

Summer 8-2014

## **Influence of Resources, Resource Loss, and Coping Response on Food Management Practices and Food Security**

Simone Perette Camel  
*University of Southern Mississippi*

Follow this and additional works at: <https://aquila.usm.edu/dissertations>



Part of the [Medicine and Health Commons](#), [Other Sociology Commons](#), [Public Health Commons](#), and the [Social Statistics Commons](#)

---

### **Recommended Citation**

Camel, Simone Perette, "Influence of Resources, Resource Loss, and Coping Response on Food Management Practices and Food Security" (2014). *Dissertations*. 282.  
<https://aquila.usm.edu/dissertations/282>

This Dissertation is brought to you for free and open access by The Aquila Digital Community. It has been accepted for inclusion in Dissertations by an authorized administrator of The Aquila Digital Community. For more information, please contact [Joshua.Cromwell@usm.edu](mailto:Joshua.Cromwell@usm.edu).

The University of Southern Mississippi

INFLUENCE OF RESOURCES, RESOURCE LOSS, AND COPING RESPONSE ON  
FOOD MANAGEMENT PRACTICES AND FOOD SECURITY

by

Simone Perette Camel

Abstract of a Dissertation  
Submitted to the Graduate School  
of the University of Southern Mississippi  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy

August 2014

August 2014

## ABSTRACT

# INFLUENCE OF RESOURCES, RESOURCE LOSS, AND COPING RESPONSE ON FOOD MANAGEMENT PRACTICES AND FOOD SECURITY

by Simone Perette Camel

August 2014

Food insecurity has been associated with compromised health and wellness. Current literature regarding coping strategies and practices employed by the food insecure often describes food management and acquisition practices, and/or the riskiness of these practices. Material and personal resources such as income, time, self-efficacy, and social support have been identified as predictors or influencers of food security status. In this study, the Conservation of Resources theory was used to conceptualize resources and resource loss as they relate to food practices and food security. It was hypothesized that the level of resources would influence food security status and the adaptive food practices employed to mitigate food insecurity. It was also hypothesized that the loss of resources would be associated with adaptive food practices and worsening food insecurity.

A descriptive, correlational design was utilized with cross-sectional data to test the theorized model. A single survey instrument was developed by combining previously validated instruments. Path analysis was used to determine model consistency with sample data. Exploratory factor analysis identified the underlying structure of the food management and acquisition practices.

Findings included significant direct relationships of several resource variables, with adaptive food practices and food security survey (FSS) scores. Resource loss was

positively associated with adaptive food practices; however, it was not directly associated with FSS scores. Thus, resource loss appeared to influence food security through adaptive food practices. A three factor solution was identified for food management practices and a four factor solution was found for the food acquisition practice category. Management factors included restricting the food supply, obtaining food opportunistically, and strategizing food preparation and food choices. Acquisition factors included conserving money for food, strategizing food shopping, relying on external sources of support, and using lower food cost sources.

This study contributes to the literature as it investigated the presence and loss of resources and adaptive food practices simultaneously to broaden the understanding of their influence on food security. Future research is needed to determine if the conceptualized model remains consistent when applied to a broader, more diverse population.

COPYRIGHT BY  
SIMONE PERETTE CAMEL  
2014

The University of Southern Mississippi

INFLUENCE OF RESOURCES, RESOURCE LOSS, AND COPING RESPONSE ON  
FOOD MANAGEMENT PRACTICES AND FOOD SECURITY

by

Simone Perette Camel

A Dissertation  
Submitted to the Graduate School  
of the University of Southern Mississippi  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy

Approved:

---

Director

---

---

---

---

Dean of the Graduate School

August 2014

## ACKNOWLEDGMENTS

I would like to thank my entire family for their support throughout this endeavor, without them, completion of this dissertation would not have been possible. I dedicate this work to my father who taught me the importance of community, human dignity, and doing what is right. I thank my mother for the many ways she has provided unconditional support and encouragement. I am indebted to my siblings, nieces, and nephews for their “hands on” assistance that enabled me to accomplish tasks that seemed insurmountable at times.

I would also like to acknowledge my friends and community members who graciously volunteered themselves as participants for this study. They exemplify the giving nature of our community.

Lastly, I would like to thank my dissertation committee, Drs. Carol Connell, Kathy Yadrick, Richard Mohn, and Denise Brown, for their guidance and wisdom.



## TABLE OF CONTENTS

ABSTRACT.....	ii
ACKNOWLEDGMENTS.....	iv
LIST OF TABLES.....	vii
LIST OF ILLUSTRATIONS.....	viii
LIST OF ABBREVIATIONS.....	ix
CHAPTER	
I. INTRODUCTION.....	1
Conceptual Framework	
Statement of the Problem	
Research Hypotheses	
Delimitations	
Limitations	
Assumptions	
Definition of Variables	
II. REVIEW OF THE LITERATURE.....	18
Food Security and Its Measurement	
Factors Influencing Food Security	
Consequences of Food Insecurity	
Consequences of Food Insecurity among Children	
Consequences of Food Insecurity among Adults	
Coping Responses and Practices Related to Food Insecurity	
Conservation of Resources Theory and its Application to Food Security	
III. METHODOLOGY .....	88
Research Design	
Sample and Sampling Procedure	
Survey Administration	
Survey Development and Variable Measures	
Analysis	
IV. MANUSCRIPT I: INFLUENCE OF RESOURCES, RESOURCE LOSS, AND COPING RESPONSE ON FOOD MANAGEMENT PRACTICES AND FOOD SECURITY.....	104

	Background	
	Research Design	
	Method	
	Analysis	
	Results	
	Discussion	
	Conclusions	
V.	MANUSCRIPT II: USING FACTOR ANALYSIS TO IDENTIFY SUBSCALES OF FOOD ACQUISITION AND MANAGEMENT PRACTICES.....	140
	Background	
	Method	
	Results	
	Discussion	
	Conclusions	
VI.	CONCLUSIONS.....	153
	APPENDIXES.....	158
	REFERENCES.....	174

## LIST OF TABLES

### Table

1. Conservation of Resources Theory Valued Resources.....	83
2. Variable Definitions and Measurement Units.....	92
3. Characteristics of the Full Sample (n=284) (Manuscript I).....	119
4. Means and Standard Deviations for Model Variables, Full Sample (n=284) (Manuscript I).....	121
5. Modified Model Regression Estimates (n=284) (Manuscript I) .....	125
6. Sociodemographics of the Problem-focused Sample (n=196) (Manuscript I).....	126
7. Means and Standard Deviations for Model Variables of Problem-focused Sample (n=196) (Manuscript I) .....	128
8. Modified Model Regression Estimates for Problem-focused Group (n=196) (Manuscript I) .....	130
9. Correlations among Variables in the Model (n=196) (Manuscript I) .....	132
10. Sociodemographics of the Full Sample (n=284) (Manuscript II) .....	142
11. Rotated Factor Loading of Management Category of Food Practices (n=238) (Manuscript II) .....	146
12. Rotated Factor Loading of Acquisition Category of Food Practices (n=240) (Manuscript II) .....	148
13. Cronbach alphas for Subscales of Management and Acquisition Categories of Food Practices (Manuscript II) .....	149
14. Mean Food Acquisition and Management Factor Scores by Food Security Level (Manuscript II) .....	149

