

FOOD SECURITY AND FAMILY WELL-BEING

by

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ABSTRACT

Each year, millions of individuals in the United States experience hunger yet can not afford to obtain food. This feeling of hunger and uncertain ability to obtain food can have many consequences including food insecurity. Food insecurity is a growing problem which has severe implications for the individual and family. Among these implications are parental depression and child behavior problems. Additionally, there is increasing research pertaining to the uniqueness of rural locales and the increased risk for food insecurity in these areas.

Although there is a growing body of literature examining food insecurity, no studies exist that examine the relationships between food insecurity, maternal depression, and child behavior among low-income families residing in rural locales. To shed light on this topic, this study examined the ways in which food insecurity—and varying levels of food insecurity—related to maternal depression and child behavior problems. This study also examined these variables as a function of rurality. And lastly, this study examined the combined effect of rurality and food insecurity on maternal depression and child behavior problems.

Sixty-seven low income women were surveyed at either the local Food Bank or the Head Start program using a convenience sample. Respondents were asked to fill out an anonymous survey about their emotional well-being, child's behavior, and food security status.

This study found a significant positive relationship between food insecurity and maternal depression, reconfirmed a well established link between maternal depression and child behavior problems, and showed a significant relationship between food insecurity status and child behavior problems. Overall, mothers who experienced more food insecurity also reported experiencing higher levels of depression and more behavioral problems with their children. Contrary to expectations, this study did not find support for a relationship between food security status and rurality.

The best predictor of maternal depression in this study was food security status. This study also examined the best predictors of child behavior problems. While food security status was a significant predictor of child behavior problems on its own, when we added maternal depression in the analyses, food security status failed to account for the variance in child behavior outcomes. Implications of the findings for research, practice, and policy are discussed.

CHAPTER 1

INTRODUCTION

Each year, millions of individuals in the United States experience hunger yet can not afford to obtain food. This feeling of hunger and uncertain ability to obtain food can have many consequences including food insecurity. Currently, there are an estimated 31 million people who live in food insecure households, meaning that at some time during the previous year, these households were unable to acquire or were uncertain of having enough food to meet basic needs due to inadequate household resources (Nord, Andrews & Carlson, 2005). In a wealthy nation, these high rates of food insecurity and food insufficiency are significant national problems. According to the United States Department of Agriculture's (USDA) *Household Food Security in the United States 2004* report, almost 12% of households are food insecure. Of these households, nearly thirty percent are food insecure with hunger. This translates into 4.4 million people or almost 4% of all US Households that are considered food insecure with hunger. Not only is this an astonishing number but a number that is rising annually (Nord et al.).

Currently, the operational definition of food insecurity is derived from a Life Science Research Office report titled "Core Indications of Nutritional State for Difficult-to-Sample Populations" published in 1990 (http://www.fao.org/wfs/index_en.htm). Food insecurity is "the limited or uncertain ability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways" (Boyle, 2003, p.114). According to the USDA's Current Population Study, households that are food insecure without hunger are those that are experiencing uncertain access to sufficient food, concerned

about inadequate resources to buy enough food, and who can not afford to eat balanced meals. Households that are food insecure with hunger are those in which the adults have decreased the quantity as well as the quality of food they consume (because of lack of money) to the point where they show clear evidence of a repeated pattern of hunger. This category includes households that have indicated that, due to constrained resources, their children were not eating enough and that they had, at times, been forced to cut the size of their children's meals in order to make ends meet (Hampl & Hall, 2002).

Although food insecurity is considered a national problem, the prevalence of food insecurity varies drastically depending on the type of household. Groups who are disproportionately represented among the food insecure include poor families, working poor families, young children, low-income women, ethnic minorities, the elderly, homeless individuals and families, and inner-city and rural dwellers (Rose, 1999). Geographically, food insecurity is most prevalent in the South and West and in central cities and rural areas. Additionally, rates of food insecurity are substantially higher for those households with incomes below the federal poverty line (Nord et al., 2005). Briefly, the federal poverty line was developed in 1965 by taking the cost of the Thrifty Food Plan, an emergency short term diet, and multiplying it by 3.3. The factor 3.3 was used because in the 1960's it was shown that low income individuals spent nearly one third of their income on food (Boyle, 2003). It is important to mention that the food plan used in this calculation is barely adequate and is defined as "short-term." Additionally, households that fall below the poverty line by definition have less money than what is needed for a barely adequate dietary intake.

Examining the problem at the state level, Montana's poverty level is approximately 14.6% and over 37% of the population is below 200% of the poverty line (Annie E. Casey Foundation, 2005). Almost 20% of Montana's children under the age of 18 live in poverty, children under age 5 are at an even higher level of poverty. In 2004, the state ranked 46th in median household income. Compared to other states in the Northwest, Montana had the highest rate of poverty (Andrews et al., 2000; Northwest Foundation, 2004). Specifically, the highest rates of poverty in Montana are among rural households. According to the Northwest Foundation's report *On getting Out- and Staying Out- of Poverty*, non metro poverty rates in Montana are 15.5%, central city rates are 14.8% and suburban rates are 9.1%. Of the eight states focused on in this report, only South Dakota ranked higher in poverty with a rate of 15.6% in non metro areas. The report also showed that over 12% of Montana's population was "food insecure," and of that number, almost 5% was "food insecure with hunger." Both children and adults living in poverty have difficulty accessing food in a sustainable manner that meets their nutrition needs (Andrews et al.; Northwest Foundation).

Food insecurity has many negative effects on individuals and families. Current research indicates that hunger and poor nutritional qualities are not the only significant negative outcomes of food insecurity. Food insecurity disrupts many aspects of the individual and family life and is associated with increased levels of parental depression and emotional, behavioral and cognitive problems in children (Campbell, 1991; Olson, 1999). Although food insecurity and hunger can potentially affect mental well being and overall quality of life, it is difficult for researchers to disentangle the health consequences

of food insecurity from those of its common risk factors including poverty and low socioeconomic status (Campbell; Olson).

A recent study by Siefert, Heflin, Corcoran and Williams (2001) analyzed the relationship between household food insufficiency and indicators of physical and mental health status among 733 European American and African American women who are current or recent welfare recipients. This study used random sampling and found that household food insufficiency was a significant predictor of fair or poor self-rated health, limitations in physical functioning, and meeting the DSM-III-R diagnostic criteria for major depression. This was found while controlling for other factors known to be associated with low income women's health and mental health. Other studies conducted by Siefert and associates have found similar results linking food insecurity to elevated levels of depression (Siefert et al., 2001). Although several researchers have come to similar findings there is a lack of consistency in the literature regarding the measures used for depression and the measures used to assess food insecurity.

Other researchers have explored the relationship between food insecurity and abnormal child behavior. Kleinman et al. (1998) found a significant relationship between hunger and abnormal child behavior. Using the Pediatric Symptom Checklist (PSC) and an 8-item hunger scale, researchers found that hunger status was significantly related to total PSC score. As hypothesized, hungry children were significantly more likely to be classified as dysfunctional by the PSC than non-hungry children or children who were classified as "at risk" for hunger. Twenty-one percent of hungry children were classified

as dysfunctional by the PSC, compared with 6% of at-risk for hunger children and 3% of non-hungry children.

Lastly, there is a growing body of evidence that food insecurity is higher in rural areas than suburban or metropolitan areas. This may be due to the unique characteristics affecting food availability and acquisition in rural areas. Among these characteristics are the limited number of supermarkets, limited availability of food items and higher relative costs of food (Morris, Neuhauser, & Campbell, 1992). Other factors that potentially contribute to higher rates of food insecurity include negative attitudes towards welfare and a lack of accurate information regarding welfare. Rank and Hirsch (1993) showed that qualified families in rural areas were much less likely to participate in food assistance programs such as food stamps than their urban counterparts due to their negative outlook on welfare.

While research in the areas of food insecurity, maternal depression, and child well-being has been conducted, few studies have examined the effect that food insecurity has on both the child and parent in terms of the parent's mental health and their child's behavioral outcomes. Additionally, no study has analyzed the levels of food insecurity including "food secure," "food insecure without hunger," and "food insecure with hunger" and the varying effects of food insecurity on maternal depression and child dysfunction. Lastly, few studies have examined how these variables relate among low-income families residing in rural communities.

To shed light on food insecurity and rurality, this study examined the relationships between food insecurity, maternal depression, and child behavior among

low-income individuals residing in rural locales. To address shortcomings in the extant literature, this study also examined maternal depression and child behavior as a function of the level of food insecurity. It was hypothesized that parents included in the “food insecure without hunger” and “food insecure with hunger” groups would display higher levels of maternal depression than their food secure counterparts. Likewise, it was hypothesized that parents reporting food insecurity without or with hunger would report more child behavior problems than their food secure counterparts. Next, this study examined food insecurity levels as a function of rurality. Due to the unique characteristics of rural areas, it was also hypothesized that individuals residing in the most remote areas of the county would report higher levels of food insecurity than those in more urbanized areas. And finally, this study examined the ability of rurality and food insecurity to account for the variance in maternal depression scores and the ability of rurality, food insecurity, and maternal depression to account for the variance in child behavior problems.

CHAPTER 2

LITERATURE REVIEW

Food Security in the United States

The concept of hunger is described in terms of food security, food insecurity, and food insecurity with and without hunger (Nord et al., 2005). Food security, access by all people at all times to sufficient food for an active and healthy lifestyle, is not a condition felt by all individuals in the United States. Previously, when addressing the issue of food security, researchers were speaking in terms of developing nations, however, this is no longer a problem just experienced by developing nations.

In addition to sufficient food for an active and healthy lifestyle, food security encompasses the fact that food is readily available, nutritionally adequate, safe, and acquired in socially acceptable ways (Boyle, 2003). According to Splett (1994), food security has five components, including: 1) quantity, a sufficient amount of food; 2) quality, where the food is nutritionally adequate; 3) suitability, which suggests the food is culturally acceptable and the capacity for preparation and storage is appropriate; 4) psychological, where the type and quantity of food alleviates anxiety, lack of choice and feelings of depression; and 5) social, in which the methods of acquiring food are socially acceptable.

The lack of food security can lead to feelings of hunger and food insecurity. Originally, the term food insecurity was used to describe the instability of national food supplies within poor nations and then expanded to include the insecurity of food

situations within families (Habicht, Pelto, Frongillo, & Rose, 2004). The most current definition of food insecurity is derived from a Life Science Research Office report titled “Core Indications of Nutritional State for Difficult-to-Sample Populations” published in 1990 (http://www.fao.org/wfs/index_en.htm). Food insecurity is “the limited or uncertain ability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways” (Boyle, 2003, p.114).

According to the USDA’s Current Population Study, households that are food insecure without hunger are those that are experiencing uncertain access to sufficient food, concerned about inadequate resources to buy enough food, and who can not afford to eat balanced meals. Households that are food insecure with hunger are those in which the adults have decreased the quantity as well as the quality of food they consume (because of lack of money) to the point where they show clear evidence of a repeated pattern of hunger. This category includes households who have indicated that due to constrained resources their children were not eating enough and that they had, at times, been forced to cut the size of their children’s meals in order to make ends meet.

Current Population Survey and Food Security in the United States

Since 1995, the USDA has monitored the food security of US households via an annual, nationally representative survey. This survey is a supplement to the Current Population Survey (CPS) and collects information regarding household food spending, food access and adequacy and sources of food assistance for the US (Nord et al., 2005). The survey results are published annually in the USDA report, *Measuring Food Security in the United States*.

