Income						
≤$34,999			7.99	(1.53, 41.73)*	12.24	(2.01, 74.67)**
$35,000-74,999			2.51	(0.42, 14.91)	3.90	(0.55, 27.50)
Faith Community Attendance			1.07	(0.36, 3.17)	2.54	(0.20, 32.09)
Income ≤$34,999 x Community Attendance					0.36	(0.02, 6.84)
Income $35,000-74,999 x Faith Community Attendance					0.36	(0.02, 6.70)
Wald χ² for the additional block	64.65***		8.97*		0.53	
df for the block	11		3		2	

Note: the reference groups are female, not currently married, ≥ 50 years, ≥ college graduate, employed, does not own a home, ≤30% of income on housing, has no car, urban, and income ≥ $75,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
* p<.05, **p<.01, ***p<.001 for the Wald Statistic.

As shown in Table 4.21, the LR test comparing the full and the constrained model is not statistically significant, demonstrating that including the interaction of faith community attendance and income does not improve the fit of the model. McFadden's Adjusted R^2 provides evidence for a satisfactory strength of association between the variables in both the full and the constrained models, but the addition of the interactions in the full model does not improve the model fit (the difference between the McFadden's R^2_{full} and McFadden's $R^2_{constrained}$ is only .015). The BIC statistic for the constrained model is smaller than that of the full model with a

difference in values of 10.85, providing very strong evidence that the model without

interactions fits the data better than the model with those interactions.

Table 4.21. *Measures of Fit for Regression Models including Faith Community Attendance*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	108.22(14)***	0.333	211.58
Full Model	108.68(16)***	0.318	222.43
LR test comparing models	0.47(2)	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not. LR = Likelihood ratio.
***p<.001

Community Support: Organization Membership

Table 4.22 presents the results of a final hierarchical logistic regression

analysis assessing whether organization membership moderated the relationship

between income and food insecurity. The block with the sociedemographic variables

was found to be a significant contributor to the model as demonstrated by the

significant block Wald χ^2 (see pages 126 and 127 for results of individual variables).

As suggested by the block Wald χ^2 ($\chi^2_{(3)}$ = 10.70, p<.05), the second block alone that

included the main effects of income and organization membership also contributed

significantly to the model. Further, one income category was found to have a

significant relationship with food insecurity; respondents with incomes of $34,999 or

less were more likely to experience food insecurity. However, the block Wald χ^2 for

the third block alone ($\chi^2_{(2)}$ = 1.09, p >.05) demonstrates that the inclusion of the

interactions between income and organization membership did not improve the fit of

the model to the data.

Table 4.22. *Moderated Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Organization Membership (N = 287)*

Characteristic	Block 1[a] OR	Block 1[a] 95% CI	Block 1 and 2[b] OR	Block 1 and 2[b] 95% CI	Block 1, 2, and 3[c] OR	Block 1, 2, and 3[c] 95% CI
Male	0.41	(0.15, 1.16)	0.43	(0.15, 1.19)	0.41	(0.14, 1.16)
Currently married	1.49	(0.48, 4.62)	1.84	(0.50, 6.72)	1.86	(0.50, 6.95)
Age						
18-34 years	1.98	(0.34, 11.69)	1.37	(0.20, 9.69)	1.47	(0.23, 9.47)
35-49 years	3.29	(1.00, 10.83)*	3.71	(1.19, 11.55)*	3.43	(1.09, 10.83)*
Education						
≤ High school degree	4.4	(1.35, 14.33)*	5.44	(1.10, 26.78)*	4.93	(0.88, 27.55)
Some college or vocational training	1.59	(0.50, 5.07)	1.84	(0.48, 7.07)	1.83	(0.45, 7.40)
Unemployed	14.09	(3.96, 50.19)***	12.97	(4.04, 41.64)***	12.54	(3.94, 39.88)***
Homeowner	0.09	(0.03, 0.28)***	0.08	(0.02, 0.35)**	0.08	(0.02, 0.35)**
>30% of income for housing	8.79	(2.96, 26.11)***	6.81	(2.14, 21.67)**	6.78	(2.13, 21.58)**
Car in working condition	0.11	(0.02, 0.56)**	0.29	(0.05, 1.57)	0.23	(0.03, 1.67)
Rural residence	1.08	(0.42, 2.75)	1.17	(0.45, 3.09)	1.13	(0.43, 3.01)
Income						
≤$34,999			7.31	(1.38, 38.78)*	10.34	(1.91, 56.02)**
$35,000-74,999			2.27	(0.35, 14.88)	2.31	(0.33, 16.12)
Organization membership			2.99	(0.70, 12.78)	4.56	(0.22, 94.48)
Income ≤$34,999 x Organization membership					0.31	(0.01, 6.65)
Income $35,000-74,999 x Organization membership					1.04	(0.04, 30.84)
Wald χ² for the additional block	64.64***		10.70*		1.09	
df for the block	11		3		2	

Note: the reference groups are female, not currently married, ≥ 50 years, ≥ college graduate, employed, does not own a home, ≤30% of income on housing, has no car, urban, and income ≥ $75,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
* p<.05, **p<.01, ***p<.001 for the Wald Statistic.

The results of the post estimation analysis for the full and the constrained models are shown in Table 4.23. The LR test comparing the full and the constrained models is not statistically significant, indicating that including the interactions of income and organization membership does not improve the fit of the model. McFadden's Adjusted R^2 provides evidence to indicate a satisfactory strength of association between the variables included in both the full and the constrained models and food insecurity. Further, the addition of the interactions in the full model does not improve the model fit (the difference between the McFadden's R^2_{full} and McFadden's $R^2_{constrained}$ is only 0.012). The BIC statistic is smaller for the constrained than for the full model and the difference in values (10.04) provides very strong evidence that the

model without interactions fits the data better than the model that included the

interactions.

Table 4.23. *Measures of Fit for Regression Models including Organization Membership*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	111.84(14)***	0.348	207.99
Full Model	113.12 (16)***	0.337	218.03
LR test comparing models	1.28(2)	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not.
LR = Likelihood ratio.
***p<.001

Organization Membership with Income Categorization based on Poverty Guidelines

With the income variable categorized based on federal poverty guidelines,

organization membership was found to play a moderating role on the relationship

between income and food insecurity. Hence, the results of this analysis are presented

in Table 4.24 below. The block with the socidemographic variables was found to be a

significant contributor to the model as demonstrated by the significant block Wald χ^2.

The block Wald χ^2 for the second block alone ($\chi^2_{(3)}$ = 5.43, p>.05) indicates that the

main effects of income and organization membership do not contribute significantly to

the prediction of food insecurity. However, the inclusion of the block with the

interactions between income and organization membership was found to be significant

when added to the model based on the significant block Wald χ^2 ($\chi^2_{(2)}$ = 6.09, p <.05).

Organization membership was not found to have a statistically significant association

with food insecurity when entered in the second block, although it does have a

statistically significant main effect in the full model. Membership in an organization

appears to increase the odds of experiencing food insecurity. However, it should be

noted that the odds ratios of main effects in the same model with their interaction

terms have different meanings and must be interpreted cautiously (Cohen et al., 2003;

Long & Freese, 2006). The interaction of income less than or equal to $19,999 and

organization membership was significant. Organization membership does play a

moderating role such that the relationship between income and food insecurity is

weakened in the presence of organization membership. In other words, respondents

with incomes at or below $19,999 who were involved in a community organization

were less likely to experience food insecurity. However, small sample sizes in the

≤$19,999 income category resulted in wide confidence intervals for the odds ratio

(i.e., 3.24, 227.74) of main effect of income in the presence of the interaction.

Table 4.24. *Moderated Hierarchical Logistic Regression Analysis: Predicting Food Insecurity with Organization Membership and Income Categories based on Poverty Guidelines (N = 287)*

Characteristic	Block 1[a] OR	Block 1[a] 95% CI	Block 1 and 2[b] OR	Block 1 and 2[b] 95% CI	Block 1, 2, and 3[c] OR	Block 1, 2, and 3[c] 95% CI
Male	0.41	(0.14, 1.16)	0.40	(0.14, 1.15)	0.25	(0.08, 0.86)*
Currently married	1.49	(0.48, 4.62)	2.20	(0.55, 8.81)	2.08	(0.46, 9.34)
Age						
18-34 years	1.98	(0.34, 11.69)	1.12	(0.16, 8.03)	1.49	(0.3, 7.34)
35-49 years	3.29	(0.99, 10.83)*	3.50	(1.13, 10.83)*	3.06	(1.05, 8.94)*
Education						
≤ High school degree	4.40	(1.35, 14.33)*	6.48	(1.62, 25.91)***	7.82	(2.08, 29.37)**
Some college or vocational training	1.59	(0.50, 5.07)	1.92	(0.51, 7.29)	2.07	(0.55, 7.74)
Unemployed	14.09	(3.96, 50.19)***	12.21	(3.78, 39.49)***	9.71	(3.08, 30.62)***
Homeowner	0.08	(0.03, 0.28)*	0.08	(0.02, 0.36)	0.04	(0.01, 0.23)***
>30% of income for housing	8.79	(2.96, 26.11)***	8.22	(2.71, 25.02)***	7.04	(2.45, 20.22)***
Car in working condition	0.11	(0.02, 0.56)*	0.24	(0.02, 2.57)	0.3	(0.02, 4.12)
Rural residence	1.08	(0.42, 2.75)	1.10	(0.42, 2.87)	0.92	(0.3, 2.87)
Income						
≤$19,999			7.03	(0.95, 51.95)	27.15	(3.24, 227.74)**
$20,000-39,999			1.90	(0.7, 5.18)	1.74	(0.44, 6.88)
Organization membership			2.85	(0.7, 11.66)	5.51	(1.01, 29.97)*
Income ≤$19,999 x Organization membership					0.01	(0.0001, 0.48)*
Income $20,000-39,999 x Organization membership					1.46	(0.15, 14.57)
Wald χ^2 for the additional block	64.64***		5.43		6.09*	
df for the block	11		3		2	

Note: The reference groups are female, not currently married, ≥ 50 years, ≥ college graduate, employed, does not own a home, ≤30% of income on housing, has no car, urban, and income ≥ $40,000. All data are weighted.
[a] Block 1 contains sociodemographic variables. [b] Block 2 adds the main effects of income and social support. [c] Block 3 adds the interactions between income and social support.
* p<.05, **p<.01, ***p<.001 for the Wald Statistic.

The results of the post estimation analysis for the full and the constrained

models are shown in Table 4.25. The results provide weak support for the constrained

model as discussed below. The LR test comparing the full and the constrained models

is statistically significant indicating that the full model with inclusion of interaction

terms between organization membership and income does improve the fit of the

model. McFadden's Adjusted R^2 provides evidence to indicate a satisfactory strength

of association between the variables included in both the full and the constrained

models and food insecurity. Yet, the addition of the interactions in the full model

improves the model fit only slightly (the difference between the McFadden's R^2_{full} and

McFadden's $R^2_{constrained}$ is -.025). The BIC statistic is smaller for the constrained than

for the full model suggesting that the model without interactions fits the data better

than the model that included the interactions, yet the absolute difference in the BIC of

the constrained and the full models is 2.99 indicating only weak support for the

constrained model.

Table 4.25. *Measures of Fit for Regression Models including Organization Membership and Income Categories based on Poverty Guidelines*

Logistic Regression Model	LR χ^2(df)	McFadden's R^2	BIC
Constrained Model	110.41(14)***	0.342	213.29
Full Model	120.34(16)***	0.367	216.28
LR test comparing models	9.93(2)*	--	--

Note: The full model included the income and social support interaction terms, while the constrained model did not.
LR = Likelihood ratio.
***p<.001

Sociodemographic Findings from Moderation Analysis

Although not the main focus of this research, several sociodemographic

variables were found to be associated with food insecurity for the analyses conducted

to test the primary hypothesis and hypothesis 2a. The block of sociodemographic variables contributed significantly to all models as indicated by the Wald χ^2 for block one in Tables 4.4, 4.6, 4.10, 4.12, 4.14, 4.16, 4.20, and 4.22. The statistically significant relationships between specific sociodemographic variables and food insecurity were similar across models. In general, the results revealed that respondents with vehicles in working condition and homeowners were less likely to experience food insecurity, while those aged 35 to 49, those with a high school education or less, those unemployed, and those who paid more than 30% of their income for housing were more likely to experience food insecurity. Last, the results of one model (emotional support) suggested that males were less likely to experience food insecurity.

Summary of Research Hypothesis 2a

As summarized in Table 4.26, with the income variable categorized based on federal poverty guidelines, emotional support from a social network was the one social support function found to play a moderating role on the relationship between income and food insecurity. Of the social support structures, two showed evidence of moderation of this relationship; support from a social network and organization membership. Emotional support, support from a social network, and membership in an organization weakened the relationship between income and food insecurity, such that in the presence of high levels of this support, respondents with incomes at or below $19,999 were less likely to experience food insecurity. However, the results of these analyses were unstable (i.e. they changed substantially when income was

recategorized in various ways), possibly due to the small number of respondents with incomes below 100% of poverty. When the income variable was recategorized to remedy the problem, no evidence of moderation was found.

Table 4.26. *Summary of Results of Hypotheses 1 and 2a*.

Hypothesis	Result
1. Social support moderates the relationship between income and food insecurity.	No evidence of moderating
2a. The moderating effects of social support on the relationship between income and food insecurity differ by the function and structure of the social support received.	
Social support functions from a social network	
Emotional support	No evidence of moderating*
Informational support	No evidence of moderating
Instrumental support	No evidence of moderating
Social support structures	
Social network support	No evidence of moderating*
Intimate partner support	No evidence of moderating
Faith community attendance	No evidence of moderating
Organization membership	No evidence of moderating*

*Evidence for moderating was found for these measures of social support for respondents with incomes of $19,999 or less, however the findings were unstable, possibly due to the small number of respondents in this income category.

Next, we turn to whether the structures and functions of social support differ based on rural or urban residence.

Research Hypothesis 2b:

The function and structure of social support differ based on rural or urban residence.

Descriptive and Bivariate Analysis

Table 4.27 displays the means and percentages of the social support measures for the rural and urban Oregonians in this sample. Bivariate linear regressions were conducted to test for significant associations between rural residence and continuous social support measures, and bivariate logistic regressions were used to test for significant associations between rural residence and binary social support measures.

As shown in Table 4.27, the only statistically significant association was between rural residence and network density, i.e., the number of close friends who are also friends with each other. The unadjusted linear regression suggested that rural Oregonians had less dense social networks. No significant associations were found between where respondents resided and any other social support measure.