## LIST OF ILLUSTRATIONS

### Figure

1.	Conceptual Model depicting the influence of the Resource Pool and Loss of Resources on Food Practices and Food Security .....	14
2.	Conservation of Resources Theory Model (Hobfoll, 2001b).....	85
3.	Theoretical Model .....	102
4.	Conceptual Model of Resources, Practices, and Food Security (Manuscript I) ...	111
5.	Theoretical Model (Manuscript I) .....	119
6.	Modified Model Estimates (n=284) (Manuscript I).....	125
7.	Modified Model for Problem-focused Group (n=196) (Manuscript I) .....	131

## LIST OF ABBREVIATIONS

ATUS	:	American Time Use Study
BMI	:	Body Mass Index
BRFSS	:	Behavioral Risk Factor Surveillance Survey
CCHIP	:	Community Childhood Hunger Identification Project
CES-D	:	Center for Epidemiologic Studies Depression Scale
CHI-C	:	Child Hunger Child Report
CHRQOL	:	child health related quality of life
CIQ	:	Consumer Impact Questionnaire
COR	:	Conservation of Resources
COR-E	:	Conservation of Resources Evaluation
CPS	:	Current Population Survey
CPS-FSS	:	Current Population Survey Food Security Supplements
CSI	:	Coping Strategy Index
DHHS	:	Department of Health and Human Services
DIS	:	Diagnostic Interview Schedule
ECLS-K	:	Early Childhood Longitudinal Study Kindergarten
EITC	:	Earned Income Tax Credit
ERS	:	Economic Research Service
FPL	:	Federal Poverty Line
FSP	:	Food Stamp Program
FSS	:	Food Security Survey

FSSM	:	Food Security Survey Module
GSE	:	General Self-Efficacy Scale
KMO	:	Kaiser-Meyer-Olkin
LOT	:	Life Orientation Test
LOT-R	:	Life Orientation Test – Revised
MSFW	:	Migrant and Seasonal Farm Workers
NCHS	:	National Center for Health Statistics
NFI	:	Normed Fit Index
NHANES	:	National Health and Nutrition Examination Survey
NNMRR	:	National Nutrition Monitoring and Related Research Act
PAF	:	principal axis factor analysis
PSC	:	Pediatric Symptom Checklist
RDA	:	Recommended Dietary Allowance
RMSEA	:	Root Mean Square Error of Approximation
SCFII	:	Continuing Survey of Food Intakes by Individuals
SD	:	Standard Deviation
SEM	:	structural equation modeling
SF-12	:	Short Form 12-item Health Survey
SIPP	:	Survey of Income and Program Participation
SNAP	:	Supplemental Nutrition Assistance Program
SSQ	:	Social Support Questionnaire
SSQ6	:	Social Support Questionnaire, Six Item
SSQNS	:	Social Support Questionnaire Number Score

SSQS : Social Support Satisfaction Score

TANF : Temporary Assistance for Needy Families

U.S. : United States

USDA : United States Department of Agriculture

WIC : Special Supplemental Nutrition Program for Women, Infants, and Children

## CHAPTER I

### INTRODUCTION

In the United States (U.S.), food insecurity has been a chronic, underlying condition that has societal impacts that are infrequently at the forefront of the nation's concerns. Food security is defined by the United States Department of Agriculture (USDA) as "access by all people at all times to enough food for an active healthy life" (Coleman-Jensen, Nord, Andrews, & Carlson, 2011, p. 2). Food insecure households are further classified as either *low food security* or *very low food security*. Low food security refers to those households where there are food access issues, but the households report little to no disruption in food intake. Very low food security households report both reduced food intake and altered eating patterns related to lack of resources (Coleman-Jensen et al., 2011).

In recent years, environmental events and changes in the U.S. economy have moved some segments of society from a food secure existence to one that is insecure as evidenced by the decrease in national prevalence of food security from 89% in 2007 (Nord, Andrews, & Carlson, 2007) to 85.5% in 2012 (Coleman-Jensen, Nord, & Singh, 2013). The national prevalence of food insecurity for 2012 in the U.S. was 14.5% with 8.8% being classified as low food security status and 5.7% as very low food security status. In U.S. households with children, 20% were food insecure with 10% experiencing food insecurity amongst the adults in the household and 10% experiencing insecurity among both the adults and the children (Coleman-Jensen et al., 2013). In the state of Louisiana, the average level of food insecurity for 2010-2012 was 15.7% with 4.8% being classified as having very low food security. The Food and Nutrition Service of the



USDA reported spending for all food assistance programs in fiscal year 2011 to be \$103,593,702,907 (U.S. Department of Agriculture, 2012). The accurate measurement and characterization of food security status has broad policy implications, particularly at a time of reduced appropriations for food assistance programs.

The National Nutrition Monitoring and Related Research Act of 1990 (NNMRR) charged the U.S. Food Security Measurement Project with developing a survey instrument to standardize the measurement of food security in the U.S. for use across programs at different levels of government (Wunderlich & Norwood, 2006). The USDA joined the Department of Health and Human Services (DHHS) and the National Center for Health Statistics (NCHS) to begin operationalizing a measure of food security in a national survey. Available research guided the development of the U.S. Household Food Security Survey Module (FSSM). The U.S. Census Bureau first administered the developed questionnaire with the Current Population Survey (CPS) in April 1995 and has repeated the survey annually since that time.

Early research that helped to conceptualize the definition and assessment of food security and hunger at the household and individual level was conducted by Radimer, Olson, and Campbell (1990). Household hunger and individual hunger were the two dimensions identified from their data. Each dimension had four major components, which included quantity, quality, psychological, and social. The household level components were food depletion, unsuitable food, food anxiety, and unacceptable means of food acquisition. The individual level components were insufficient intake, inadequate diet, feeling deprived and lacking choice, and disrupted eating patterns. The authors also indicated that women described coping tactics as an aspect of the hunger experience such

as obtaining additional food, stretching one's food and food money, and restricting food intake. The authors also noted that hunger was described as a managed process and the coping tactics employed to mitigate the effects of food insecurity were variable amongst households. From this work, a hunger scale was devised. Several studies followed that helped to validate the scale and expanded the findings to include a wider variety of income and age groups (Kendall, Olson, & Frongillo, 1995, 1996; Nord, 2003; Wolfe, Frongillo, & Valois, 2003; Wolfe, Olson, Kendall, & Frongillo, 1996).