Specifically, 60,000 surveys were sent out to households in 2004 and 48,000 households responded. The participating households were civilian and non-institutionalized. Each household was placed into one of three categories based on their responses to an 18 item food security questionnaire. The questionnaire titled, “Questions Used to Access the Food Security of Households in the CPS Food Security Survey,” included 10 questions regarding food conditions in the household, specifically adults in the household. If the household contained children, 8 additional questions were used to measure their food conditions (Nord et al., 2005). According to the 2004 report, households were classified as food secure if they reported no food-insecure conditions or if they reported only one or two food-insecure conditions. Households were classified as food insecure if they reported three or more food insecure conditions. The survey further classified food insecure households into either food insecure without hunger or food insecure with hunger depending on the number of food insecure responses (Nord et al.).

Prevalence of Food Insecurity. The USDA report shows that in 2004, 12% of American households (13.5 million households) were food insecure at least some time during the year and had difficulty providing enough food for all their members due to a lack of resources. This number has risen from 11.2 percent of households in 2003 (Nord et al., 2005).

Of these food insecure households, approximately one-third experienced food insecurity with hunger; one or more members were hungry at least some time during the year because they could not afford sufficient food. The remaining two thirds used a variety of coping strategies such as eating less varied diets, participating in Federal food

assistance programs, or utilizing emergency food pantries in order to obtain enough food to avoid hunger.

The USDA report states that most of the questions used to assess households' food security status asked whether a condition, experience or behavior occurred at any time in the past 12 months. Therefore, households could have been classified as food insecure with hunger based on a single, severe episode during the year. Additionally, Nord et al. (2005) further mention that when food insecurity with hunger occurs in the United States, it is usually occasional or episodic, not chronic.

Further analyzing the data on the duration of household food insecurity, the 2004 *Household Food Security* report shows that about one third of the households that were food insecure with hunger experienced the condition rarely or occasionally. The remaining two-thirds experienced hunger in three or more months of the year. Twenty percent of food insecure households and thirty percent of food insecure with hunger households experienced food insecurity with hunger chronically—as often as every month. Additionally, households classified as food insecure with hunger experienced this condition, on average, in 8 to 9 months during the year. This does not mean, however, that these households were food insecure with hunger every day of those eight or nine months. On average, these households experienced this condition between one and seven days of the month (Nord et al., 2005). Regardless of the longevity of hunger experienced, the number of Americans experiencing food insecurity is astonishing.

Household Characteristics. The USDA's (2004) *Household Food Security in the United States* report shows that the level of food security and prevalence of food

insecurity varied depending on specific household characteristics. The lowest rates of food insecurity were among households with more than one adult and no children (6.7%) and for households with elderly persons (6.5%). For this study, “elderly” people are those ages 65 and older. These percentages are substantially lower than the national average of 11.9%.

Additionally, certain types of households experienced food insecurity at much higher levels than the national average, including households with incomes below the 2004 poverty line of \$19,157 for a family of four (36.8%); households with children headed by a single woman (33.0%) or a single man (22.2%); Black households (23.7%) and Hispanic households (21.7%). There were also significant differences in reports of food insecurity depending on the presence of children in the household. Approximately 17.6% of households with children reported food insecurity, which is approximately twice the rate of food insecurity among households without children (8.9%). This information shows that single, female headed households with children are at the highest risk for food insecurity.

Rates of food insecurity also varied depending on geographic region and proximity to a metropolitan area. Households in selected principle cities of metropolitan areas reported a 15.4% food insecurity rate while 9% of suburban households reported food insecurity. Approximately 13% of households living in non metropolitan areas reported food insecurity. Geographically, the highest rates of food insecurity were reported in the South and West with rates of 13.3% and 12.8 % respectively (Nord et al., 2005).

Food Insecurity in Montana

Economic Status and Poverty in Montana

Montana is the fourth largest state in the nation with a land mass of approximately 147,042 square miles, however, it is the third least populated state with approximately 6.3 persons per square mile in 2003. It is an agricultural state with 94.5% of its land in non metropolitan areas. Unfortunately, it is one of the poorest states in the nation and ranked 50th overall in annual pay (Annie E. Casey Foundation, 2005).

In 2002, the average annual pay for individuals in the state of Montana was \$26,001. Almost 14% of the population (13.7%) was below the poverty line and 19.1% of its youth (17 and younger) were living in poverty. Additionally, in this same year, Montana ranked second in the nation for children living in poverty per 100,000 population and had an overall unemployment rate of 4.6%. According to Kids Count state level data, these statistics have not improved since 2002 and in some cases are worsening (Annie E. Casey Foundation, 2005).

Briefly, in 2004, the overall unemployment rate rose to 4.8%, the teen unemployment rate was up from 11.9% in 2002 to 14.6%, the number of eligible students for free or reduced price lunch rose from 69,886 to 73,424 people, the monthly average of food stamps participants rose from 63,766 to 81,317 people and the estimated median household income dropped from \$34,835 to \$34,105. Moreover, 12% of the population was considered “food insecure.” Of that number, almost 5% was “food insecure with hunger” thus leading to the conclusion that both children and adults living in poverty

have difficulty accessing food in a sustainable manner that meets their nutrition needs (Annie E. Casey Foundation, 2005).

The Northwest Foundation (2004) reported economic information on eight states including, Idaho, Iowa, Minnesota, Montana, North Dakota, Oregon, South Dakota and Washington. Montana had the highest rate of severely poor individuals (tied with SD) at 5.8% of the population, the highest rate of individuals at the poverty level (14.6%) and the highest rate of individuals below 200% of the federal poverty level (37.1%). This report states that Montana's rural nature has implications on the geographic distribution of those living in poverty . The poverty rate for central cities in Montana was 14.8% and in non metro areas was 15.5% (Northwest Foundation).

The Effects of Food Insecurity on Health

Theoretical Framework

In the early 1990s, Campbell (1991) offered a refined conceptualization of food insecurity, which included its risk factors and consequences. In this conceptualization, she indicated that there were two sets of potential consequences of food insecurity. The first set of consequences refers to one's nutritional status and includes the typical physical and physiologic symptoms of suboptimal nutritional status, such as anthropometric, biochemical, and clinical symptoms. The second set of consequences refers to those related to poor nutritional status, including health and quality of life indicators. In her framework, Campbell divides health into social and mental well being in addition to physical health. Campbell makes the very important point that food

insecurity can affect health and quality of life either directly or indirectly through nutritional status. This research paper focused on the second set of consequences—specifically, familial mental health as it relates to food insecurity.

In conjunction with Campbell's theoretical framework, this study was guided by Maslow's Hierarchy of Needs. Maslow (1968; 1970) suggests that all human beings, regardless of culture, have five basic needs that can be arranged on a hierarchy according to prepotency or pressing drive for fulfillment. From the lowest level of needs (the most prepotent needs) to the highest level, these include physiological needs, safety needs, need for belongingness and love, esteem needs, and self-actualization.

The most prepotent need group, physiological needs, relates to the body's need for food, water, oxygen, optimal temperature, and sleep in order to maintain physiological homeostasis and survival. Without food, water, sleep and oxygen, nothing else in life matters; however, once these needs are met one is able to move to the next level. The second most prepotent need group, safety needs, includes the need for security, protection, stability, and freedom from fear or constant anxiety. At this level we look for safety through other people and strive to find a world that will protect us and keep us free from harm (Harper, Harper, & Stills, 2003). Once we feel safe and secure in our world we can seek out friendship in order to feel a sense of belonging (Harper et al.).

Need for belongingness and love, the next level, is described by Maslow as the need to belong to and feel loved by a group. These groups include one's family, religious group, work group, professional group, social club or fraternity, or even one's youth gang. The fourth hierarchical level is called esteem needs. This level has to do with self-

esteem for one's accomplishments or achievements and deserved esteem from others, based on one's accomplishments, status, or appearance. At this level we focus our energy on self-respect, respect from others and feeling that we have made accomplishments in our lives.

The final level in the hierarchy is the need for self-actualization. Self-actualization refers to a complete understanding of the self and the need to develop one's common potential and unique talent at the highest possible level of growth and achievement. To be self-actualized means to deeply know who you are, where you belong in the greater society or scheme of life, and to feel like you have accomplished all that you have set out to accomplish (Harper et al., 2003)

The premise behind Maslow's hierarchy is that we are born with certain needs. Without meeting our initial needs we may not be able to continue our life (e.g., if basic needs are not met) and may not be able to move upward on the hierarchy (Harper et al., 2003). It is also possible that individuals will attempt to meet their "higher-order" needs (e.g., belongingness, esteem) but may do so in dysfunctional, less optimal, or unhealthy ways. Based on this theory, it seems logical that without fulfilling the basic physiological need for food, one will likely not be able to fulfill higher needs, which may compromise one's mental health and familial well-being.

Food Insecurity and Mental Health

Current research suggests that food insufficiency/food insecurity may affect mental health, specifically the likelihood of parental depression. There are several reasons why this may occur. First, food insufficiency could impair mental health through

the direct effect of nutritional shortfalls on psychological functioning and behavior. Even the early stages of nutrient deficiency can adversely affect behavior and mental performance. In a study conducted by Hesecker, Kubler, Pudel and Westenhoffer (1992), 1081 young men in good health received a reduced vitamin intake over a 2 month period. This reduced intake was associated with negative changes in psychological disposition and functioning. Tiemeier et al. (2002) also found that inadequate vitamin intake was associated with increased irritability, nervousness, depression, feelings of fear and decreased well-being, memory and reaction performance.

Secondly, research suggests that household food insufficiency may be subjectively experienced as a stressful event. The presence and or persistence of food insufficiency could initiate or maintain feelings of self-blame and the perception that one is not efficacious (Gecas & Schwalbe, 1983). Furthermore, there is a documented association between cumulative or persistent stressful life events or conditions and the onset or chronicity of depression. This is particularly prevalent in, but not limited to, mothers with low self-esteem and lack of support (Brown & Moran, 1997).

A recent study conducted by Siefert et al. (2001) analyzed the relationship between household food insufficiency and indicators of physical and mental health status among 753 African American and White women. These women were either current or recent welfare recipients. This study found that household food insufficiency was a significant predictor of fair or poor self-rated health, limitations in physical functioning and meeting the DSM-III-R diagnostic criteria for major depression.

In another study conducted by Siefert, Heflin, Corcoran, and Williams (2004), researchers investigated the physical and mental effects of food insufficiency by using two waves of the same data mentioned above. This longitudinal study allowed researchers to measure persistent or recurrent food insufficiency and allowed researchers to estimate the effects of food insufficiency on health status at the second wave, while controlling for both initial health status at wave 1, personal risk factors and common risk factors.

Specifically, Siefert et al. (2004) analyzed the data from the second wave of the Women's Employment Study. The study participants were 753 mothers who were receiving cash assistance in an urban Michigan county in February 1997. Researchers hypothesized that household food insufficiency would be associated with worse physical and mental health in this population and that persistent or recurrent food insufficiency would be associated with worse physical and mental health status. It is important to note that in this study, the term "food insufficiency" was defined as "restricted household food stores or too little food intake among either adults or children in the household" (Siefert et al., p. 174). Food insufficiency was measured using a single item validated measure and major depressive disorder was measured using the Composite International Diagnostic Interview developed by Siefert and associates.

The results showed that over one third of the participants had experienced food insufficiency at one or both of the waves, 11.8% were food insufficient at both waves, 12.7 % were food insufficient at wave 1 and 10.2% were food insufficient only at wave 2 (Siefert et al., 2004). Food insufficiency at both waves and food insufficiency at wave 2

were significantly associated with meeting the diagnostic criteria for major depression. Studies like this are difficult to interpret due to the challenge in distinguishing the health consequences of food insecurity from those of its common risk factors such as poverty and low socioeconomic status (Campbell, 1991). When social and environmental risk factors as well as background characteristics were controlled for, the associations became smaller in size; however, they were still significant.

