

## ABSTRACT

Title of Document: THE RELATIONSHIPS AMONG FOOD SECURITY, HEALTH LOCUS OF CONTROL, AND MENTAL HEALTH.

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Prior research has demonstrated a relationship between food insecurity and poor mental health, but this research has been conducted primarily in samples of females. In addition, the mechanisms through which this relationship operates are not well understood. This study investigated whether a relationship between food security and mental health exists for both males and females, as well as whether health locus of control mediates this relationship. Data were from a convenience sample of 110 female and 40 male Supplemental Nutrition Assistance eligible adults in Maryland. Based on self-reports, the relationship between food security and mental health was significant among males and borderline significant among females. Whereas health locus of control mediated the relationship between food security and mental health for the women, it did not for the men. Findings indicated men and women commonly experience food insecurity and poor mental health concurrently. Understanding this relationship is essential for appropriate intervention.

THE RELATIONSHIPS AMONG FOOD SECURITY, HEALTH LOCUS OF  
CONTROL, AND MENTAL HEALTH.

By

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## Table of Contents

Acknowledgements.....	ii
Table of Contents .....	iii
List of Tables .....	v
List of Figures .....	vi
Chapter 1: Introduction .....	1
Statement of the Problem.....	1
Groups affected by food insecurity.....	1
Outcomes associated with food insecurity.....	2
Questions that need to be addressed regarding food insecurity and mental health .....	3
Purpose.....	5
Chapter 2: Literature Review.....	8
Stress and Coping Theory .....	8
The Relationship between Food Insecurity and Mental Health.....	14
Cross-sectional studies.....	14
Longitudinal studies.....	20
Qualitative studies.....	22
The Relationship between Health Locus of Control and Mental Health .....	24
Cross-sectional studies.....	24
The Relationship between Locus of Control and Mental Health in the Context of Stressors .....	26
Cross-sectional studies.....	26
Hypotheses .....	34
Chapter 3: Methodology .....	35
Sample.....	35
Procedures.....	38
Measures .....	38
Demographic variables .....	38
Food security.....	39
Health locus of control.....	40
Chapter 4: Results.....	43
Supplementary Analysis .....	45
Chapter 5: Discussion .....	47
The Relationship between Reported Food Security and Reported Mental Health .....	47
Degree of support for hypothesis.....	47
Relation of findings to past literature.....	47
Reported Health Locus of Control as a Mediator of the Relationship between Reported Food Insecurity and Reported Mental Health .....	48
Degree of support for hypothesis.....	48
Relation of findings to past literature.....	48
Possible explanations for findings .....	50
Implications of Findings .....	53
The relationship between food insecurity and mental distress .....	53

The relationships among food insecurity, mental distress, and health locus of control in women .....	55
Limitations of this Study.....	56
Sample.....	56
Measures and analyses .....	56
Specific Research Needed to Clarify or Extend Findings .....	57
Sample.....	57
Measures .....	57
Directions for Future Research .....	57
Appendix A.....	59
Appendix B.....	60
Appendix C.....	61
Appendix D.....	62
References.....	63

## List of Tables

Table 1	Demographic Characteristics of the Sample	38
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## List of Figures

Figure 1	Proposed Mediation	35
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## Chapter 1: Introduction

### Statement of the Problem

Despite the seeming abundance of food in the United States, food insecurity, “the limited or uncertain availability of nutritionally adequate and safe foods or the limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (Anderson, 1990, p. 1560) is still a problem for many Americans. During 2008, approximately 14.6 percent of households (49.1 million people, including 16.7 million children) experienced food insecurity at some time (United States Department of Agriculture [USDA], 2009). This is an increase from 11.1 percent of households in 2007 and a dramatic increase from 9.8 percent of households in 2001 (Nord, Andrews, & Carlson, 2007).

**Groups affected by food insecurity.** Food insecurity most affects vulnerable groups, such as those who are low-income, minorities, women, or children. According to the USDA 2008 Household Food Insecurity Report (USDA, 2008), particularly high levels of food insecurity were found among households with incomes below the official poverty line, earning \$21,834 for a family of four (42.2%); households with children, headed by a single woman (37.2%); households with children, headed by a single man (27.6%); Hispanic households (26.9%); Black households (25.7 %); and rural households with children (17.7%).

Among adults, food insecurity is associated with large household size, unexpected expenses, lower levels of food and financial management skills, not owning a home, and difficulty paying for medical care (Olson & Rauschenbusch, 1997). Women, especially women of color, are disproportionately affected by food insecurity (Collins, 2009). Factors associated with greater food insecurity among 4,037 randomly sampled women in

California were being Hispanic or Black; having obtained less than a 12th grade education; being unmarried; being less than 55 years old; speaking only Spanish; having spent less than half of one's life in the United States; experiencing sadness or depression; feeling overwhelmed; and experiencing poor physical and mental health (Kaiser, Baumrind, & Dumbauld, 2007). Given these characteristics, food security appears to most occur amongst those who lack power and privilege and who, therefore, have less access to opportunities and resources in society.

**Outcomes associated with food insecurity.** Studies of correlates of food insecurity have primarily focused on women and children, as women disproportionately experience food insecurity and children are amongst the most vulnerable in society. For these groups, food insecurity has been associated with a variety of negative health outcomes. For women, these outcomes include low intakes of protein, magnesium, calcium, phosphorous, and vitamins A, E, C, and B6 (Rose & Oliveira, 1997), as well as high rates of self-reported physical and mental health problems (Corcoran, Heflin, & Siefert, 1999). In addition, food insecurity in women seems to be related to higher body weight, although the nature of the relationship is inconclusive (Dinour, Bergen, & Yeh, 2007). Overall, food insecure women report more mental, emotional, and physical health problems than food secure women (Kaiser et al., 2007).

Food insecurity is related to a wide variety of health and developmental outcomes for children. For children in food insecure households, health issues associated with food insecurity include compromised psychosocial functioning, even when controlling for maternal education and estimated household income (Olson, 1999); health and developmental problems (Melchior et al., 2009); impaired academic performance,

declined social skills in boys, and greater weight and BMI in girls (Jyoti, Frongillo, & Jones, 2005). In addition, food insufficiency, a more specific form of food security that occurs when household food stores are restricted or there is too little household food intake among either adults or children (Scott & Wehler, 1998), has been associated with negative outcomes for children. Children living in homes characterized by food insufficiency have a greater incidence of behavior problems (Alaimo, 2005) and more limited cognitive development and achievement (Alaimo, Olson, & Frongillo, 2001) than those in food sufficient households.

Level of maternal food insecurity is positively correlated with prevalence of behavior problems among three-year-old children (Whitaker, Phillips, & Orzol, 2006). In addition, household food insecurity during infancy is associated with less secure attachment to caregivers and lower mental proficiency in toddlerhood. There is evidence that this association is indirect, mediated by maternal depression and parenting practices (Zaslow et al., 2009).

**Questions that need to be addressed regarding food insecurity and mental health.** The negative physical health outcomes associated with food insecurity have been widely investigated, and rightfully so. However, as observed by Hadley and Patil (2008), “food insecurity literature has been dominated by a focus on nutritional outcomes despite emerging recognition that mental health outcomes are important sources of disability” (p. 230). The relationship between food security and mental health is an important but relatively new area of study, and a broader conceptualization of food security “takes into account the possibility that acute or chronic exposure to periods of uncertainty in the food supply can influence mental health as well as physical health outcomes” (Hadley & Patil,

2006, p. 359). In extant literature focusing on the relationship between these two variables, food insecurity has been consistently linked to negative mental health outcomes. For example, mental health conditions associated with food insecurity for women include “higher levels of stress, anxiety, irritability, social isolation, heightened emotional responsiveness, eating disorders and depression, as well as impaired cognitive abilities” (Collins, 2009, p. 251).

The negative outcomes associated with food insecurity are difficult to disentangle from those associated with being low-income and of minority status. However, the existing research concerning food security and mental health has controlled for a wide variety of relevant covariates, including income, inter-partner violence, and employment. Even though the studies examine a diverse array of groups, including those in rural and metropolitan areas and people who are non-Hispanic white, Hispanic, African American, and African, all studies found a significant association between food insecurity and poor mental health. In addition, Alaimo, Olson, and Frongillo (2002) found that in a sample of adolescents, family food insufficiency, but not low family income, was associated with Dysthymia (moderate level, chronic depression) and suicidal symptoms, measured as the endorsement of statements such as “thought a lot about death—either your own, someone else’s or death in general,” and “felt like you wanted to die” (p. 720).

Although a clear relationship exists between food insecurity and poor mental health in populations of women and children, the nature of that relationship and the mechanisms through which it operates are not well understood. In addition, it is unclear if this relationship exists and is salient for both sexes because of the dearth of research regarding food security and mental health in populations of males. The present study

intended to address these gaps in knowledge regarding the link between mental health and food security.

### **Purpose**

Because food insecurity, by definition, is a construct reflecting uncertainty, it is possible that this experience of uncertainty may be associated with feelings of a lack of control over one's health and an experience of mental distress. This study investigated health locus of control as a potential mediator of the relationship between individuals' food insecurity and poor mental health. The construct of locus of control reflects the degree to which people believe that life situations are within their control (Lefcourt, 1976). People who believe that outcomes are not within their control have an external locus of control, whereas people who believe that they have the capacity to control outcomes in their lives have an internal locus of control. The construct taps into the basic way in which individuals view themselves in relation to the world. Locus of control has been the subject of research for decades, and "an impressive body of literature demonstrates the significant benefits of feelings of control, and there is now a consensus that sense of control facilitates positive adaptation under stressful life conditions and promotes physical and emotional well-being" (Jang, Chiriboga, & Small, 2008, p. 2). Locus of control is pertinent to the topic of food security and mental health, because research has found that individuals who report higher levels of stress in their lives also report a more external locus of control orientation, as well as higher levels of physical and psychological illness (Roddenberry & Renk, 2010). In addition, in many contexts, locus of control orientation has been associated with degree of depression, with greater externality associated with greater depression (Benassi, Sweeney, & Dufour, 1988).

Furthermore, Laraia, Siega-Riz, and Gundersen (2006) found that having an external locus of control was positively associated with household food insecurity.

Although there has been no evidence regarding gender-based differences in general locus of control, gender differences have been uncovered in specific domains, such as locus of control regarding academic achievement, with the relationship between locus of control and academic achievement being more substantial for males than for females (Findley & Cooper, 1983).