Food insecurity has been associated with compromised health and wellness, impacting those who experience it physically, emotionally, and psychosocially (Alaimo, Olson, & Frongillo, 2001b; Casey et al., 2005; Kleinman et al., 2002; Kleinman et al., 1998; Lee & Frongillo, 2001; Weinreb et al., 2002). Food security has been viewed as an indicator or predictor of health conditions, a stressor associated with changes in performance and productivity at school or work, and as a condition, is associated with parenting behaviors that may negatively affect the children of that household. Food insecurity has been associated with alterations in diet quality and other health behaviors, which may impair health promotion and disease prevention efforts (Alaimo et al., 2001b; Alaimo, Olson, Frongillo, & Briefel, 2001c; Alaimo, Olson, & Frongillo, 2001d; Devine et al., 2009; Duffy, Zizza, Jacoby, & Tayie, 2009; Kleinman et al., 2002; Kleinman et al., 1998; Lee & Frongillo, 2001; Wehler et al., 2004; Weinreb et al., 2002). Gaining an understanding of the dynamics of these associations at an individual level may provide insight into the context in which the food insecure make decisions about how to cope with insufficient food.

Many factors influence food security status. While income is a significant predictor, food security status is also influenced by household characteristics such as the number, gender, and age of adults in a household, the presence of children, and homelessness (Coleman-Jensen et al., 2011; Heflin, Sandberg, & Rafail, 2009; Himmelgreen & Romero-Daza, 2010; Lee & Greif, 2008; Rose, 1999). It is also influenced by the cost of housing, including heating and cooling (Kirkpatrick & Tarasuk, 2011; Nord & Kantor, 2006), geography (Bartfeld & Dunifon, 2006), individual employment characteristics (Coley, Lohman, Votruba-Drzal, Pittman, & Chase-Lansdale, 2007), participation in food assistance programs both governmental and non-governmental (Bartfeld & Hong-Min, 2011; Bhattarai, Duffy, & Raymond, 2005; Jones & Frongillo, 2006; Kim & Frongillo, 2007), and sociocultural influences such as norms, beliefs, social networks, and cohesion (Chilton & Booth, 2007; Chung et al., 2012; Lee & Greif, 2008; Lee & Frongillo, 2001).

The poverty rate in the U.S. is 15% based on the 2011 Current Population Survey (CPS), which represents no significant change from 2010 (Denavas-Walt, Proctor, & Smith, 2012). However, this poverty rate is an increase from that of 12.5% in 2007 (Denavas-Walt, Proctor, & Smith, 2011; Denavas-Walt et al., 2012). State-specific poverty data from the 2011 CPS, reveals a poverty rate of 18.9% for the state of Louisiana (Denavas-Walt et al., 2012).

Rose (1999) noted that those in poverty were 3.5 times more likely to be food insufficient when compared to those not in poverty; however, not all those in poverty were food insufficient. Rose (1999) also noted in a review article addressing the measurement of food insecurity that food insufficient households were more likely to

have recently experienced financially stressful events such as job loss, adding of household members, or losing food stamps. One difficulty in interpreting the literature on income and relationship among income, poverty, and food insecurity is that income alone does not determine the amount of money available for food. Housing costs and available government benefits were identified as factors that account for differences in study outcomes (Rose, 1999).

Cook et al. (2002) studied the impact of welfare benefit reduction or loss on the food security status of children in hospitals across six U.S. cities. Utilizing the USDA-FSS survey, those who had lost welfare benefits or who had benefits reduced were 1.5 times more likely to be classified as food insecure. Kirkpatrick and Tarasuk (2011) investigated the relationship between food security and housing affordability in Toronto, Canada. Subjects were recruited from both market rental and subsidized housing in high poverty census tracts. Household food insecurity was inversely associated with both total income and after-shelter income. Food insecurity increased for market rental families when greater than 30% of income was used for housing. The amount of funds available for food purchasing was inversely proportional to the funds allocated for housing.

In addition to income, other personal resources have been associated with food practices and food security, including education level, optimism, social support satisfaction, time, experience with food practices, and participation in food assistance programs. Education was shown to be predictive of food insecurity in the U.S. Rose (1999) identified that having a head of household with a high school education or higher as being protective against food insecurity. A similar association, maternal education of less than six years predicted food insecurity, was found utilizing the U.S. FSSM in a

study of Texas migrant and seasonal farm workers (Weigel, Armijos, Hall, Ramirez, & Orozco, 2007). Herman, Harrison, Afifi, and Jenks (2004) found that mothers new to the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) who had a high school degree were more likely to become food secure with program participation. In a study of households who participated in the Food Stamp Program (Supplemental Nutrition Assistance Program) and informal food assistance activities, education of the head of household was predictive of food security status (Yu, Lombe, & Nebbitt, 2010).

Coping with food insecurity as a stressor may also be affected by the personal resources of self-efficacy and optimism (DiClemente, Crosby, & Kegler, 2009; Hobfoll, 1998). Optimism has been positively associated with social networks, reduced stress, improved quality of life, and more adaptive responses to difficult situations (Brisette, Scheier, & Carver, 2002; Carver, Scheier, & Segerstrom, 2010; Harju & Bolen, 1998; Schou, Ekeberg, & Ruland, 2005; Smith & Freedy, 2000). Optimism affects how one appraises a situation and the behavior related to coping with situations, and is associated with positive management of stressful situations (Nes & Segerstrom, 2006; Prati & Pietrantonio, 2009). Self-efficacy has been extensively studied and is important to changing coping behaviors and improved health related outcomes (Cicognani, 2011; Nápoles, Ortíz, O'Brien, Sereno, & Kaplan, 2011). Self-efficacy is considered a coping resource as increased self-efficacy has been associated with increased problem-solving coping behaviors and coping capacity (Trouillet, Doan-Van-Hay, Launay, & Martin, 2011; Turner, Goodin, & Lokey, 2012). Self-efficacy has also been identified as

important to the practical aspects of managing the home food environment (Devine et al., 2006; Kolopaking, Bardosono, & Fahmida, 2011).

Time is a personal resource that is needed if low-income households are expected to stretch food dollars by cooking more meals utilizing basic ingredients similar to those included in the USDA's Thrifty Food Plan. Utilizing the American Time Use Study (ATUS) (U.S. Department of Labor, 2012) data from 2003-2004, Mancino and Newman (2007) explored the relationships between personal and family characteristics, and time allocated to food preparation, for women of all income levels. They found that as time allocated to employment increased, time allocation to food preparation decreased. Overall, as income increased, women decreased their time spent on food preparation, but this inverse relationship did not hold true for low-income women (less than or equal to 130% of the federal poverty level). The authors proposed this was possibly related to low-income women being less able to substitute money for time compared to higher income women. The presence of children increased time spent on food preparation at all income levels.

Employment demands such as long or irregular working hours of low-to-moderate income parents was shown to impact food and meal choices for themselves and their families (Devine et al., 2009). In a pilot telephone survey, working parents from low-to-moderate income (annual family income <\$60,000) zip codes in upstate New York were found to skip meals themselves, utilize foods prepared away from home, consume *quick* items at work instead of meals, eat in the car, and cook more on days when they were not working. Children were reportedly fed separately from parents by 44% of fathers and 52% of mothers, and many ate while watching television. Time related to work was an

influencing factor on food related practices. The findings from Devine et al. (2009) and those of Mancino and Newman (2007) suggested that the resource of time had a greater impact on food preparation than income and supported the need to consider time as an influencing factor in food related practices.