It was also found that the women who became food insufficient between the first and second waves were more likely to meet the diagnostic criteria for major depression at wave 2. If reconfirmed researchers think that preventing food insufficiency might lower the risk of major depression in this particular population. Another interesting finding pertained to the longevity of food insufficiency. This study found that the participants who reported food insufficiency only at wave 1 and not again at wave 2 had similar physical and mental health outcomes as those who never reported food insufficiency. This suggests that the effects of short term food insufficiency may not be permanent (Siefert et al., 2004). The exact duration of food insufficiency experienced for an individual to display negative health outcomes is not known. The overall findings supported the hypothesis that persistent or recurrent food insufficiency is a significant and independent predictor of self-rated health (Siefert et al.).

In a convenience sample of 5306 mothers in 5 states and the District of Columbia, researchers arrived at similar associations between parental depression and food insecurity. Casey et al. (2004) conducted household-level surveys and medical record audits during a three year time period. Caregivers were interviewed and demographic

information was collected. Household food security was measured using the USDA 18-item Food Security Scale and maternal depression was measured using a 3-item maternal depression screen. The study found that 35% of the mothers in the sample were positive on the maternal depression screen and that a positive maternal depression screen was strongly associated with food insecurity. Additionally, 53% of the mothers who reported food insecurity scored positive on the maternal depression scale (Casey et al.). Although there is substantial literature linking food insecurity and parental depression, there are few, if any, studies that have looked at the severity of food insecurity and how it is related to the mental health of caregivers.

Parental Depression and Child Behavior

Maternal depression has been identified as an extremely important variable in relation to child outcomes. Higher rates of parental stress and maternal depression are associated with harsher, inconsistent, and less responsive parenting (McLeod & Nonnemaker, 2000). Studies show an association between a mother's depression and adverse outcomes for a child. These adverse outcomes include low birth weight, behavior problems, learning difficulties, poor growth, higher incidences of accidents, emotional illness and somatic complaints (Zuckerman & Bearslee, 1987). According to Petterson and Albers (2001), depressed women's maternal behavior has been characterized in studies as less responsive, more hostile, critical, alternatively disengaged or intrusive, disorganized and less active, avoidant of confrontation and generally less confident than non depressed mothers. Although the rate of clinical depression in the general population

is said to be only 5%, there are indications that up to 21% of females are diagnosed with depression (Kornstein et al., 2000).

It is important to recognize that the rates of depression differ depending on the different populations studied and the assessment tool used. Childrearing also plays an important role on depression rates as over 12% of mothers with young children have a diagnosable depression and up to 52% have depressive symptoms (Zuckerman & Beardslee, 1987). Other factors that are associated with an increased rate of depression include lower education, housing dissatisfaction, immigrant status, poor marital relations, stressful life events and belonging to a lower economic class. According to Zuckerman and Beardslee (2001), researchers have shown that working class mothers are much more likely to be depressed than those mothers in a higher economic class. In conjunction, both gender and low SES are strongly associated with increased risk of depression, however, the pathways through which they influence mood disorders are not well understood. Epidemiologic studies worldwide have established that depression is twice as prevalent in women as men, and that childbearing and child-rearing years is when the first onset of depression peaks (Culbertson, 1997; Kessler et al., 1994; Weissman & Olfson, 1995). Other researchers have found that mothers of young children are at particular risk; maternal depression rates in pediatric primary care settings range from 12% to 47% (Heneghan, Silver, Bauman, Westbrook, & Stein, 1998). Mothers with several young children, single mothers, and mothers in poverty are at even higher risk of depression (Heneghan et al.; Hobfoll, Ritter, Lavin, Hulsizer, & Cameron, 1995).

In a study looking at maternal depression and child outcomes among a child welfare sample, Leschied, Chiodo, Whitehead and Hurley (2003) found that poor child outcomes such as attention deficit disorder, conduct disorder and emotional adjustment were related to maternal depression. This study was a retrospective file review of child protection cases from the years 1995 and 2001. The participants included 853 mother/child pairs. Information regarding the families' mental health, family violence and access to social services was collected. Additionally, information collected on the children included past and present access to mental health, young offender, educational and developmental services as well as outcomes related to behavioral, developmental, academic and psychological concerns. A risk analysis was then completed from this information via a Risk Assessment Tool. Two behavioral outcomes and one psychological outcome were considered including an attention deficit hyperactivity disorder (ADHD), conduct disorder and the primary psychological (emotional) concern of the child.

According to Leschied et al. (2003), the results indicated that more children of depressed mothers were diagnosed with ADHD and were on medication for an adjustment related disorder than children living with non depressed mothers. In addition, a higher number of children living with depressed mothers were identified as having a psychological/emotional concern versus children of non-depressed mothers. Other findings suggest that children with depressed mothers are more likely to have higher risk scores than children of non depressed mothers. Lastly, depressed mothers and their

offspring are more likely to be utilizing treatment services and be more socially isolated than non-depressed mothers.

In another study conducted by Fendrich, Warner, and Weissman (1990), researchers assessed multiple measures of family discord on psychopathology in children of depressed and non-depressed parents. Essentially, their study compared offspring from 65 families with one or more depressed parents with offspring from 26 non-depressed parents. Parents were interviewed about their children and answered question pertaining to their child's behavioral and social functioning as well as developmental history. Additionally four lifetime diagnoses in children including major depression, anxiety disorder, conduct disorder and any other diagnosis were compared to indexes of family disharmony (Fendrich et al.). The results showed that the rates for all of the diagnostic categories were higher for the children of depressed parents than for children of non-depressed parents. The most relevant findings of this study indicated that the presence of parental depression is the most important risk factor and predictor of major depression, anxiety disorders and any diagnosis in offspring. Furthermore, parental depression was identified as an important risk factor for child conduct disorder.

While researchers have examined relationships between food insecurity and parental depression, and relationships between parental depression and child behavior, fewer studies have focused on food insecurity and child outcomes. The following section reviews the extant literature in this area.

Food Insecurity and Child Behavior

Dunifon and Kowaleski-Jones (2003) state that food insecurity is likely to affect children via two pathways. The first pathway is related to food insecurity in the home. Food insecurity in the home may translate into a source of family stress that has the potential to affect both parenting behaviors and the children's reactions to parenting behaviors. These familial stressors may have negative implications for child behavior. Additionally, as low income parents experience hardships or new stresses, their mental health and interactions with their children may change. This change could directly affect their children's functioning. The second pathway is the direct affect that food security has on the child's health. Research suggests that children who are living in homes where the availability of food is limited are less likely to have access to nutritionally adequate foods therefore potentially affecting their health outcome (Dunifon & Kowaleski-Jones). Others have found that going without food can cause distractibility, irritability or emotional changes which in turn affect children's achievement and psychosocial behaviors (Strupp & Levitsky, 1995). Regardless of the exact mechanism, there are several studies that indicate that children living in food-insecure or hungry households experience considerable psychological and emotional distress.

According to Murphy et al. (1998), most of the current data available on the impact of intermittent episodes of food insufficiency and hunger comes from the CCHIP surveys. The Community Childhood Hunger Impact Project or CCHIP conducted a series of 18 studies using large, selected samples in communities through out the nation. This project categorized families as "hungry", "at-risk for hunger," or "not hungry" based on

the parent's answers to 8 standardized questions. Based on these parental reports, it has been consistently shown that children who are classified as hungry are more likely to have mood and attention problems than those who are not hungry (Murphy et al.).

In a study conducted by Murphy et al. (1998), researchers examined the relationship between child hunger as measured by CCHIP parental reports and psychosocial problems assessed using standardized measures. This study was conducted in a total of four schools in Philadelphia and Baltimore using a battery of psychosocial, academic and food insufficiency/hunger measures before the start of a free breakfast program. Teachers of all of the students completed a teacher report measure before and after the free breakfast program began (Murphy et al.). The results indicated that 65% of the children were classified as not hungry according to the CCHIP scale, 27% were at risk for hunger and 8% were hungry. According to the parent report measures, those children that were classified as hungry and at risk for hunger scored twice as high on the Child Behavior Checklist as children in the not hungry group. A higher score is indicative of impairment. Additionally, on the second child behavior measure, the Pediatric Symptom Checklist, total scores were significantly associated with child hunger status. This checklist is a parent completed questionnaire that has been validated as a screening measure to identify children with psychosocial problems (Murphy et al.). These findings suggest that parent reported hunger scores are associated with psychosocial dysfunction in their children as assessed by the standardized measures mentioned above. Furthermore, in this study, hungry children were 2-3 times more likely to score in the impaired range on the measures concerning emotional problems than their non hungry schoolmates.

Lastly, attention and behavior problems per teacher reports were more prevalent in hungry children than either those at risk for hunger or those classified as not hungry (Murphy et al.).

Two additional studies found similar results. A study conducted by Kleinman et al. (1998) looked at the potential behavioral and emotional correlates among hungry children. The data for this study were taken from a CCHIP study in Pittsburgh PA and the surrounding county. Similar to previous studies conducted by Murphy et al., hunger was assessed using an 8 item CCHIP scale and participants were classified as “hungry,” “at risk for hunger,” or “not hungry” depending on their responses to the questions. The Pediatric Symptom Checklist (PSC), a 35 item questionnaire answered by parents, was used to assess child psychosocial dysfunction. Researchers hypothesized that hungry children would have a higher rate of psychosocial dysfunction than not hungry children.

The results of this study showed that total hunger status was significantly related to total PSC score and as hypothesized, hungry children were significantly more likely to be classified as dysfunctional by the PSC than non hungry or at risk children (Kleinman et al., 1998). Specifically, 21% of the “hungry” children scored in the dysfunctional range on the PSC vs. 6% of the “at-risk for hunger” children and 3% of the “non hungry” children. When analyzing specific behaviors, this study found that hungry children were 7 to 12 times more likely to exhibit symptoms of conduct disorder than non hungry children. Additionally, higher levels of irritable, anxious, aggressive and oppositional behaviors were found among low income hungry children than among low income non hungry children (Kleinman et al.).

More recently, Alaimo, Olson, and Frongillo (2001) investigated the association between food insufficiency and cognitive, academic and psychosocial outcomes for US children aged 6 to 11 and 12 to 16. Data from the Third National Health and Nutrition Examination Survey (NHANES III) were used. This national health survey was conducted from 1988 to 1994 among the US civilian population and included medical and cognitive examinations and interviews conducted with survey participants and proxy respondents. Alaimo and associates postulated that poor cognitive, academic and psychosocial outcomes are caused by deficiencies in family and child resources, environmental risks, past nutrition, health and social risks, and family food insufficiency. Of particular interest is the component of this study related to food insufficiency and psychosocial outcomes. In this study, psychosocial outcomes included whether the child had ever seen a psychiatrist (or other mental health professional) for emotional, mental or behavioral problems, number of days absent from school, whether they had been suspended, number of friends, and if they had trouble getting along with other children or teenagers. Families were reported as food insufficient if the familial survey respondent answered that they either “sometimes” or “often” did not get enough food to eat.

The results showed that food insufficient children were more likely to have psychosocial difficulties than food sufficient children. After adjusting for potentially confounding variables, there was a positive association between food insufficiency and having seen a psychologist and repeating a grade among 6-11 year olds. Food insufficient teenagers were 3 times as likely to have been suspended from school, more than 2 times

as likely to have seen a mental health professional and 2 times as likely to have problems getting along with others than their food sufficient classmates (Alaimo et al., 2001).