4.27. *Social Support Characteristics and Unadjusted Regressions Assessing Associations between Social Support Measures and Rural versus Urban Residence*

Characteristic	Urban		Rural		β or OR (CI)[†]
	Mean/%	SE	Mean/%	SE	
Number of close friends	7.55	1.20	6.08	0.92	β = -.05
Number of close relatives	7.30	0.72	6.72	0.77	β = -.03
Social network size	14.86	1.64	12.82	1.56	β = -.05
Frequency of social contact	12.28	0.29	11.98	0.33	β = -.04
Network density	0.61	0.05	0.46	0.04	β = -.11*
Social network support function					
Emotional support	2.89	0.07	2.89	0.08	β = -.002
Informational support	2.76	0.07	2.61	0.08	β = -.07
Instrumental support	2.29	0.09	2.25	0.10	β = -.01
Social support structures					
Intimate partner support	2.99	0.11	3.13	0.10	β = .05
Social network support	2.64	0.07	2.58	0.08	β = -.03
Social network & partner support	2.72	0.06	2.72	0.07	β = -.0003
Faith community attendance	39.61%		30.94%		OR = 0.68 (.42, 1.11)
Organization membership	33.61%		27.86%		OR = 0.76 (.47, 1.25)
Residential tenure in years	17.56	1.16	17.91	1.24	β = .01

[†]β are reported for linear regression and odds ratios (OR) and confidence intervals (CI) for logistic regression.
* $p < .05$

Multiple Linear Regression Results

A multiple linear regression predicting combined social support from a social network and an intimate partner was conducted, even though no statistically significant relationship was found between this variable and place of residence through the unadjusted regression analysis. The reason this outcome variable was still used was to control for potential covariates and determine whether they may have

masked the relationship between social support and place of residence. Hence, a multiple linear regression was conducted, regressing the combined measure of support from an intimate partner and a social network on rural residence, while adjusting for selected socidemographic characteristics. To maximize the parsimony of the model, unadjusted regressions were conducted to determine which potential covariates were associated with social support (results not shown). Those variables that had a significant association at $p \leq 0.1$ were included in the multiple regression model. Table 4.28 displays the unstandardized regression coefficients (B), their standard errors (SE), and the standardized regression coefficients (β) from the multiple linear regression. Four potential covariates had significant associations with the combined measure of social support from an intimate partner and social network. Respondents who were currently married or aged 18 and 34 (versus 50 to 64) had higher levels of social support. Involvement with a faith community was also significantly associated with greater social support. Conversely, being male was associated with less social support. Rural residence did not have a significant association with social support. Altogether, 15% of the variability in social support was explained by this model, $F_{(9, 308)} = 7.42$, $p<.001$. Nearly identical results were obtained with the income categorization that was not based on poverty guidelines (data not shown).

Table 4.28. *Results of Linear Regression of Combined Social Support from Intimate Partner and Social Network (N = 318)*

Variable	B	SE	β
Male	-0.30	0.09	-.18**
Currently married	0.37	0.13	.21**
Age[a]			
18-34 years	0.51	0.12	.19***
35-49 years	0.18	0.10	.11
Income[b]			
≤$19,999	0.003	0.21	.001
$20,000-39,999	-0.15	0.12	-.08
≤185% of poverty	-0.21	0.18	-.10
Faith community attendance	0.25	0.09	.15**
Rural	-0.02	0.08	-.01
R^2			.15
F			7.42***

Note: All data are weighted.
[a] The reference category for age was 50 to 64 years.
[b] The reference category for income was $40,000 or more.
* $p<.05$, **$p<.01$, ***$p<.001$

Summary of Research Hypothesis 2b

Only one statistically significant association was found between where a respondent resided and measures of social support. Rural residence was associated with less dense social networks. Moreover, no association was found between place of residence and amount of social support.

Section Two: Qualitative Interviews

This section provides a brief overview of the interview participants who were either low income, food insecure, or both, and then results from the in-depth interviews with these participants are presented.

Overview of Sample

Qualitative interviews were conducted with 25 participants who completed the mail survey. Participants resided in a diverse set of communities throughout Oregon. Of those interviewed, 14 were from rural areas and 11 lived in urban regions. The

mean age of the interview participants was 47.75 years. Six had children in the home. Of the 25 participants, 18 were female and seven were male.

Interview Themes and Subthemes

First, the themes and subthemes generated from the interviews to provide insight into experiences with food security and insecurity and how social support might play a role are presented. Of particular interest were the five participants who were low-income and food secure. Hence, the themes and subthemes that emerged with respect to what enabled this subset of people to achieve and maintain food security are presented separately, because the strategies that they used to maintain food security could help others. Second, themes and subthemes concerning the experience of food insecurity are compared based on rural or urban residence.

Three main themes emerged from the in-depth interviews. Within these themes, 20 subthemes were generated. These themes and subthemes are shown on Table 4. 29.

Table 4.29. *Themes and Subthemes Generated from Qualitative Interviews*

Theme	Subtheme
Contributors to food insecurity	Crime, gambling
	Drug/ETOH
	Employment
	Health
	High cost of food
	Other bills
	No social support/isolation
	Relationships
	Geographic isolation/transportation
Coping strategies	Alternate food sources
	Budgeting
	Education
	Food stretching
	Private assistance
	Public assistance
	Social support
	Church
	Family
	Friends
	Instrumental
	Informational
	Emotional
Condition improving mechanisms	Education
	Employment
	Housing

Experiences of Food Insecure Oregonians

The food insecurity findings are grouped into three main themes: contributors to food insecurity, coping strategies, and mechanisms for improving conditions related to food insecurity. The presentation of these findings includes an exploration of the role of social support.

Contributors to Food Insecurity

A variety of subthemes emerged to explain why participants were experiencing food insecurity. These subthemes included illness and injury, unemployment, underemployment and the instability of low wage work, family changes such as

divorce and the birth of a child, and having other bills to pay.

Illness and injury. Becoming ill or getting injured were major contributors to food insecurity among those interviewed. Of the 25 interviewed, seven cited health problems, theirs or a family member's, as a major contributor to their financial difficulties. This subtheme is illustrated with the following quote, which was given in response to a question about factors contributing to food insecurity in her family. The participant explained that her family's income had decreased for the following reason:

> My husband is sick. He has a fracture in his back and now he has rehabilitation [he is on disability], one year. Oh, he is a mechanic and he was working, on a ladder and he took time to check something in the office and he fell from the ladder. (food insecure, low-income, urban dweller)

A participant from a rural Oregon town related how he had been injured on the job and could not find another job, saying "I've got rods up and down my back and screws and you know no one wants to hire you. I got my bachelors degree when I was 50 and that means nothing to anybody because I was over 50." He went on to talk about the impact of being injured on the job, explaining "When I first got hurt we went through $40,000 of retirement savings. [We spent it on] living, taxes, and many medical bills. The company paid mine [medical bills], but they didn't pay my wife's." As a result of his inability to work and high medical bills, he and his wife struggled to have enough food to eat.

Another rural participant who was food insecure, but not low-income, told of struggling financially because of illness, saying "I was really sick, I was unable to work, but didn't qualify for SSI. [My wife] was going to school, and we basically

lived on the little money she made from work, and help from our church and friends."

Few respondents were covered by health insurance. When asked what they did when they got sick, many reported that they took the risk that they would not get sick. However, several of them did get injured or ill and faced tremendous bills that led to food insecurity, as illustrated in the following quote:

> That was one of the major problems that I had earlier this year was that when I went to the hospital I no longer had health insurance and that was really what threw me into a real tailspin also. I mean, I am still getting out of that (food insecure, not low-income, rural participant).

Others without health insurance got ill or injured, but did not seek medical care, leading to more problems. One participant had lost her insurance coverage through the Oregon Health Plan and had numerous health problems for which she could not afford to be treated, as she explained:

> I have diabetes. I have panic attacks. I can't take any of my medications [because I can't afford them]. I have a sciatic nerve, three pinched nerves, I have chronic bronchial pneumonia, yeah and I can't get any help." (food insecure, low-income, rural participant)

This participant had hoped to grow a garden to supplement the food she was able to purchase with her food stamp allotment; however, she was physically unable to do so because of these untreated health issues.

In another example, a participant was injured making it impossible for her to work. Moreover, she did not have insurance coverage to pay for the operation that would have allowed her to go back to work. She observed:

> I re-injured an old injury is what happened. I had gotten out of my car at the [gas station] and I guess I stepped on some oil and fell and then I fell here at my house down the stairs and this is all in like the matter of a

month and so I owned my own business. I was starting up a housekeeping business and I was making really good money, but I ended up, when I fell, having to give it up. I couldn't find any good help. [Now] if I could find a job I would, but I do have limitations 'cuz of the injuries. I have quite a few disks in my back that I can't afford to get medical insurance so I don't want to have surgery. (food secure, low-income, rural participant)

Employment. Unemployment and underemployment were also recurrent

explanations for food insecurity. Many participants noted that finding and keeping a

job was difficult. In response to questions about barriers to having enough food, one

participant told of losing her job and explained:

I've been trying to find a job since 2003. I worked for an auto parts store and um, after that burned down, because of my age, I couldn't find any work. I [eventually] found work last June, and I've worked two jobs. (food insecure, low-income, rural participant)

Other rural participants emphasized that few jobs were available in their small

towns. One participant also cited lack of employment as a barrier to obtaining enough

food, as illustrated by this quote:

I've been on Unemployment for the past year and a half and going to school…So I was using my Unemployment benefits. And now I'm working at [chain clothing store] but it's only part time, so I'm looking for work. So, I've been applying for jobs regularly since October, and [this] was the second place to call me. So, ….[clothing store is closing], but I needed a job, my Unemployment was running out. I had to have some money, so they offered me a job, I took it. Plus, like I said, it's not what I want to do long term, it's just a job that pays my bills. (food insecure, not low-income, rural participant)

A third participant cited lack of employment as a contributor to her family's

food insecurity, noting:

One of the reasons that I am between jobs is that there really is nothing - I have 30 years of secretarial and administrative experience and there really is nothing in the area that is open to me. Well, I don't know if it is the

competition or the younger kids coming out that they don't have to be paid as much. There are just no jobs for people in my age group with my experience. It is very rare that you even find administrative and secretarial positions available in [this] area and definitely not in our town so it is really tough to get a job. (food insecure, not low-income, rural participant)

The lack of jobs was not unique to rural Oregon. One participant indicated that she was food insecure solely due to lack of employment and cited the dearth of job opportunities in her city, remarking:

It's very hard to find work that is a living wage employment, considering one's background and education. It's very hard, very competitive. I would say for every administrative or management job I'd guess there's a thousand applicants, and they can't respond to everyone individually, there are no rejection letters or e-mail because that's just too much. Well, I apply to about four or five jobs a week. I have not received any offers for interviews, and this has been going on for the last six months. It's difficult. It's hard. It's very frustrating. (food insecure, low-income, urban participant)

This participant was once a caregiver for her mother and was finding it difficult breaking back into the traditional workforce, as she explains here:

The point is the transition that caregivers have back to the regular work force, that their skills and values are not seen as equal or as valuable, even though I hold a Master's degree and I've worked. So, you can be…a college education does not guarantee a life.

She concluded by saying: "I think that's about the real message I want to get across. It's not that people are unwilling to work, it's that they can't find work that provides the basic necessities." This view was supported by all of the interviewees. All expressed a desire to work and provide for their families in a meaningful way. A mother who was struggling with food insecurity after losing her job made this point poignantly. She explained that she was not allowed to leave her low-wage job to attend court hearings:

I don't know, I really don't know, They said yes and the other court dates it was fine because we were fighting for him [indicates 3-year old son], so I had to be there. The other court dates they were fine, but I think it was the management people, one of them didn't want to work for me. I only asked for the day. No, so I said No, I'm gonna go and they said I had to work but I took off that day because I had to be there. I was up all night. I was vomiting blood because I was so upset because you know a job is important to me. And I told them I can't deal with it, I'd been up all night and I quit. (food insecure, low-income, rural participant)

Family changes. Another subtheme that surfaced from the interviews was that

drastic changes within a family can lead to food insecurity as well. The participant

who lost her job due to a child custody battle, struggled with food insecurity because,

as she explained:

Well, my ex-husband hit me and so I got a restraining order on him … and it took probably 3 months to finally get child support and after I gave all the taxes and everything showing that we made over $100,000 in one year. He [her husband] is not "working." He is working under the table so it looks like he doesn't have anything, but he does. And when he did actually work for somebody they had it [child support] taken out of there, but I haven't seen child support for about a year. (food insecure, low-income, rural participant)

Another participant recently married and had a child. He reported that these

changes required his family to be much more careful with their budget and often

struggled with having enough to eat. This food insecure, low-income, urban

participant noted "we weren't planning on the baby at that point. The baby was kind

of a surprise. We were planning to make more income at this point [before they had

a child]."

Prior choices. One subtheme that came up several times was that participants

had made poor decisions in their past that were contributing to their experiences with

food insecurity. One urban dweller, who was food insecure and low-income, had lost

his driver's license due to repeated DUI arrests. His inability to drive had limited his

employment options to lower paying jobs that made paying all his bills and having

enough food a challenge. A female participant, food insecure, but not low-income,

resided in a rural town and had spent ten years in prison. She had experienced stigma

in her small community due to her stint in prison and had a history of unstable

employment. This lack of job stability was one of the causes of her food insecurity.

However, hers was a remarkable story. Since her parole, she had earned her bachelor's

degree and was about to complete her Masters in Social Work.

Another participant and her spouse were addicted to gambling. In response to

questions about what led to their food insecurity, she described the consequences of

this addiction as follows:

> We lived in Las Vegas. We both liked to gamble. That's why we needed
> to get out of Las Vegas. It wasn't a good environment. My husband also
> has a problem with gambling. We both lost a lot of money. We both lost
> our checking accounts. Things are really hard when you don't have a
> checking account. We dug ourselves a pretty big hole. We are trying to
> climb out of it now. But when we moved here we found out that there
> were lots of Indian Casinos around here. (food insecure, not low-income
> rural participant)

A third participant spent many years addicted to drugs. He spoke very candidly about

how his drug use had diminished his employment opportunities, which contributed to

his experience with food insecurity, as this quote illustrated:

> I was a drug addict for many years. I got sober with the help of AA in [my
> small town] in 1990. My drug addiction impacted my life and how it has
> turned out and where I am now. I made poor choices in my youth around
> using drugs. (food insecure, not low-income, rural participant)

Other bills. Another subtheme that emerged to explain why participants were food insecure was the complicated calculus of bill paying because most participants had very little income with which to pay housing, transportation, utility, and food bills. The most salient of these expenses was heating, likely because all interviews were conducted in the winter. One participant, when asked why she had trouble obtaining adequate food for her family, talked of choosing between buying pellets for her stove and paying other bills as this quote demonstrates:

> Electricity, water, pellets to keep warm - that is the hardest thing for me to do right now. Yeah, its about $300 a month to run pellets and it is hard to find them. They are expensive. The other thing I have is baseboard heaters. I had to run those when I first moved in, but it cost me $400 in electricity so I can't do that anymore... If I pay all my other bills that leaves me very little money to buy pellets, but If I don't have any electricity I can't use the pellets, and if I don't have any electricity then I will get kicked out 'cuz see I am on Section 8 and so I have to pay that first [electricity] and water. Sometimes I turn the heat down so it will last a little longer and then we use blankets, I don't know what else to do. If I had to I would use the baseboard heaters, but then it is the after effects - How am I going to pay for it. I can't let my kids freeze. (food insecure, low income, rural participant)

This quote illustrates an opinion shared by several participants. Participants felt that certain bills, like rent and electricity, had to be paid first. Other expenses, particularly food, came last because they were considered to be more elastic. Participants often skimped on food to be able to pay other expenses.