Food security has also been linked to formal and informal social support systems that include food assistance programs, social networks, family, and friends. Garansky, Morton, and Greder (2006) studied randomly sampled rural households in the Midwestern U.S. from counties with poverty rates above the state average. The six-question USDA Food Security Short Form along with a survey was used to evaluate the relationships of the resources provided by the local food environment, transportation, and formal and informal social support systems with food security. Informal social support was measured by questions that included the number of people one could call on if help was needed and whether or not the respondents had shared or received food from family and/or friends. Two informal social support indices were found to predict food security: being able to rely on others and the sharing of foods. Perhaps a coping practice of relying on others for food resources and participating in the rural “norm” of exchanging food, if it exists in a community, helps to stabilize food security. The impact of participation in these practices and of social support on food security warrants further study.

Social support is considered a resource of value for coping with stressors (Hobfoll, 1985; Hobfoll, Johnson, Ennis, & Jackson, 2003; Schwarzer & Knoll, 2007). The loss of social support has been shown to negatively impact the outcomes of coping efforts (Hobfoll et al., 2003). Social networks, social support, and community norms are considered components of social capital. Social capital has been described as “resources

available to individuals through their social behaviors and membership in community networks” (Kawachi, 1999, p. 121). To examine a relationship between social capital and food insecurity at the household and community level, Martin, Rogers, Cook, and Joseph (2004) conducted a study in an urban population with incomes less than 185% of the federal poverty level. A previously validated scale was utilized as an index of social capital and included questions about willingness to help neighbors, ability to ask for help from neighbors, and personal relationships with neighbors that reflected a perceived sense of trust and reciprocity. Household social capital was associated with significantly decreased odds of being hungry. Households were less likely to experience hunger in communities with high social capital. The presence of an elderly member in a household was associated with a decreased likelihood of experiencing hunger. This study supported the importance of social capital as a resource for food security in an urban setting. The researchers did not evaluate whether the knowledge and skills that the elderly possess regarding food management may be protective against hunger. While social support is an aspect of social capital, this study did not investigate the participants’ satisfaction with social support.

Participation in formal food assistance programs has had positive impacts on food security status (Herman et al., 2004; Metallinos-Katsaras, Gorman, Wilde, & Kallio, 2011). Participation often includes education related to feeding and food practices, thereby potentially affecting food related practices beyond the time spent in a food assistance program. Having a history of food insecurity and the experience of coping with the condition of food insecurity in the distant past may also influence food practices. This



may be considered a resource particularly if practices are associated with improvement or stability of food security status.

Effective acquisition and management of food resources may influence a household's food security. Household members at all ages can contribute to these efforts, even children. Bowen and Devine (2011) documented the influence of intergenerational factors that influence the transfer of food related knowledge and skills. Fram et al. (2011) determined that children were aware of food security issues in a household and took responsibility for managing food resources. High school students also contributed to the food shopping duties of a household (McCullum & Achterberg, 1997). To capture the resource of "experience with food practices" it will be important to identify the total amount of experience in a household. There is a need to capture the years of responsibility for food practices by each household member to explore this resource.

Reports regarding coping strategies and practices employed by the food insecure are most often related to food management and acquisition practices at various levels of food security, and the frequency and riskiness of these practices (Anater, McWilliams, & Latkin, 2011; Kempson, Keenan, Sadani, & Adler, 2003; Kempson, Keenan, Sadani, Redlen, & Rosato, 2002a, 2002b; McLaughlin, Tarasuk, & Kreiger, 2003; Wood, Schultz, Butkus, & Ballegos, 2009; Wood, Schultz, Edlefsen, & Butkus, 2006). The intent of these studies was not to characterize the influence of personal resources on the coping strategies chosen in the presence of food insecurity challenges. Thus, further research is needed to determine whether specific practices are associated with improved food security.

## Conceptual Framework

The Conservation of Resources (COR) theory was used as a framework for this study. It was developed by Stevan Hobfoll (1989) in an effort to incorporate the impact of resource losses and gains on the stress process and overall individual well-being (DiClemente et al., 2009). The underlying assumption or tenet of the COR theory is that individuals “strive to obtain, retain, protect, and foster those things they value or their resources” (Hobfoll, 2001, p. 341). Stress occurs when an individual’s resources are threatened with loss, are lost, or there is a failure to gain resources after an investment of resources (Hobfoll, 2001). COR theory evolved from a need to incorporate both the “perceived and the objective environment” into the coping process (DiClemente et al., 2009, p. 133). People are believed to utilize their resources to “conduct regulation of self, their operation of social relations, and how they organize, behave, and fit into the greater context of organizations and culture itself” (Hobfoll, 2012, p. 228). COR theory posits that resources will determine an individual’s perception and ability to cope with a stressful situation. COR theory is predictive in nature in that it examines the dynamic nature of losses and gains. Research has shown that “resource loss is the principal ingredient in the stress process” (Hobfoll, 2001, p. 337).

Two primary principles and four corollaries that emerge from the central tenet of COR theory are (Hobfoll, 2001, 2012)

### Principle 1: The Primacy of Resource Loss

Resource loss is disproportionately more salient than resource gain.

### Principle 2: Resource Investment

People must invest their resources to protect against loss, recover

from losses, and gain resources.

Corollary 1: Those with greater resources are less vulnerable to resource loss and are more capable of organizing resource gain.

Corollary 2: Those who lack resources are not only more vulnerable to resource loss, but that initial loss begets future loss.

Corollary 3: Those who possess more resources are more capable of gain, and that initial resource gain begets further gain.

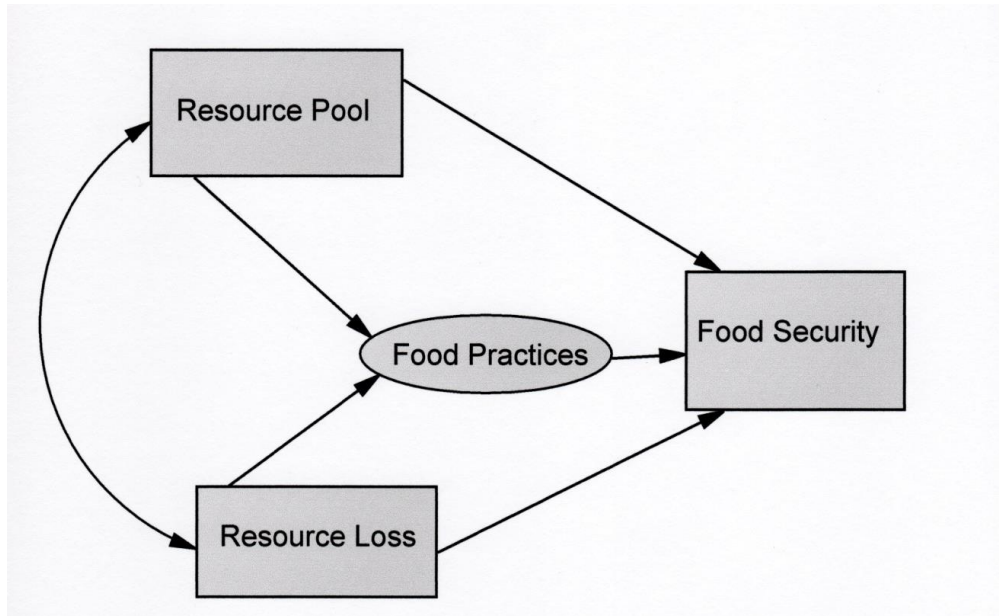
Corollary 4: Those who lack resources are likely to adopt a defensive posture to conserve their resources.