All of the studies explained above are similar in respect to the correlational relationship that they show. In most cases, it is difficult to discern the role that poverty plays among children versus food insecurity. Poverty and food insecurity are interdependent and many studies demonstrate higher levels of food insecurity among the poor. Additionally, lower income adults have higher rates of mental disorders including depression and antisocial behaviors than those with higher incomes. A repeated link between general economic hardship and poor mental health in adults has been documented (Dohrenwend et al., 1992; Jayakody, Danzinger, & Pollak, 2000; Pollak, Danziger, Seefeldt, & Jayakody, 2002). In turn, further research has shown that poor mental health among parents is associated with impaired parent-child interactions (McLeod & Nonnemaker, 2000). What remains to be studied are the relationships between food insecurity, maternal depression, and child behavior among low-income families residing in rural locales.

Food Insecurity in Rural Areas

Research has shown that rates of food insecurity are higher among rural areas than suburbs, metropolitan areas and noncentral cities. In their study, Morris et al. (1992) stated that there are several factors that contribute to a higher degree of food insecurity in rural areas. These factors include a limited number of supermarkets in rural areas compared to urban areas, the lack of variety of food items available in rural areas, and higher food prices.

There are additional factors that may contribute to food insecurity in rural areas. Rank and Hirsch (1993) have shown that qualified families in rural areas are much less likely to participate in food assistance programs such as food stamps than their urban counterparts. These researchers found two main reasons for low food stamp participation rates including adverse attitudes toward welfare and lack of accurate information. Furthermore, studies indicate that food acquisition may be constrained in rural areas and that these constraints may increase households' risk of food insecurity (Rank & Hirsch).

Olson and Rauschenbach in their 1997 study examined household food insecurity in a rural area in upstate New York. Their objectives were threefold. First, the researchers identified the social, demographic and economic characteristics of households that contribute to food insecurity. Second, the researchers identified the food acquisition characteristics of households that contribute to food insecurity. And lastly, the researchers analyzed the interrelationships between these two factors. Specifically, this study was conducted in a county with an approximate population in 1990 of 60,000 people. Two hundred women with children in their household participated in this study which included two in-home interviews. The information collected included sociodemographic characteristics, methods of obtaining food, food program participation, household expenditure and the Radimer/Cornell hunger and food insecurity questions. A household food inventory was also conducted. Their results showed that there were higher rates of food insufficiency among households that were low income, renting a home, headed by a single parent, had a low educational level, were larger in size—that is, six or more people in the household, and of an ethnic minority group. Economic

insecurity and limited income earning potential were also related to an increased risk of food insecurity. Additionally, total annual food expenditures were strongly associated with food insecurity and low food supplies. Total amount of money spent on food differed as well. Food insecure households spent approximately 83% of what food secure households spent on food. Although only a small portion of households received food stamps in this study, those receiving insufficient food stamp allowances in which they had to add \$50 or more of their personal money to groceries were more likely to be food insecure and to have lower household food supplies (Olsen & Rauschenbach).

In another study conducted by Olsen, Anderson, Kiss, Lawrence, and Seiling (2004), the researchers interviewed 316 families with children in 24 rural counties in 14 states. Their objectives were to assess how the level of human resources of the household and the diversion of financial resources from food acquisition influence food security. To be eligible for the study, households had to have incomes at or below 200 percent of the federal poverty line and had at least one child 12 years old or younger (Olsen et al.). Both in-depth qualitative and quantitative data were collected from the mother in each household. The results of this study were similar to Olsen's previous work and demonstrated that chronic health conditions, life skills, knowledge of community resources, and participation in the Food Stamp Program were each related to food security status.

Study Purpose and Hypotheses

Although there is a growing body of literature examining food insecurity, no studies exist that examine the relationships between food insecurity, maternal depression, and child behavior among low-income families residing in rural locales. To shed light on this topic, this study examined the ways in which food insecurity—and varying levels of food insecurity—related to maternal depression and child behavior problems. This study also examined these variables as a function of rurality. And lastly, this study examined the combined effect of rurality and food insecurity on maternal depression and child behavior problems.

Based on the extant literature, there were a number of hypotheses developed for this study. These hypotheses included the following bivariate and multivariate expectations:

Bivariate Hypotheses

Food Insecurity and Maternal Depression

- 1a. It was hypothesized that food insecurity would be related to maternal depression. Mothers who reported higher levels of food insecurity would experience more depressive symptoms than their more food secure counterparts.
- 1b. It was hypothesized that mothers included in the “food insecure without hunger” and “food insecure with hunger” groups would display higher levels of maternal depression than their food secure counterparts.

Maternal Depression and Child Behavior

2. It was hypothesized that, as compared to less depressed mothers, mothers who experienced more depressive symptoms would also report that their child exhibited more behavior problems.

Food Insecurity and Child Behavior

- 3a. It was hypothesized that food insecurity would be related to child behavior such that families experiencing higher levels of food insecurity would report more child behavior problems than families experiencing food security.
- 3b. It was also hypothesized that mothers who reported experiencing food insecurity without or with hunger would report more behavior problems exhibited by their children than their food secure counterparts.

Food Insecurity and Rurality

4. It was hypothesized that individuals residing in the most remote areas of the county would report higher levels of food insecurity than those in more urbanized areas.

Multivariate Hypotheses

Rurality, Food Insecurity, and Maternal Depression

5. It was hypothesized that both degree of rurality and level of food insecurity would predict maternal depression such that more rural dwellers and more food insecure mothers would report more depressive symptoms than their less rural, less food insecure counterparts.

Rurality, food insecurity, maternal depression, and child behavior

6. It was hypothesized that rurality, food insecurity, and maternal depression would predict child behavior problems such that more rural dwellers, more food insecure mothers, and mothers experiencing more depressive symptoms would report that their child exhibited more behavioral problems than their less rural, less food insecure, less depressed counterparts.

CHAPTER 3

METHODS

Sample

This study was conducted at two locations: the Gallatin Valley Food Bank and Head Start centers located in the Gallatin Valley. At the Food Bank, data were gathered over a two week period. In an average week, one hundred families receive emergency assistance from the food bank. Given inclusion criteria and refusals, we estimated that we would recruit a minimum of 50% of the families. At the end of the first week, there were only 25 respondents; thus, we extended this study for a second week.

The Gallatin Valley Food Bank provides a 3-5 day supply of “emergency” food to individuals in need and allows recipients to receive food every thirty days as needed. The facility is located in the largest city in the county, Bozeman. Individuals and families from neighboring towns and counties also receive emergency food supplies from this location. Due to the “emergency” relief that the food bank provides, most individuals that come to the food bank are low-income and/or receiving federal assistance.

In 2005, a study of 296 clients at food pantries and soup kitchens in the state was conducted by America’s Second Harvest. Although almost half the people surveyed were employed, almost 77% were experiencing food insecurity, and of this number, over 46% were dealing with severe hunger. In households with children under aged 18, 76% were food insecure. In households with seniors over the age of 65, 57% were food insecure (Montana State Advisory Council on Food and Nutrition, 2006).

Specific to the Gallatin Valley, in 2004, 6,153 Households were provided with emergency food boxes, representing 17,458 individuals and an average household size of 2.83. Of the total households, 907 were requesting emergency food assistance for the first time. Additionally, 29% of the households served requested assistance only once within a one year period. Lastly, almost 33% of the people receiving assistance were under the age of 17 and 9.4% were over the age of 60 (Gallatin Valley Food Bank, 2005).

Inclusion/Exclusion Criteria

Study participants were limited to women with children aged 4 to 16 years. The study was limited to women due to the overwhelming amount of research suggesting higher rates of depression among women than men. As previously mentioned, epidemiologic studies worldwide have established that depression is twice as prevalent in women as men, and that childbearing and child-rearing years are when the first onset of depression peaks (Culbertson, 1997; Kessler et al., 1994; Weissman & Olfson, 1995). Other researchers have found that mothers of young children are at particular risk; maternal depression rates in pediatric primary care settings range from 12% to 47% (Heneghan et al., 1998). Mothers with several young children, single mothers, and mothers in poverty are at even higher risk of depression (Heneghan et al.; Hobfoll et al., 1995). If a participating mother was the primary caregiver for more than one child between the ages of 4 and 16, the mother was asked to focus on the child that had the most recent birthday.

Measures

Demographic Characteristics

All participants were asked a series of questions detailing their sociodemographic characteristics, including mother's age, child's age, mother's level of education, income, and relationship status.

Food Security

Household food security was assessed using the 18-item US Household Food Security Survey Module (Hamilton et al., 1997) which was derived from the CPS data described previously. This scale is the most widely used scale to assess household food insecurity and consists of 18 questions; 10 items about household food insecurity and adult hunger and 8 items about child food insecurity and hunger. These 18 items are ordered by severity and cutoff points were placed a scale according to substantive considerations. The scale is scored using the number of affirmative responses by the household and placed into one of four categories. These are food secure (affirmative responses to less than 3 items in all types of households), food insecure without hunger (households with out children: 3-5 positive responses, households with children: 3-7 positive responses), food insecure with hunger (without children: more than 5 positive responses; households with children: more than 7 positive responses). Households with children are further classified as food insecure with hunger among children if there are affirmative responses to 5 of 8 items specifically addressing children (Alaimo, 2005). Examples of items include: "In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?" and "I/We couldn't afford to

eat balanced meals.” This 12 month scale has been shown to have a reliability score of .81 for households with children and is the most comprehensive instrument developed for measuring food security and hunger in US households (Keenan, Olson, Hersey, & Parmer, 2001).

Maternal Depression

Depression as an indicator of psychological well-being was measured using the Centers for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977). Depression was defined in this study as symptomology expressed through the self-report CES-D Scale which included: depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance. This scale has been successfully used in non-clinical samples. Questions on the CES-D included, “I was bothered by things that don’t usually bother me,” “I felt that everything I did was an effort,” “My sleep was restless,” and “I felt that people disliked me.” Each symptom was coded on a scale ranging from 0 (symptom experienced rarely or never in the past week) to 4 (symptom experienced usually or all the time in the past week). This measure was scored by summing the 20 items, which yielded scores ranging from 1-60. The cutoff score of 16 indicates clinical concern for depression (Radloff). The CES-D is a widely used, easily administrated self-report measure of current depressive symptoms. The scale has good internal consistency with a Cronbach’s alpha of .73, acceptable test-retest reliability, and excellent concurrent validity. The psychometric properties have previously been found to be consistent across sex, age, and ethnic subgroups (Radloff & Locke, 1986).

Child Behavior

Child Behavior was measured using the Pediatric Symptom Checklist. This measure is a psychosocial screen designed to help recognize cognitive, emotional and behavioral problems in children ages 6-16. This parent-completed form consists of 35 items that are rated as “never”, “sometimes” or “often” scored as 0, 1 and 2 respectively. The total score is calculated by summing the scores for each of the items with a cut off point of 28. A score of 28 or higher indicates psychological impairment (Kleinman et al., 1998). Examples of items include: “Less interested in school,” “Does not understand other people’s feelings,” and “Takes things that do not belong to him or her.”

Rurality

Measures of rurality are quite limited in scope. The USDA defines rural areas as those with fewer than 2,500 residents (USDA Economic Research Service, 2007). For this study, we used the following question as a proxy for rurality: “How many miles do you live from the closest major grocery store?” Those who lived farthest away from a major grocery store were considered the most rural dwellers. This measure assumed proximity to a major grocery store was indicative of one’s rurality.