One specific domain of locus of control is health locus of control, which reflects the degree to which a person believes that the quality of his or her health is within his or her control (Wallston & Wallston, 1982). For those with physical conditions such as chronic pain and cancer, a more external health locus of control orientation predicts depression, anxiety, and higher overall levels of psychological distress (Arraras, Wright, Jusue, Tejedor, & Calvo, 2002; Crisson & Keefe, 1988; Wu, Tang, & Kwok, 2004).

Health locus of control was examined in this study, because food insecurity presents constraints for healthy living. Potentially, those who are food insecure feel as though they are not in control of their health -- i.e., have an external health locus of control orientation. Feeling a lack of personal control over one's health may have implications for individuals' mental health, as health locus of control may be an internal process through which the experience of food insecurity results in psychological distress.

The purpose of the present study was to investigate whether there is a direct relationship between food security status and level of mental health in a sample of Supplemental Nutrition Assistance Program (SNAP) eligible adults, as well as whether the relationship between food security and mental health in this population exists for both

women and men. In addition, the study investigated whether health locus of control is a mediator of that relationship for each sex. Better understanding of the processes through which food insecurity is linked to mental health problems may help to elucidate the experiences of those who suffer from food insecurity and mental distress. Increased understanding of such processes is an important prerequisite for identifying interventions to reduce distress and enhance the sense of personal control in the lives of the substantial number of individuals experiencing food insecurity.

## **Chapter 2: Literature Review**

### **Stress and Coping Theory**

This study examined the associations among food insecurity, health locus of control, and psychological distress from the perspective of Stress and Coping Theory (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). This theory addresses not only stress and coping, but also personal control, making it particularly applicable to the present topic. Stress and Coping Theory focuses on individual differences in people's responses to a variety of demands or stressors that they encounter in life. The model is process-oriented, because it focuses on relationships between persons and their environments, instead of focusing on the person or environment in isolation. Within the theoretical model, stress is defined as "a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and as endangering his or her well-being" (Folkman, 1984, p. 840). From this perspective, stress is not solely a property of the person or of the environment, but instead emerges from the relationship between the two. The person makes evaluations of the meaning of an event in the context of a specific environment and circumstances, as well as personal factors specific to the individual. The model views the person-environment relationship as dynamic (constantly changing) and bidirectional (the person is affected by the environment and the environment is affected by the person).

Folkman (1984) specifically addressed the role of personal control in Stress and Coping Theory, pointing out two forms of control 1) generalized beliefs about control and 2) situational appraisal of control. She asserted that, given the Stress and Coping Theory's relational perspective, "control must be viewed in the particular person-



environment relationship in which it is embedded” (p. 840), and given its process orientation, “appraisals of personal control are likely to change throughout a stressful encounter as a result of shifts in the person-environment relationship” (p. 840). Whether beliefs of control induce or reduce stress depends on the meaning that personal control has for a person in a particular situation. That meaning is determined by one’s cognitive appraisal of the situation.

By making a cognitive appraisal, an individual attaches a meaning to an event that he or she experiences. According to the theory, individuals engage in two forms of appraisal of the stressors that they encounter -- primary appraisal and secondary appraisal -- that determine the level of subjective distress that they experience (Folkman, 1986).

In primary appraisal, the individual evaluates the level of danger that an event poses for his or her well-being, with greater perceived danger being associated with greater distress. One can judge a transaction as irrelevant (insignificant to one’s well-being), benign-positive (not taxing or signifying negative consequences), or stressful (signifying negative consequences or potentially negative consequences). Categories of stressful appraisals include harm/loss, “injury or damage already done;” threat, “the potential for harm or loss;” or challenge, “the opportunity for growth, mastery, or gain” (Folkman, 1984, p. 840). Negative emotions (e.g., anger, resentment, fear) characterize appraisals of harm/loss or threat, while positive emotions (e.g., excitement) characterize appraisals of challenge (Folkman, 1984).

Personal and situational factors shape primary appraisals, helping to determine whether the encounter is judged to be irrelevant, benign-positive, or stressful. Two important personal factors include beliefs, “preexisting notions about reality that serve as

a perceptual lens,” and commitments, what is important to or has meaning for the person (e.g., values and ideals) (Folkman, 1984, p. 841).

Beliefs can be shaped by one’s culture (e.g., religious or political beliefs) or can be idiosyncratic to an individual. Individuals have generalized beliefs about control, “which concern the extent to which individuals assume they can control outcomes of importance,” and these beliefs influence primary appraisal (Folkman, 1984, p. 841). Locus of control is a conceptualization of individuals’ generalized beliefs about control. Generalized beliefs about control most often come to the fore when a situation is ambiguous or novel. Ambiguity occurs when “situational cues regarding the nature of the outcome and/or the extent to which it can be controlled are minimal” and with greater ambiguity, personal factors have greater influence in determining the meaning of the situation (p. 841). Conversely, in a non-ambiguous situation the characteristics of the situation would influence judgments of controllability more than generalized beliefs.

Commitments signify what is important or meaningful to a person and determine how much is at stake for an individual in a particular encounter. Folkman (1984) points out that, “Any encounter that involves a strongly held commitment will be evaluated as significant with respect to well-being to the extent that the expected outcome harms or threatens that commitment” (p. 841). In regard to control, the more serious the commitment involved in a situation, the more important it may be for an individual to feel that he or she has control over the outcome in order to protect that commitment. For example, a person who has a commitment to a professional goal may perceive a performance evaluation as stressful, feeling that his or her career advancement is at stake, so it may be especially important to that individual that he or she be able to control the

outcome. It is likely not as important for individuals to feel they can control situations that do not threaten a commitment. In sum, “the greater the appraised threat in a situation, the more meaningful controllability will be” (p. 841).

In addition to the personal factors of beliefs and commitments, situational factors influence primary appraisal. The nature (how clear or ambiguous is the expected outcome), familiarity (how familiar or novel the event is), likelihood (how likely is it that the event will occur), frequency (how often does it occur), and duration (how long the event is likely to last) of an encounter can influence whether an event is judged to be irrelevant, benign-positive, or stressful (Folkman, 1984).

In addition to primary appraisal, the individual also makes a secondary appraisal regarding the degree to which he or she has the ability or resources to cope with or counteract the experienced stressor. The person evaluates his or her coping resources in the context of the demands of the event. Such resources can be physical, social, psychological, or material in nature. The more favorable the secondary appraisal (i.e., the better the perceived match between demands of the stressor and the capabilities of one’s coping resources), the less stress the individual experiences (Folkman et al., 1986). Situational appraisals, a part of secondary appraisal, “refer to the person’s judgment or belief about the possibilities for control in a specific encounter” (Folkman, 1984, p. 842). Situational appraisals are produced by the person’s evaluation of the situation’s demands, as well as his or her resources, options, or ability to cope. Folkman (1984) points out the similarity between situational appraisals and Bandura’s (1977) concepts of outcome expectancy (the likelihood a particular action will lead to a particular outcome) and

efficacy expectancy (one's belief in his or her ability to perform the action necessary to achieve the outcome).

Cognitive appraisal, which encompasses primary and secondary appraisals, is one mediating process between stressful person-environment interactions and their outcomes. The other is coping. Coping occurs when one makes "cognitive or behavioral efforts to master, reduce, or tolerate the internal and/or external demands that are created by the stressful transaction" (Folkman, 1984, p. 843). The focus is on the effort of the individual, not the outcome of that effort. Coping efforts are divided into *emotion-focused coping*, through which one seeks to regulate one's subjective emotional distress, and *problem-focused coping*, through which one tries to manage (control, reduce) the stress-producing problem (Folkman, 1984). People commonly use both forms of coping, although the degree to which each type is used with a particular stressor is influenced by the way in which the situation is appraised. Problem-focused coping has been found to be used more in situations viewed as changeable, whereas emotion-focused coping has been found to be used more in situations viewed as less changeable (Folkman & Lazarus, 1980).

Folkman (1984) makes a distinction between generalized beliefs about control that factor into cognitive appraisals and control used as a coping process. The latter refers to an individual's use of a variety of coping strategies to attempt to exercise control of life stressors. One may seek to control one's subjective distress, engaging in emotion-focused coping. One also may attempt to control the situation, utilizing problem-focused coping, through problem-solving actions intended to reduce or remove the situational conditions that are threatening to one's well-being (Folkman, 1984).

In applying Stress and Coping Theory to the topic of food insecurity, when an individual encounters the stressor of food insecurity, he or she makes a primary appraisal, assessing how vulnerable he or she feels to negative effects of the food insecurity and how unpleasant or dangerous the effects will be. As previously mentioned, primary appraisal is influenced by personal factors (beliefs and commitments) and situational factors (e.g., the nature, likelihood, duration, frequency of the encounter) (Folkman, 1984).

The individual's generalized beliefs about control -- i.e., locus of control -- influence the primary appraisal, and ultimately, whether or not the individual will judge the encounter as stressful. Generalized beliefs about control are most salient in situations characterized by ambiguity, and by definition, food insecurity is a condition of uncertainty. A food insecure individual does not know whether or not the food supply will be adequate to meet their needs. Therefore, generalized beliefs about control seem particularly relevant to one's primary appraisal of food insecurity.

As mentioned earlier, the more serious the commitment involved in a situation, the more important it may be for an individual to feel that he or she has control over the outcome. Food insecurity can interfere with commitments individuals may have regarding food. For instance, a person could have a commitment to providing his or her family with enough food or to eating healthfully. The more important these commitments are to the individual, the more he or she will perceive food insecurity as a threat. In addition, he or she would be more likely to experience the negative emotions (e.g., anger, resentment, fear) that characterize appraisals of threat.

After the primary appraisal, the individual then makes a secondary appraisal in which he or she considers how effectively he or she is likely to be in altering the food-insecurity conditions through coping behaviors (Ingoldsby, Smith, & Miller, 2004). Those with a more external health locus of control orientation would likely determine that they cannot influence the situation through coping attempts (i.e., low perceived control), including coping attempts aimed at gaining control over the situation (i.e., problem-focused coping), potentially leading them to experience symptoms of psychological distress. Perceiving the stressor as out of one's control may even lead one to become overwhelmed, thereby entering into crisis state of diminished cognitive, emotional and behavioral functioning (Ingoldsby, Smith, & Miller, 2004). Consequently, Stress and Coping Theory seems to be highly relevant to understanding the potential link between food insecurity and mental health problems.