COR theory provides a framework for conceptualizing resources and resource losses as they relate to food security. Hobfoll (1998) developed a list of 74 valued resources to be used in testing the theory principles. Amongst these resources one finds adequate food, personal transportation, necessary home appliances, sense of optimism, and “feelings of independence, goal accomplishment, control over my life, being of value to others, and adequate personal health, social support, and self-efficacy” (Hobfoll, 1998, p. 53). The resources identified may affect the choice, nature, and effectiveness of coping strategies related to resource management. Some of these resources are the same as or similar to those identified in the literature as influencing food security status and as those which may support an individual’s ability to strategically prevent or minimize insecurity and improve food security.

Research has been published using COR theory as a framework to study the impact of resource loss and coping on psychological distress and well-being in a variety of settings such as after the occurrence of natural disasters, work burnout, loss of

wellness, and pregnancy amongst others (Benight, Swift, Sanger, Smith, & Zeppelin, 1999; Ehrlich et al., 2010; Freedy, Shaw, Jarrell, & Masters, 1992; Wadsworth, Santiago, & Einhorn, 2009; Zamani, Gorgeivski-Duijvesteijn, & Zarafshani, 2006). The use of COR theory to specifically address the relationships among resources or resource loss known to influence food security to date has not been found in the literature. The importance of establishing how the theory underpins food security lies in its potential ability to support future intervention research efforts that utilize COR theory principles in resource-based intervention programs. Hobfoll (as cited in DiClemente et al., 2009) contended that interventions based on behaviors must also address resources because they are necessary for success.

To begin to investigate the application of the theory to food security, relationships among resources needed to be established. Food insecurity can be considered a condition that causes distress and impacts well-being. It is often associated with a loss of resources, but it may also be a chronic condition. With this consideration, it was important to initially investigate the relationship of both the level of resources and resource losses to food security as described by the resource construct of Principle 1 and Corollary 1 of COR theory. The preferred coping responses were postulated to impact food related practices and ultimately food security status. The coping response relationships investigated by the current study addressed the resource investment and conservation construct described in Principle 2 and Corollary 4 of COR theory. The proposed conceptual model (Figure 1) depicts these relationships.



*Figure 1.* Conceptual model depicting the influence of the resource pool and loss of resources on food practices and food security.

#### Statement of the Problem

The purpose of the study was to investigate the applicability of the Conservation of Resources theory to food security. The conceptual model (Figure 1) depicts the theorized impact of the resource pool and resource loss on an individual's food practices which influence food security status. Relationships among/between variables within the model were assessed by path analysis to determine consistency with the proposed model. To determine if the proposed model was influenced by coping response behaviors, there was a plan to analyze the model for consistency across two coping response groups (problem or emotion-focused) identified by the survey instrument using invariance model testing methods.

## Research Hypotheses

### *Resource Pool*

A. Income, level of education, optimism, social support satisfaction, self-efficacy, food practices experience, time spent on meal management, and a history of participation in a food assistance program is negatively associated with food security scores.

B. Income, level of education, optimism, social support satisfaction, self-efficacy, food practices experience, time spent on meal management, and a history of participation in a food assistance program is negatively associated with food practices.

### *Resource Loss*

C. The loss or threat of loss of resources is positively associated with food security scores.

D. The loss or threat of resource loss is positively associated with food practices.

### *Food Practices*

E. Food practices are positively associated with food security scores.

### *Coping Response*

F. The path coefficients in the model are significantly different between coping response groups.

## Delimitations

The study utilized a convenience sample that was delimited geographically to south Louisiana for utilization of personal contacts to successfully execute snowball sampling. Participants were 18 years of age or older and non-institutionalized.

### Limitations

This study was limited in generalizability as the sampling was not representative of a larger population. The data was cross-sectional in nature and therefore could not predict causality. The data were collected by self-report and there was no secondary source of data for validation.

### Assumption

The researcher assumed that participants responded to the survey honestly, accurately and completely.

### Definition of Variables

*Resource pool.* Group of valued things one strives to obtain, retain, protect, and foster.

*Resource loss.* Loss or threat of loss of resources related to food security.

*Income.* The annual household income from all sources.

*Education.* The level of formal education.

*Optimism.* Participant rating of expectancy for the future.

*Self-efficacy.* Perceived belief in one's ability to complete new or difficult tasks, or face adversity.

*Social support satisfaction.* Participants appraisal of satisfaction with social support.

*Time.* The amount of time the participant typically spends completing food shopping, preparation, and cleaning activities.

*Experience.* Cumulative years of food activity responsibility of household members.

*Program participation.* History of participation in any public or private food assistance program in the participants' lifetime.

*Food insufficiency.* An inadequate amount of food intake due to a lack of resources (Alaimo, Briefel, Frongillo, & Olson, 1998).

*Food practices.* Frequency of engaging in food acquisition and food management practices for the household.

*Food security.* Access at all times to enough food for an active healthy life (Coleman-Jensen et al., 2011).

*Coping response.* Response to stressful situations in the past year, categorized as problem or emotion focused.



## CHAPTER II

### REVIEW OF THE LITERATURE

#### Food Security and Its Measurement

In the U.S., food insecurity has been a chronic, underlying condition that has societal impacts that are infrequently at the forefront of the nation's concerns. Recent environmental events and changes in the country's economy have moved some segments of society from a food secure existence to one that is insecure, as can be seen from the decrease in national prevalence of food security from 89% in 2007 (Nord et al., 2007) to 85.5% in 2012 (Coleman-Jensen et al., 2013). The Food and Nutrition Service of the United States Department of Agriculture (USDA) reports spending for all food assistance programs in fiscal year 2011 to be \$103,554,817,263 (USDA, 2012). The accurate measurement and characterization of food security status has broad policy implications particularly at a time of reduced appropriations for food assistance programs.

Food security is defined by the USDA as "access by all people at all times to enough food for an active healthy life" (Coleman-Jensen et al., 2011, p. 2). The most recent statistics available on food security in the U.S. are based on the Current Population Survey (CPS) of December 2010 that included the food security survey (FSS) supplement. Each question asked in the FSS refers to the previous 12 months and indicates that the response relates to a lack of resources as a cause for the behavior or condition in question. Households are considered food-secure if they report 0-2 food-insecure conditions or behaviors and are considered insecure if they report 3 or more food-insecure conditions or behaviors. The survey includes 10 questions for all households with an additional 8 questions if the household includes children. Food

insecure households are further classified into those with either “low food security” or “very low food security.” Low food security refers to those households where there are food access issues, but report little to no disruption in food intake. Very low food security households report reduced food intake and altered eating patterns related to lack of resources. Several questions have responses that attempt to measure the frequency of the specific food insecurity experiences (Coleman-Jensen et al., 2011). The national prevalence of food insecurity in the U.S. in 2011 was 14.5% with 9.1% being classified as low food security status and 5.4% as very low food security status. In U.S. households with children, 20.2% were food insecure with 10.4% experiencing food insecurity amongst the adults in the household and 9.8% experiencing insecurity among both the adults and the children. In the state of Louisiana, 12.6% of the population was food insecure with 4% being classified as having very low food security (Coleman-Jensen, Nord, Andrews, & Carlson, 2012).