Procedure

This study used a convenience sample and participation was voluntary. Data were collected for two weeks from the hours of 1-4 pm while the Food Bank was open for emergency assistance. Surveys were distributed on clipboards to individuals receiving food boxes at the Gallatin Valley Food bank. Individuals were asked to fill out the

surveys while waiting for their food boxes. The surveys were numbered and not named in order to maintain anonymity. Women were screened by intake workers at the Gallatin Valley Food bank to determine if they fit the inclusion criteria. Once women fitting the inclusion criteria agreed to participate in the study, they were given a consent form. Following their consent, questionnaires were distributed and included a demographics and income survey, the Pediatric Symptom Checklist, the CES-D Scale and the 18 item Household Food Security Scale. Members of the research team were present to answer any questions that participants had regarding the surveys and to distribute/collect questionnaires. Participants filled out a registration form that entered them into a drawing for gift certificates to Albertson's grocery store. Registration forms and questionnaires were separated from one another therefore maintaining anonymity.

To increase the sample size, we also surveyed mothers of Head Start children residing in the same communities as those receiving food boxes at the local food bank. We chose Head Start as a secondary site because Head Start works with low-income families. The Director of the local program asked Head Start teachers to invite mothers to participate in the study. Those who volunteered followed the same protocol as the participants located at the food bank.

Data Analysis Plan

Preliminary Analysis

Prior to analyzing the data, variables were cleaned and coded. Data were then entered and examined for errors. Prior to testing the study hypotheses, univariate statistics were run to determine the demographic characteristics of the sample (e.g., frequencies,

means, and standard deviations). Using independent t-tests, demographic comparisons were made between Food Bank and Head Start participants. Also, using cross-tabulations, the relationships between food security level and receipt of government assistance was reported. The final preliminary analysis included running Pearson Product-Moment correlation coefficients to examine relationships between demographic variables and rurality, food security, maternal depression, and child behaviors. This study set an apriori level of significance at $p < .05$.

Hypothesis Testing

Next, to test the study bivariate hypotheses (1-4), correlation coefficients and Oneway ANOVAs with Tukey HSD post hoc tests were run. To examine the multivariate hypotheses, two regression analyses were conducted. The first was a multiple linear regression to examine the ability of rurality and food insecurity to predict maternal depression (Hypothesis 5). “Survey location” (Food Bank versus Head Start) was included as a control variable in the model.

The next analysis run was a hierarchical linear regression to examine the best predictors of child behavior problems (Hypothesis 6). Predictor variables were entered into blocks. Initial runs included “survey location,” rurality, and total food insecurity score in the first block; however, to present the best model, only total food insecurity was included in the final model. Block 2 added maternal depression. The outcome variable was child behavior problem score. The hierarchical regression analysis was chosen to examine the relative strength of food insecurity and maternal depression to account for the variance in child behavior problems. The rule of thumb for sample-size using

regression analysis according to Darlington (1990) is that the sample size should equal at least 10 times the number of regressors. For this study, the inclusion of 2-4 regressors was well within the limits, given the study sample size of 66 cases.

CHAPTER 4

RESULTS

Preliminary AnalysesDemographic Characteristics

Table 1 presents the demographic characteristics of the total sample. This sample represents all individuals that responded to the survey both at the Gallatin Valley Food Bank and at the Head Start Program. The mean age of respondents was 35.1 with a range of 20 to 57 years. The education level of the sample was relatively high with a mean of 12.47 years of education. Almost 24% of the sample had achieved 14 years of education. Forty-six percent of mothers reported being employed and 15% of the women worked 40 hours a week. Over 55% of the sample's annual household income was less than \$20,000, which is at or below the 2006 federal poverty level for a family of four.

Given that this study was conducted at two separate locations, we compared the demographic characteristics by survey location (see Table 2). Using independent samples t-tests for continuous variables, and Chi-square analyses for discrete variables, there were only four significant differences between those surveyed at the Food Bank and at the Head Start program. Individuals surveyed at the Gallatin Valley Food Bank were significantly older ($M = 36.19, SD = 8.47$) than Head Start participants ($M = 31.47, SD = 5.82$), $t(65) = 2.02, p < .05$. Food Bank participants were less likely to receive government assistance (38.5%) than Head Start participants (80%), $\chi^2(67) = 8.05, p < .01$. Third, Food Bank participants lived further from a major grocery store ($M = 5.18, SD =$

7.00) than Head Start participants ($M = 2.66$, $SD = 2.59$), $t(61) = 2.14$, $p < .05$ and lastly, children at the Food bank were significantly older ($M = 9.67$, $SD = 4.07$) than Head Start children ($M = 5.29$, $SD = 2.27$), $t(58) = 3.84$, $p < .001$. Because there were few significant differences between the two groups, we conducted most subsequent analyses with the groups combined. However, “survey location” was included as a control variable in certain analyses (e.g., multivariate analyses).

Table 2. Demographic Characteristics by Survey Location

Demographic Characteristics	Food Bank (N=52)	Head Start (N=15)	<i>t(df)</i> or χ^2
<i>M (SD)</i> or <i>N (%)</i>			
Age in years	36.19 (8.47)	31.47 (5.82)	<i>t</i> (65)=2.02*
Marital Status			
Single, living alone w/children, divorced, separated.	15 (29.4%)	6 (40%)	χ^2 (67)= 0.60
Married/living with significant other	36 (70.6%)	9 (60%)	
Years of education	12.72 (2.14)	12.47 (3.02)	<i>t</i> (64)=0.36
Work situation			
Working for pay/employed	24 (46.2%)	7 (46.7%)	NA
Unemployed	10 (19.2%)	1 (6.7%)	
Stay at home/caregiver	15 (28.8%)	7 (46.7%)	
Student	2 (3.8%)	0	
Other	1 (1.9%)	0	

* $p < .05$. ** $p < .01$. *** $p < .001$

Table 2. Continued

Demographic Characteristics	Food Bank (N=52)	Head Start (N=15)	<i>t(df)</i> or χ^2
	<i>M (SD)</i> or <i>N (%)</i>		
Hours of work a week	14.86 (20.32)	14.47 (17.48)	<i>t</i> (65)=0.07
Annual household income			
\$0-\$10,000	9 (17.3%)	4 (26.7%)	$\chi^2(67)=0.25$
\$10,001-\$20,000	19 (36.5%)	5 (33.3%)	
\$20,001-\$30,000	14 (26.9%)	4 (26.7%)	
\$30,001-\$40,000	7 (13.5%)	1 (6.7%)	
\$40,001-\$50,000	2 (3.8%)	0 (0%)	
\$50,001-\$60,000	1 (1.9%)	0 (0%)	
Children living in household	2.57 (1.38)	2.47 (1.64)	<i>t</i> (64)=0.24
Child's age	9.67 (4.07)	5.29 (2.27)	<i>t</i> (58)=3.85***
Receive government assistance:			
% yes	20 (38.5%)	12 (80%)	$\chi^2(67)= 8.05^{**}$
% no	32 (61.5%)	3 (20%)	
Miles from a major grocery store	5.18 (7.0)	2.66 (2.59)	<i>t</i> (61)=2.14*

* $p < .05$. ** $p < .01$. *** $p < .001$.

Means, Standard Deviations, and Internal Consistency of Food Security, Maternal Depression and Child Behavior Scores

Table 3 depicts the means and standard deviations for study variables of interest, as well as the internal consistency reliability results (using Cronbach's alpha). The acceptable level for Cronbach's alpha is .70 or above (Berg, 1995). As Table 3 shows, all measures were found to have acceptable internal consistency with alpha scores ranging from .88 to .92.

Table 3. Food Security, Maternal Depression, and Child Behavior Problems: Means, Standard Deviations and Reliability Alphas

Study Variables (N=67)	<i>M (SD)</i>	Cronbach's Alpha
Total Food Security Score	3.52 (2.25)	.877
Maternal Depression Total CESD Score	17.17 (11.16)	.903
Child Behavior Problems PSC Score	18.31 (10.82)	.918

Level of Food Security by Survey Location

Table 4 examines the level of food security by survey location. Although there are individuals in each classification at both survey locations, nearly 44% of the total respondents were classified as “food insecure with hunger.” Only 1 respondent at the Head Start location was classified at this level.

Table 4. Level of Food Security by Survey Location

Survey Location	Level of Food Security		
	Secure (N=16)	Insecure w/o hunger (N=22)	Insecure with hunger (N=29)
	N (%)	N (%)	N (%)
Food Bank	6 (9.0%)	18 (26.9%)	28 (41.8%)
Head Start	10 (14.9%)	4 (6.0%)	1 (1.5%)

Government Assistance as a Function of Level of Food Security

Preliminary analyses were also conducted to examine the relationship between food security levels and receipt of governmental assistance. Those participants who reported being food insecure also reported being less likely to utilize government assistance programs such as TANF, Medicaid/Medicare, Food Stamps, and WIC (See Table 5). Furthermore, participants who reported being food insecure with hunger had the

lowest rates of government assistance with over 65% (n = 19) of those individuals reporting that they did not receiving any government assistance.

Table 5. Receipt of Government Assistance as a Function of Food Security Level

	Level of Food Security		
	Secure	Insecure w/o hunger	Insecure with hunger
Government Assistance Programs	(N=16)	(N=22)	(N=29)
	N (%)	N (%)	N (%)
Public Assistance (%Yes)	8 (50%)	14 (63.6%)	10 (34.5%)
TANF (%Yes)	0 (0%)	1 (4.5%)	0 (0%)
Medicaid/Medicare (%Yes)	6 (37.5%)	10 (45.5%)	7 (24.1%)
Food Stamps (%Yes)	3 (18.8%)	9 (40.9%)	6 (20.7%)
WIC (%Yes)	6 (37.5%)	3 (13.6%)	3 (10.3%)

Correlations between Sociodemographic and Study Variables

Pearson correlation coefficients depicting the strength and direction of the relationships between sociodemographic characteristics and study variables are presented in Table 6. Few demographic variables were significantly related to each other or to maternal depression, child behavior, food security, or rurality. However, maternal age was significantly related to their child's age ($r = .43, p < .01$), level of education ($r = .29, p < .05$) and receipt of government assistance ($r = -.28, p < .05$). As mothers' aged, the

age of their children increased, their level of education increased and government assistance decreased. Relatedly, education level and receipt of government assistance was also significantly related to level of income. As mothers' education levels increased, mothers' annual household income also increased ($r = .33, p < .01$). As mothers' household income increased, their use of government assistance programs decreased ($r = -.32, p < .01$).

Age of the child was significantly related to several variables including mothers age ($r = .43, p < .01$), number of children living in the household ($r = .33, p < .05$), receiving government assistance ($r = -.35, p < .01$), and total food security score ($r = .44, p < .01$). Interestingly, as the age of the child increased, the familial food security status decreased. Number of children in the household was significantly related to two variables: the number of hours mothers' reported working ($r = -.28, p < .05$) and their annual household income ($r = .32, p < .01$). As the number of children in the household increased, mothers' appeared to work fewer hours, however, their income increased. Included among the demographic variables is "miles from a grocery store," our proxy variable for rurality. Interestingly, there were no significant correlations among rurality and demographic variables.

Next, sociodemographic variables were examined in relation to food security, maternal depression, and child behaviors. Interestingly, no sociodemographic variables were significantly correlated with food security, maternal depression, or child behavior scores (see Table 6).