### **The Relationship between Food Insecurity and Mental Health**

**Cross-sectional studies.** Siefert, Heflin, Corcoran, and Williams (2001) were among the first researchers to establish the relationship between food insufficiency and women's mental health. Food insufficiency, a more severe form of food insecurity, occurs when a household has restricted food stores or too little food intake among members of the household (Scott & Wehler, 1998). Siefert et al. (2001) examined the association between food insufficiency and physical and mental health outcomes in low-income women. Food insufficiency was assessed using a widely accepted single-item measure used in national surveys, such as the Current Population Survey and the Third National Health and Nutrition Examination Survey (NHANES III) (Siefert et al., 2001). The question asks, "Which of the following describes the amount of food your household

has to eat – enough to eat, sometimes not enough to eat, or often not enough to eat?”

Mental health status was determined by whether or not women met the diagnostic criteria for major depressive disorder and/or generalized anxiety disorder, as defined by the revised third edition of the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R) (American Psychiatric Association, 1987). This was assessed using the World Health Organization’s (WHO) Composite International Diagnostic Interview, Version 1.0 (CIDI; WHO, 1990).

The population studied included a random sample of 724 single mothers in an urban Michigan county who received welfare in February, 1997 (Siefert et al., 2001). To be eligible, participants had to be between the ages of 18 and 54, as well as identify as non-Hispanic white or African American. Face-to-face in home structured interviews were administered to the mothers who participated. The researchers assessed food insufficiency, global self-rated health, physical limitations, major depression, and generalized anxiety disorder (Siefert et al., 2001). To control for other variables that are likely to be associated with food insufficiency, poverty, unemployment, poverty-related stressful life circumstances (e.g., utilities shut-off, homelessness), domestic violence, and experiences of discrimination based on race or gender were also assessed. Of those surveyed, almost 24% reported sometimes or often not having enough to eat in their household. Food insufficiency “was significantly related to age, education, employment status, exposure to stressful life circumstances, exposure to domestic violence, experiences of racial discrimination, and the physical and mental health measures” (Siefert et al., 2001, p. 167). Even when controlling for background characteristics and social and economic risk factors, food insufficiency was a significant predictor of major

depression. These findings highlight how food insecurity may be a part of a constellation of factors that could contribute to the experience of vulnerability and lack of control.

Study limitations included cross-sectional and self-report data.

Casey et al. (2004) examined the relationships among maternal depression, household food insecurity, loss or reduction of welfare support or food stamps, and child health. Participants included 5,306 mothers who had children younger than 36 months who visited hospital clinics or emergency rooms. The interviews took place in five states and Washington, D.C. The investigators used the U.S. Department of Agriculture's 18-item Food Security Scale (Bickel et al., 2000) to measure household food security status. Maternal depression was assessed using the 3-item maternal depression screen developed by Kemper and Babonis (1992).

Similar to the findings of Siefert et al. (2001), Casey et al. (2004) found that mothers who scored positively on the maternal depression screen were likely to report more household food insecurity than mothers who scored negatively, even when controlling for the study site, maternal race, education, insurance type, and child's low birth weight status. Similar to the Siefert et al. (2001) study, the Casey et al. (2004) study's limitations included the use of self-report data and a cross-sectional design, making it impossible to determine the causal direction between food insecurity and depression.

Laraia et al. (2006) examined correlates of food insecurity in 606 pregnant women with incomes less than or equal to 400% of the poverty line. Data were from the Pregnancy, Infection, and Nutrition (PIN) study (<http://www.cpc.unc.edu/projects/pin>). The researchers used the USDA Food Security Module (Bickel, Price, Hamilton, &



Cook, 1997) to measure food security, which was the main outcome variable for the study. Laraia et al. also included several psychosocial variables in the study, reasoning that personal psychological states (e.g., depression, anxiety, and perceived stress) and personal dispositions (e.g., self-esteem, mastery, or locus of control) may influence how a person copes with food insecurity. The Center for Epidemiologic Studies Depression (CES-D) Scale (Radloff, 1977) was used to assess mental distress, and Levenson's (1981) 24-item IPC Locus of Control questionnaire was used to measure locus of control. Locus of control emerged as a predictor variable in the study. Even when controlling for demographic and socioeconomic variables, "psychosocial indicators of perceived stress, trait anxiety, and depressive symptoms, and a locus of control attributed to chance were positively associated with any household food insecurity" (Laraia et al., 2006, p. 177).

Whitaker et al. (2006) collected survey data from 2,870 mothers of 3-year-old children in 18 large U.S. cities. To measure maternal food security, the researchers used the ten household- and adult-referenced questions in the U.S. Household Food Security Survey Module (Bickel et al., 2000). Of those who responded, 71 percent were completely food secure, 17 percent were marginally food secure, and 12 percent were food insecure. Major depressive and generalized anxiety disorders were assessed in the mothers using the World Health Organization Composite International Diagnostic Interview-Short Form (CIDI-SF; Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). In their analyses, the researchers adjusted for socio-demographic factors, as well as maternal physical health, alcohol use, drug use, prenatal smoking, and prenatal physical domestic violence. Even when controlling for those factors, the percentage of mothers with a diagnosis of major depressive disorder or generalized anxiety disorder was greater

with higher levels of food insecurity, with 16.9 percent of those who were food secure diagnosed with one of the disorders, 21.0 percent of those who were marginally food secure diagnosed with one of the disorders, and 36.7 percent of those who were food insecure diagnosed with one of the disorders. This finding further strengthened the evidence of a link between food insecurity and mental health problems in mothers (Whitaker et al., 2006).

Kim and Frongillo (2007) examined the relationships among food insecurity, weight, and depression in a sample of 12,652 elderly persons in two longitudinal studies: the Health and Retirement Study (HRS) and Asset and Health Dynamics among the Oldest Old (AHEAD; Soldo, Hurd, Rodgers, & Wallace, 1997). Unlike many other studies regarding this topic, Kim and Frongillo's (2007) study examined food security and depression in both females and males. Dependent variables in the study included Body Mass Index (BMI) and depression, which were assessed using an 8-item version of the CES-D (Radloff, 1977). Independent variables included food insecurity, as measured by modified questions in the U.S. Household Food Security Survey Module (HFSSM; Rose & Oliveira, 1997) and physical functioning, as measured by six items from the Activities of Daily Living Scale (Frongillo, Rauschenbach, Roe, & Williamson, 1992). The researchers controlled for age, gender, ethnicity, marital status, education, smoking status, income, physical functioning, health conditions, and social interaction. Data were analyzed using a weighted multilevel linear regression analysis. In both data sets, food insecurity and depression were positively related.

A study by Laraia et al. (2008) assessed 206 African American women between 18 and 35 who were first-time mothers with infants. The researchers recruited the

participants through local Women, Infants, and Children (WIC) clinics. The six-item short form of the U.S. Department of Agriculture Core Food Security Module for families (Bickel et al., 2000) was used to assess household food security status, and maternal depression was assessed using the CES-D (Radloff, 1977). Food security status was divided into three categories: food secure, marginally food secure, and food insecure. The statistical model included maternal age, education, work status, depression score, self-esteem score, and household-composition characteristics. The depression symptoms of the mothers were associated with risk for marginal food security and food insecurity. Women who reported food insecurity scored an average of 16 points higher on the depression scale than women who reported food security (Laraia, Borja, & Bentley, 2008).

The empirically demonstrated link between food security and mental health seems to be a broad experience, as it has not been limited to the United States, or even to industrialized societies. Hadley and Patil (2006) interviewed 449 female caretakers from randomly selected households in four ethnic groups living in two diverse rural subsistence communities of Tanzania. Women who scored higher on a measure of food insecurity, a modified version of the USDA's core food security module (Bickel et al., 2000), scored higher on a measure of anxiety and depression using a Swahili version of The Hopkins Symptoms Checklist-25 (HSCL) (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974). Results showed a strong positive correlation between food insecurity and the psychological distress index, which was maintained even when controlling for covariates such as the caretaker's age and marital status. The authors noted that though a causal or temporal sequence was not established between the variables, "it is

overwhelmingly clear that both food insecurity and maternal anxiety have shared roots in much larger structural factors that operate through gender and poverty” (Hadley & Patil, 2006, p. 365).

**Longitudinal studies.** Although most of the studies concerning food insecurity and mental health have been cross-sectional, there have been some longitudinal studies as well. For instance, Siefert, Heflin, Corcoran, and Williams (2001) extended their previous study of single mothers who received welfare in an urban Michigan county by analyzing the 1998 wave of data in conjunction with the 1997 wave of data from the study. Using data from 676 of the previous participants and controlling for common risk factors of food insufficiency, the results indicated that those who reported food insufficiency in both years were more likely to report fair or poor health than those who did not. In addition, reporting food insufficiency in 1998 was significantly correlated with meeting diagnostic criteria for major depression. Those who became food insufficient between the first and second wave of data collection were more likely to meet the diagnostic criteria for depression in the second wave than those who remained food sufficient (Siefert et al., 2004).

The results of this study were expanded further by analyzing the 1999 wave of data from their longitudinal sample in conjunction with the 1997 and 1998 waves of data. Even when controlling for risk factors, changes in food sufficiency status were significantly and positively correlated with changes in depression status within this sample, evincing an enduring relationship (Heflin, Siefert, & Williams, 2005).

Huddlestone-Casas, Charnigo, and Simmons (2008) investigated food insecurity and maternal depression, surveying 184 rural, low-income women from sixteen states. To

be included, the women had to be 18 years or older with at least one child 13 or younger and had to be eligible for food stamps in their state. The researchers administered measures of food insecurity and depression yearly in three waves. The purpose of the study was to ascertain whether food insecurity predicted maternal depression or vice versa over the three year period. The Core Food Security Module (CFSM; Hamilton, Cook, & Thompson, 1997) was used to measure food security, and the CES-D (Radloff, 1977) was used to assess depression. Data regarding each woman's age, ethnicity, household income, marital status, and education were also collected in the first wave. The majority of the respondents were non-Hispanic white; living with a partner or married; and had a high school education, General Education Development certificate, or less. The mean age of the respondents was 31, and the median household income was \$14,826. Using structural equation modeling, analysis of the data uncovered a bidirectional causal relationship between food insecurity and depression among this sample of rural women, such that there is a causal relationship from food insecurity to depression and a causal relationship from depression to food insecurity.