The accurate measurement of food insecurity and hunger has been the task of researchers since the National Nutrition Monitoring and Related Research Act of 1990 (NNMRR) charged the U.S. Food Security Measurement Project with developing a survey instrument. The instrument was developed to standardize the measurement of food security in the U.S. for use across programs at different levels of government (Wunderlich & Norwood, 2006). The USDA staff first began the task of reviewing existing literature in 1992 and by 1994 joined with the Department of Health and Human Services (DHHS) and the National Center for Health Statistics (NCHS) to begin operationalizing a measure of food security in a national survey. The U.S. Census Bureau

administered the developed questionnaire with the Current Population Survey (CPS) in April 1995 and has repeated it annually since that time (Wunderlich & Norwood, 2006).

Early research that helped to conceptualize the definition and assessment of food security and hunger at the household and individual level was conducted by Radimer, Olson, and Campbell (1990), who used a two-phase research process. In the first phase, qualitative data were collected from interviews with 32 women from upstate New York who had experienced hunger or near-hunger. Household hunger and individual hunger were the two dimensions identified from this data; each dimension had four major components. The components for each dimension included quantity, quality, psychological, and social. The household level components were food depletion, unsuitable food, food anxiety, and unacceptable means of food acquisition. The individual level components were insufficient intake, inadequate diet, feeling deprived and lacking choice, and disrupted eating patterns (Radimer et al., 1990). The authors also indicated that the women described coping tactics as an aspect of the hunger experience such as obtaining additional food, stretching one's food and food money, and restricting food intake. While it was noted that hunger was described as a managed process, the coping tactics employed to mitigate the effects of food insufficiency were variable amongst households. In the second phase of the research, a survey was developed to assess the concept of hunger. The survey included items designed to assess each of the previously identified components. The questionnaire was tested for face, content, and construct validity with 189 women from upstate New York. Participants were from both rural and urban areas and were identified through low-income and food assistance programs. The survey items were designed to make responses related to the hunger

experience associated with inadequate resources and to address both household and individual hunger. Ultimately, hunger scales were developed for three dimensions: household hunger, women's hunger, and children's hunger. Each scale consisted of four items, two for each sub dimension of food depletion and food anxiety. The authors recommended that the dimensions of hunger and the hunger of women and children be measured separately as hunger was experienced at different times and at different severity levels. Indirect indicators of hunger such as the coping tactics of receiving family assistance with the food supply, limiting intake, or reducing the quality of meals, and physical consequences of hunger were insensitive or nonspecific to the identification of hunger. The authors felt that the measurement of these indirect indicators or risk factors would be useful for monitoring and program planning purposes to eliminate hunger, but should not be used alone to identify hunger (Radimer et al., 1990).

To further validate Radimer et al.'s (1990) earlier research, Kendall, Olson, and Frongillo (1995) conducted a survey that utilized an expanded income range of participants and included items related to fruit and vegetable consumption as well as household food supply. Participants were randomly selected from a 1989 health census in upstate New York that allowed the researchers to stratify by socioeconomic status and age. Two interviews were conducted with each of the 193 participants in their homes approximately three weeks apart. In the first interview demographic and food security risk factor data were collected. In addition, the Radimer/Cornell hunger scale items were included along with fruit and vegetable consumption questions from the Behavioral Risk Factor Surveillance Survey (BRFSS) and a household food inventory was also conducted. An item was added to the Radimer/Cornell hunger scale to address the qualitative

component of the food supply and lack of variety as household food supply was depleted. Findings supported the criterion validity of the Radimer/Cornell hunger scale. The scale indicated that as food insecurity became more severe there was an increase in the prevalence of participants having a low-income, participating in food assistance programs, and having less education and employment. Also noted was a decline in household food availability and consumption of fruits and vegetables with worsening levels of food insecurity. The authors concluded that the inclusion of diet quality assessment items was important to identifying food insecurity without hunger since quality concerns precede a shift to the quantity concerns associated with hunger. These diet quality assessment items also assisted with identifying individual level food insecurity within a household (Kendall et al., 1995). In a further analysis of these data, Kendall, Olson, and Frongillo (1996) assessed the differences between the food secure and food insecure groups for nutrients and food group consumption, household food supplies, and eating behaviors. Results supported previous findings and the use of the Radimer/Cornell hunger scale. A reduction in consumption of fruits and vegetables, a decrease in household food supplies, as well as an increase in disordered eating patterns was associated with food insecurity status (Kendall et al., 1996).

The above described research was used to guide the development of the U.S. Household Food Security Survey Module (FSSM). Because participants were primarily women with children, Wolfe, Frongillo, and Valois (2003) sought to increase the accuracy of food security measures in the elderly. The researchers utilized previously completed work conceptualizing food insecurity in the elderly as a foundation (Wolfe et al., 1996). A purposive sample of 46 elderly households was recruited from three cities in

upstate New York. Two in-depth interviews were conducted six months apart. Interview data were analyzed using grounded theory and the constant comparative method. The researchers used the results to identify components of food insecurity in the elderly not identified by the U.S. FSSM at that time. Fourteen new items were constructed for inclusion with the U.S. FSSM. These items were developed to address the newly identified components reported by the elderly of not “having the right foods for health” and experiencing the “inability to use food i.e., to prepare, gain access to and/or eat food because of functional impairments and health problems” (Wolfe et al., 2003, p. 2766). The authors felt that these components may not be directly related to a lack of financial resources, but do have food and nutrition policy implications and should be further investigated.

The Economic Research Service (ERS) of the U.S. Department of Agriculture (USDA) conducted a study of the U.S. Food Security Scale to determine if the elderly responded to the survey in the same way as the non-elderly (Nord, 2003). The Rasch model of statistical analysis was utilized to re-examine the data collected from the 1998, 1999, and 2000 Current Population Survey Food Security Supplements (CPS-FSS). The Rasch model provides a way to determine the severity level of the experience of each question on the survey. It allows an ordering of severity on a progressive scale measure. The analysis indicated that the CPS-FSS did reflect the overall food security status of the elderly; however, there were differences noted between the elderly and non-elderly households. Responses to several questions asked in addition to those that comprised the FSS were analyzed. For example, those responding that they did not always have the “kinds” of foods they wanted to eat were asked to identify the reasons why they did not

have the “kinds” of foods they wanted to eat; those reporting not having enough to eat were also asked for reasons in follow-up. When comparing responses to the food sufficiency questions, elderly households were less likely to indicate problems as compared to non-elderly households, which was consistent with the responses to the FSS questions. This group also relied less on food assistance programs as compared to non-elderly households. Researchers suggested that the differences seen in the data patterns supported the negative impact of food access problems, transportation limitations, and health issues altering dietary needs among elderly households. Nord (2003) noted that while the CPS-FSS scale does identify food security status in the elderly overall, it may not identify the social acceptability of how food is obtained and it may not address the “balanced meal” concept as the elderly were inconsistent in their responses to this item.