Bivariate Analyses: Hypothesis Testing

In order to examine the bivariate hypotheses listed below, Pearson Product Moment correlation analyses and Oneway ANOVAs with Tukey HSD post hoc tests were run. Results of each hypothesis is described in turn.

Hypothesis 1A and 1B: Food insecurity and maternal depression

Hypothesis 1A stated that food insecurity would be related to maternal depression. Mothers who reported higher levels of food insecurity would experience more depressive symptoms than their more food secure counterparts. As can be seen in Table 5, food security was significantly positively correlated with maternal depression ($r = .38, p < .01$), such that greater food insecurity was related to more depressive symptoms. Thus Hypothesis 1A was supported by the data.

Hypothesis 1B stated that mothers included in the “food insecure without hunger” and “food insecure with hunger” groups would display higher levels of maternal depression than their food secure counterparts. Based on results of the Oneway ANOVAs and Tukey HSD post hoc tests (see Table 7), maternal depression scores were significantly different as a function of level of food security, $F(2, 64) = 8.21, p < .001$. However, contrary to expectations, both mothers’ who reported being food secure ($p < .01$) and mothers’ who reported experiencing food insecurity without hunger ($p < .01$) reported significantly lower levels of depression than mothers who experienced food

insecurity with hunger in the past year. Thus, hypothesis 1B was not supported by the data.

Hypothesis 2: Maternal depression and child behavior

Hypothesis 2 stated that, as compared to less depressed mothers, mothers who experienced more depressive symptoms would also report that their child exhibited more behavior problems. Based on the correlation analyses (as presented in Table 6), maternal depression was significantly positively related to child behavior problems ($r = .32, p < .01$), such that more depressed mothers reported more child behavior problems.

Hypothesis 2 was supported by the data.

Hypothesis 3A and 3B: Food insecurity and child behavior

Hypothesis 3A stated that food insecurity would be related to child behavior such that families experiencing higher levels of food insecurity would report more child behavior problems than families experiencing food security. Hypothesis 3A was assessed by examining the correlation matrix presented in Table 6. Results revealed that the more food insecure a family, the more child behavior problems were reported by mothers ($r = .25, p < .05$). Thus, hypothesis 3A was supported by the data.

Hypothesis 3B stated that mothers who reported experiencing food insecurity without or with hunger would report more behavior problems exhibited by their children than their food secure counterparts. Based on the Oneway ANOVAs and Tukey HSD post hoc tests (see Table 7), child behavior problems significantly differed as a function of level of food security, $F(2, 64) = 3.30, p < .05$. However, the post hoc tests revealed only a trend in the data with respect to where the differences existed. In this case,

mothers' who reported experiencing food insecurity without hunger reported fewer child behavior problems than mothers who experienced food insecurity with hunger in the past year ($p < .10$). As with hypothesis 1B, this hypothesis was not supported by the data.

Hypothesis 4: Food insecurity and rurality

As stated by Hypothesis 4, it was expected that individuals residing in the most remote areas of the county would report higher levels of food insecurity than those in more urbanized areas. Based on the correlation results (Table 6), levels of food insecurity was not related to rurality as measured by miles from the nearest major grocery store. Contrary to expectations, this hypothesis was not supported.

Table 6. Correlation Coefficients of Study Variables

	1	2	3	4	5	6	7	8	9	10	11
1. Mother's Age	--	.43**	.29*	.07	.05	.12	-.28*	.12	.03	-.01	.20
2. Age of child	--	--	.21	-.20	.19	.33*	-.35**	.02	.44**	.14	.15
3. Education level	--	--	--	-.01	.33**	.05	-.23†	-.08	-.02	-.23†	.12
4. Hours of work per week	--	--	--	--	-.05	-.28*	-.18	-.10	.05	-.03	-.05
5. Annual income	--	--	--	--	--	.32**	-.32**	.16	-.07	-.11	-.12
6. Number of children	--	--	--	--	--	--	.17	-.08	.11	.16	.02
7. Government Assistance	--	--	--	--	--	--	--	-.16	-.04	-.13	-.17
8. Rurality: Miles from grocery store	--	--	--	--	--	--	--	--	-.11	-.05	-.07
9. Total Food Insecurity	--	--	--	--	--	--	--	--	--	.38**	.25*
10. Total CESD	--	--	--	--	--	--	--	--	--	--	.32**
11. Total PSC	--	--	--	--	--	--	--	--	--	--	--

† $p < .10$. * $p < .05$. ** $p < .01$.

Table 7. Maternal Depression and Child Behavior Scores as a Function of Food Security

	Level of Food Security		
	Secure (N=16)	Insecure w/o hunger (N=22)	Insecure with hunger (N=29)
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Maternal Depression Total CESD	13.31 (11.54)	12.77 (7.24)	23.00 (10.90)*** ^a
Child Behavior Problems Total PSC	15.56 (11.12)	15.36 (8.66)	22.07 (11.30)* ^b
Rurality: Miles from major grocery store	6.11 (9.35)	3.66 (4.46)	4.52 (5.61)

* $p < .05$. ** $p < .01$. *** $p < .001$.

^a Food insecure with hunger scores significantly higher than food insecure without hunger and food secure scores based on Tukey HSD post hoc tests ($p < .05$).

^b Food insecure with hunger scores significantly higher than food insecure without hunger based on Tukey HSD post hoc tests ($p < .10$).

Multivariate Analyses: Hypothesis Testing

To examine the relationships between multiple variables, a series of regression analyses were run. The first regression examined the ability of rurality and food security scores to predict the variance in maternal depression scores. “Survey location” (i.e., Food Bank versus Head Start) was included as a control variable in this analysis. Initial runs also included sociodemographic variables (e.g., mothers’ age, annual household income, government assistance); however, because none of these variables made a significant contribution to the model, the model was “cleaned” to present the “best” model. Following are the results of the first regression analysis to test Hypothesis 5.

Hypothesis 5: Rurality, food insecurity, and maternal depression

It was hypothesized that both degree of rurality and level of food insecurity would predict maternal depression such that more rural dwellers and more food insecure mothers would report more depressive symptoms than their less rural, less food insecure counterparts. As shown in Table 8, the regression ANOVA was significant, $F(3,63) = 3.91, p < .05$. However, only the total food security score made a significant contribution to the model. As food insecurity increased, mothers’ symptoms of depression also increased ($p < .01$). Contrary to expectations, rurality (as measured by miles from a major grocery store) was not a significant predictor of maternal depression scores.

Table 8. Predictors of Maternal Depression

Predictors	<i>B</i>	(Std Error)	Beta	<i>t</i> value	<i>p</i> value
Survey Location	1.63	(3.65)	.062	.45	.657
Rurality	-0.12	(0.21)	-.070	-.59	.560
Food Insecurity	2.92	(0.68)	.411	3.00	.004

R = .396; *R* Square = .157; Adjusted *R* Square = .117

Next, to examine Hypothesis 6, a hierarchical regression was run. This analysis tested the ability of rurality, food insecurity, and maternal depression to predict child behavior problem scores. Because survey location and rurality made no contribution to the final model, both variables were dropped to present the “best” model predicting child behavior scores.

Hypothesis 6: Rurality, food insecurity, maternal depression, and child behavior

As stated in Hypothesis 6, it was expected that rurality, food insecurity, and maternal depression would predict child behavior problems such that more rural dwellers, more food insecure mothers, and mothers experiencing more depressive symptoms would report that their child exhibited more behavioral problems than their less rural, less food insecure, less depressed counterparts. Using a hierarchical regression analysis allowed for the examination of individual contributions of variables as well as combined

contributions of variables to the prediction of child behavior. Contrary to expectations, rurality did not make a significant contribution to the model (data not presented in table form); thus, Hypothesis 6 was only partially supported.

The final hierarchical regression model included only food insecurity in block 1 and maternal depression in block 2. The final regression ANOVAs were significant for block 1 ($F(1, 65) = 4.38, p < .05$) and block 2 ($F(2, 64) = 4.34, p < .05$). When food insecurity was added in block 1 of the final model, it was significantly related to child behavior problems, such that as a family's food insecurity increased, child behavior problems increased ($p < .05$). The relationship between food security and child behavior problems accounted for 6% of the model variance. However, when maternal depression was added in block 2, total food insecurity no longer made a significant contribution to the model. Maternal depression was the stronger and significant predictor, suggesting that more depressed mothers reported more behavior problems exhibited by their children as compared to the behavior problems of less depressed mothers ($p < .05$). The final model accounted for 12% of the variance in child behavior problem scores.

Summary of Results

Table 10 provides a summary of the study findings by hypotheses. In the discussion section (Chapter 5), each finding is discussed in turn, followed by implications of study findings for researchers, practitioners, and policymakers.

Table 9. Hierarchical Regression Analysis of Food Insecurity and Maternal Depression as Predictors of Child Behavior

Predictor Variables	Block 1			Block 2		
	<i>B</i>	SE	Beta	<i>B</i>	SE	Beta
Food Insecurity	1.21	.579	.251*	.736	.612	.153
Maternal Depression				.251	.124	.257*
Model R^2		.063			.120	
Model F		4.38*			4.34*	

* $p < .05$. ** $p < .01$ *** $p < .001$.

Table 10. Summary of Results Compared with Original Hypothesis

Hypothesis	Results
<p>1a. Food insecurity would be related to maternal depression, where mothers who reported higher levels of food insecurity would experience more depressive symptoms than their more food secure counterparts.</p>	Supported
<p>1b. Mothers included in the “food insecure without hunger” and “food insecure with hunger” groups would display higher levels of maternal depression than their food secure counterparts.</p>	Rejected
<p>2. Mothers who experienced more depressive symptoms would also report that their child exhibited more behavior problems.</p>	Supported
<p>3a. Food insecurity would be related to child behavior such that families experiencing higher levels of food insecurity would report more child behavior problems than families experiencing food security.</p>	Supported

Table 10. Continued

Hypothesis	Results
<p>3b. Mothers who reported experiencing food insecurity without or with hunger would report more behavior problems exhibited by their children than their food secure counterparts.</p>	Rejected
<p>4. Individuals residing in the most remote areas of the county would report higher levels of food insecurity than those in more urbanized areas.</p>	Rejected
<p>5. Both degree of rurality and level of food insecurity would predict maternal depression such that more rural dwellers and more food insecure mothers would report more depressive symptoms than their less rural, less food insecure counterparts.</p>	Partially Supported
<p>6. Rurality, food insecurity, and maternal depression would predict child behavior problems such that more rural dwellers, more food insecure mothers, and mothers experiencing more depressive symptoms would report that their child exhibited more behavioral problems.</p>	Partially Supported

CHAPTER 5

DISCUSSION

The purpose of this study was to examine relationships between food insecurity, maternal depression, and child behavior problems among low-income families residing in rural locales in the state of Montana. Although extant research has examined aspects of these relationships, this study was unique in that it attempted to examine maternal depression and child behavior problems as a function of level of food insecurity and rurality. Consistent with extant research, this study found that food insecurity was related to mothers' mental health, that maternal depression was related to child outcomes, and that food insecurity was related to child behavior problems. Contrary to expectations, however, this study did not find support for a relationship between food security and rurality. Following is a discussion of these study findings.

Food Insecurity and Maternal Depression

As hypothesized, this study found a significant relationship between food insecurity and maternal depression. Specifically, mothers who reported higher levels of food insecurity experienced more depressive symptoms than their more food secure counterparts. This is consistent with past research including the findings of Siefert et al. (2004) and Casey et al. (2004). Siefert and colleagues found an association between household food insufficiency and poor physical and mental health outcomes among current or recent welfare recipients in Michigan and also found that these negative relationships worsened over time. Unlike Siefert et al.'s findings, this study did not

address the duration of food insecurity; however, this study did examine maternal depression as a function of food insecurity levels.