Hadley and Patil (2008) continued their analysis of female caretakers from randomly selected households in four ethnic groups living rural Tanzania; however, for this wave of data collection they could only contact 173 of the women enrolled in the study. In addition, they studied only two of the ethnic groups included in the previous study. The researchers sought to examine whether the changes in growing season — and therefore changes in food security — were related to changes in anxiety and depression among the caretakers. They found that changes in anxiety and depression were predicted by changes in food insecurity across the growing seasons. Scores on the depression

instrument were highest for those who were experiencing food insecurity during the postharvest season, when food is most abundant, indicating that these individuals may be experiencing particularly acute deprivation. A notable strength of the study was that ethnographic work was conducted to build a culturally competent theoretical framework and methodology.

**Qualitative studies.** Chilton and Booth (2007) conducted a qualitative study to examine the relationships among health, hunger, and food insecurity. Their goal was to characterize hunger qualitatively using a phenomenological approach, “because the experience of food insecurity and hunger is, at its core, an experience of suffering... [which] demands a kind of inquiry that privileges lived experiences to the point where one cannot deny their moral implications” (p. 117). Chilton and Booth recruited African American women from three food pantries in Philadelphia as participants for the study. Of these women, the majority received food stamps, scored positively on a measure of food insecurity, and rated their health as either fair or poor. About half of the women cared for children in their home. The study utilized four focus groups and 12 individual in-home semi-structured interviews. Twenty-two women participated in the four groups. To understand the subjective emotional experience of food insecurity, the focus groups included the question, “Sometimes in the hardships of daily life, it is hard to make sure that you eat, and that your family eats well. What does it feel like when it’s hard to find and prepare food you would like to eat?” (Chilton & Booth, 2007, p. 118). The two major themes that emerged from the participants’ responses included hunger of the body, “the physical experience of hunger owing to a lack of economic resources” and hunger of the mind, “the emotional experience of hunger that manifests physically through loss of

appetite or nervousness” (Chilton & Booth, 2007, p. 119). Hunger of the mind encompasses the psychological anguish that accompanies stressors relating to poverty, poor health, and exposure to violence. There were three subcategories of the hunger of the mind, which included stress and depression, deliberate hunger (purposefully not eating because of stress or depression, sometimes related to a loss of will to live), and violence and the inability to eat (trauma-related loss of appetite). One participant said, “When you ain’t got food, you get depressed, and you stressed. Because you stress yourself trying to figure out how you going to get it. How you going to get it, that’s the biggest thing. Who I’m a call, where’s I’m a go, what I’m a get” (Chilton & Booth, 2007, p. 120). This quote seems to indicate that the experience of food insecurity can lead to depression. The researchers’ model included variables of poverty, limited access to health care, gender-based interpersonal violence, economic hardship, food insecurity, poor nutrition, and poor health. According to the model used by the researchers, it may be that “food insufficiency is one dimension of a more pervasive vulnerability to a range of physical, mental, and social problems among economically constrained households” (Chilton & Booth, 2007, p. 123).

Chilton and Booth (2007) postulate that hunger of the mind and hunger of the body interact with one another, contributing to poor nutrition and poor health. Their data suggest that hunger of the mind may result in poor appetite and poor coping mechanisms, which may affect nutrition. A lack of access to mental health care compounds this problem. The authors point out that food insecurity measures capture the hunger of the body but do not address the psychological component of the hunger experience, such as the depression and hopelessness that can ensue when one is food insecure.

Lent, Petrovic, Swanson, and Olson (2009) also conducted a qualitative study, which examined the link between depression and food insecurity in 29 poor rural families in upstate New York. To be eligible, participants had to be mothers 18 years or older with at least one child 12 years or younger living at home. In addition, their annual household income had to be below 200% of the federal poverty level. The participants were interviewed three times between 2000 and 2003. In their analysis, the investigators found that mothers' depression symptoms and poor mental health decreased the likelihood that families would attain food security. Based on the interviews, the authors concluded that the association between poor mental health and food security operated through mental health problems limiting the employment of family members and thereby the income of the household and ability to purchase food. In addition, the authors found that depression symptoms in mothers prevented them or other family members from working. Depression and mental health conditions in children also interfered with food security, because parents of depressed children found that childcare options for these children were limited. This limited access prevented adults from working.

### **The Relationship between Health Locus of Control and Mental Health**

**Cross-sectional studies.** Locus of control and the related concept of health locus of control have been linked consistently to psychological health. A study by Wu et al. (2004) supported the relationship between health locus of control and psychological distress. They examined the relationships among health locus of control, self-efficacy, and psychological distress in a sample of elderly Chinese women who were between the ages of 60 and 89. Self-efficacy is a concept distinct from yet related to locus of control. It refers to one's beliefs about his or her ability to perform a desired behavior in various



situations (Schwarzer & Fuchs, 1996). The authors used the Multidimensional Health Locus of Control Scale (Wallston et al., 1978) to measure health locus of control. Psychological distress was measured using the 28-item General Health Questionnaire (Goldberg, 1978). Regression analyses showed that a high level of external health locus of control and low level of self-efficacy best predicted participants' psychological distress. There was no interaction between health locus of control and self-efficacy -- each variable had a main effect on level of psychological distress. Even when controlling for the effects of self-efficacy, external health locus of control was a significant negative predictor of participants' mental health status. The study was limited by use of a non-random, homogenous sample, a cross-sectional study design, and self-report data.

Arraras et al. (2001) examined coping style, locus of control, psychological distress and pain-related behaviors in 118 cancer patients with pain and chronic pain patients without cancer in the United Kingdom and Spain. An adaptation of the Multidimensional Health Locus of Control Scale (Wallston, Wallston, & Devellis, 1978) was used to measure health locus of control. Mental distress was assessed using The Hospital Anxiety and Depression Scale (HAD; Zigmond & Snaith, 1983). Results of multiple regression analyses indicated that lower internal locus of control beliefs were associated with higher depression. The study was limited by use of cross-sectional data, such that one cannot determine the direction of the relationship between depression and an internal health locus of control.

## **The Relationship between Locus of Control and Mental Health in the Context of Stressors**

**Cross-sectional studies.** An important research area to explore for the purposes of this study is locus of control in the context of stressors, as food insecurity is a type of stressor. A study by Takakura and Sakihara (2001) established the relationship between locus of control and mental health in the context of stressors. They assessed whether life stressors, perceived social support, health practices, self-esteem, and locus of control correlated with depression symptoms in 3,202 students from 12 public senior high schools in Okinawa, Japan. Locus of control was assessed using an 18-item locus of control scale developed by Kambara, Higuchi, and Shimizu (1982), which was based on Rotter's I-E scale (1966), the initial measure developed to measure internal versus external locus of control. Depression symptoms were assessed with the CES-D (Radloff, 1977). After controlling for relevant demographic variables, the authors found that lower levels of current depression symptoms were related to greater perceived social support, positive health practices, higher self-esteem, and higher internal locus of control. In a hierarchical multiple regression, these variables accounted for 14% of the variance in presence and persistence of depression symptoms. Limitations of the study included cross-sectional and self-report data, as well as a homogenous sample consisting of 15-18 year old students.

Grote, Bledsoe, Larkin, and Brown (2007) studied acute and chronic stress exposure, depression, optimism, and perceived control in a sample of 194 low-income African American and white women. For this cross-sectional study, the researchers recruited participants from a clinic within a large urban hospital. Perceived control is

similar to locus of control. However, whereas locus of control denotes a person's sense of control over things in general, perceived control assesses the extent to which a person thinks he or she has control over specific stressors (Grote et al., 2007). The 90-item Women's Stress Scale (WSS) was used to assess chronic and acute stressors in the women's lives (Grote et al. 2007). The women were asked to rate the amount of control they perceived they had over each stressor. Responses included "not very much control," "a little control," "some control," "quite a bit of control," and "very much control." The scores on each perceived control item were totaled. The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) was used to assess severity of depression.

Grote et al. (2007) analyzed their data using a hierarchical multiple regression analysis, finding that "among women experiencing a high number of exposures to acute and chronic stressors, optimism and perceived control were associated with less severe depression that fell within the nonclinical range of functioning" (p. 19). The designation of clinical versus non-clinical depression was made using the BDI-II cutoff score (>17) for major depression. Study limitations included a non-representative sample, use of only self-report measures, and a cross-sectional study design.

A cross-sectional study by Jang et al. (2008) investigated the potential mediating and moderating role of sense of control regarding the degree to which individuals experienced the stressor of perceived discrimination and their level of psychological well-being. Differences by age, gender, and race were also explored. Sense of control is a concept similar to locus of control and refers to "the extent to which individuals perceive that they have personal power and control over their life and environment" (Jang et al., 2008, p. 2). The authors used data from the Midlife Development in the United States

(MIDUS) survey, which surveyed English-speaking, non-institutionalized adults between the ages of 25 and 74 in 48 states (<https://icpsr.umich.edu/icpsrweb/NACDA/studies/4652>). Jang et al.'s analyses were based on a sample of 1,554 adults aged 45 to 74. Perceived discrimination, perceiving oneself as being treated unfairly, was assessed using a 9-item scale (Williams, Yu, Jackson, & Anderson, 1997). The 12-question measure used to assess sense of control was based on Pearlin and Schooler's (1978) measure of sense of mastery and included statements such as "I can do just about anything I really set my mind to do" (Jang et al., 2008, p. 3). Participants were asked to rate their agreement with the statements using a Likert-type scale. Psychological well-being was assessed using items selected from a variety of well-validated scales, including the Affect Balance Scale (Bradburn, 1969), the University of Michigan's Composite International Diagnostic Interview (Kessler, Andrews, Moroczek, Ustun, & Wittchen, 1998), and the CES-D (Radloff, 1977). Positive affect was assessed by asking participants to respond to the question, "how often have you felt cheerful, in good spirits, extremely happy, calm and peaceful, satisfied, and full of life during the last 30 days" (Jang et al., 2008, p. 4). Likewise, negative affect was assessed by asking participants to report how frequently they felt "sad, nervous, restless, hopeless, everything was an effort, and worthless during the last 30 days" (Jang et al., 2008, p. 4). Responses ranged from none of the time, coded as one, to all of the time, coded as five. Correlation analyses showed that being younger, male, and reporting less discrimination were associated with a greater sense of control. The researchers tested their mediation model using the Sobel test, a statistical test used to determine the

influence of a mediator on an outcome variable by quantifying the degree of reduction in regression coefficients.