The CPS-FSS collects data used to determine food security status over the past year. The CPS has also included supplemental questions regarding occurrence of food sufficiency problems and changes in food related behaviors over the past year that are not used by the FSS. To explore the frequency and the duration of food sufficiency experiences and behaviors in relation to food security status, Nord, Andrews, and Winicki (2002) analyzed the data from the August 1998 CPS-FSS. The responses to the time sensitive component of these questions were then analyzed by the food security scale status categories to determine the frequency of food insufficiency occurrences. The majority of food insecure households experienced insecurity in three or more months of the previous year. The authors estimated the monthly prevalence to be about 60% of the annual prevalence, the daily prevalence to be 13-18% of the annual prevalence, and that 10-20% of the food insecure households experienced this condition for at least 15 days.

Because food insecurity does not necessarily occur every month of the year or every day of the month for those who are food insecure, there may be a benefit from a more comprehensive understanding of their coping tactics in order to identify those coping tactics that are effective and can be addressed by educational interventions.

### Factors Influencing Food Security

While income is a significant predictor of food security status, it is by no means the only factor. Food security status is also influenced by household characteristics such as the number, gender, and age of adults in a household, the presence of children, and homelessness (Coleman-Jensen et al., 2011; Heflin et al., 2009; Himmelgreen & Romero-Daza, 2010; Lee & Greif, 2008; Rose, 1999). It is also influenced by the cost of housing including heating and cooling (Kirkpatrick & Tarasuk, 2011; Nord & Kantor, 2006), geography (Bartfeld & Dunifon, 2006), employment characteristics (Coley et al., 2007), participation in food assistance programs both governmental and non-governmental (Bartfeld & Hong-Min, 2011; Bhattarai et al., 2005; Jones & Frongillo, 2006; Kim & Frongillo, 2007), and sociocultural influences such as norms, beliefs, social networks, and cohesion (Chilton & Booth, 2007; Chung et al., 2012; Lee & Greif, 2008; Lee & Frongillo, 2001). Poverty, income, and food insecurity are related, yet food insecurity depends on more than just economic hardship and there is a need to identify the underlying factors that impact long term food security (Ribar & Hamrick, 2003).

The poverty rate in the U.S. is 15% based on the 2011 Current Population Survey (CPS), which represents no significant change from 2010; however, this rate is an increase from 12.5% in 2007 (Denavas-Walt et al., 2011, 2012). The U.S. currently has an estimated prevalence of food insecurity of 14.5% (Coleman-Jensen et al., 2011). The



state of Louisiana has a poverty rate of 18% (Denavas-Walt et al., 2011), whereas its food insecurity prevalence is estimated to be 12.6% based on a three-year average (Coleman-Jensen et al., 2011). The difference in the poverty and food security prevalence may be due to the impact of the multiple factors influencing food security status including the actions taken by a household or individual to alleviate food insecurity.

It has been noted that those in poverty were 3.5 times more likely to be food insufficient when compared to those not in poverty; however, not all those in poverty were food insufficient (Rose, 1999). Rose (1999) also noted in a review article addressing the measurement of food insecurity that food insufficient households were more likely to have had recent financially stressful events such as job loss, adding of household members, or losing food stamps, while food sufficiency was positively associated with home ownership (Rose, 1999). These overall findings in the literature at that time have for the most part remained consistent with the current literature. For example, Cook et al. (2002) studied the impact of welfare benefit reduction or loss on the food security status of children in hospitals across six U.S. cities. Caregivers of children ( $n = 2718$ ) were interviewed in hospital based clinics or emergency departments across five states. Inclusion criteria were the receipt of welfare or the recent loss of the benefit. Utilizing the USDA-FSS survey, it was found that those who had lost welfare benefits or who had benefits reduced were 1.5 times more likely to be classified as food insecure.

A difficulty noted in interpreting the literature on income and its relationship to poverty and food insecurity is that income alone does not determine the amount of money available for food. Housing costs have been identified as a factor in differences in study outcomes. Kirkpatrick and Tarasuk (2011) investigated the relationship between food

security and housing affordability in Toronto, Canada. Subjects were recruited from both market rental and subsidized housing in high poverty census tracts. Inclusion criteria included having at least one child in the household, having resided in the current location for one month or more, being able to complete an oral interview in English, and having a household income at or less than the Canadian low-income level. Structured interviews were conducted with the household member responsible for food purchasing and management. A final sample of 473 households was surveyed using the U.S. FSSM to determine food security status. Shelter costs were determined using monthly rental charges and utilities and after-shelter income was calculated. Housing was considered affordable if it consumed less than 30% of income. Housing stability indicators included currency on rent and whether or not rent funds were borrowed or obtained from other sources. All data were reported for the previous 12 months. Regression analyses were employed to investigate associations between variables. Household food insecurity was inversely associated with both total income and after-shelter income. Sixty-five percent of respondents were classified as food insecure. Food insecurity increased for market rental families when greater than 30% of income was used for housing. The amount of funds available for food purchasing was inversely proportional to the funds allocated for housing. This association was not significant for all families as a group (subsidized housing and market rental). There was no significant difference in food security prevalence between those in subsidized housing and those in market rentals; however, there was a difference between those in subsidized housing and those waiting for subsidized housing, the latter having more food insecure households. Crowding was not associated with food insecurity, but having housing in need of repair was associated with

food insecurity in the market rental group. The authors felt that households may be compromising housing quality to minimize food insecurity and the affordability of housing, not just total income influenced food security.

Household characteristics have also been predictive of food insecurity in the United States. Rose (1999) identified the following as being protective against food insecurity: a head of household with a high school education or higher, aged >60 years, and home ownership. Increased levels of food insecurity were related to being Hispanic, having larger households, having a household with only one adult plus children, or not owning the home. In a study of Connecticut households with incomes <185% federal poverty line (FPL), households with social capital measured by civic participation, trust, and reciprocity amongst household members, neighbors, or community members had lower odds of being hungry. Also, those with older household members were found to be less likely to experience hunger than households without social capital or older members. (Martin et al., 2004). Similar associations between food insecurity and household characteristics can also be found among migrant and seasonal farm workers (MSFW). Utilizing the U.S. FSSM in a study of 100 Texas MSFW households, 82% were found to be food insecure. Food insecurity was predicted by the presence of minor children and maternal education of less than 6 years (Weigel et al., 2007).