It is important to note that our findings revealed a significant difference in maternal depression between those mothers who experienced food insecurity with hunger and those who experienced food insecurity without hunger. Additionally, there was a significant difference in maternal depression scores among those women who were classified as food secure and those who experienced food insecurity with hunger. Interestingly, there was not a significant difference between mothers classified as food secure and food insecure without hunger as hypothesized. It appears that only the presence of hunger, and not being food insecure alone, correlated to higher depression scores. This study found that mothers experiencing food insecurity with hunger had a mean depression score of 23. This score is well above the depression cut off point of 16, which suggests cause for clinical concern. This finding supports and expands upon the findings of Siefert et al. (2004), who suggested that preventing food insufficiency might lower the risk of major depression in this particular population. It seems reasonable to conclude that the prevention of hunger and the improvement of food insecurity status from “food insecure with hunger” to “food insecure without hunger” may help to ameliorate depression among low-income women with children.

Maternal Depression and Child Behavior

The results of this study reconfirmed a well established link between maternal depression and child behavior problems. Study results suggest that as maternal depression increased so did child behavior problems. This is an important finding because studies

show an association between a mother's depression and adverse outcomes for a child. These adverse outcomes include low birth weight, behavior problems, learning difficulties, poor growth, and higher incidences of accidents, emotional illness and somatic complaints (Zuckerman & Bearslee, 1987). Furthermore, McLeod and Nonnemaker (2000) have established that higher rates of parental stress and maternal depression were associated with harsher, inconsistent, and less responsive parenting, which can further hinder positive child development. It is important to note that mother-child relationships are bidirectional in nature—in other words, it is possible that child behavior problems resulted in maternal depression, perhaps because mothers grew frustrated by or felt inadequate to sufficiently deal with their child's problematic behaviors. Determining causality between maternal depression and child behavior problems requires longitudinal studies.

Food Insecurity and Child Behavior

The results of this study showed a significant relationship between child behavior problems and food insecurity status indicating the more food insecure the family, the more child behavior problems reported. The results were consistent with past research indicating that children experiencing food insufficiency were more likely to have psychosocial difficulties than their food sufficient counterparts (Alaimo et al., 2001). However, when we examined child behavior problems as a function of the level of a family's food insecurity, findings were not consistent with expectations. While there was a significant child behavior difference by food security levels, the post hoc analyses only revealed a trend in the data, suggesting that the child behavior differences were between

families experiencing food insecurity with hunger and those experiencing food insecurity without hunger. Mothers who were food insecure with hunger reported more child behavior problems than their insecure without hunger counterparts. Such findings were consistent with findings regarding maternal depression and suggest the need to examine the experience of hunger (rather than food insecurity per se) as salient in understanding familial coping and child behavioral outcomes. However, it is important to note that, although the post hoc analyses did not show a significant difference between child behavior problems among the “food secure” and “food insecure with hunger” groups, the mean score of the “food secure” group was comparable to the “food insecure without hunger” group (i.e., 15.6 and 15.4, respectively). It is possible that our sample size was too small to detect significant differences. Future research with larger samples will likely yield enough statistical power to detect significant differences between these groups.

Food Insecurity and Rurality

Contrary to expectations, this study did not find support for a relationship between food security status and rurality. Previous research has found that families living in highly rural locales are more at risk for food insecurity than those living in the suburbs, metropolitan areas, and non-central cities (Morris et al., 1992). The lack of a significant relationship between food security and rurality may be due to several factors. First, in this study, a proxy measure was used to assess level of rurality. Mothers were asked to report how many miles they lived from the nearest major grocery store. And while there was variance in the distances reported (e.g., from less than a mile to 35 miles away), the majority (79%) lived five miles or less from a grocery store. It is likely that this measure

did not significantly relate to food security levels (or maternal depression or child behavior problems) because it did not sufficiently tap into the construct of rurality. As mentioned previously, reliable measurements of rurality are lacking. Future research is needed to continue to operationalize the term and ensure that we are actually measuring the rural experience.

Second, Rank and Hirsch (1993) have shown that qualified families in rural areas are much less likely to participate in food assistance programs such as the Food Stamp program as compared to their more urban counterparts. Rank and Hirsch also concluded that rural households had adverse attitudes toward welfare. It is possible that highly rural families in our sampling area, who are less likely to participate in food assistance programs and have negative attitudes towards government assistance, are also less likely to utilize emergency assistance provided by the local Food Bank. Thus, it is possible that rural residents may be underrepresented at the Food Bank and at the Head Start program. It is also possible that, in our two week data collection window at the Food Bank, we missed highly rural families. Future researchers should ensure that their sampling strategies yield a representative sampling of the range of rural dwellers residing in their targeted communities.

Predictors of Maternal Depression and Child Behavior

In addition to examining bivariate relationships between food security, maternal depression, and child behavior problems among low-income families residing in rural locales, this study also examined predictors of maternal depression and child behavior problems. Consistent with the findings above, the regression analysis examining

predictors of maternal depression revealed that rurality as measured by miles from a major grocery store failed to account for the variance in maternal depression. The best and only significant predictor of maternal depression in this study was food security status. As discussed earlier, those mothers who experienced more food insecurity also reported experiencing greater numbers of depressive symptoms. Such findings suggest that one's ability to access food of high quality and adequate quantity is critical to one's mental health and coping abilities. Mothers who are food insecure—and especially mothers who are food insecure and hungry—must struggle to meet their own basic needs as well as the nutritional needs of their children. As Maslow's (1970) Hierarchy of Needs suggests, when one's basic needs are not sufficiently met, coping and functioning will be compromised.

This study also examined the best predictors of child behavior problems. While food security status was a significant predictor of child behavior problems on its own, when we added maternal depression in the analyses, food security status failed to account for the variance in child behavior outcomes. It is possible that food security status and maternal depression accounted for overlapping variance in child outcomes. In other words, there may have been problems with multicollinearity. It is also possible that maternal depression is the better predictor of child behavior. Perhaps the pathway is experienced as follows: mothers who are food insecure and hungry do not have adequate coping capacity to deal with their feelings of sadness and hopelessness; depressed mothers then may be unable to positively cope with or meet the developmental needs of their children, which may result in child behavior problems. Clearly, this cross-sectional

study with a limited sample size cannot determine whether such pathways are accurate. Future research is needed to continue to flush out these relationships and how they manifest in the lived experiences of low-income families. However, study findings do hold implications for future research, practice, and policymaking.

Study Limitations and Future Research

Although this study sheds light on relationships between food security, maternal depression, and child behavior outcomes among low-income families residing in rural locales, there are a number of limitations that should be addressed by future research efforts. For example, this study was limited by its small convenience sample. Although we anticipated a larger sample from the Gallatin Valley Food Bank, after two weeks of collecting data we were only able to obtain 52 responses (about half our anticipated sample size). Because we were limited by time constraints to execute this study, we extended our survey location to include mothers of children participating in Head Start. Our rationale was that these families were also low-income and likely experienced similar hardships associated with limited resources. Unfortunately, because we did not establish adequate ties to the Head Start community, our participation rate was fairly low. While Food Bank and Head Start mothers did not vary significantly in terms of their demographic profile, Head Start mothers were less food insecure than Food Bank participants.

The sampling limitations of this study preclude us from generalizing our findings to larger, more diverse groups of families in Montana. Moreover, because the sample was predominantly White, future research examining food security issues is needed among

more diverse racial and ethnic groups (as well as more diverse rural dwellers). In Montana, Native American families comprise approximately 6% of the total population in the state. Native American families often live on reservations that vary in their degree of rurality and proximity to larger, more urbanized communities. Examining relationships between food security status, maternal depression, and child behavior among these more diverse groups hold implications for the ways in which we intervene in order to ameliorate food insecurity and hunger. Thus, to obtain a more accurate picture of food insecurity in rural Montana, a representative random sampling strategy should be employed.

Another study limitation relates to our chosen methodology and reliance on self-report responses from surveys. Although anonymous surveys are often the chosen methodology when asking individuals sensitive and possibly embarrassing questions about their personal and family lives, there is no way to know if participants were honest with their responses. The questions about child behavior were answered by the parent and were their opinion of their child's behavior. Future research might consider conducting in-depth interviews with families and also observing child behaviors and parent-child interactions. These methods may shed additional light on familial processes and adaptations to food insecurity.

Another limitation of this study is that we were unable to establish a response rate. It appeared that most participants who met the inclusion criteria at the Food Bank agreed to participate; however, we know of one participant who failed to complete the survey and we dropped two additional surveys due to missing data. We do not know how

many surveys were dispersed at the Head Start location, therefore, we can not determine the overall response rate for this study. It will be important for future research efforts to more carefully sample participants in order to better understand which methodologies are best suited for our population of interest. Pilot studies may be useful in this process. Unfortunately, because of time constraints and limited resources, this study could not address these methodological and sampling concerns adequately.

And finally, the analyses run for this study were of a correlational nature. Therefore, the data cannot explain causality of relationships. For example, based on this study's findings, we cannot conclude definitively that maternal depression caused poorer behavioral outcomes in children. To determine causality and to better understand the complex relationships associated with food security status, future longitudinal research efforts are needed. Other variables to be included in future research might include the length of time families received assistance at food banks, the length of time families have experienced food insecurity with and without hunger, changes in child behavior status over time, and changes in maternal depression over time. And clearly, if future researchers want to better understand the influence of rurality on food security status and family functioning, more complex and reliable measures of rurality are needed.

Implications for Practitioners and Policymakers

Findings from this study have many implications for researchers, practitioners, and policymakers. It is apparent from the findings of this study, as well as findings from the extant literature, that food security status is related to maternal depression and child behavior outcomes. These findings should be understood in terms of Maslow's (1970)

Hierarchy of Needs. Before emotional needs can be addressed, basic physiological needs must be met. Thus practitioners and policymakers alike are challenged to ameliorate food insecurity among families and address hunger in Montana and across the nation if they wish to improve familial coping and child well-being, especially among low-income families.

In addition, practitioners and policymakers are challenged to better understand why—in a nation as wealthy as ours—so many families are qualified to receive government assistance. In other words, why are there so many low-income families in the US? In our study, 55% of the participants met the 2006 federal poverty level for a family of four. Eighty-two percent of the study participant's annual income was \$30,000 or less. Additionally, only 16.4% of the sample reported being unemployed. This suggests that those that work need access to better paying jobs and those who are unemployed should be provided with assistance in finding gainful employment that pays a living wage. Scholarships, grants and incentives should be provided to low income individuals to pursue a higher education or technical degree in order to obtain a well paying job. Low cost child care should be provided to families that want to work. If practices and policies supported the upward mobility of families, perhaps fewer families would qualify for and need food assistance and other government-supported services.

In conjunction, practitioners and policymakers should work together to better understand why low-income, Food Stamp eligible families are falling through the cracks and not accessing food assistance programs. Why is there such a high percentage of food insecure families who are not utilizing government assistance? Looking back at our data,

over one-third of families were not participating in the Food Stamp program, yet reported experiencing food insecurity. Government programs must be more accessible to qualified individuals and policies should be written to ensure that the process of applying for assistance is streamlined and user friendly. Moreover, practitioners should consider reaching out to low-income and rural families to attempt to decrease the stigma associated with receiving food assistance (or government assistance more broadly). As the economies of rural communities struggle in the global marketplace, it is likely that rural families will face food insecurity issues at a growing rate. Information should be made readily available to rural and non-rural families alike regarding Federal food and income assistance programs, including WIC, TANF, Food Stamps, and the National School Lunch Program. All income eligible children should be participating in the National School Lunch program (as well as Breakfast and Summer Lunch Programs). If eligible children are able to have one or more free, substantial meals a day, perhaps family resources could be redistributed and food insecurity reduced. Moreover, these food assistance programs should be examined to ensure that food quantity, quality, and suitability, as well as the psychological and social aspects of food programs, are meeting the needs of the families they are intending to serve (Splett, 1994).