Common significant predictors of positive and negative affect included age, gender, perceived discrimination, and sense of control. Those who were older and those who were male reported less perceived discrimination, as well as a higher sense of control and greater levels of psychological well-being. The correlation coefficient between perceived discrimination and negative affect was significantly stronger in the low sense of control group compared to the high sense of control group. The authors concluded, “The findings suggest that sense of control protects individuals from the adversity of discrimination and enables them to remain resilient” (Jang et al., 2008, p.6). Study limitations included cross-sectional and self-report data.

Fisman and O’Neil (2009) examined data from the World Values Survey, which was administered in four waves between 1981 and 2004 in 81 countries to determine if gender differences exist in beliefs regarding the roles of luck and hard work in achievement, as well as the demographic context in which men and women are situated. The role of luck versus hard work in achievement is similar to the construct of locus of control in that both assess one’s beliefs regarding one’s control over outcomes. Participants were asked to indicate their view of the respective roles of luck and hard work in producing success by marking a spot on a continuum from one to ten. One indicated, “In the long run, hard work usually brings a better life,” and ten indicated, “Hard work doesn’t generally bring success -- it’s more a matter of luck and connections” (Fisman & O’Neil, 2009, p. 861). Questions were asked regarding participants’ current employment, position in the workplace hierarchy, household obligations, strength of

religious beliefs, and view of competition. For the purposes of this review, variables such as a lack of employment and a low position in the workplace hierarchy could be perceived as stressors. In addition, country-level variables were considered, including participation of women in the labor force, number of women in parliament, and the GDP per capita in U.S. dollars averaged over the years of 1989-1999. Also, participants' gender, household income, and education were included in the analyses. A sample of 128,665 participants completed the hard work versus luck question. In general, responses to the question were skewed toward the end representing "In the long run, hard work usually brings a better life;" however, women were more likely than men to attribute success to luck. Gender differences were found for this variable, as well as for the participants' views of competition (with women holding a more negative view of competition), their current employment (with women less likely to be currently employed), position in the workplace hierarchy (with women having lower positions in the hierarchy), household income (with women reporting lower incomes), and level of education (with women reporting lower levels of education). Women's more negative views about competition varied systematically with "workforce participation, workplace status, and other attributes in a way that is consistent with an explanation built on differential access to career advancement" (Fisman & O'Neil, 2009, p. 869). The results of this study coincide with the view that those who have less access to opportunities and resources (e.g., women) may be more likely to perceive events as being out of their control. Women in this study were less likely to be employed, more likely to have a lower position in the workplace hierarchy, less likely to have a high household income, and less likely to attain a higher level of education than men. These circumstances may be

indicative of systemic discrimination and may contribute to the view that success is arises from luck (similar to an external locus of control). Study limitations included cross-sectional and self-report data.

A study by Fischer and Holz (2010) studied the relationships among the stressor of sexist discrimination, personal belief in a just world, perceived control, well-being, and psychological distress in a sample of 264 undergraduate women. The authors hypothesized that the relationship between sexist discrimination and distress is mediated by a personal belief in a just world (the belief that one as an individual generally receives what she or he deserves) and perceived control (the belief that by doing good things one will receive good things). The hypotheses were: (1) the greater a woman's acknowledgement of personal experiences of sexist discrimination, the greater her level of psychological distress; (2) the greater a woman's acknowledgement of personal experiences of sexist discrimination, the weaker her personal belief in a just world; (3) the lower the personal belief in a just world, the lower the perceived control; and (4) the lower the perceived control, the poorer the woman's mental health (as determined by a composite index of well-being and psychological distress). The Schedule of Sexist Events (SSE; Klonoff & Landrine, 1995) assessed perceived sexist discrimination. Dalbert's (1999) PBJW scale assessed personal belief in a just world. The Environmental Mastery subscale of Ryff's (1989) Scales of Psychological Well-Being measured perceived control. Psychological distress was assessed using the depression and anxiety subscales of the Symptom Checklist-90-Revised (Derogatis, 1983), whereas psychological well-being was measured using the Psychological Well-Being subscale of the Mental Health Inventory (MHI; Veit & Ware, 1983). Fischer and Holz (2010) also accounted for

socially desirable responding using the 20-item Impression Management (IM) subscale of the Balanced Inventory of Desirable Responding, Version 6 (BIDR-6; Paulhaus, 1994).

Fischer and Holz (2010) tested the predicted sequential mediating effects of personal belief in a just world and personal control (with personal belief in a just world preceding personal control), between sexist discrimination and quality of mental health, statistically controlling for impression management. A full mediation model, with personal belief in a just world and personal control fully accounting for the relationship between sexist discrimination and mental health, was a good fit to the data according to the commonly used comparative fit index (CFI) and standardized root mean square residual (SRMR), but not according to the root mean square of approximation (RMSEA). The full mediation model was compared to a partial mediation model that included, in addition to the indirect effects, direct paths from sexist discrimination to the mental health variables. The partial mediator model was a superior fit to the data according to the CFI, SRMR, and RMSEA fit indices. Fischer and Holz (2010) concluded, “Women’s health may be enhanced by increasing awareness of links found here, supporting development of attributions for distress extending beyond personal problems to societal conditions, skills to enhance feelings of personal control in other areas of their lives, and connections to the history of women’s empowered social action” (p. 297). A strength of the study included controlling for socially desirable responses. Limitations included the use of a relatively homogeneous and privileged sample (undergraduate college students) and the use of cross-sectional data, which precludes determinations of causality.

Using a sample of 159 college students, Roddenberry and Renk (2010) examined whether locus of control, health locus of control, and self-efficacy mediated the



relationship between academic stress and symptoms of illness (psychological and physical). The study used the Multidimensional Health Locus of Control Scale (MHLC; Wallston et al., 1978) to measure health locus of control and the Internal, Powerful Others, and Chance Locus of Control Scale (IPC; Levenson, 1974) to measure general locus of control. The Brief Symptom Inventory (BSI; Derogatis, 1993) measured psychological symptoms. Those who reported higher levels of stress also endorsed higher levels of illness, a more external locus of control orientation, and lower levels of self-efficacy. In the results, locus of control appeared to partially mediate the relationship between stress and illness.

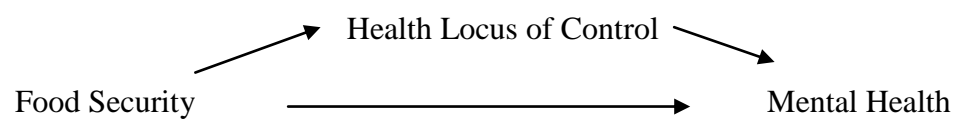
In Roddenberry and Renk's (2010) study, stressors and locus of control orientation were significantly associated, as were locus of control orientation and psychological symptoms. Findings from their correlational analysis indicated that there was a significant positive relationship between general and academic stress and general and health-related external locus of control. General stress of the participants had a significant negative relationship with their general and health-related internal locus of control. The psychological symptoms of the participants had a significant positive relationship with their general and health-related external locus of control. Anxiety and depression symptoms were negatively related to a general internal locus of control. Similar to the previously described studies, the limitations of this study included a non-representative sample, use of self-report measures, and a cross-sectional study design. Causal relations among stress, health locus of control, and psychological symptoms cannot be determined based on the data.

The results of these studies further substantiate the existence of relationships among stressors (e.g., discrimination), locus of control, and psychological distress. Although most studies have been cross-sectional, limiting conclusions regarding causal relationships among variables, there has been consistent evidence indicating an association between individuals' locus of control beliefs and their responses to life stressors. Consequently, it is possible that food insecurity, a potentially salient stressor, could also be related to locus of control and psychological distress. The present study tested those relationships.

### **Hypotheses**

It was hypothesized that lower food security is associated with individuals' greater self-perceived global mental health problems (a direct association). It also was hypothesized that the relationship between food insecurity and perceived global mental health problems is mediated by individuals' health locus of control, as shown in Figure 1. Specifically, it was proposed that greater food insecurity is associated with a higher degree of perceived external health locus of control, which in turn contributes to the experience of poor mental health that is associated with food insecurity. The study also explored whether the relationship between food insecurity and perceived mental health exists for both males and females, and whether health locus of control mediates that relationship for both males and females.

*Figure 1. Proposed Mediation*



## Chapter 3: Methods

### Sample

The present study involved a secondary data analysis of data from the Maryland Health and Nutrition Literacy Study (Grutzmacher, 2010), which was designed to examine the nutrition knowledge, attitudes, skills, and behaviors among 220 Supplemental Nutrition Assistance (SNAP) eligible adults and families. In the Maryland Health and Nutrition Literacy Study a convenience sample ( $n = 220$ ) was recruited by caseworkers from the waiting rooms at 11 SNAP offices in five of the 24 counties in Maryland. Recruiters asked potential participants if they would like to participate in a study, aimed at exploring their ideas and opinions concerning nutrition and about their experiences of feeding themselves and their families with limited resources. In the present study, analyses were limited to 150 participants who had completed all of the measures relevant to the hypotheses of this study.

The sample included both men and women. Their demographic characteristics are summarized in Table 1. The 40 men were between the ages of 18 and 56 years of age ( $M = 37.67$ ,  $SD = 9.822$ ). Most of the men identified as either Black (37.5%) or White (45%). Among the men, 66.7% had a yearly income of less than \$10,000. Regarding education, 20.0% had not graduated from high school, 40% graduated from high school or passed their General Education Development exams, 27.5% had some college or technical training, and 12.5% had a college degree. Concerning household composition, 47.5% of the men reported that they were the only adults in their household, 37.5% lived in a household with two adults, and 10% lived in a household with three or more adults. Among the men, 67.5% had no children in their household, 10.0% had one child in the

household, 10.0% had two children in the household, and 12.5% had three or more children in their household. At least 22% of the men were homeless, and at least 35% were unemployed at the time of the interview.

The 110 women in the sample were between 19 and 69 years of age ( $M = 35.8$ ,  $SD = 11.121$ ). Most identified as either Black (54.1%) or White (33.9%). Among the women, 67.0% had a yearly income of less than \$10,000. Regarding education, 25.5% had not graduated from high school, 33.6% graduated from high school or passed their General Education Development exams, 26.3% had some college or technical training, and 14.6% had a college degree. Concerning household composition, 54.6% of the women reported that they were the only adults in their household, 27.8% lived in a household with two adults, and 17.7% lived in a household with three or more adults. Among the women, 24.5% had no children in their household, 25.5% had one child in the household, 21.8% had two children in the household, and 28.2% had three or more children in their household. At least 8.2% of the women were pregnant, 4.5% were homeless, and 36.4% were unemployed at the time of the interview.