Others complained of the high cost of housing. One food insecure, low-income, rural participant, when asked what contributed to her family's difficulties with obtaining enough food, said: "We rent. It is very high here. It is unreasonable, the high

rent. We can afford it because we split the rent with my parents. It is more expensive

than the trailer, but cheaper for utilities."

Strategies for Coping with Food Insecurity

Several subthemes were generated with respect to strategies for coping with

food insecurity. All of the food insecure participants employed some combination of

these coping strategies to ensure that they had enough food to eat. Food stretching and

the use of alternate food sources, such as gardening, were major subthemes concerning

coping with food insecurity. Other strategies that emerged included use of public and

private nutrition assistance and creative bill paying. Finally, many people drew on

social support from family, friends, and their faith communities.

Food stretching and alternate food sources. Participants used many strategies

to find food cheaply and/or stretch their food dollars. One method was to use coupons

as described by this participant:

> All the time I try to buy when something is cheap or I have those coupons.
> Sometimes I say 'OK, I find a 39 cents for a dozen eggs [coupon]' and I
> say 'everyone take your coupon' and everyone goes and everyone needs to
> pass through the check out [using separate coupons]. I need to make
> money go. (food insecure, low-income, urban participant)

Another strategy was to shop for bargains as this rural participant, who was

low-income and food insecure, explained: "I buy a lot of things that the expiration date

is like today, but they still sell it, so instead of $3 they sell it for $1.50. So, I buy it and

put it in my freezer." Yet another way mentioned to stretch food dollars was to prepare

meals in large quantities, as illustrated by this quote:

> What I usually do is get enough ingredients to make a large pot of

something that will last a few days instead of making individual meals each day. Yeah, I'll have chili one night, then chilidogs, and then, you know, stuff like that. Pretty much every meal is leftovers. (food insecure, low-income, rural participant)

An urban resident who was food insecure and low-income described the same strategy: "I tend to make things in big batches. I'll make a big pot of spaghetti sauce and I'll freeze a quart or two and towards the end of the month we'll have that."

Of the 25 people interviewed, 15 grew gardens as an alternate source of food (seven of the 14 rural participants and eight of the 11 urban participants), as described by this participant:

I grew a garden and I love to grow lettuce and things like that, very simple stuff, I grow tomatoes. Those types of things, last summer. I guess over here it is kind of natural to do a lot of that. (food insecure, not low-income, rural participant)

A second rural resident, who was food insecure, but not low-income also told of gardening: "Last year we grew corn and peas and green beans and broccoli and peppers and tomatoes. We just basically grow enough for us, and if there's a little bit extra I give it away." A food insecure, low-income, urban participant noted that he spent much less on food during the summer because he was able to garden, as this quote suggested: "During the summer…we get a lot of our produce from our garden. We get chard, onions, greens, eggplant, you know, stuff like that. There is a lot of planning that goes into the garden in the summer."

Use of public assistance. Many of those interviewed participated in nutrition assistance programs like the Food Stamp Program (FSP), The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and the Free and

Reduced School Breakfast and Lunch Programs. Although many felt that these

programs were very helpful, others mentioned that the bureaucracy surrounding the

programs made them difficult to navigate. One participant described her experience

this way:

> I used to get the Oregon Trail card [FSP] when [my son] was a baby, but
> then he got older and they had to look at both my income and my
> boyfriend's and he made a couple dollars too much so we couldn't get it. I
> tried to qualify myself, but since I am only 21 and living with my parents I
> didn't qualify. (food insecure, not low-income, rural participant)

When asked if she would reapply, she said: "I don't think so, it was too much of a

hassle to deal with that office and there was a lot of paperwork to do." Another

participant explained in detail his thoughts about public nutrition assistance programs:

> [We use] the Oregon Trail [FSP]. I have a bachelor's degree, so does my
> wife, and I'm amazed that anyone can navigate the Oregon Department of
> Human Services. So, if anyone of political importance is going to read
> this… I've been a part-time social worker for years, and my guess is that
> people go to their friends and say, just put zero here and zero here and
> you're going to get something. How people without a high school
> education manage this is beyond me. But, the good news about Oregon
> Trail is that it's a fantastic program, and when we're spending all this
> money on repaving our highways and stuff, and in a country as affluent as
> America, people should be eating. (food insecure, low-income, urban
> participant)

He went on to discuss his use of WIC: "We're also on WIC. WIC is fantastic because

it's not a bureaucratic nightmare. They've also helped us out." But, when asked if he

would use any other programs such as Temporary Aid to Needy Families (TANF), he

said:

> I don't really know the DHS system, I'm kind of nervous to get involved
> with anything else. I can't afford to go down there and twiddle my thumbs
> for an hour and wait for them to tell me if I'm eligible or not.

Another participant, the Social Work student described above, had very

positive things to say about the FSP:

> So, when it comes to the Food Stamp stuff and how that plays, to me it is another blessing. People step in at the right time and helped me get through to this point, you know. By the time I get done, I will give it back to the community. That is my plan anyway.

> *Use of private assistance.* In addition to public nutrition assistance, another

coping strategy subtheme that emerged was the use of private nutrition assistance, be

it food pantries or, to a lesser extent, soup kitchens or community meals. Participants

expressed varying degrees of satisfaction with receiving aid in this way. One

participant related her gratitude for this help:

> A friend worked at the food bank. She said come over here, come and see us and they gave me food for over a month so that it would tide me over until um, you know, either I got food stamps from DHS or whatever was going to happen. It was such a Godsend. It relieved that worry you have that you are going to be OK. I was very blessed. (food insecure, not low-income, rural participant)

Another participant noted that she was given help from a private agency for several

needs, but that she could only receive help infrequently:

> I've gotten help with my electric bill. I think they helped me once with water and pellets, and food. And they helped me with laundry soap and shampoo and stuff like that. With the help for pellets and stuff I think it is either once a year or once every six months. (food insecure, low-income, rural participant)

> Many participants who sought assistance from a food pantry did so as a last

resort, as this rural participant noted:

> I said I didn't think I qualified for that [food from a food pantry] and she [my friend] said "oh, yes, you do." She made sure I went over there and

got services. And my thought was I felt bad because I am usually a person
that is working and whatever and I don't want to take food out of the
mouths of somebody else, like kids and eat it. It wasn't that I didn't need it
at that point in time, but it was what your thinking was, how you felt about
it. It was hard at first.

Use of food pantries and soup kitchens can be difficult for those in small towns

because of the stigma and lack of anonymity inherent in rural living. For example, one

resident of a small town noted that she did not go to the local soup kitchen, saying:

"There's also a community meal on Friday, and we would go, but my kids are

embarrassed, so we don't go." However, another rural resident did attend community

meals and felt no stigma:

There's a church in [our small town], every Tuesday or Wednesday, they
have what they call a friendship dinner. And that is where they will
prepare food, a dinner, and anybody who shows up is welcome. They will
have bread there for people to take if they need it. Oh, yeah, [my wife] and
I did [attend].

Aside from food pantries and community meals, a couple respondents had

participated in gleaning programs. These two participants were residents of the same

rural town and had been involved in the local gleaning program, but neither was

currently involved. One reported that her family curtailed their involvement, because

they were mistreated. The other cited both dislike of the rules of the organization and

poor quality of the products received, saying, "Um, two years ago I worked for the

gleaners, and that was questionable. But I was actually going and getting it. Some of

it [produce] is already questionable."

Creative bill paying. Another coping strategy subtheme that was brought up

repeatedly was the juggling of various bills. Participants shuffled which bills to pay,

negotiated with creditors, and used energy assistance from electric companies. This

quote illustrates all of these strategies:

> [I use] energy assistance, and a lot of shuffling, well, like when the water
> bill is close to being due and we just don't have the money, we call them
> and they work it out, we've been on time payment plans with the power
> and the gas, and a lot of times it's just falls through. (food insecure, low-
> income, rural participant)

Another participant described in more detail the negotiations she conducted with her

creditors:

> So, I fell behind on a lot of payments, a lot of stuff. I still get more
> creditors calls and I tell them 'well, you know, I am just doing the best I
> can do and as quick as I can I will send you more, you know.' They can't
> say a whole lot because I am paying them some. Of course they are not
> real happy with that. I will tell you that its' sort of helped because some of
> them have renegotiated prices so that has helped. It is one of those deals
> where you just do what you can do. That's life. (food insecure, not low-
> income, rural participant)

Several participants received help paying high electricity bills or participated in

programs that allowed them to pay the same amount for electricity all year-round, as

illustrated by this quote:

> Because I didn't realize when I got Oregon natural gas that I was gonna
> have to pay this much to stay warm. A flannel nightgown is a lot cheaper.
> This month's bill is $375. I have it prorated monthly you know, they
> figure out how much it is going to cost based on what you used last year.
> They [the electric company] have a program that you go on and sign up
> for every year and then you prorate your bill so you don't pay in the
> winter months they pay $300-$400 a month. I don't know how poor
> people stay warm. (food insecure, low-income, urban participant)

> *Drawing on social support.* Receipt of social support was a major subtheme

explaining how participants coped with food insecurity. Nearly all participants

described drawing on social support as a way to ensure that they had enough food.

Some participants received food from and shared meals with friends and family.

Others followed certain faith community teachings that helped them obtain adequate

food.

Support from family and friends. A number of participants related incidents of

sharing or receiving food from friends and family members. An urban low-income,

food insecure participant remarked: "Occasionally, my friends will take me to lunch or

take me out for coffee," because she could not afford to do such things. Another

participant told of how he traded computer assistance for meals:

> The last two nights my mom's friends fed me because I have been doing
> some side work for them, computer work for them. I don't have any
> problem, if I am running out of food, I have no problem with my mom
> helping me or friends. (food insecure, low-income, urban participant)

Another participant explained how he accessed food through his social

network this way: "We trade. He has some wild grapes that grow in his backyard.

We're also on WIC, so we have enough milk to give them, and we also have enough

juice, too." He went on to describe his social support this way:

> So, I feel like my family lives in a social network that is helping each
> other out and it could be watching their dog, or [a friend] needs help with
> his garden or caulking the bay window on his house, or I'll ask [a friend]
> to come over and help me, or my buddy… feeds our cat when we're out of
> town, so it can range from little stuff to big stuff. (food insecure, low-
> income, urban participant)

Several participants stated that they received food from friends, as illustrated

by this quote from a participant who received food from her boyfriend's family and

other friends:

Once a week we go up to his parents' house and have dinner. We get a lot of fish from friends who are fisherman who have extra, like in crab season they have extra crab. It works, I mean as long as you have friends it helps. (food secure, low-income, rural participant)

Another participant also explained how friends and family helped her out with

food:

I have to wait to get my paycheck before I have money to buy other food. But, I can get food from my family when I visit or from family friends who live in Portland. Whenever I go over there I leave with food. (food secure, low-income, urban participant)

An additional rural resident explained how he and a group of friends started a

joint garden that helped his family to obtain enough food during financial difficulties,

as this quote demonstrates:

We'll share a garden with some friends. Our friends are in [this small town]. They have a ranch, farm whatever. A lot of this is because, we found if we group together and work a quarter acre. All of us together do a quarter acre [for] oh, the last ten years. [It started as] uh, a tomato contest between two guys.

One participant illustrated the subtheme of receiving support from friends to deal with

food insecurity with the following quote:

And I have one wonderfully good friend, she is just amazing, she has given me almost a thousand dollars total over the past six months, and she has no expectation, she says if you can repay me great, if not, that's ok. And she's also bought me groceries. (food insecure, low-income, urban participant)

Support from one's faith community. A subtheme that was mentioned by

several participants was that connections to a faith community can help to ameliorate

food insecurity. Several participants were members of the Church of Jesus Christ of

Latter-day Saints (LDS). Each of them described the LDS teaching of storing a year's

supply of food in case of emergency. One participant explained this practice in the

following quote:

> We've been taught since the 1930s that we should have a one-year's
> supply. Not a one year's supply of everything, but just a one year's supply
> of what would sustain life if you were really….what would sustain life.
> We have wheat storage, we have powdered milk storage. Yeah, there are
> times when, well…you know…because I have so much storage, that's
> easy to do. I'll think, well, this is a hard month so I won't buy many
> groceries and we'll live on what we have. I do that a lot, actually. (food
> secure, low-income, rural participant)

Another participant described how this practice helped his family with adequate food:

> Yeah, we're taught in church to be prepared, and one of the things we're
> encouraged to have food storage for a year or two years. Now, a lot of
> the people think we're hoarding stuff for the end of the world, and it
> cracks me up when I hear people talk about things like that out of
> ignorance. What it is, is that they teach us to be prepared, like when I was
> sick. We had a lot of food we were able to use that helped carry us
> through. (food insecure, not low-income, rural participant)

> All three also mentioned the 'Bishop's Storehouse' which functions similar to

a food pantry. One participant had taken advantage of this service, as he describes in

the following quote:

> A person would come up from the church and you would make a grocery
> list of what you needed, you would plan out meals for a week. And then
> there is a center in Eugene that is like a private grocery store or
> warehouse, and they'd fill the order, and then you would go pick it up or
> someone would bring it to you. (food insecure, not low-income, rural
> participant)

> Another participant reported receiving instrumental support from her faith

community, although not with food:

> [When her truck broke down], it would have cost probably close to a
> hundred dollars, because we would have had to call a tow truck, and go
> somewhere, but Pastor ____ saw what happened, he called someone, they

came and all we had to do was buy a $14 belt and they put it in for us.
Thank you Lord! (food insecure, not low-income, urban participant)

Mechanisms Improving Conditions Related to Food Insecurity

A number of those interviewed had previously experienced food insecurity, but

had conditions improve so that they were no longer facing the threat of food

insecurity. Several subthemes emerged from the interviews with this subset of

participants with respect to improved situations. These subthemes included obtaining

more education so that they could gain better jobs, securing stable employment, and

purchasing a home.

Education and employment. Obtaining more education was key to reducing the

chance of food insecurity for several participants. One participant was working hard to

improve her situation through education and greater work stability. She had obtained a

stable job and although she was still experiencing some food insecurity, her financial

situation was improving, as she explained in the following quote:

> I went, I can't say back, I went to community college and picking up
> classes that would benefit me. I was already working in an area of office
> work, but I needed more bookkeeping, more education. But that made the
> biggest change, and just consistently working toward getting off
> assistance, because I was on assistance part or full for many years. I had
> the kids back then, and there was no other income besides assistance and
> my wages, and my wages were very small. So I could work my way up.
> (food insecure, not low-income, urban participant)

Another urban participant had recently improved his situation so he was no

longer low-income or food insecure. He attributed this to educational opportunities for

himself and his wife, saying:

> When my wife and I first started out, she made like $5 an hour and I made

$4.50 an hour. We had enough to pay rent and electricity and that was pretty much it. There were a lot of times when it was top ramen and chili and eat a bag of peas or whatever you could find. Education, that is pretty much what happened. Well, my wife went to a business college in order to learn how to do medical coding which got her into the business. She worked her way up to office manager. For me, I am self-taught. (food secure, not low-income urban participant)

Homeownership. Another theme cited by several participants as a way their situation improved was homeownership. When asked what factors helped his family to afford an adequate diet, this food insecure, low-income, rural participant cited owning a home, as illustrated in the following quote: "Yes. We are lucky. We would be out on the street. Well, we bought it in 1969 and the rest [we built] in 1975. Right now I don't see how anybody buys and builds."