Before we can address any other human needs, we must ensure that individuals and families are not hungry. Once food security is established, mental health professionals may be better able to provide counseling and psychological resources pertaining to depression and child behavior problems. However, if the root of these problems and family challenges is not addressed, individuals may be less likely to

address their mental health needs and improve their individual and family functioning. Teachers, mental health workers, and public health care professionals in general should be educated about the increasing problem of food insecurity and the potential negative consequences of food insecurity for families. By better understanding the challenges faced by families—and especially low-income families—practitioners and policymakers will be better able to support the needs of families and the larger communities in which they live.

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APPENDICES

APPENDIX A

HUMAN SUBJECTS APPLICATION



INSTITUTIONAL REVIEW BOARD
For the Protection of Human Subjects

960 Technology Blvd Room 127
c/o Veterinary Molecular Biology
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Telephone: 406-994-6783
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E-mail: cherylj@montana.edu

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Administrator:
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MEMORANDUM

TO: Lauren Long
FROM: Mark Quinn, Ph.D. Chair *Mark Quinn*
Institutional Review Board for the Protection of Human Subjects
DATE: November 16, 2006
SUBJECT: *Food Insecurity, Parental Depression, and Child Behavior*

The above research, described in your submission of November 15, 2006, is exempt from the requirement of review by the Institutional Review Board in accordance with the Code of Federal Regulations, Part 46, section 101. The specific paragraph which applies to your research is:

- (b)(1) Research conducted in established or commonly accepted educational settings, involving normal educational practices such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
- (b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.
- (b)(3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
- (b)(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if those sources are publicly available, or if the information is recorded by the investigator in such a manner that the subjects cannot be identified, directly or through identifiers linked to the subjects.
- (b)(5) Research and demonstration projects, which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.
- (b)(6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed, or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the FDA, or approved by the EPA, or the Food Safety and Inspection Service of the USDA.

Although review by the Institutional Review Board is not required for the above research, the Committee will be glad to review it. If you wish a review and committee approval, please submit 3 copies of the usual application form and it will be processed by expedited review.

APPENDIX B

HUMAN PARTICIPANTS PROTECTIONS EDUCATION FOR RESEARCH

COMPLETION CERTIFICATE



Human Participant Protections Education for Research Teams

Completion Certificate

This is to certify that

lauren long

has completed the **Human Participants Protection Education for Research Teams** online course, sponsored by the National Institutes of Health (NIH), on 11/12/2006.

This course included the following:

- key historical events and current issues that impact guidelines and legislation on human participant protection in research.
 - ethical principles and guidelines that should assist in resolving the ethical issues inherent in the conduct of research with human participants.
 - the use of key ethical principles and federal regulations to protect human participants at various stages in the research process.
 - a description of guidelines for the protection of special populations in research.
 - a definition of informed consent and components necessary for a valid consent.
 - a description of the role of the IRB in the research process.
 - the roles, responsibilities, and interactions of federal agencies, institutions, and researchers in conducting research with human participants.
-

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FIRSTGOV

APPENDIX C

INFORMED CONSENT FORM



CONSENT FORM

FOOD AND FAMILY WELL-BEING

You are being asked to participate in a study that will examine food security and family well being in the Gallatin Valley. This study will focus on women who have children between the ages of 6 and 16. Although you may not personally benefit from participating in this study, the research team hopes to better understand the relationship between food security and our family well being.

If you agree to participate in this study, you will be asked to complete a questionnaire which will take a total of 15 minutes of your time. Because we appreciate your time and value your contribution to this study, you will receive a gift certificate from one of several area stores. Please note that you may refuse to answer any of the questions or stop participating without any consequence to you. All of the information obtained in this study will be kept confidential as you will remain **anonymous**. Only the research team will view the information gathered on the questionnaires.

QUESTIONS:

If you have questions regarding the research study, please contact Lauren Long at (406) 994-7396 or via email at laurenlong@wispwest.net or Dr. Bethany Letiecq at (406) 994-7396 or via email at bletiecq@montana.edu.

You may also contact Dr. Mark Quinn, Chair of the MSU Institutional Review Board for the Protection of Human Subjects, at (406) 994-5721.

COMMUNITY RESOURCES:

We also want to let you know about other resources in the community that may be able to help you meet your family's needs.

Office of Public Assistance (TANF, Food Stamps, Medicaid)	406-582-3010
Food Stamp Hotline—Citizen's Advocate	800-332-2272
WIC (Women, Infants, Children) Office	406-582-3115
Gallatin City/County Health Department	406-582-3100
Child and Family Services	406-585-9984
MSU Human Development Clinic	406-994-4113
Bozeman Area Mental Health Center	406-522-7357
Mental Health Help Desk	800-866-0328

APPENDIX D

SURVEY

Section 1. Tell Us about Yourself and Your Family

The following questions will help us gather general information about you and your family. Your answers will be kept strictly confidential. Please be as honest as possible and feel free to write comments in the margins to clarify your answers (if needed).

Please fill in the blank or check the box that best reflects your experience:

1. What is your age? _____ years
2. What is your relationship status? Married/living with significant other
 Single: living alone/with children, divorced, separated
3. How many years of education have you completed? _____ years of education
4. Which of the following best describes your working situation? (Please check one)
 - Working for pay/employed
*How many hours a week do you typically work? _____ hours/week
 - Unemployed
 - Retired
 - "Stay at home" parent/caregiver
 - Student
 - Other, please specify: _____
5. How many children do you have living in your household? _____ children in my house
6. What is your annual household income range? (Please check one)

<input type="checkbox"/> \$0 - \$10,000 per year	<input type="checkbox"/> \$40,001 - \$50,000
<input type="checkbox"/> \$10,001 - \$20,000	<input type="checkbox"/> \$50,001 - \$60,000
<input type="checkbox"/> \$20,001 - \$30,000	<input type="checkbox"/> over \$60,000
<input type="checkbox"/> \$30,001 - \$40,000	<input type="checkbox"/> Refuse to answer this question
7. Do you or your children receive government assistance? Yes No
If yes, please check all that apply:
 - TANF/TANF Child-Only
 - Medicaid/Medicare
 - Food Stamps
 - WIC
 - Other: _____

8. How many miles do you live from the closest **major** grocery store (e.g., Safeway, Albertsons)?
_____ miles

9. What community do you live in? (Please check one)

Bozeman

Belgrade

Three Forks

Ennis

Livingston

Other, please specify: _____

Section 2. Tell Us How You are Feeling this Week

This set of questions deals with some of your own feelings over the past week. Please check the box that best reflects how often you felt this way over the past week. Choices include:

(0) (1) (2) (3)
Rarely or none **Some or a little** **Occasionally or a** **Most or all**
of the time **of the time** **moderate amount of** **of the time**
(less than 1 day) **(1-2 days)** **time (3-4 days)** **(5-7 days)**

<i>This past week...</i>	(0) Less than 1 day	(1) 1-2 days	(2) 3-4 days	(3) 5-7 days
1. I was bothered by things that usually don't bother me.				
2. I did not feel like eating; my appetite was poor.				
3. I felt that I could not shake off the blues even with help from my family or friends				
4. I felt I was just as good as other people.				
5. I had trouble keeping my mind on what I was doing.				
6. I felt depressed.				
7. I felt that everything I did was an effort.				
8. I felt hopeful about the future.				
9. I thought my life had been a failure.				
10. I felt fearful.				
11. My sleep was restless.				
12. I was happy.				
13. I talked less than usual.				
14. I felt lonely.				
15. People were unfriendly.				
16. I enjoyed life.				
17. I had crying spells.				
18. I felt sad.				
19. I felt that people dislike me.				
20. I could not get "going".				

Section 3. Tell Us about Your Child The next two sections are about your child **ages 4-16**. If you have more than one child in this age range, **please choose the child who had the most recent birthday**. *Age of your child _____ years.

	Never	Sometimes	Often
1. Complains of aches and pains.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Spends more time alone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Tires easily, has little energy.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Fidgety, unable to sit still.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Has trouble with teacher.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Less interested in school.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Acts as if driven by a motor.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Daydreams too much.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Distracted easily.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Is afraid of new situations.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Feels sad, unhappy.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Is irritable, angry.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Feels hopeless.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Has trouble concentrating.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Less interested in friends.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Fights with other children.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Absent from school.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. School grades dropping.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Is down on him or herself.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Visits the doctor with doctor finding nothing wrong.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Has trouble sleeping.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. Worries a lot.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Wants to be with you more than before.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Feels he or she is bad.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Takes unnecessary risks.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Gets hurt frequently.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Never	Sometimes	Often
27. Seems to have less fun.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Acts younger than children his or her age.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Does not listen to rules.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Does not show feelings.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Does not understand other people's feelings.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Teases others.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Blames others for his or her troubles.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Takes things that do not belong to him or her.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Refuses to share.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 4. Tell Us How You Deal with Your Child

Please tell us how often you do the following with your child. Your choices are:
 1 = Never 2 = Once in a While 3 = About Half of the Time 4 = Very Often
 5 = Always

	1	2	3	4	5
	Never				Always
1. I give praise when my child is good.....	<input type="checkbox"/>				
2. I show patience with my child.....	<input type="checkbox"/>				
3. I spank when my child is disobedient.....	<input type="checkbox"/>				
4. I give into my child when my child fusses.....	<input type="checkbox"/>				

- 5. I argue with my child.....
- 6. I joke and play with my child.....
- 7. I ignore my child's bad behavior.....
- 8. I set strict rules for my child.....
- 9. I bribe my child with rewards
to bring about good behavior.
- 10. I yell or shout when my child misbehaves.
- 11. I express affection by hugging, kissing,
and holding my child.....
- 12. I reason with my child when my child misbehaves

Section 5. Tell Us about Food in Your Home

The next set of questions is about the food eaten in your household in **the last 12 months**.

Please check the box that best reflects your situation

1. **“The food that I/we bought just didn’t last and I/we didn’t have money to get more.”** Was this often, sometimes or never true for your household **in the last 12 months**.

often true sometimes true never true

2. **“I/we couldn’t afford to eat balanced meals.”** Was this often, sometimes or never true for your household **in the last 12 months**.

often true sometimes true never true

3. **In the last 12 months**, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn’t enough money for food?

Yes
 No

***If yes**, how often did this happen?

Almost every month
 Some months but not every month
 Only 1 or 2 months

4. **In the last 12 months**, did you ever eat less than you felt you should because there wasn’t enough money to buy food?

Yes
 No

5. **In the last 12 months**, were you ever hungry but didn’t eat because you couldn’t afford enough food?

Yes
 No

THE END.
THANK YOU VERY MUCH!!!

If you would like to be entered into a drawing for a chance to win one of five \$20 gift certificates to Albertsons please complete and detach the registration form on the next page. Surveys and registration forms will be kept **SEPARATE!**

Survey Registration Form
Please Print Clearly

Name _____

Address _____

Phone _____

Thank you for your time. This Form enters you into a drawing for a chance to win one of five \$20 gift certificates to Albertson's Grocery Store. Please complete only one survey and one registration form per household.