Table 1  
*Demographic Characteristics of the Sample*

	Males	Females
Age	<i>M (SD), Range</i> 37.67 (9.82), 18-56	<i>M (SD), Range</i> 35.80 (11.12), 19-69
Income	N (%)	N (%)
Less than \$10,000	26 (66.7%)	54 (50.5%)
Between \$10,000 and \$14,999	4 (10.3%)	13 (12.1%)
Between \$15,000 and \$19,999	2 (5.1%)	10 (9.3%)
Between \$20,000 and \$24,999	4 (10.3%)	6 (5.6%)
Between \$25,000 and \$29,999	2 (5.1%)	7 (6.5%)
Between \$30,000 and \$34,999	0 (0%)	7 (6.5%)
Between \$35,000 and \$39,999	0 (0%)	3 (2.8%)
More than \$40,000	1 (2.5%)	7 (6.5%)
Race/Ethnicity		
Black or African American	15 (37.5%)	59 (54.1%)
Hispanic or Latino	1 (2.5%)	8 (7.3%)
White	18 (45%)	37 (33.9%)
Asian or Pacific Islander	1 (2.5%)	0 (0%)
American Indian or Alaskan		
Native	1 (2.5%)	0 (0%)
Other	4 (10%)	5 (4.6%)
Education		
Less than HS diploma	8 (20%)	28 (25.4%)
12th grade/GED/HS diploma	16 (40%)	37 (33.6%)
Technical School or Military Training	2 (5.0%)	5 (4.5%)
Some college, no degree earned	9 (22.5%)	24 (21.8%)
Associates degree/2 yr degree	3 (7.5%)	8 (7.3%)
Bachelor's/4 yr degree	2 (5.0%)	8 (7.3%)
Graduate degree (MS, PhD, JD)	0 (0%)	0 (0%)
Number of Adults in House	<i>M (SD), Range</i> 1.76(1.13), 1-6	<i>M (SD), Range</i> 1.77(1.12), 1-6
Number of Children in House	<i>M (SD), Range</i> 0.73 (1.24), 0-5	<i>M (SD), Range</i> 1.71 (1.45), 0-6

## **Procedure**

Data were collected by the principal investigator of the Maryland Nutrition Literacy Study and a team of graduate students who completed both face-to-face surveys and in-depth, semi-structured qualitative interviews with SNAP-eligible clients (Grutzmacher, 2010). Data for the present study come from the face-to-face survey that included standardized instruments administered orally by the interviewers. Surveys lasted between 30 minutes and 2 hours, written informed consent was collected from all participants, and participants received nutrition resources, emergency food resources, and \$25 cash for their time. The present study was approved by the University of Maryland Institutional Review Board with an expedited review due to the minimal risk associated with participation. Participants' names were not paired with interview data. In the original study, quantitative data were entered into an SPSS data file by the Maryland Nutrition Literacy Study research team at University of Maryland, and data were stored without identifying information. As such, no identifying information regarding the original participants were available to the present researcher. Data for the present study were accessed with permission from the principal investigator of the Maryland Nutrition Literacy Study, and all ethical and professional guidelines for the original project were followed.

## **Measures**

**Demographic variables.** Participants' levels of education were measured with the question "What is the highest grade in school you have completed?" Participants were also asked, "How much money does your household take home each year?" Possible responses included "Less than \$10,000," "Between \$10,000 and \$14,999,"

“Between \$15,000 and \$19,999,” “Between \$20,000 and \$24,999,” “Between \$25,000 and \$29,999,” “Between \$30,000 and \$34,999,” “Between \$35,000 and \$39,999,” and “More than \$40,000.” In addition, participants were asked “How do you describe your race/ethnicity?” with possible responses including, “Black or African American,” “Hispanic or Latino,” “White,” “Asian or Pacific Islander,” “American Indian or Alaskan Native,” or “Other.” Lastly, participants reported their age in years, which was recorded by the interviewer.

**Food security.** Level of food security is the degree to which a person is certain that nutritionally adequate and safe foods are available or acquirable in socially acceptable ways. Food security status was determined in the present study by the participants’ scores on a five-question version of the Short Form of the USDA Food Security Scale (Bickel et al., 2000; Blumberg, Bialostosky, Hamilton, & Briefel, 1999). Questions AD1 and AD1a from the six-question version were combined. The instrument asks respondents to answer questions pertaining to food availability in the last twelve months, including “How often did you have enough money to buy the food that you needed?” and “How often could you afford to eat balanced meals?” Responses for these questions include “Always true,” “Sometimes true,” or “Rarely True.” The response choices for the question, “How often did you or other adults in your household cut the size of your meals or skip meals because there wasn’t enough money for food?,” include “Almost every month,” “Some months, but not every month,” “Only one or two months,” and “Adults in my household (including me) never cut the size of meals or skipped meals because there wasn’t enough money for food.” Response choices for the final two questions, “Did you eat less than you felt you should because there wasn’t enough money

to buy food?” and “Were you ever hungry but did not eat because you could not afford enough food?” include “Yes” and “No.” The short form was developed based on the 18-item Household Food Security Scale. The short form of the measure classified the food security status of 97.7% of the households in the 1995 Current Population Survey (CPS) correctly, as classified originally by the 18-item scale (Blumberg et al., 1999). Analysis of annual CPS data has established the stability and robustness of the measures across years and major population subgroups (Bickel et al., 2000).

A higher score on the measure indicates more food *insecurity*. Traditionally, food security scores on this measure have been classified into categories that include high/marginal food security (0 - 1 points), low food security (2 - 4 points), and very low food security (4 - 6 points) (Bickel et al., 2000; Blumberg et al., 1999). However, for the purposes of this study scores were used as a *continuous variable* in order to utilize the full range of information available. Each item is worth one point, with responses being either affirmative (one point) or negative (zero points). For instance, responses to the question, “In the last 12 months, how often did you or other adults in your household cut the size of your meals or skip meals because there wasn’t enough money for food?,” include, “Almost every month,” “Some months, but not every month,” “Only one or two months,” and “Adults in my household (including me) NEVER cut the size of meals or skipped meals because there wasn’t enough money for food.” Either of the first two responses, “Almost every month” and “Some months, but not every month,” would be scored as affirmative and indicate one point. Either of the other two responses would be scored as negative and receive zero points. In the present study, the Cronbach internal



consistency reliability for the food insecurity measure was .84 and .82 in the samples of males and females, respectively.

**Health locus of control.** Health locus of control is the overall amount of control that a person believes he or she has over his or her own health. To measure this construct, participants were asked to place themselves along a five inch line representing a continuum between the statements “I have no control over my health,” representing an external health locus of control, and “I have total control over my health,” representing an internal health locus of control. There were marks at the line endpoints and at each inch, and participants’ responses were measured with a ruler. Possible scores range from 0 to 5, and continuous scores, measured to the nearest quarter inch, were used in this study. Higher scores indicate a more internal locus of control.

This question is a semantic differential scale developed by the investigators of the original study to assess health locus of control. A semantic differential scale is “a scaling tool which has been used frequently for measuring social attitudes, particularly in the fields of linguistics and social psychology... Typically the scale is a seven point bipolar rating scale using adjectival opposites, although some studies have used five- and six-point scales” (Al-Hindawe, 2009, p. 1). In this instance, the single semantic differential scale item was used to gauge health locus of control with the anchors of “I have no control over my health” and “I have total control over my health.”

**Mental health.** Self-reported mental health was measured using a question from the Behavioral Risk Factor Surveillance System (BRFSS), a nationwide telephone survey given to a large probability sample of adults (Center for Disease Control, 2010). Participants indicated how many days their mental health was “not good” in the last 30

days. Participants orally responded with a number between 0 and 30. Thus, the higher the score, the poorer the individual's self-reported overall mental health. The item is a surveillance question, rather than a complex measurement of mental health. It has been used to assess mental distress in other studies as well (e.g., West & Weeks, 2006). The question has been demonstrated to have a test-retest reliability of .71 over a span of 14-21 days (Kapp, Jackson-Thompson, Petroski, & Schootman, 2009), as well as .67 in a sample of 868 respondents of the 1999 BRFSS from Missouri who were re-interviewed by telephone approximately two weeks after their initial interview (Andresen, Catlin, Wyrwich, & Jackson-Thompson, 2003). Reliability was determined in both studies using intra-class correlation coefficients and kappa statistics (Andresen et al., 2003; Kapp, 2009).

## Chapter 4: Results

It was hypothesized that food security would be directly associated with individuals' perceived mental health, for both women and men. For the 110 women, scores on the food security measure ( $M = 3.51, SD = 2.32$ ) and scores on the mental health measure ( $M = 6.54, SD = 10.23$ ) were positively correlated and borderline significant;  $r(109) = .19, p = .05$ . For the 40 men, scores on the food security measure ( $M = 3.95, SD = 2.28$ ) and scores on the mental health measure ( $M = 9.46, SD = 12.72$ ) were positively and significantly correlated;  $r(37) = .39, p = .02$ . Thus, the findings supported the hypothesized association between lower food security (higher scores on the food security measure) and poorer mental health (higher scores on the mental health index) for men and tended to support it for women as well.

It was also hypothesized that the relationship between food security and perceived mental health would be mediated by individuals' health locus of control. Specifically, it was proposed that less food security would be associated with a more external locus of control orientation, and that a more external health locus of control would be associated with poorer perceived mental health. Individuals' levels of external locus of control orientation were expected to account for the association between food security and perceived mental health.

Baron and Kenny (1986) proposed criteria for determining whether a variable mediates the relationship between two other variables. The criteria are first that significant relationships exist (a) between the independent variable and the mediating variable (Path A), (b) between the mediating variable and the outcome variable (Path B), and (c) between the independent variable and the outcome variable (Path C). Second, the

relationship between the independent and outcome variables (Path C) must no longer be significant when the relationship between the independent and mediating variables (Path A) and the relationship between the mediating and outcome variables (Path B) are controlled. In other words, the partial correlation between the independent and outcome variables, controlling for the mediating variable, will be non-significant. A case of *partial mediation* may be demonstrated if the correlation between the independent and outcome variables, controlling for the mediating variable, is still significantly different from zero but also is significantly lower than the zero-order correlation between the independent and outcome variables.