In response to questions about factors that helped her family have enough food, another participant reinforced the theme of homeownership with the following quote:

Well, we didn't actually buy it, it was given to us. My husband's great grandfather built it and when he passed away, other family members inherited it and it was given to us when we got married. We lived in the house and rented it from his grandparents for fifty dollars a month, so we've been blessed. (food insecure, low-income, rural participant)

The participant who cited education as an avenue by which his family had gained better financial footing noted that the ability to purchase a house also helped, as the following quote demonstrates:

We bought a house and by using the equity in the house we were able to pay off all our debt. We were able to get a pretty smokin' deal on the house. We knew the landlord 'cuz we had rented from them for over two years and when we told them we were looking to buy a house they said if you like the house you are in you can buy that. They made us a good deal and we said "great" "there you go." We went through a refinance in order to get the equity out of the home to pay off all our debt, and we refinanced

at basically the same rate as the original loan and now all of our cars are
paid off, all of our credit cards are paid off. Definitely, things are a lot
better. (food insecure, not low income, urban participant)

One participant who could not work due to an injury acknowledged, when

asked how she maintained food security, that her situation would be much more dire

had her boyfriend not been able to purchase a home, as the following quote illustrates:

His family has an inheritance type deal with them and their two sons, so it
is like a community fund for them and their family. They really don't have
to pay it back because it comes out of their inheritance. And that is how
he got his house. They paid cash for their house. (food secure, low
income, rural participant)

Comparisons between Low-income and Non-Low-Income Food Insecure

Although those interviewed had diverse life experiences, many common

threads existed to explain their tendency toward food insecurity, regardless of whether

they were below or above 185% of poverty. These commonalities included the

subthemes presented above: health issues, underemployment or unemployment, family

changes, and other expenses. Still, some variations were noted between the food

insecure who were below poverty and those who were above that cut-off. One

subtheme where variation existed between these two groups of food insecure

participants was employment. Only one participant above 185% of poverty was

unemployed, while five participants at or below 185% of poverty were unemployed.

Lack of employment was the primary reason that these participants were low-income

and they were unemployed either due to health constraints or because they were

raising young children.

Being unemployed due to having young children in the home related to another difference found between the food insecure respondents who were low-income and those who were not. Although only six of the 25 participants still had minor children in the home, five of those six were low-income and food insecure.[4] Several parents described the added financial strain of having children in the home as a contributor to food insecurity. One participant made clear why she sometimes skipped meals:

> 'Cuz I wanted my kids to have food. I feed everybody first. If there is some left over, I eat it. If not, I won't. I constantly have to tell the kids that they can't eat so that you can make it last. You have to keep saying, "No, you can't have that, that's for a meal, that's for a meal." You know. It is hard. Then they say, "I'm hungry" and I say, "I'm sorry." I don't know what to do. What can you do, you know? (food insecure, low-income, rural participant)

Another participant explained that her family really needed two incomes to make ends meet, but that day care was not affordable:

> When I need to do something my step-dad watches them. My husband really has no ability to help with that because he works all day. I just don't work if I have to put them in day care. We just can't afford it. (food insecure, low-income, rural participant)

Another female participant struggled with the same issue:

> I've tried [to find a job]. There's really not a whole lot out there and, you know, with day care, you know DHS will help me with it, but even with their little bit of help I was still putting out $400 a month and that was my whole paycheck. (food insecure, low-income, rural participant)

An urban participant, a graduate student at a major university in Oregon, described in detail how he and his spouse budgeted their money now that they had a child:

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[4] The other participant had recently taken a job that moved him out of poverty and made food insecurity much less likely.

So, last week, my daughter got her first tooth at Christmas, and she got another one right after that. When they're teething, sometimes they get really fussy, and she was just screaming and there's the whole thing about what do you give your kid for teething. So there's these teething tablets, and lately we've been putting a little brandy on her gums, that seems to help, I trust that more than benzocaine. We also give her a little Tylenol at night, but some parents say, Oh, you should use Motrin, because it works really well, so we used it once and it was five bucks for a little bottle, I mean it was gone. So, the point of all this is that the Motrin costs five dollars and was gone in a week, and that's a big deal for us.

Another subtheme that varied among food insecure participants who were low-income versus those who were not was marital status. Twice as many of the low-income participants were single or cohabiting versus those who were not low-income. A few single participants, such as the mother of three who was divorced and not receiving child support, specifically mentioned their unpartnered status as a financial hardship contributing to food insecurity, as illustrated by the following two quotes:

I think that the hardest thing is in my age group and they are trying to get on with life and live an appropriate lifestyle as far as maintaining the basics without having to be in a marriage. Because, in the day, women like me would marry just anybody just to be, to not have to worry about how am I going to live or pay for this or that. It's difficult for women in middle age to maintain their singleness and to find a living wage job, even though they are highly educated and it all comes down to the necessities of life—medical care, food, housing. I mean, I'm under poverty level now. (food insecure, low-income, urban participant)

That is why so many single women [like myself] will go into the bar business or grocery business because they aren't going to get help from their spouses and they know it. So, they go into one of those fields because you don't have to have an education and you can get medical coverage. (food insecure, low-income, urban participant)

Comparison between Rural and Urban Food Insecure

Many of the themes and subthemes that emerged to explain food insecurity (e.g. ill health, unemployment or underemployment, and the high cost of other bills) were given by both urban and rural participants (see Table 4.30). Similarly, most of those interviewed described using similar strategies to cope with food insecurity and make sure they had enough food for themselves and their families. However, interviews with rural participants generated some differing subthemes, included social isolation, geographic isolation, and the use of alternate sources of food.

Table 4.30. *Subthemes for Rural and Urban Participants (n = 25)*

Theme	Subtheme	Rural Participants	Urban Participants
Contributors to Food Insecurity	Crime, gambling	X	
	Drug/ETOH	X	X
	Employment	X	X
	Health	X	X
	High cost of food	X	X
	Other bills	X	X
	Social isolation	X	
	Relationships	X	X
	Geographic isolation/transportation	X	
Coping Strategies	Alternate food sources		
	Gardening	X	X
	Hunting	X	
	Fishing/crabbing	X	
	Cattle ranching	X	
	Budgeting	X	X
	Education	X	X
	Food stretching	X	X
	Private assistance	X	X
	Public assistance	X	X
	Social support		
	Church	X	X
	Family	X	X
	Friends	X	X
	Instrumental	X	X
	Informational	X	X
	Emotional	X	X

Social Isolation

One subtheme explaining food insecurity that only appeared in interviews with rural participants was social isolation. A number of rural participants made it clear that they had no one to turn to in times of trouble. When asked if he ever asked others for assistance obtaining enough food, one rural food insecure man said "I don't know anybody I could ask. I just don't get around, I just sit around at home because I can't afford to do anything or go anywhere." He further explained that "I don't have any family left, they're all gone." Another rural participant, this one food secure, also told of being isolated: "My first winter here, I must confess, was very hard. I was very isolated. I really had a hard time." A third rural participant was very candid about her social isolation, explaining how she rarely saw friends or family:

> I have not seen my son in 10 years and my grandkids. My friends are all married and have their own lives. I don't like to impose on 'em. Like on Thanksgiving, I am alone most of the time because you know if you don't get invited. Sometimes, I think I must be a terrible person, but I mean like I said I don't like to impose on someone. My friend, she don't ask if I would like to go to the food bank. She has a son who takes her to the food bank and he raises two kids. And if she goes then I go with her and if she hasn't asked me then I am not asking. I don't like to ask people if you can take me somewhere. If my friend asks, I don't like to ask. (food insecure, low-income, rural participant)

An additional rural participant explained that she did not have any friends or family to turn to for help with food, as illustrated by the following quote:

> I mean, I had one friend who moved away because she couldn't afford it. She moved back closer to her family. But, I really, I mean I know people, I know my friends, but I don't really go and visit or anything. Um no, they really can't afford it and I don't want to, I really can't explain it. I don't want to say, "Hey, can you…" and then they can't and I don't want to make them feel bad because I am already feeling bad enough. (food

insecure, low-income, rural participant)

None of the urban residents reported such extreme isolation. This social

isolation certainly contributed to the food insecure status of these people. Those who

expressed social isolation often could not get to places to obtain food. If they were

able to get to grocery stores, their incomes may not have allowed them to purchase as

much food as they required, and they had no one to ask for help or who could suggest

where they might be able to receive help.

Geographic Isolation

Another subtheme only mentioned by rural participants was geographic

isolation. Many of the participants who resided in rural areas had to contend with

geographic isolation resulting in barriers to food security. The barriers may be the

higher cost of food, burdensome fuel costs associated with greater distances to travel

for food, and lack of affordable public transportation for those who did not have

vehicles. When asked how often she was able to get into town for grocery shopping, a

participant who lived on a cattle ranch in Eastern Oregon explained:

> Once a month is my practice. Uh…I would say it's hard [to get into town]
> because of the price of fuel. I try to plan it with other trips. Like, if [my
> husband] has a dentist appointment on the tenth, I don't go right on the first
> when we get paid, I'll wait until the tenth. Or, just trying to plan it around
> other errands makes it difficult, so I don't waste trips, and I can do it all at
> once. (food secure, low-income, rural participant)

This participant also noted that "they have a senior lunch every Friday in [the closest

town]. We don't go into it, [my husband] is usually working and it's too far." Another

participant described how isolated they were in her small town:

On the same token, you are pretty isolated. If you want to go out to dinner to a really nice restaurant you have to drive a lot of miles. We actually go to Vancouver a lot. It is about an hour away. Portland is about an hour and a half away. (food insecure, not low-income, rural participant)

A third participant described the hardships he had faced without transportation in an

isolated area:

Before I got the car, I used to take a taxi or hitchhike. Yeah, it's real expensive [taking a taxi]. I went to this church in [this small town], right here on the corner for a while. But…that was before I had a car, so I couldn't find a way of getting back. My ride didn't show up. They have, you know, they [the church] can give you help with food, but I was never able to do it, I didn't ask. I talked to the pastor and explained I was having trouble with transportation and getting into town for food and stuff. Well, I was going to [ask for help with food], but I just couldn't get rides out here anymore, and it just kind of dwindled away. (food insecure, low-income, rural participant)

Another participant had a car that was always breaking down and noted that

transportation was also difficult in her rural area: "There isn't any [public

transportation]. I think there might be a bus that picks people up [the disabled and

elderly], but there's no public transportation except a cab. I live too far away [to

walk]."

Two rural residents mentioned the high cost of food related to living outside of

a major metropolitan area:

In general the prices over here [in Eastern Oregon] are higher because they have to tack on their shipping costs. So, for example, when I go to visit my son I go "oh, wow, such differences in price." In Portland their prices are much better than ours here. It is just where you live, like I said before. Everything is relative. It just depends where you are at. Gas is a little higher here. But it is where we live and that is one of the costs of living here. We don't really have a choice.

The other participant added when asked if she ever drove to a bigger town to

go grocery shopping: "No. That would be stupid. It would be very expensive to drive

there and we can barely afford it here. They're very high [food prices], very high

because everything has to be trucked down."

Alternate Sources of Food

Social and geographic isolation made it difficult for low-income rural

participants to maintain food security, still they did have some advantages such as

alternate sources of food that urban participants did not. Although both rural and urban

participants reported receiving food from friends and family (as described on pages

147 and 148), with one exception, only rural participants mentioned the receipt of food

procured through cattle ranching, or from professional or amateur fishing, crabbing, or

hunting. This subtheme is illustrated by the following quote: "Before June, we had a

man [a cattle rancher] that gave us a beef, and some people we know give us fish." A

couple of rural participants told of receiving free beef, including this participant who

lived on a cattle ranch and explained that:

> The owner usually gives us a beef. We've been here three years, and we've
> only butchered two. A beef goes a long way. The one I just butchered was a
> small steer, and no one wanted to feed him anymore, so he got butchered at
> the first of the year. (food secure, low-income, rural participants)

Conversely, having relatives or friends in a rural part of the state was of assistance to

one urban participant, as demonstrated by the following quote:

> If it's summertime, my folks have 72 acres on the Clackamas River, and
> they put in a huge garden. I get all the fresh vegetables I want and I can
> put up by canning or freezing so I have them to eat throughout the year.
> That cuts down on my grocery bill. They also have cattle, so if I need beef
> I can get it. (food insecure, not low-income, urban participant)

Only participants from rural parts of Oregon told of recently hunting for food. When asked what he hunted, one food insecure participant said: "Deer. I fish for fish, and crab, I get a lot of crab meat. [My wife] is freezing the deer meat and fish we've gotten. Yeah, we have a lot of frozen meat." Another participant described her family's hunting this way:

> My dad and boyfriend hunt deer, elk, and turkey. They just went turkey hunting, but it is hard to hunt turkey because they see in color. My boyfriend and dad gut and cut it up. I have to touch it too because we wrap it and freeze it. My brother just got a meat grinder so this last week we ground meat for burgers. That way there is a lot less fat in it. (food insecure, low-income, rural participant)

A third participant explained how her family was able to hunt in the following quote:

> Um, [my husband] hunts a little, he's not a big hunter. We do get land owner preference tags for elk and he hunts, two of the three years he's shot an elk and he's not real fond of the elk. But, I use the elk burger. I make hamburger soup and he doesn't even know he's eating elk. (food secure, low income, rural participant)

Summary of Qualitative Interview Findings

Analysis of the interviews conducted with participants who were food insecure, low-income, or both suggested common contributors to food insecurity such as ill health and unemployment or underemployment. Several subthemes were generated explaining how food insecure participants coped with food insecurity including drawing on social support from friends, family, and faith communities. Variations in contributors to food insecurity were seen among food insecure participants who were low-income and those who were not, including unemployment, having minor children in the home, and marital status. The subthemes generated in the

interviews with rural and urban food insecure participants also varied. Rural food insecure participants described problems with social and geographic isolation that urban participants did not. However, rural participants had greater sources of food such as cattle ranching, fishing, crabbing, and hunting.

CHAPTER 5. DISCUSSION AND CONCLUSIONS

This chapter provides a discussion of the results of this study. Then, study

limitations are presented. Next, recommendations for future research and public health

implications are discussed. Last, concluding remarks are made.

The Moderating Role of Social Support

This study advances the knowledge in the field through the examination of the

potential moderating effects of social support on the relationship between income and

food insecurity. Prior to this research, no other studies had tested the moderating role

of social support on this relationship. Total social support, measured by a combined

scale of the support received from an intimate partner and from a social network, was

not found to play a moderating role in the relationship between income and food

insecurity for working-age Oregonians. This finding does not support the conceptual

model proposed for this study on page 56. However, when individual measures of

social support were tested with income categorized based on poverty guidelines,

emotional support, support from a social network, and organization membership were

found to moderate this relationship, although results for these analyses produced very

large odds ratios. When income was categorized in another way to solve this problem,

the moderating effects disappeared. Thus, partial evidence for the study's conceptual

model is provided with these findings.

Emotional support was found to weaken the relationship between income and

food insecurity such that respondents with incomes at or below 100% of poverty who

possessed high levels of emotional support were less likely to experience food

insecurity. Even though this finding must be viewed with caution because it came from analyses with unstable results, this finding is consistent with the findings of Tarasuk (2001) and findings from the qualitative study conducted by Ahluwalia and colleagues (1998). However, this finding is inconsistent with results from a third study, which found that respondents cited receiving instrumental support more often than emotional support to cope with food insecurity (Pierce et al., 2002). In addition, researchers have suggested that certain stressors are dealt with better through the receipt of tangible forms of support, such as food or money to purchase food, than through the provision of emotional support (Schaefer et al., 1981). Of note, those interviewed for the present study also cited instrumental support more often than emotional support in connection with experiences with food insecurity, so it is somewhat surprising that instrumental support was not found to play a moderating role in the relationship between income and food insecurity. A possible explanation for the lack of moderation by instrumental support may be that respondents reported less instrumental than emotional support. A few respondents even noted on their surveys that they could not answer the questions about instrumental support, because they had never asked for that type of support.

Garasky and colleagues (2006) achieved results similar to the present study and suggest that the exchange of food may be a social norm and not a behavior specific to food insecure households. Hence, maybe instrumental support, in the form of food assistance, did not work so much to alleviate food insecurity as to help individuals who were food insecure not go hungry. The qualitative results of the

present study tend to support this view, because the majority of those interviewed regardless of their food insecurity status reported receiving food from their social network. Yet, none of those interviewed suggested that the receipt of food from friends and family allowed them to stop worrying about food or their financial situation. In other words, support from friends and family may not have been sufficient to substantially reduce or eliminate food insecurity.

Again, while evidence of moderation must be viewed with caution, support from a social network was also found to weaken the relationship between income and food insecurity, such that the lowest income respondents with high levels of social network support were less likely to experience food insecurity. This finding is consistent with those of Garasky, Morton, and Greder (2006). Garasky and colleagues (2006), in their study of rural Iowans, found that respondents with greater social network support were less likely to live in households that were food insecure. Unlike the present study, Garasky and colleagues (2006) did not assess the moderating role of social network support and the present study did not find a significant main effect for social network support. Given that no other studies have assessed the moderating role of social support on the relationship between income and food insecurity and that these results should be viewed with caution, replication studies should be conducted to further examine the moderating effect of social network support on this relationship.

Organization membership was also found to moderate the relationship between income and food insecurity, although, again, these results should be viewed with caution. For the lowest income participants, membership in a community organization

was found to reduce the likelihood of experiencing food insecurity. Previous studies

have found community organization involvement to have a protective effect, although

they assessed outcomes other than food insecurity. For example, Berkman and Syme

(1979) found that individuals involved in community organizations had lower

mortality rates. Black and colleagues (2005) found that community support

moderated the relationship between intimate partner relationship quality and health

status, such that in the absence of community support the relationship between poor

relationship quality and poor health was strong. Unfortunately, the finding that

organization membership behaves as a moderator cannot be elucidated by the

qualitative portion of the study, because participants were not asked about

involvement in community organizations in general, but only about nutrition

assistance programs specifically. Additional qualitative research should be conducted

to further explore this finding. The following research questions could be addressed:

In what types of organizations are low-income Oregonians involved? What benefits do

low-income Oregonians derive from their involvement with community

organizations? How might these benefits lower the risk of experiencing food

insecurity?

<center>Factors Associated with Food Insecurity</center>

A constellation of human capital factors, education, employment, income,

homeownership, having a car, and income spent on housing, was associated with food

insecurity. Participants with a high school degree or less education were more likely to

be food insecure than were those with more education, a finding that is consistent with

that of Bartfeld and Dunifon (2003). A possible explanation for this finding is that the

earning potential of individuals with only a high school diploma is lower than that for

more highly educated individuals (Bayard, Hellerstein, Neumark, & Troske, 2003).

Less educated individuals also may have less job security than individuals with more

education, which means that they may not be able to rely on steady paychecks and

may have periods of time when no money is coming in (Shulman, 2003).

Unemployed respondents were more likely to have experienced food insecurity

than were employed respondents, also corresponding to findings from Bartfeld and

Dunifon (2003). This finding is clearly related to lack of income, which is supported

by the finding that respondents with incomes of $19,999 or below (100% of poverty or

below) were more likely to experience food insecurity also. Participants who did not

own a home were much more likely to be food insecure compared to homeowners.

This parallels the findings of Edwards and Weber (2003) who found that more Oregon

renters were food insecure than were Oregon homeowners. The protective effect of

homeownership was also found nationally (Bartfeld & Dunifon, 2003; Rose, 1999).

The authors of a similar study that included rural participants only also found that

renters were more likely to be food insecure (Olsen et al., 2004). Homeowners

probably have more assets and, thus less need (Gundersen & Gruber, 2001).

Moreover, those who spent more than 30% of their income on housing costs were

more likely to be food insecure than their counterparts who spent a lower percentage

of their income on housing. Clearly, respondents who spent a high percentage of their

income on housing had more limited resources to use for food, and of course, the less

income they have to begin with, the worse the problem.

Last, although over 90% of respondents reported having a vehicle in working condition, those who did not were more likely to be food insecure. This finding parallels that of Garasky and colleagues (2006) who found that respondents with transportation problems were more likely to be food insecure. Individuals with reliable transportation have greater ability to shop at multiple food outlets to find the best prices. Ability to conduct this sort of "comparison shopping" is limited for those without reliable transportation, possibly explaining the greater odds of food insecurity for those without a vehicle.

In addition to the human capital factors, gender was associated with food insecurity. Women were more likely to experience food insecurity than were men, which may be explained by the fact that women earn less than men (U.S. Census Bureau, 2001). Another explanation is that a greater number of single-parent households are headed by women, and female-headed households are more likely to experience food insecurity (ERS, 2006).

<div align="center">Experiences with Food Insecurity</div>

The present study also increases the understanding of the causes of food insecurity and the strategies individuals use to cope with food insecurity via the data collected through interviews with participants who were food insecure, low-income, or both. The most frequently mentioned subthemes explaining food insecurity included illness and injury, unemployment or underemployment, and the high cost of other bills. In particular, participants struggled with the high cost of heating. This finding is

consistent with the findings of a study by Bhattacharya, DeLeire, Haider, and Currie

(2003). The findings of that study indicated that low-income households decrease their

spending on food and eat less when heating costs increase.

Several subthemes emerged to describe strategies used to obtain an adequate

amount of food such as using public and private assistance and stretching food dollars.

These strategies are consistent with strategies that participants reported in a study of

low-income North Carolinians (Ahluwalia et al., 1998) and a study of low-income

Canadians (Hamelin et al., 1999). Nearly all those interviewed for the present study

mentioned that they drew on social support from friends, family, and faith

communities to obtain enough food. These findings are also similar to those of a

previous qualitative study of food insecurity in Oregon (Gross & Rosenberger, 2005).

Participants who were food insecure and low-income differed from those who

were food insecure, but not low-income, based on the results of the qualitative

interviews. Low-income, food insecure participants reported that unemployment,

being unmarried, or having minor children living in the home were contributors to

their food insecurity, while their non-low-income counterparts did not. Clearly,

participants who were unmarried or unemployed had fewer resources coming into the

home, which likely contributed to their low-income status. Further, with minor

children in the home, available resources must be spread over more people.

Several of those interviewed were no longer food insecure, and similar themes

emerged to explain their improved situations including the ability to purchase a home

and obtaining more education to secure a higher paying or more stable job. These

findings complement the findings from the quantitative phase of the present study and mirror the findings of other researchers (Bartfeld & Dunifon, 2003; Rose, 1999). Similarly, as discussed above, the quantitative portion of the present study also found that homeownership and higher educational attainment protected against food insecurity.

Variations Among the Urban and Rural Food Insecure

Another contribution of this research is the advancement of knowledge concerning how experiences with food insecurity vary with urban or rural residence. Food insecure participants from rural Oregon reported problems with social and geographic isolation that their urban counterparts did not. In terms of geographic isolation, several rural Oregonians facing food insecurity noted that transportation was a barrier for them, paralleling the research of Holben and colleagues (2004). Through their study of food insecurity in rural Appalachia, Holben and colleagues (2004) found that lack of reliable transportation greatly increased the likelihood of food insecurity. These findings also parallel the quantitative findings of the present study, which found that having a car reduced the odds of experiencing food insecurity.

Rural participants interviewed in the present study also mentioned that food prices were higher in their areas, a finding supported by other studies and related to geographic isolation (Morris et al., 1992; Stuff et al., 2004). Still, with the exception of one urban respondent who reported some comparable sources, only rural participants cited hunting, fishing, crabbing, and cattle ranching as sources of food. The wider range of food sources in rural areas was also seen in research by Hoisington

and colleagues (2002). Most of rural Oregon is characterized by its natural resources such as seafood and wild game, and by industry such as cattle ranching, so it is understandable that rural Oregonians would have greater access to these food sources than would their urban counterparts.

Differences in Social Support Between Rural and Urban Oregonians

This study also provides insight into the differences in social support between urban and rural residents by demonstrating that rural residence was associated with a less dense social network for this sample of Oregonians in the quantitative data analysis. Thus, only minimal support for the conceptual model is provided (p. 56). This finding diverges from the findings of a previous study, which found that rural dwellers had denser social networks than urban residents (Kohler et al., 2004). A possible explanation for this finding is that rural respondents may have been more socially and geographically isolated than the urban respondents, as suggested from the qualitative findings. Due to this isolation, perhaps rural respondents had friends and family who were more spread out geographically and so did not know each other.

In the quantitative analysis, place of residence was not associated with amount of social support reported by the present study respondents. Henly and colleagues (2005) found that those living in an urban census tract reported lower levels of social support, while in the present study no significant difference was found. Further, Mickelson and Kubzansky (2003) provided evidence that rural dwellers reported greater emotional support than urban dwellers, but in the present study no difference was found.

One possible reason for the inconsistencies between the findings of the present study that showed few social support differences between rural and urban participants and other studies that did find differences is that, in Oregon, no differences exist. Alternatively, variation in the way that social support was measured may explain differences in findings between studies. However, a review of previous studies that did find rural/urban differences in social support, mentioned above, shows that social support was measured in a similar manner to the present study. Further, for the present study, social support was measured in numerous ways to account for many social support domains and provide more opportunity for finding differences between urban and rural respondents, if they existed.

Another explanation for the fact that the present study found few differences in social support between urban and rural respondents compared to other studies is misclassification of rural and urban Oregonians. Some respondents classified as urban residents actually resided in fairly rural communities, which was discovered when interviews were conducted in participants' communities. An imperfect classification system may introduce increased variance within the rural and urban subsamples. Increased variance may result in less precise parameter estimates, which could account for the evidence of little difference in social support between the rural and urban subsamples in this study. However, only a small percentage of interview participants were found to be misclassified and a review of the lists of the rural and urban subsamples suggested that few were potentially misclassified.

Rural and urban designations are difficult to determine geographically, because rural and urban communities are intermingled at the county and the census tract level. Still, the method for classifying Oregonians for the present study, done to ensure that an adequate number of rural Oregonians were included to allow for comparisons to be made, closely approximated the proportions of urban and rural Oregonians obtained using other rural/urban classifications systems. These other methods included those developed by the Office of Management and Budget (OMB), the Economic Research Service of the USDA, and the U.S. Census Bureau (a description of the classification method can be found on page 61) (Rural Policy Research Institute, 1999). Both the classification system used for the present study and the alternatives mentioned above divided Oregon's population into approximately 70% urban and 30% rural.

Perhaps future research could improve upon these methods by asking respondents whether they consider their community rural or urban and comparing their answer to their census tract designation to confirm rural or urban status. Alternatively, data could be collected in communities that are clearly rural and clearly urban to reduce the error often inherent in these classification systems.

Although place of residence was not found to be associated with any functions or structures of social support in the quantitative analysis, a couple of other factors were. Being married was associated with higher levels of support, which makes sense as unmarried respondents were less likely to have an intimate partner for support, lowering their social support scores. Attending a faith community was also associated with having higher levels of social support. Individuals who attend faith communities

come into contact with a wide range of people who attend the same faith community. These contacts may explain why respondents who attended faith communities reported greater social support. In other words, participation in a faith community may be a crucial social connection that can be drawn upon. However, faith community involvement was not found to moderate the relationship between income and food insecurity for this study. One reason for this discrepancy may be that faith community attendance in Oregon is low, at approximately 31% (Glenmary Research Center, 2002). The lower rate of faith community attendance in Oregon may indicate that any moderating effect of faith community attendance could not be observed.

<div align="center">Food Insecurity Rates</div>

The food insecurity rate for this sample was 14.44%, with the hunger rate equal to 7.68%. Both of these rates were higher than the Oregon food insecurity (approximately 11.9%) and hunger (approximately 3.8%) rates found by other researchers for 2004 (Brown & Fournier, 2005; Grussing & Edwards, 2006) and for 2003-2005 (ERS, 2006). These higher rates may reflect the fact that people are more likely to complete a survey when the topic is of interest to them (Dillman, 2000). A disproportionate number of people experiencing food insecurity may have felt compelled to complete this survey to share their experiences. Conversely, people who had no trouble affording enough food may have decided that they would not be providing any pertinent information and so chose not to complete the survey. In fact, a small number of respondents did comment on their surveys that they got food in the "normal way" (i.e., they worked, made money, and bought it) and did not think their

answers would be helpful. Perhaps others felt similarly, but chose not to complete or return the survey.

Another possible explanation for the higher food insecurity rate found in this study may be that, although a representative sample was sought by using a rigorous sampling design, a segment of the population with a higher rate of food insecurity may have completed the survey at a disproportionately higher rate. For example, a slightly higher percentage of White/non-Hispanics completed the survey than were representative of Oregon's population. Further, White/non-Hispanics may have had a higher rate of food insecurity when compared to other racial subgroups in Oregon, possibly inflating the overall food insecurity rate for this sample. Food insecurity rates are only available for two ethnic subgroups for the Northwestern United States combined (Oregon, Washington, and Idaho): Hispanic and Non-Hispanic. Hispanics in the Northwest were much more likely to experience food insecurity than are Non-Hispanics (Grussing & Edwards, 2006). However, other racial/ethnic subgroups such as Asian/Pacific Islanders, African Americans, and Native Americans may have lower rates than Non-Hispanic Whites. Unfortunately, very few Oregonians in those racial/ethnic groups responded to the study, too few, in fact, to allow separate analyses to be conducted.

In this study, respondents from rural Oregon had lower food insecurity rates than their urban counterparts, mirroring the trend found for the years of 1999-2001 (Edwards & Weber, 2003). However, the rates diverged from those found for the years of 2002-2004 (Grussing & Edwards, 2006). Grussing and Edwards (2006) found

a rural Oregon food insecurity rate equal to the rate for the present study (13.3%); however, they found a lower urban Oregon food insecurity rate (11.4% versus 14.89% for this study). The hunger rates for the rural and urban respondents in the present study were similar (7.95% and 7.58% respectively), yet higher than the rates for Oregon from 1999-2001 (Edwards & Weber, 2003) and from 2002-2004 (Grussing & Edwards, 2006).