To test whether health locus of control met the criteria for being a mediator variable, correlation analyses were conducted, determining the significance levels of the relationships among the variables (food security, health locus of control, and mental health). For the 110 women, scores on the food security measure and scores on the health locus of control measure ( $M = 3.60$ ,  $SD = 1.14$ ) were negatively and significantly correlated,  $r(109) = -.21$ ,  $p = .03$ , indicating that lower levels of food security were associated with a more external health locus of control. However, for the 40 men, scores on the food security measure and scores on the health locus of control measure ( $M = 3.39$ ,  $SD = 1.12$ ) were not significantly correlated,  $r(38) = -.02$ ,  $p = .90$ . In addition, women's scores on the health locus of control measure and scores on the mental health measure were negatively and significantly correlated,  $r(109) = -.26$ ,  $p = .006$ , indicating that those with a more external health locus of control reported poorer mental health. Men's scores on the health locus of control measure and scores on the mental health measure were not significantly correlated,  $r(38) = -.14$ ,  $p = .39$ . As previously mentioned, women's scores

on the food security measure and scores on the mental health measure were positively correlated and borderline significant,  $r(107) = .19, p = .05.$ , and men's scores on the food security measure and scores on the mental health measure were positively and significantly correlated,  $r(37) = .39, p = .03.$  Therefore, the initial criteria of significant relationships among the independent variable (food security level), mediator variable (food locus of control) and outcome variable (e.g., mental health) were not met for the sample of men, but they were met for the sample of women.

To test whether health locus of control served as a mediator between food security and perceived mental health, a partial correlation was conducted for each sex. When controlling for health locus of control scores, the relationship between food security scores and perceived mental health scores was no longer significant for females,  $r(107) = .14, p = .15.$  Therefore, health locus of control met the mediation criteria (i.e., significant correlations existed between all three variables and the correlation between the independent and outcome variables was no longer significant when controlling for the mediating variable) in the sample of women but not in the sample of men. Mediation criteria were not met for men, because significant correlations did not exist among all of the variables.

### **Supplementary Analysis**

An independent samples *t*-test was used to ascertain whether males and females in the sample reported comparable levels of food insecurity, health locus of control, and mental health. Results indicated that the mean food security scores for the sample of men and for the sample of women were not significantly different,  $t(147) = 1.03, p = .30.$  In addition, the mean health locus of control scores for the sample of men and for the

sample of women were not significantly different,  $t(148) = -.958, p = .966$ . However, the mean mental health scores for the sample of men and for the sample of women were significantly different,  $t(147) = 1.47, p = .004$ . The mean mental health score for the sample of men was higher than the sample of women, indicating that men reported significantly poorer mental health scores than women in the sample.

## Chapter 5: Discussion

### **The Relationship between Reported Food Insecurity and Reported Mental Health**

**Degree of support for hypothesis.** It was hypothesized that food security in the sample would be positively associated with individual's greater self-perceived global mental health. The study also investigated whether the relationship would exist for both males and females. Data supported the hypothesis, and the relationship did exist in the sample of males as well as females. Those with higher food insecurity rated themselves as having more days where their mental health was "not good" than those lower in food security.

Overall, the men in the sample had poorer mental health than the females in the sample. The reasons for this are unclear; however, it highlights the significant distress associated with food insecurity for men and the importance of understanding their subjective experiences.

**Relation of findings to past literature.** The existence of an association between food security and mental health, though not well understood, has been supported in many prior studies (Casey et al., 2004; Hadley & Patil, 2006; Kaiser et al., 2007; Laraia et al., 2008; Siefert et al., 2001; Whitaker et al., 2006), and it was found in the present study as well. A unique contribution of this study was the investigation of this relationship in a sample of males. It seems that males, similar to females, experience food security and mental distress in concert with one another. Mental distress may be an integral facet of the experience of food security, as the relationship exists for both males and females.

## **Reported Health Locus of Control as a Mediator of the Relationship between Reported Food Insecurity and Reported Mental Health**

**Degree of support for hypothesis.** It was also hypothesized that the relationship between food insecurity and perceived global mental health problems would be mediated by individuals' health locus of control. Specifically, it was hypothesized that lower levels of food security would be associated with a more external health locus of control, which in turn would be associated with more days of perceived mental distress. The study also sought to ascertain whether this mediation process would exist for both males and females. It was found that health locus of control mediated the relationship between food security and self-perceived global mental health for females but not for males. For the sample of females, the significant relationships between the variables occurred in the expected directions and met the criteria for mediation. For the sample of men, no significant relationships existed between reported food security and reported health locus of control or between reported health locus of control and reported mental health. Mean health locus of control scores were not significantly different between groups, and similar variability in responses existed for both groups.

**Relation of findings to past literature.** To the author's knowledge, no other studies have examined health locus of control as a mediator in the relationship between food security and mental health. However, the finding of such a relationship converges with related findings from other studies. First, as mentioned previously, numerous studies have uncovered a relationship between food insecurity and poor mental health, although the research participants in such studies were primarily female (Casey et al., 2004;



Hadley & Patil, 2006; Kaiser et al., 2007; Laraia et al., 2008; Siefert et al., 2001; Whitaker et al., 2006).

Second, having an external locus of control was positively associated with household food insecurity in a study by Laraia et al. (2006). The researchers included psychosocial variables in their study of food insecurity because of the potential for personal psychological states (e.g., depression, anxiety, and perceived stress) and personal dispositions (e.g., locus of control) to influence how a person copes with food security. In addition, the relationship between stressors other than food insecurity and an external locus of control have been demonstrated in several studies. Individuals' reports of general levels of stress, as well as specific types of stressors (e.g., academic stress, perceived discrimination), have been associated with a more external locus of control orientation (Fischer & Holz, 2010; Grote et al., 2007; Jang et al., 2008; Roddenberry & Renk, 2010). Third, a relationship between locus of control in general, and health locus of control in particular, and psychological distress has been supported by several studies (Arraras et al., 2002; Crisson & Keefe, 1988; Takakura & Sakihara, 2001; Wu et al., 2004).

Finally, several of the reviewed studies examined the relationships among stressors, perceptions of control, and psychological symptoms concurrently and found that the three variables were related (Fischer & Holz, 2010; Grote et al., 2007; Jang et al., 2008; Roddenberry & Renk, 2010). For instance, as reviewed earlier, Roddenberry and Renk (2010) found that general stress experienced by their participants had a significant negative relationship to their general and health-related internal locus of control. The psychological symptoms of the participants had a significant positive relationship with

their general and health-related external locus of control. In addition, Grote et al. (2007) found that women with many chronic stressors who perceived those stressors as being more controllable were less likely to experience clinically significant major depression.

**Possible explanations for findings.** An important question for this study is why this relationship existed in the sample of females but not in the sample of males. One possible explanation is that there were not enough males in the study to detect an effect. The sample of males ( $n = 40$ ) was much smaller than that of females ( $n = 110$ ), limiting the statistical power of the tests of the relationships among the variables for the males. Thus, although this study's inclusion of a male sample was unique and a strength of the study, it will be important to replicate it in the future with a larger sample of males in order to provide a more adequate test of the hypotheses among males.

It is also possible that this finding is reflective of larger structural factors. Given the research findings in this area, women may feel a more pervasive sense of vulnerability to life circumstances because of societal level discrimination. The victimization of women and feminization of poverty both play a large role in hunger and poor health (Chilton & Booth, 2007), and these social problems are built upon a foundation of power imbalances and discrimination. The fact that households with children headed by a single woman have the highest rate of food insecurity after families of four with an annual income below the poverty line (United States Department of Agriculture, 2008) seems to support this assertion.

The relationships among stressors, perceived control, and psychological distress have been found previously in studies examining gender-based stressors, such as sexist discrimination (Fisher & Holz, 2010) and low social status (Fisman & O'Neil, 2009).

Fisman & O'Neil (2009) found that women were more likely than men to attribute success to luck, have a lower position in the workplace hierarchy, have lower household income, and have a lower level of education. In addition, women were less likely than men to have a favorable view of competition and to have current employment.

Correlational analyses in a study by Jang et al. (2008) showed that being younger, male, and reporting less discrimination were associated with a greater sense of control.

Common significant predictors of positive and negative affect included age, gender, perceived discrimination, and sense of control. Those who were older and male reported less perceived discrimination, and they reported a higher sense of control and evinced greater levels of psychological well-being. Viewed from the Stress and Coping Theory framework, it is possible that previous experiences with discrimination and unfairness are part of the personal and situational factors that shape primary appraisals -- the perceptual lens through which individuals view reality. As women experience unfair events based in gender discrimination, they may come to view the world as being unfair and their control over events as limited. Although discrimination also exists for some groups of men, it is possible that the number of men of minority status in the sample was too small to detect any effects. This could be investigated by examining racial and ethnic differences in locus of control using a large, diverse sample of males. In addition, it is also possible that females and males are socialized to cope differently in response to stressors.

Another possibility is that women may feel a greater responsibility in this society to care for and feed their families, and this commitment may mean that women appraise the situation as having particularly high stakes. In her paper, "Right to food; right to feed; right to be fed: The intersection of women's rights and the right to food," Esterik (1999)

highlights the special relationship between women and food, pointing out that the culturally constructed division of labor typically places the responsibility of feeding upon women. They are the source of food for fetuses and infants, and they are typically responsible for the production, acquisition, preparation, distribution, and clean-up of food. The identities and feelings of self-efficacy of many women are related to their ability to feed their families (Esterik, 1999), possibly making them more susceptible to feeling a lack of control. In accordance with Stress and Coping Theory, the stronger a person's commitments involved in an event, "or the more at stake these commitments are for a person, the more important it may be for the person to believe that he or she can control the outcome" (Folkman, 1984, p. 842). In the present sample, most of the women (75.5%) had children in their household and most (54.6%) were the only adult in their household, whereas most of the men in the sample (67.5%) did not have children in their household, and half were the only adult in their household.

The cultural roles and identities of men regarding food may provide insight into possible mediating factors regarding the relationship between food security and mental health for men. For instance, men may receive messages from society indicating that they should always be self-sufficient and able to provide for themselves. Therefore, men may feel like they *do* have control over their health but have failed at self-sufficiency. This may challenge the masculine identity set by society and produce feelings of distress.