The study finding that the food insecurity rate is lower among rural Oregonians than urban Oregonians is notable, in light of the fact that a higher proportion of rural dwellers in this sample were at or below 185% of poverty (17.92%) than were urban dwellers (13.80%). However, this is in keeping with previous research suggesting that rural Oregonians have higher levels of poverty (US Census 2000), but lower food insecurity rates (Edwards & Weber, 2003). Comparing the food insecurity rates from this study to the rural/urban trends from the other two studies of food insecurity in Oregon does not provide a clear picture. For 1999-2001 urban Oregonians had a higher rate of food insecurity than their rural counterparts, but by 2002-2004 the reverse was true, as presented in Chapter I (Edwards & Weber, 2003; Grussing & Edwards, 2006). More research is needed to further elucidate these trends.

<div align="center">Limitations</div>

Aside from the limitations discussed specifically above, the findings of this study must be considered in light of several more general limitations. For the mail survey, the primary limitation was the low response rate. Although mail surveys typically achieve response rates of approximately 50% (Dillman, 2000), the response

rate for the present survey was only 34.4%. Efforts were made to maximize the survey response rate by making four contacts with each person in the sample, based on recommendations by Dillman (2000). Due to financial and time constraints, further contacts to improve the response rate were not possible. The response rate may have been low because the survey was sent to the general public, and those who received the survey may not have been sufficiently interested in the issues covered to devote the time to completing it. The response rate may also have been low because the initial round of surveys was mailed out at the end of August, a time when people often go on vacation. Still, the sample size did provide adequate power for all analyses conducted, as discussed in Chapter III.

The limitation of low response rate dovetails with a related limitation, the small number of low-income individuals who completed the survey. Having relatively few low-income respondents made determining moderation difficult because evidence of moderation by social support was seen for those under 100% of poverty, but only 8.5% of the sample fell within this category. Hence, while evidence of moderation was found for this lowest income category, the results were unstable likely due to the small number of respondents in that category. As a result, drawing conclusions about the first two research hypotheses was difficult.

The low response rate limits the generalizability of the study findings. A non-response analysis, presented in Chapter III (see page 64), was conducted by comparing the demographics of the study sample to Oregon data from the U.S. Census Bureau's 2005 American Community Survey (U.S. Census, 2005) and faith community

attendance data from the Glenmary Research Center (2002). The results of this assessment indicated that study respondents were more likely to be married, employed, college-educated, have higher incomes, and be older than the general Oregon population, indicating some selection bias and reducing the generalizability of the findings. In addition, due to sample selection methods that used primarily telephone directories, the mail survey sample may have included fewer low-income Oregonians than if the sample had been drawn using another source of Oregon residents. Data were only collected in Oregon, so findings may not be generalized to other states or the United States as a whole.

As noted above, the study sample was biased toward those with higher socioeconomic status, a finding that is not unexpected, because higher income individuals are more likely to participate in research (Turrell, 2000). However, despite the higher socioeconomic status of the sample, the food insecurity rate was higher than that of the general population suggesting that those experiencing food insecurity may have been more compelled to complete the survey than would be expected given their socioeconomic status.

A further limitation is that the study was cross-sectional, so causal inferences cannot be made (Portney & Watkins, 2000). Longitudinal studies are needed to determine the temporal sequence of the associations between income, social support, and food insecurity. Also, response bias may have occurred on some survey items, if participants were more likely to select certain response categories preferentially due to factors such as social desirability, the tendency of individuals to want to project

positive images of themselves to others (Johnson & Fendrich, 2002; Netemeyer et al., 2003). However, an attempt was made to minimize this bias by crafting clear, concise questions; ensuring that questions were not leading or loaded; and providing a wide range of possible answer choices.

For the interview portion of the study, the primary limitation was selection bias. The sample included only those who both agreed to be contacted via the mail survey and agreed to the interview once they were contacted personally. Thus, it could be that this sample was significantly different from those who chose not to participate. For example, many participants possessed high levels of social support, making it difficult to examine differences in the coping strategies of low-income Oregonians. Those who agreed to participate may have had particularly positive or negative experiences that led to their interest in being interviewed, which may have influenced the results. In fact, two interview participants expressed a desire to be interviewed because they had complaints about either the Food Stamp Program or their region's gleaning program. Still, the goal of this portion of the study was not to make generalizations about the Oregon population, but to gain insight into experiences with food insecurity.

Further, both study phases relied on self-report of predominately retrospective data and are subject to all the potential risks inherent in the use of this data collection method (e.g., Bradburn, Rips, & Shevell, 1987; Dillman, 2000). These include the fact that reported answers cannot be confirmed and that the data is subject to respondent recall, which could introduce measurement error. For instance, a respondent may

inaccurately report the frequency of social contact because she/he does not remember. Further, as a result of self-reporting, respondents may under-report food insecurity due to the stigma surrounding this issue or over-report the amount of social support received due to social desirability. However, the use of a confidential mail survey for the present study allowed people to be more candid than face-to-face or telephone administered surveys would have (Dillman, 2000).

Last, both study phases were limited by definition issues (Portney & Watkins, 2000). On the survey, for example, respondents were asked to report the number of close friends and close relatives they had. *Close* may be defined differently by different respondents, introducing measurement error. Future research could be improved by offering definitions for terms such as this, instead of leaving it to the respondents to interpret.

Despite these limitations, the present study also had strengths, some of which were already discussed above. The present study employed a rigorous probability sampling method that improved the generalizability of the sample to Oregon as a whole. Further, the study incorporated data from both rural and urban respondents to allow for comparisons to be made. In addition, the survey collected data on a wide range of factors related to food insecurity. Last, the study employed mixed methodology. The strength of this approach was that the qualitative data provided a greater understanding of the results of the quantitative analyses and a richer context with which to view food insecurity in Oregon.

Future Research

This study was the first to test the moderating role of social support on the relationship between income and food insecurity. Certain measures of social support were found to moderate the relationship between income and food insecurity, while other were not, although these findings must be viewed with caution because they came from analyses with unstable results. In light of these findings, further research is needed. First, efforts must be made to include a larger proportion of low-income respondents in any future research. This may be done by improving response rate through a greater number of contacts with individuals in the sample, by reducing the length of the survey, or by increasing the amount of the included incentive. Another strategy for increasing the proportion of low-income respondents may be to oversample in low-income census tracts.

As discussed earlier, while caution should be taken in viewing these results, organization membership was found to weaken the relationship between income and social support such that the lowest income respondents who were involved with a community organization were less likely to be food insecure. This finding is an interesting one, as community participation has waned over the last several decades (Putnam, 2000), but may also suggest an important way to support individuals at risk for food insecurity. Unfortunately, as noted earlier, the qualitative interviews could not shed light on this finding because participants were not specifically asked about organization membership. As discussed above, more qualitative research should be conducted to further explore this finding.

Social capital, defined as connections between individuals, characterized by reciprocity and trustworthiness (Putnam, 2000), may be more important than social support for understanding why some low-income individuals are not food insecure. A focus on social capital would include richer information on the community in which respondents reside. This focus may be important because organization membership is one measure of social capital, and evidence was found that organization membership may moderate the relationship between income and food insecurity in this study. This finding suggests that understanding the community context is important for understanding why some low-income individuals experience food insecurity and some do not.

Social capital can be measured at the individual and at the community-level. At the individual-level, data could be collected on various factors including extent of community involvement, feelings of connectedness to the community, and reciprocity and trustworthiness of relationships, as other researchers have done (Liu & Besser, 2003). At the community-level, social capital could be measured by the percent of the population involved in faith communities and community organizations, and average length of residential tenure, as has been done in previous studies (Flora, 1998). With these measures, the association between social capital at the community level and community food insecurity rates could be assessed to determine whether community social capital is a salient factor in the experience of food insecurity. A similar study, conducted with households in Hartford, Connecticut, found evidence that social

capital was associated with a decreased risk of hunger (Martin, Rogers, Cook, &

Joseph, 2004).

Furthermore, multi-level modeling could be used to determine whether social

capital at the individual or community-level was a better predictor of food insecurity

status. In addition, the study that Hofferth and Iceland (1998) conducted to assess

differences in social support between urban and rural dwellers can also be built upon

to assess the differences in social capital between urban and rural communities.

The qualitative portion of this study provided some degree of insight into

factors that were believed to have led to the reduction of food insecurity in people's

lives. Factors such as homeownership, higher educational attainment, and improved

work stability were suggested explanations for deceased food insecurity. However,

additional research in this vein is warranted. One potential area for further research

may be an expanded qualitative study with a larger number of individuals who had

once been food insecure. Such a study could help determine whether any common

factors contributed to the elimination of food insecurity. The determination of these

factors may allow for the development of recommendations for the elimination of food

insecurity.

<center>Implications for Public Health</center>

Findings from both phases of the present study suggested factors that worked

to eliminate food insecurity. Those interviewed reported that homeownership, more

education, and more stable employment did alleviate food insecurity. Moreover,

homeownership, educational attainment, and employment were associated with lower

likelihood of food insecurity in the quantitative portion of this study. Taken together, these findings highlight the importance of augmenting the human capital of individuals experiencing food insecurity. Legislation to boost educational supports for low-income students should be promoted. For example, the State of Oregon could increase tuition assistance for low-income students seeking higher education and implement a Parents as Scholars Program similar to Maine's successful program (Maine Equal Justice Partners, 2005). Maine's Parents as Scholars Program allows students in postsecondary institutions to receive Temporary Aid for Needy Families (TANF). Allowing low-income individuals to obtain higher education degrees is an important step to securing higher paying, more secure employment and thus greater financial security (Shulman, 2003; U.S. Census Bureau, 2001)

Another way to alleviate food insecurity is through the use of federal nutrition safety net programs. However, nearly all participants who reported using the FSP or WIC during their interview were still experiencing food insecurity. This finding taken with those of others (Bhattacharya et al., 2003; Oberholser & Tuttle, 2004) indicated that such safety net programs are insufficient to buffer low-income households from food insecurity. Federal nutrition safety net programs should evaluate the nutritional status of beneficiaries to determine if the amount of aid received allows for an adequate diet. If the amount of aid is found lacking, the federal government should examine ways that the FSP can be expanded to ensure that while families are struggling financially they have adequately nutritious diets.

Oregon has the highest rate of FSP participation of any state because officials took note of the high food insecurity rate and launched a massive outreach campaign to increase FSP usage (Oregon Hunger Relief Task Force, n.d.). Still, several counties have very low participation rates and many students at institutions of higher learning, although eligible for FSP, are unaware of their eligibility. Counties and cities should be encouraged to improve FSP outreach, particularly to educate students and student parents about their eligibility. Counties with low FSP take-up rates lose out on funding that would come into their counties if the FSP were used to capacity (Oregon Hunger Relief Task Force, 2001). This potential increased revenue can serve as an incentive to encourage government officials to implement FSP outreach programs.

Many of those interviewed who were food insecure and below 185% of poverty had minor children in the home. Having minor children made employment more complicated for parents, contributing to food insecurity for the family. Research has demonstrated that the complexity of child care subsidy procedures and policies used to determine eligibility and maintain eligibility can be burdensome for low-income working parents in Oregon (Grobe, Weber, & Davis, 2006). State programs should improve outreach efforts to educate parents about the option of child care subsidies and decrease the burdensome procedures for participation to encourage more parents to apply for and maintain this work-support benefit. This effort will allow more of the unemployed and underemployed to work, improving their financial standing.

Poor health emerged from the interviews as a major contributor to food insecurity. Many of the food insecure interview participants found themselves in that situation due to illnesses and injuries, resulting in high health care costs partially caused by lack of health insurance. These findings imply that the State of Oregon ought to increase funding for the Oregon Health Plan and encourage employers to extend health care benefits to part-time and low-wage workers through inducements like tax incentives. This suggestion is consistent with the Oregon Hunger Relief Task Force's recommendations from their report: *The Act to End Hunger* (Oregon Hunger Relief Task Force, 2004).

Although most participants owned vehicles, several pointed out the lack of public transportation in their rural communities. Further, those without vehicles were more likely to be food insecure. State and local governments and social service providers should work to develop innovative strategies to provide transportation to social service agencies, health care centers, grocery stores, food pantries, and soup kitchens. One example, mentioned by a food insecure participant from rural Eastern Oregon, is a transportation service, which is part of Community Connection of Union County. Community Connection of Union County provides door-to-door transportation for low-income residents and the elderly at very low cost (Community Connection of Union County, n.d.).

Findings from both the quantitative and qualitative analyses provide evidence that homeownership may be protective against food insecurity. Other researchers have found that homeownership can be an effective wealth accumulation tool for even low-

income individuals (U.S. Department of Housing and Urban Development, 1995).

Reports from the United States Department of Housing and Urban Development

(1995, 2002) suggest that homeownership is one of the primary avenues through

which low-income families can build equity and gain tax advantages such as income

tax deductions. The federal government and private organizations, recognizing the

benefits of homeownership for low-income families, have created programs to help

low-income families buy or build homes. Federal homeownership programs include

the Public Housing Homeownership Program, a program that makes public housing

units available for purchase by low-income families, and the Homeownership Voucher

Program, a program that aids first-time home buyers with monthly mortgage and

homeowner expenses (U.S. Department of Housing and Urban Development, 2001).

Special housing programs exist for low-income families residing in rural communities

as well, such as the Rural Housing Direct Loan Program of the USDA Rural

Development Housing & Community Facilities Programs (USDA Rural Development,

n.d.). The purpose of this program is to provide loans to low-income families so that

they may purchase or build homes in rural areas. Mortgage payments are based on

household income and payment subsidies are available (USDA Rural Development,

n.d.). One of the most well known private housing agencies is Habitat for Humanity

(Habitat for Humanity, 2007). Low-income families, in partnership with Habitat for

Humanity, build themselves homes. These families are able to purchase the homes

using affordable loans. In exchange, families are required to contribute hours of

"sweat equity" to the building of the home (Habitat for Humanity, 2007).

Homeownership can also have its drawbacks. Low-income individuals are often unstably employed, as several of those interviewed reported, and are likely to be the first laid off during economic downturns. Being laid off can result in the inability to pay the mortgage and, ultimately, to foreclosure on the home. Yet, the results of this study and others (Boehm, & Schlottmann, 2001; Di, 2005; Katz, Turner, Brown, Cunningham, & Sawyer, 2003) suggest that low-income homeownership initiatives should be promoted.

Organization membership was found to lessen the likelihood of experiencing food insecurity for those with the lowest incomes, although this finding must be viewed cautiously. Still, if this finding is replicated by future research it may suggest that community involvement has implications for improving individual well-being. The finding from this study that those who regularly attended a faith community had higher levels of social support further supports this implication. Involvement in faith communities and civic or service organizations, such as Rotary, Parent- Teacher Associations (PTA), and the Red Cross can serve to help low-income residents build social capital. A recent study found that lower social capital was associated with a poorer diet (Locher, Ritchie, Roth, Baker, Bodner, & Allman, 2005), while another study found that higher social capital was associated with a reduced risk of hunger (Martin et al., 2004). Participation in a faith community could also work to improve well-being by offering sources of emotional support, which was found to moderate the relationship between income and food insecurity in the present study.

Organizations interested in reducing food insecurity should encourage members to seek out low-income residents and invite them to join. Moreover, organizations that currently give handouts to low-income Oregonians, such as food pantries and soup kitchen, could go a step further and involve clients in a more substantive way in the organization, instead of just as the receivers of charity. Low-income individuals could be invited to volunteer in the food pantry or soup kitchen, attend board meetings, or serve on the board. The inclusion of low-income individuals into the administration of private nutrition programs can be an important way to impart job skills and maintain the dignity of those needing assistance (Poppendieck, 1998).

Another avenue to help low-income individuals by promoting community involvement to build social capital is through gleaning programs. Gleaning programs provide a double benefit because participants can also obtain food. Gleaning programs are run by and for low-income individuals and require participants to volunteer, usually between four and 16 hours per month, in exchange for weekly food allotments (S. James, personal communication, August 15, 2006). In addition to obtaining food inexpensively, participants gain skills such as record keeping, event coordination, running meetings, and serving as officers and board members.

As mentioned above, in this study, belonging to a faith community predicted higher levels of social support, although faith community attendance was not found to affect food insecurity in the quantitative analysis. Still, other researchers have found faith community attendance to be associated with nutrition status (Locher et al., 2005),

implying that faith communities should work to draw in their low-income parishioners, familiarize them with the services the community provides, and include them in faith community activities. As Putnam (2000) noted, faith communities may be one of the most important sources of social capital in the United States. As opposed to gleaning programs that often consist entirely of low-income members, through faith community involvement low-income individuals become acquainted with people from a broad socioeconomic spectrum. In this way, involvement in faith community activities can help low-income members to learn skills that will help them to gain more stable employment such as networking skills and knowledge about community norms.

Last, the findings of this study may be used to design and implement more effective community-based programs and nutrition interventions that would target food insecurity. Specifically, public health practitioners and researchers could develop nutrition interventions taking into account the association between social support and food insecurity by incorporating social network building activities. For example, nutrition classes could mix low-income and higher income participants together so that individuals at risk for food insecurity could have the opportunity to form those weak ties, as Granovetter describes (1973), to individuals on better financial footing.

<div align="center">Conclusions</div>

Clearly, some Oregonians are struggling with food insecurity. The State of Oregon has recognized this and is making strides to eliminate the environmental factors that contribute to food insecurity (Oregon Hunger Relief Task Force, 2004).

The findings of this study suggested several strategies that may have a positive effect

on those at risk for food insecurity, including increased work and educational supports

for low-income workers and students; increased benefits through such programs as the

FSP; expanded health coverage; continued homeownership assistance; encouragement

of community involvement; and more effective programs and interventions. Findings

have also suggested that public and private nutrition assistance is not enough. The goal

of future research and efforts to reduce food insecurity must be to address the root

causes of food insecurity instead of treating the symptoms through charity. Most

nutrition assistance provided by private agencies is in the form of handouts (as

detailed above) that do not improve the long-term circumstances of those they serve.

Instead, these handouts only reduce food insecurity in the short-term. Individuals who

run these agencies should consider becoming advocates for increases in minimum

wage and other measures that will target long-term change. As Janet Poppendieck

stated in her book, *Sweet Charity: Emergency Food and the End of Entitlement*

(1998*)*:

> It is not acceptable to have people in our society too poor to participate
> and contribute, too poor to provide a decent chance in life for their
> children, too poor to pursue happiness. We need to aim for the creation of
> a just and inclusive society that taps everyone's potential and makes us all
> better off in the long run, not just a society where no one starves. (p. 315)

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APPENDICES

Appendix A.

List of Expert Reviewers of Survey

Survey Instrument Reviewers

Reviewer	Expertise
John Edwards, Ph.D.	Dr. Edwards is an Associate Professor in the Department of Psychology at Oregon State University. He specializes in social cognition and teaches psychometrics.
Dan Sundseth	Executive Director of the United State Department of Agriculture Farm Services Agency, Oregon and a member of the Oregon Hunger Relief Task Force
Sharon Thornberry	Community Food Programs Advocate for the Oregon Food Bank, President of the Community Food Security Coalition of North America, and member of the Oregon Hunger Relief Task Force

Appendix B.

Mail Survey Instrument

Oregon Food Access Survey

The purpose of this survey is to learn how Oregonians get food and the role of family and friends. The questions ask where you get food, about support from friends and family, and about yourself.

We would like you to fill out this survey if you are the person in your household who meets the following requirements and most recently had a birthday:

*You consider Oregon your usual place of residence,
*You are between the ages of 18 and 64, and
*You speak English.

Instructions: It will take you about 15 minutes to complete this survey. Please answer each question unless directed otherwise. **Unless told otherwise, please circle one number for the response that best fits your answer. Your answers are strictly confidential.**

Today's Date: ____/____/____
(month)(day)(year)

Section 1
In this section we would like to ask you some questions about your food sources.

1. Does anyone in your household have a food-producing garden either at home or as part of a community garden?

    No, I have neither a garden at home or as part of a community garden…0

    Yes, a garden at home……………………………………………………1

    Yes, a plot at a community garden…………………………………………..2

    Yes, both a home garden and a community garden plot…………………3

2. Does anyone in your household do any of the following to get food?

	Yes	No
Hunt or trap animals……………………………………...	1	0
Raise animals…………………………………………….	1	0
Fish………………………………………………..……....	1	0
Forage (search for fruits or vegetables such as berries)…….	1	0
Scavenge in dumpsters or other locations…………..……...	1	0

3. In the last 12 months, have you used any of the following? (**circle all that apply**)

    Food banks……………………………………………………………………1

    Soup kitchens…………………………………………………………………2

    Gleaning programs……………………………………………………………3

4. In the past 12 months, have you experienced any of the following?

		Never	Sometimes	Often
a.	Worry whether your food would run out before you had money to buy more?	0	1	2
b.	The food that you bought just didn't last, and you didn't have money to get more?	0	1	2
c.	You couldn't afford to eat balanced meals?	0	1	2

5. In the last 12 months, did you <u>ever</u> cut the size of your meals or skip meals because there was not enough money for food?

    No…………………………………………………………………..0

    Yes, only one or two months………………………………………1

    Yes, some months but not every month……………………………2

    Yes, almost every month…………………………………………...3

6. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?

    No…………………………………………………………………..0

    Yes…………………………………………………………………1

7. In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?

    No…………………………………………………………………..0

    Yes…………………………………………………………………1

8. In the last 12 months, did you lose weight because you didn't have enough money for food?

    No…………………………………………………………………..0

    Yes…………………………………………………………………1

9. In the last 12 months, did you not eat for a whole day because there wasn't enough money for food?

No……………………………………………………………………..0

Yes, only 1 or 2 months in the last year ……..……………………….1

Yes, some months but not every month……………………………….2

Yes, almost every month…………………………………………....3

Section 2
In this section we would like to ask you questions about your family and friends.

---

10. Are you currently living with a partner, like a boyfriend/girlfriend, husband/wife, or lover?

No……………………………………………………………………..0

Yes………………………………………………………………….1

Don't know/Not sure…………………………………………………2

11. Are you currently:

Single, never married…………………………………………………1

Divorced……………………………………………………………...2

Separated……………………………………………………………..3

Widowed……………………………………………………………..4

Married……………………………………………………………….5

Living alone, but have boyfriend/girlfriend, husband/wife, or lover...6

→ **If you do not have an intimate partner, like a boyfriend/girlfriend, husband/wife, or lover, please skip to # 14.**

11. In the past 4 weeks, how often did your intimate partner show that he/she loved and cared for you?

Never …………………………………………………………………0

Once a month …………………………………………………….....1

Once a week …………………………………………………………2

Once every two days …………………………………………………3

Once a day or more ………………………………………………….4

13. How much do you agree that your intimate partner is someone who…

		Strongly disagree	Disagree	Neither agree/ disagree	Agree	Strongly agree
a.	You can really talk to about things that are important to you?	0	1	2	3	4
b.	You can count on for understanding and advice?	0	1	2	3	4
c.	You can rely on for practical things such as help with chores?	0	1	2	3	4

14. How many friends do you feel close to? _____ friends

15. How many of your close friends are also friends with each other? ___ people

16. How many relatives do you feel close to? _____relatives

17. Select the four (4) friends and relatives you feel most close to (other than an intimate partner). On the table below list the relationship of each person to you (i.e. mother, friend) and how often you have contact with each of them.

	Once a month or less	Twice a **Month**	Once a week	**Once every two days**	Once a day or more
a. Person 1: _____	1	2	3	4	5
b. Person 2: _____	1	2	3	4	5
c. Person 3: _____	1	2	3	4	5
d. Person 4: _____	1	2	3	4	5

18. Thinking about the friends and relatives you feel close to (other than an intimate partner), how often can you rely on them for the following?

		Never	Rarely	Sometimes	Often	Always
a.	To make you feel he/she cares about you	0	1	2	3	4
b.	To be there with you (physically) in a stressful situation	0	1	2	3	4
c.	To listen to you talk about your private feelings	0	1	2	3	4
d.	To praise or compliment you	0	1	2	3	4
e.	To suggest some action you should take to deal with a problem you were having	0	1	2	3	4
f.	To tell you what they did in a stressful situation that was similar to one you were experiencing	0	1	2	3	4
g.	To give you information that made a difficult situation easier to understand	0	1	2	3	4
h.	To give you information, suggestions, and guidance that you found helpful	0	1	2	3	4
i.	To care for you following an illness or injury	0	1	2	3	4
j.	To provide you with transportation	0	1	2	3	4
k.	To pitch in to help do something that needed to get done, like household chores or yard work	0	1	2	3	4
l.	To give you money or other resources such as food	0	1	2	3	4

Section 3
In this section, we would like to ask you some questions about your community.

19. How long have you lived in your current town? _____ years _____ months

20. Do you regularly (at least once a month) attend a church, temple, mosque, or synagogue?

No……………………………………………………………………..0

Yes……………………………………………………………………1

21. Are you a member of a formal or informal organization in your community (such as local government, Rotary, gleaner groups, Parent and Teacher Association (PTA), recovery or support groups, and/or sports teams) excluding churches?

No……………………………………………………………………..0

Yes……………………………………………………………………1

If yes, please list _____

22. Within the past 12 months has anyone in your household used any of the following social services? (**circle all that apply**)

Food Stamps	…………………………………… 1
Medicaid/Oregon Health Plan	…………………………………… 2
Temporary Aid to Needy Families (TANF)	…………………………………… 3
Social Security Insurance (SSI)	…………………………………… 4
WIC	…………………………………… 5
Federal School Lunch Program	…………………………………… 6
Federal School Breakfast Program	…………………………………… 7
Section 8 or other subsidized housing progra	…………………………………… 8
None	…………………………………… 0

Other, please list

_____

Section 4
In this section, we would like to ask you some questions about your background. Remember that your answers will be **strictly confidential** and will help us better understand who takes part in this survey.

---

23. Are you:

Female…………………………………………………………………..0

Male…………………………………………………………………..1

24. What is your birth date? ____/____/____

(month)(day)(year)

25. Are you Hispanic or Latino?

    No……………………………………………………………………....0

    Yes……………………………………………………………......…1

26. What is your race? **(Circle all that apply)**

    American Indian or Alaska Native………………………………….…1

    Asian…………………………………………………………….…….2

    Black or African American……………………………………………3

    Native Hawaiian or Other Pacific Islander…………………………….4

    White…………………………………………………………….…….5

27. How many people reside in your home? (**include yourself**) _____ people.
    a. How many of these are children under 18? _____ children.
    b. How many people in your household are between the ages of
       18 and 64 and speak English?
       (**include yourself**) _____ people.

28. Do you own or rent your home?

    Rent…………………………………………………………………….1

    Own…………………………………………………………………….2

    Other _____

29. How much do you pay in rent/mortgage per month? $_____ total,
                                                     $_____ your
                                                                  share

30. What percent of your monthly household income **before** taxes do you
spend on rent/mortgage?
(divide your rent or mortgage by your income)

    25%……………………………………………………………………1

    50%……………………………………………………………………2

    75%……………………………………………………………………3

    More than 75%……………………………………………………….4

    Other _____ %

31. What is the highest level of education you have completed?

Less than a high school diploma……………………………………….1

High school diploma or GED……………………………………………….2

Vocational, trade, or business school………………………………..3

Some college…………………………………………………………..4

College graduate………………………………………………………5

Graduate degree or other professional degree…………………………..6

I know that the following is a sensitive question, but this information is important for getting a clear picture of the Oregonians responding to this survey. This information will be kept <u>strictly confidential.</u>

32. Which of the following categories would best describe your **total household income before taxes** for 2005?

Less than $5000……………………………………………………..1

$5,000 – 9,999……………………………………………………….2

$10,000 to 14,999…………………………………………………...3

$15,000 to 19,999…………………………………………………...4

$20,000 to 24,999…………………………………………………....5

$25,000 to 29,999…………………………………………………...6

$30,000 to 34,999…………………………………………………....7

$35,000 to 39,999…………………………………………………...8

$40,000 to 44,999…………………………………………………...9

$45,000 to 49,999…………………………………………………..10

$50,000 to 74,999…………………………………………………..11

$75,000 or higher…………………………………………………...12

33. What is your current employment status? (Full-time = at least 35 hours/week)

Employed full-time/ full year……………………………………………1

Employed part-time/ full year……………………………………………2

Employed full-time/part-year ……………………………………………3

Employed part-time/part-year……………………………………………4

Self-employed……………………………………………………………5

Unemployed, but looking for work………………………………………6

Unemployed/Not in labor force (e.g. Disabled, full-time student)….....7

Retired……………………………………………………………………8

Other _____

34. Do you have a car that is in working condition?

No……………………………………………………………………..0

Yes……………………………………………………………………1

a. If you answered **No**, what do you use for transportation?
(**circle the number of the one you most often use**)

1. Public transportation such as a train or bus

2. Taxis

3. Hitch a ride from a friend or relative

4. Bicycle

5. Walk

6. Other _____

35. What is your zip code? _____.

36. Do you commute into a larger city for work?

No……………………………………………………………………..0

Yes……………………………………………………………………1

a. If you answered **Yes**, which city? _____

37. Please indicate any additional comments you may have:

<u>Follow-up Opportunity</u>

We would like to interview individuals who complete this survey to get more information about how Oregon residents obtain food and the support they get from friends and family. We will randomly select 32 individuals from all those who are willing to be interviewed. If you are selected, an interview would be scheduled at a time and place that is convenient for you. The interview will last about one hour. You will be compensated for your time.

Would you be willing to participate in an in-depth interview about how you obtain food and the support you get from family and friends?

_____Yes
_____ No

If yes, when would be the:
Best time to contact you _____ Morning _____ Afternoon _____ Evening
Best method to contact you: ___ Phone (number: _____)
                              ___ Email (Email: _____)

Is it OK to leave a message? _____

This information will remain strictly confidential.