Thus, the gender difference in the findings of this study indicate that, aside from the need to obtain a larger sample of males, it will be important for future research to assess additional aspects of individuals' subjective experiences with food insecurity. In particular, the personal responsibility that an individual feels for providing food and other

nurturance for their family and themselves should be assessed, as well as the individual's generalized expectancies for personal control over life stressors. The present study has supported the importance of considering females' and males' personal appraisals of stressors associated with food insecurity and opens the door for even more refined assessment of such subjective experiences that may be tied to gender roles and other structural constraints on individuals' lives.

### **Implications of the Findings**

**The relationship between food insecurity and mental distress.** Because food insecurity and depression are often symptoms of larger systemic problems, such as poverty and discrimination, the cause-and-effect relationship between the two is difficult to disentangle. Causality among the variables cannot be determined in the present data, because the data are cross-sectional and correlational. However, from the perspective of Stress and Coping Theory, which views stress as emerging from the dynamic and recursive relationship between the person (e.g., feelings of distress) and the environment (e.g., conditions of food security), it is plausible that food insecurity and mental distress weave into and out of each other, having bidirectional effects. Regardless of which variable precedes the other, the relationship between mental distress and food insecurity is an important topic to explore, because high scores on depression and food insecurity scales indicate human suffering. Both variables are associated with a wide variety of negative outcomes.

The fact that food insecurity and mental distress often co-occur highlights the importance of addressing the issue from multiple directions. First, a lack of mental health service access may leave individuals more vulnerable to becoming food insecure, as

mental distress may interfere with potential employment and contribute to the psychological problems associated with food insecurity. In these instances, policies that lessen inequalities in mental health care are needed to avoid food insecurity and the ensuing problems for the family. In at-risk areas, such as those with concentrations of low-income families, facilities that offer reduced-cost services, sliding fee scales, and accept Medicaid payments may help to reduce the disparity. In order to facilitate service usage in some areas, public health campaigns designed to increase awareness and decrease stigma associated with mental health issues may be needed (Lent et al., 2009). It is possible that programs aimed at preventing household food insecurity could help reduce the incidence and prevalence of major depression in welfare recipients, especially high-risk mothers (Heflin et al., 2005).

Second, the adequacy of food safety nets needs to be addressed. Revision of current laws and practices regarding welfare and SNAP, especially for single parents with children, could also be considered. Single parents could receive larger benefit allotments. In addition, training regarding food resource management could be provided to help low-income individuals maximize their food dollars and learn how to access other programs for which they may be eligible in order to have more money to spend on food (e.g., childcare, healthcare, job placement programs). This may be especially important, as food insecurity is associated with lower levels of food and financial management skills (Olson & Rauschenbach, 1997). However, as the nation's budget tightens, programs that provide food resources for those who are low-income may be threatened. The public needs to advocate for the protection of programs for those who are low-income and at-risk for hunger. In order to protect the physical and mental health of many Americans,

enabling vulnerable populations to combat hunger needs to be a national priority.

Research is needed to evaluate the most efficient and efficacious means of ensuring that the most vulnerable will have secure access to food.

Ameliorative policies can only treat the symptoms of food insecurity and mental distress. The fundamental causes of health disparities and other factors that contribute to food insecurity and mental distress must be addressed as well. Better understanding the contributing factors and outcomes of the issues and implementing policy based on that understanding may help to alleviate this distress. People need to be empowered to take control of their health, and society needs to provide mechanisms through which this can be accomplished.

**The relationships among food insecurity, mental distress, and health locus of control in women.** Although women are most likely to be responsible for feeding their families, they are also least likely to determine the policies surrounding the access to food. In nutrition literature, women are often discussed in relation to belonging to an at-risk group. Researchers and policy makers should work to instead conceptualize women as the “gatekeepers of family health” (Esterik, 1999, p. 228), thereby empowering them to make decisions concerning the health and well-being of themselves and their families. Researchers and policy makers need to approach food insecurity from a multidisciplinary, culturally-considerate approach, and women must be actively involved in shaping policies regarding food. Elimination of all forms of discrimination against women is an essential part of dealing with food insecurity (Esterik, 1999).

## **Limitations of this Study**

**Sample.** First, as noted previously, the male and female groups were not equivalent in size. There was a smaller sample of males than females, limiting statistical power of the analyses for males. Second, no information was collected regarding the percentage of people approached to be in the study who declined. It is possible that those with lower internal locus of control were more likely to refuse to take part out of hopelessness. Third, findings from this study may not extend to other groups, as the sample included only those who were low-income and seeking resource assistance from SNAP, and the study used a convenience sample, which is not representative of the population.

**Measures and analyses.** First, the measure used to assess mental distress, although it has demonstrated reliability in other studies (Andresen et al., 2003; Kapp et al., 2009) and is used in a nationwide telephone survey administered by the Center for Disease Control, has not been validated with clinical populations or other measures of similar constructs. In addition, it is a global measure and does not discriminate between different types of mental distress (e.g., depression, anxiety). Second, the measure used to assess health locus of control is a new measure and has not been validated with other measures or populations. In addition, it would have been preferable to assess health locus of control, used as a mediator variable, with more than one type of instrument, to establish its concurrent validity (Baron & Kenny, 1986). The measures that were used to assess mental health and health locus of control in this study are global scales, which are particularly vulnerable to issues of subject global response sets and lack sensitivity, potentially oversimplifying the constructs of interest.



Third, there is potential that the findings of this study could be partially accounted for by method variance, as all of the measures used were self-report. The results may be tapping into an overall sense of hopelessness or pessimism rather than the specific constructs. Perhaps ratings of subjects' mental health symptoms by trained clinical interviewers could be used as an alternative to sole reliance on self-reports.

### **Specific Research Needed to Clarify or Extend Findings**

**Sample.** A larger sample size of males would increase the power of the study. In addition, sampling a more diverse population in terms of race, ethnicity, age, education, and occupational background would help in ascertaining whether the results could be generalized across characteristics of a broader population.

**Measures.** In order to better understand the present findings, future research should include 1) a more sensitive measurement of mental health that has been validated with clinical populations in order to obtain a richer description of the psychological experiences of the sample, 2) multiple measures of locus of control, 3) measures of perceived discrimination and coping strategies to help elucidate the relationships among these variables, as well as how this experience fits within Stress and Coping Theory, 4) qualitative studies of men's experiences of food insecurity and mental distress, that may help elucidate the processes underlying the unique experiences of men, and 5) alternative measures of variables that may mediate the relationship between food insecurity and mental health problems among men.

### **Directions for Future Research**

As the numerous studies have demonstrated a relationship between mental distress and food insecurity, it is possible that mental distress is an integral aspect of food

insecurity and that food security measures should be amended to address this aspect. In addition, literature in this area has primarily focused on women; however, the existence of a relationship between mental distress and food security in men highlights the need for more attention to be paid to this phenomenon in men. Lastly, investigation of factors that serve as buffers against food insecurity and mental distress could help make future interventions more effective. For instance, potential moderators of the relationship (e.g., variables such as self-efficacy, social support, adequate nutrient intakes, etc.) could be explored.

## Appendix A: Demographic Variables

**READ:** I want to ask you some questions about health and nutrition. This is not a test, and there are no wrong answers. Please be as honest as you can. I won't tell anyone what you say, which means your answers will be kept secret. I'm going to read some questions out loud and write your responses on my form.

**1. Birthdate:** \_\_\_\_\_ **Age:** \_\_\_\_\_

**2. Sex:**  Male  Female

**3. Height:** \_\_\_\_\_ feet, \_\_\_\_\_ inches

**4. Weight:** \_\_\_\_\_ pounds

**5. How many people live in your household, including you?** \_\_\_\_\_ adults and \_\_\_\_\_ children

**Adult 1: Self**

**Child 1 Age:** \_\_\_\_\_

**Child 4 Age:** \_\_\_\_\_

**Adult 2 R'ship:** \_\_\_\_\_

**Child 2 Age:** \_\_\_\_\_

**Child 5 Age:** \_\_\_\_\_

**Adult 3 R'ship:** \_\_\_\_\_

**Child 3 Age:** \_\_\_\_\_

**Child 6 Age:** \_\_\_\_\_

**6. How much money does your household take home each year?**

Less than \$10,000

Between \$25,000-\$29,999

Full time

Between \$10,000-\$14,999

Between \$30,000-\$34,999

Part time: \_\_\_\_\_ hours/week

Between \$15,000-19,999

Between \$35,000-\$39,999

Unemployed since: \_\_\_\_\_

Between \$20,000-\$24,999

More than \$40,000

Student: \_\_\_\_\_ hours/week

**7. What is the highest grade in school you have completed?**

8<sup>th</sup> grade

12<sup>th</sup> grade/GED/High school diploma

Associates/2 year degree

9<sup>th</sup> grade

Technical school or military training

Bachelor's/4 year degree

10<sup>th</sup> grade

Some college, no degree earned

Graduate degree (MS, PhD, JD)

11<sup>th</sup> grade

**8. How do you describe your race/ethnicity?**

Black or African American

Asian or Pacific Islander

Hispanic or Latino

American Indian or Alaska Native

White

Other: \_\_\_\_\_

## Appendix B: Food Security Scale

**These next questions are about the food eaten in your household in the last 12 months and whether you were able to afford the food your family needed.**

**In the last 12 months, how often did you have enough money to buy the food that you needed? Check 1 box.**

- Always true
- Sometimes true
- Rarely true

**In the last 12 months, how often could you afford to eat balanced meals? Check 1 box.**

- Always true
- Sometimes true
- Rarely true

**In the last 12 months, how often did you or other adults in your household cut the size of your meals or skip meals because there wasn't enough money for food? Check 1 box.**

- Almost every month
- Some months, but not every month
- Only one or two months
- Adults in my household (including me) NEVER cut the size of meals or skipped meals because there wasn't enough money for food

**In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food? Check 1 box.**

- Yes
- No

**In the last 12 months, were you ever hungry but did not eat because you could not afford enough food? Check 1 box.**

- Yes
- No

Food Security Score: \_\_\_\_\_

- 0 -1 High/marginal food security
- 2-4 Low food security
- 5-6 Very low food security

### Appendix C: Health Locus of Control Measure

Think about how much control you have over your own health. On one end of this line, it says, "I have no control over my health." On the other end, it says, "I have total control over my health." Place an X on this line to show where you fall.

**I have NO  
control over  
my health.**

**I have TOTAL  
control over  
my health.**

## **Appendix D: Mental Health Measure**

In the last 30 days, on how many days was your mental health not good? \_\_\_\_\_

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