Thank you very much for your help.

When you are finished, please fold the survey so that the return address is showing, tape the survey closed twice where indicated, and put it in the mail.
Postage has already been paid.

If you have any questions, please feel free to contact Molly De Marco at 541-757-2079 or demarcom@onid.orst.edu or Sheryl Thorburn at 541-737-9493 or Sheryl.Thorburn@oregonstate.edu

↑
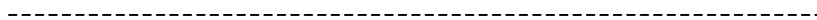TAPE HERE

↑
TAPE HERE

OSU
Oregon State
UNIVERSITY

Molly De Marco
Department of Public Health
Oregon State University
254 Waldo Hall
Corvallis, Oregon 97331-6406

FOLD HERE   --

Appendix C.

Survey Pre-Notification Notice Text

Dear Oregon resident [will be personalized]:

In a few days you will receive in the mail a request to fill out a survey for an important research project we are conducting in the Department of Public Health at Oregon State University. Your name was randomly selected from a database of Oregon telephone listings.

In this research project we hope to learn how Oregon residents, between the ages of 18 and 64, access food and the role of family and friends.

We are writing in advance because we have found many people like to know ahead of time that they will be contacted. This study is an important one that will help public health professionals and private and public social service workers in Oregon understand how people access food in Oregon.

Thank you for your time and consideration. It is only with the generous help of people like you that our research can be successful. If you have any questions or would not like to participate in this study please call Molly De Marco at (541) 737-1281.

Respectfully,

Molly De Marco, MPH, CHES   Sheryl Thorburn, Ph.D., MPH

Doctoral Candidate   Associate Professor

P.S. We will be enclosing a small token of appreciation with the survey as a way of saying thanks.

Appendix D.

Survey Cover Letter

Dear Oregon Resident: [will be personalized]

Oregon State University researchers in the Department of Public Health are doing a study about how Oregonians get food and the role of family, friends, and communities. By asking people about these issues we hope to learn more about how Oregon residents get food. Study results will be used for a student research project. The results will also be published and presented to public health professionals and the public.

As part of our sample of Oregon residents, your name has been randomly selected using telephone listings and other sources. Every household in your community had an equal chance of selection. Our sample is small. For the study results to truly represent the opinions of people in your area it is important for each person to return their survey. To give every adult in your house an equal chance to participate, **the adult between the ages of 18 and 64 years, who speaks English, and last had a birthday should fill out the survey.** If this person is not you, please give this survey to the person in your household who meets these requirements. If no one meets the criteria, please send back the survey with a note saying that no one meets the requirements. If you would you prefer not to participate or receive future mailings, you can mail back a blank survey. Postage has already been paid by the researcher.

If you decide to take part in this study, the survey will take about 15 minutes to complete. **All responses will be kept <u>completely confidential.</u>** Some of the questions we ask are personal. If you agree to participate, you may feel uncomfortable answering some of these questions. You do not have to answer any questions you do not want to. We will use your information in a way that will not identify you. You will not be paid for being in this study and will receive no direct benefits from participating in this study. However, to thank you for completing the survey, a $1 bill has been included. Please keep this form for your records. By returning a completed survey you are agreeing to take part in this study.

This survey has an identification number. This number is used to keep track of who completes the survey, so you do not receive future mailings. On the last page of the survey you will be asked if you would be willing to also be interviewed about these issues. If you are willing to be interviewed, you will be asked for your contact information. This information will be removed from your survey and stored separately.

We know that your time is valuable and thank you very much for your willingness to help. If you have any questions, please call Molly De Marco at (541) 757-2079 or demarcom@onid.orst.edu or Sheryl Thorburn at (541) 737-9493 or Sheryl.Thorburn@oregonstate.edu. If you have questions about your rights as a participant, please contact the Oregon State University Institutional Review Board (IRB) Human Protections Administrator at (541) 737-4933 or IRB@oregonstate.edu.

Respectfully,

Molly De Marco, MPH, CHES   Sheryl Thorburn, Ph.D., MPH
Doctoral Candidate   Associate Professor

Appendix E.

Reminder Postcard

Date

      Last week a survey seeking information on accessing food in Oregon was mailed to you. If you have already completed and returned the questionnaire to us, please accept our sincere thanks. If not, please do so today. We are especially grateful for your help because it is only by asking people like you to share your experiences that we can understand how Oregonians access food.

      If you did not receive a survey, or if it was misplaced please call us at (541) 737-1281, and we will get another one in the mail to you today.

Sincerely,

Molly De Marco, MPH, CHES   Sheryl Thorburn, Ph.D., MPH

Doctoral Candidate   Associate Professor

254 Waldo Hall
Department of Public Health
Oregon State University
Corvallis, Oregon
97333

Appendix F.

Second Round Survey Cover Letter

Dear Oregon resident [will be personalized]:

About three weeks ago we sent a survey to you about how Oregonians access food and the role of friends and family. We have not yet received a completed survey from you. The responses of people who have already participated include a wide variety of experiences in accessing food in Oregon. Many have described their experiences, both good and bad, with accessing food in Oregon. We think the results from this study are going to be very useful to public health workers, public and private assistance workers, and others.

We are writing again because of the importance that your experiences have for helping to get accurate results. Although we sent surveys to many people, its only by hearing from everyone in the sample that we can fully understand these issues.

A few people have written to say that they should not have received the survey because they no longer live in Oregon. If this applies to you, please let us know this on the cover of the survey and return it so that we can delete your name from the mailing list.

Finally, we'd like to make a comment about our survey procedures: The questionnaire identification number is printed on the back cover of the questionnaire so that we can check your name off the mailing list when it is returned. This list of names is kept in a secure locked file cabinet. Protecting the confidentiality of people's answers is very important to us, as well as the University.

We hope you will fill out and return the questionnaire soon, but if for any reason you prefer not to answer it, please let us know by returning a note or blank questionnaire.

Sincerely,

Molly De Marco, MPH, CHES   Sheryl Thorburn, Ph.D., MPH

Doctoral Candidate   Associate Professor

P.S. If you have any questions, please feel free to contact us in Corvallis at (541) 737-1281.

Appendix G.

Text for Interview Scheduling Contact

On the phone or via e-mail:

Hi, my name is Molly De Marco. I am a graduate student at Oregon State University. A few weeks ago you completed and returned a survey that is part of a project that I am conducting to learn about access to food in Oregon and the role of family and friends. On your survey, you indicated that you would be willing to be interviewed to provide more information on these issues. I would be interested in interviewing you.

Being interviewed would involve meeting with me in your home or another convenient location in your community. You will be asked questions about how you get food and support you give to and get from your friends and families. This interview should take approximately one hour and you will receive a $20 gift certificate to a local grocery store for participating.

This interview is completely voluntary. If you have decided that you would not like to participate, I will not contact you again. However, if you would be willing to participate, we could set up a time for the interview today.

If you have any questions about the study at any time, you may contact me at 541-737-1281. You may also contact my faculty advisor, Professor Sheryl Thorburn, at 541-737-9493.

If you have any questions about your treatment or rights as a prospective participant in this study, you may contact the Oregon State University Institutional Review Board at 541-737-8008.

Would you be willing to be interviewed for this study?

(If yes) Great – can we schedule a time that would be good for you to me interviewed?

(If no) That's okay – if you change your mind, just let me know.

Appendix G.

Interview Guide

```
Gender: _____
Age: _____
Race/ethnicity: _____
```

ID: _____
Date: _____

Oregon Food Access Survey

Thank you for agreeing to participate in this important research about access to food in Oregon and the role of family and friends. This is part of a study being conducted by the Department of Public Health at Oregon State University looking at how people in Oregon are managing on a limited income and how support from friend and family is helping. There are no "right" answers to any of our questions. We just want to hear what life is like for you. Remember, this interview is voluntary. If you don't want to answer a question, you do not have to. All information you give will be kept confidential.

(**Complete Informed Consent document**)

While I am getting the tape recorder set up, would you fill out this table about who lives in your household. <u>For yourself, you only need to enter your marital status.</u>

Person	Gender	Age	Race/ Ethnicity*	Marital status	Relationship to interviewee
Person 1 (Yourself)					
Person 2					
Person 3					
Person 4					
Person 5					
Person 6					
Person 7					

*Key to Race/Ethnicity Codes:
W   =   Non-Hispanic White
H   =   Hispanic/Latino(a)
AA   =   African American
N   =   Native American/Alaskan Native
A   =   Asian
HP   =   Native Hawaiian and Other Pacific Islander

For example: If you are part African American and part Hispanic/Latino you would write in H, AA

<u>Community Questions</u>

Now, I am going to ask you some questions about the community you live in.

    1. How many years have you lived in this community? _____ years/months

    2. What is the best thing about your community? (anything else?)

    3. What is the worst thing about your community? (anything else?)

<u>Employment</u>

Now, I would like to ask you some questions about the work people do in your household.

4. Of all the people living in your household, who is earning money?

        a. Part-time or full time?

        b. Seasonal or full-year?

<u>Transportation</u>

Next, I would like to ask you some questions about transportation.

5. Let's talk about transportation. How do you usually get around?
(prompts: do you have a car or can you borrow one? How do you usually get to the grocery store?)

6. If you have a car, how reliable is it?

7. When was the last time the car broke down? Did you have any trouble getting it fixed?

8. What do you do when you really need transportation and none is available?

Income and Expenses

Now, I would like to ask you some questions about your major expenses and how you pay for them. I know that these can be very sensitive questions, but it is important to ask about them because people's experience are often different depending on what their major expenses are and how they pay for them. This information will be used to gain a better understanding of who participants are and will be kept strictly confidential. Only the two researchers conducting this study will ever see this information.

9. What are your major expenses?

10. Tell me about what resources you use to pay expenses.
    (prompts: income from jobs, public assistance…)

11. If you think back, can you remember a specific time when you had trouble paying for something? What caused it and what did you do about it?

12. Do you own/rent your home? Is affordable housing a problem for you? Are there other costs related to your housing that are a problem?

Food and Hunger

Next, I am going to ask you some questions about your grocery shopping and eating habits.

13. How do you get the food you eat?

14. Where do you most often buy it? Why?

15. How easy is it for you to get to the place that you most often get food?

16. Does the store where you most often shop carry fresh fruits and vegetables?

17. Do you consider the prices high or low or just right at the store where you most often shop?

18. Do you grow any of your own food? Where? Why not?

19. Are you aware of any programs that help people to get food in your community?

20. Have you or any of your household members gone hungry or almost gone hungry? _____

      a. what led to it?

      b. how did you deal with it?

21. What barriers have you experienced in having enough food for you and your family?

      a.   During which part of the year do you eat the best? _____

Why?

b. During which part of the year do you eat the worst? _____
Why?

22. How do you make ends meet so you have enough food on the table for your family when others who have a similar income struggle with that?

23. What strategies do you use to keep enough food on the table?

24. What do you think others could do to make their situation better?

Social Support

The last questions I would like to ask you are about your family and friends and the support you receive and give them.

25. How often do you meet with friends, neighbors, or relatives (who you don't live with) ? _____
(prompts: once a day, one every two days, once a week, once a month)

26. When was the last time that you met with a friend, neighbor, or relative outside of your household for a talk or something?

27. Do you have neighbors, friends, or relatives whom <u>you help out</u>?

28. What kind of help do you give?
(prompts: transportation, child care…)

29. Could you tell me about a situation in which you helped someone out?

30. Do you have neighbors, friends, or relatives whom you can call upon <u>if you need help</u>?

      a. If yes, what kinds of help do you ask for?

31. Could you tell us about a situation in which you asked for help?

32. If you haven't asked anyone for help, why do you think you haven't?

33. Is there anything that we haven't talked about yet, that you would like to share?

Appendix H.

Qualitative Interview Consent Form

INFORMED CONSENT DOCUMENT

Project Title: Oregon Food Access Survey
Principal Investigator: Sheryl Thorburn, Department of Public Health
Co-Investigator(s): Molly De Marco, Department of Public Health

What is the purpose of this study?
You are being invited to take part in a research study designed to learn about how Oregonians get food and the role of family members, friends, and communities. The results of this survey will be used for a student research project and for publication and presentation to public health professionals and the public. We are studying this issue because it is important to learn more about how Oregonians are getting food.

What is the purpose of this form?
This consent form gives you the information you will need to help you decide whether to be in the study or not. Please read the form carefully. You may ask any questions about the study, the possible risks and benefits, your rights as a volunteer, and anything else that is not clear. When all of your questions have been answered, you can decide if you want to be in this study or not.

Why am I being invited to take part in this study?
You are being invited to take part in this study because you completed the mail survey for the first portion of this study and are an Oregon resident.

What do I have to do and how long will it take?
If you agree to take part in this study, you will be interviewed about your experiences getting food in Oregon and the strategies you use. The interview will last about 1 hour. The interview will be audio taped so that an exact typed copy of what you say can be made. You can choose not to have the interview audio taped. In that case, the interviewer will use her notes about what you say to create an exact typed copy.

Are you willing to have your interview audio taped? _____ Yes _____ No

What are the risks of this study?
Some of the questions we ask are personal. If you agree to participate, you may feel uncomfortable answering some of these questions. You do not have to answer any questions you do not want to. You may stop participating in the study at any time. If during the interview, you decide that you want to stop, you will still receive a $20 gift card. Your answers will be strictly confidential. Remember, you do not have to take part in this study if you do not want to.

What are the benefits of this study?
You will not directly benefit from being in this study. However, we hope that, in the future, other people might benefit from this study, because we can use the findings to explain how Oregonians are getting food and the roles that family, friends, and communities play in this.

Will I be paid for participating?
You will receive a $20 grocery store gift card for your participation.

Who will see the information I give?
The information you provide during this study will be kept confidential to the extent permitted by law. To help protect your confidentiality, we will only use your first name, or a name you make up, during the interview. The information you provided about yourself so that we could schedule this interview will be kept separately and destroyed once the study is completed. We will keep all study materials in locked file cabinets when not being used. As part of this study, your interview will be audio recorded, if you agree, to insure an accurate record of the interview. Once we are done with your interview, we will type what was said during the interview into a computer to create an interview transcript. Then, the tape will be destroyed. Your name will not be associated with any study results that are made public.

Do I have a choice to be in the study?
If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to participate. You can stop at any time during the study and still keep the benefits and rights you had before volunteering. You will not be treated differently if you decide to stop taking part in the study. You are free to skip any questions that you would prefer not to answer. If you choose to withdraw from this project before it ends, the researchers may keep information collected about you and this information may be included in study reports.

What if I have questions?
If you have any questions about this research project, please contact: Molly De Marco at (541) 757-2079 or demarcom@onid.orst.edu or Sheryl Thorburn at (541) 737-9493 or Sheryl.Thorburn@oregonstate.edu. If you have questions about your rights as a participant, please contact the Oregon State University Institutional Review Board (IRB) Human Protections Administrator, at (541) 737-4933 or by email at IRB@oregonstate.edu.

Your signature indicates that this research study has been explained to you, that your questions have been answered, and that you agree to take part in this study. You will receive a copy of this from.

Participant's Name (printed): _____

_____
(Signature of Participant)   (Date)