In an effort to identify predictors of food insecurity in Los Angeles County a study utilizing the six item short form of the U.S. FSSM as part of a telephone survey was conducted. A subset of subjects from the population based survey who reported income as less than 300% of the 1999 FPL was eligible to participate in a second study. Fifty-five percent (n = 1,898) of the eligible survey respondents participated in this

second survey. Data regarding the following variables were collected: income, race/ethnicity, children in household, public assistance, and homelessness in the past 12 months. Of the 24.4 % reporting food insecurity, 15.8% were food insecure at 200-300% FPL, 23.7% at 100-200% FPL, and 34.7% at less than 100% of the FPL. African Americans and Latinos reported higher levels of food insecurity than Caucasians or Asian/Pacific Islanders. Households with children, those participating in public assistance, and those reporting past homelessness reported a significantly higher prevalence of food insecurity than those without those characteristics. The lower two income levels (<100% FPL and 100-200% FPL) independently predicted food security as did the presence of children in the household and past homelessness (Furness, Simon, Wold, & Asarian-Anderson, 2004).

While older age has been noted previously to be a protective factor for food security, there are also specific risk factors noted in the elderly population. Wolfe, Olson, Kendall, and Frongillo (1996) studied a sample of older low-income rural White and urban Black in upstate New York to create a conceptual framework of food security in the elderly. Food insecurity was found to relate to limited income, poor health, physical disabilities, high healthcare bills, and unexpected expenses. Food insecurity was reduced by participation in public and private food programs, utilization of savings, availability of family members (as a resource for money, food, and transportation), utilization of food-management strategies, and availability of transportation and grocery stores. Similarly, a group of 192 elderly residing in rural Appalachia were also found to have reports of eating alone and income below 150% of the FPL as strong predictors of food insecurity and, similar to previous reports, taking three or more prescription drugs was associated

with food insecurity in this study (Quandt & Rao, 1999). Likewise, Lee and Frongillo (2001) noted that a low level of education, minority status, participation in food assistance programs, and social isolation was associated with food insecurity in the elderly.

Wolfe, Frongillo, and Valois (2003) found that food security was negatively impacted by a lack of funds, transportation and mobility limitations, and health conditions. The elderly in this study (n = 53) also reported the importance of having “appropriate foods for health” as part of food security (Wolfe et al., 2003, p. 2766). They also reported that they had sometimes made compromises on the quantity and quality of food because of lack of funds and because they chose to purchase medicine instead of food. They also reported sometimes lacking the motivation to cook and eat because of depression, even when funds and food were available. In a different study of 268 homebound older persons (>60 years of age), inadequacy of economic resources was also associated with food insufficiency despite receiving five delivered meals per week. The authors suggested that in this group who had received home-delivered meals over a 12 month period in North Carolina, the economic hardship was likely due to changes in costs related to medical and social service needs (Sharkey & Schoenberg, 2005).

Education has been shown to be predictive of food insecurity in the United States. Rose (1999) identified having a head of household with a high school education or higher as being protective against food insecurity. A similar association, maternal education of less than six years predicted food insecurity, was found utilizing the U.S. FSSM in a study of Texas migrant and seasonal farm workers (Weigel et al., 2007). Herman et al. (2004) found that mothers new to WIC who had a high school degree were more likely to

become food secure with program participation. In a study of households who participated in the Food Stamp Program (Supplemental Nutrition Assistance Program) and informal food assistance activities, education of the head of household was predictive of food security status (Yu et al., 2010).

Macro-environmental factors can influence the rate and severity of food insecurity. These factors are associated with differences in food insecurity levels and are attributable to U.S. State characteristics such as “average wages, cost of housing, levels of participation in food assistance programs, and tax policies” (Bartfeld & Dunifon, 2006, p. 934). Policy and program regulation differences may alter a household’s ability to earn income or receive assistance that could support food security. In a study of the variations in the state administration of the Food Stamp Program (FSP), Temporary Assistance for Needy Families (TANF), minimum wage and the Earned Income Tax Credit (EITC) policies, Ratcliffe, McKernan, and Finegold (2008) analyzed the Survey of Income and Program Participation (SIPP) data from 1996-2003 and found that FSP participation increased with more lenient vehicle exemption and immigration policies, lengthened recertification periods, the use of electronic benefit transfer programs, and increased expenditures on outreach programs. Ratcliffe and McKernan (2010) utilized SIPP data to investigate the impact of the FSP, now called Supplemental Nutrition Assistance Program (SNAP). The analysis indicated that participation in SNAP reduced the likelihood of being food insecure by 31.2%, making participation in SNAP by those who are eligible vital. Louisiana ranked 18th with a 77% SNAP participation rate of those eligible for the program in 2009; the national participation rate was 72% (Cunyngham, 2011).

Improvement in the participation rates in these states could result in a reduction of the level of food insecure households.

Food insecure households are nestled within communities whose characteristics are also influenced by macro-environmental factors including public policy, crime, and available social services. Chilton and Booth (2007) conducted a qualitative study to explore the relationship between overall health and food security status of African American women. They conducted focus groups and individual home interviews with 34 participants who were clients of Philadelphia food banks. Utilizing a phenomenological coding scheme and network analysis they found that physical hunger was worsened by emotional stressors associated with homelessness, drug addiction, and depression. Additional contributors to mental health consequences also included the presence of family and community violence, abusive partners who manipulated through food, and a history of abuse in childhood. Themes identified in the interviews support the interrelationships between overall well-being, response to stressors, and the context in which people reside. The qualitative nature and small sample size of the study were limitations; however, the findings supported expanding the research in the area of food security to include the psychosocial needs of the food insecure since these may hinder appropriate coping behaviors in persons responsible for household food management.

#### Consequences of Food Insecurity

Food insecurity has been associated with compromised health and wellness, impacting those who experience it physically, emotionally, and psychosocially (Alaimo, Olson, & Frongillo, 2001a; Casey et al., 2005; Kleinman et al., 2002; Kleinman et al., 1998; Lee & Frongillo, 2001; Weinreb et al., 2002). It has been viewed as an indicator or

predictor of health conditions, a stressor associated with changes in performance and productivity at school or work, and as a condition, is associated with parenting behaviors that may negatively affect the children of that household. Food insecurity has been associated with alterations in diet quality and other health behaviors which may impair health promotion and disease prevention efforts (Alaimo et al., 2001b; Alaimo et al., 2001a; Alaimo, 2001c; Devine et al., 2009; Duffy et al., 2009; Kleinman et al., 2002; Kleinman et al., 1998; Lee & Frongillo, 2001; Wehler et al., 2004; Weinreb et al., 2002). Gaining an understanding of the dynamics of these associations at an individual level may provide insight into the context in which the food insecure make decisions about how to cope with this situation.

#### Consequences of Food Insecurity among Children

Childhood food insecurity was experienced by 9.8% of households with children (3.8 million) in 2010 (Coleman-Jensen et al., 2011). The impact of food insecurity on children has broad policy implications for food assistance programs, health care planning, and educational program planning. Literature related to the consequences of food insecurity in children follows.

To examine the relationship between food insufficiency and psychosocial functioning measures in low-income children between the ages of 6 and 12 years, Kleinman et al. (1998) evaluated a subset of data from 328 parents and children who participated in the Community Childhood Hunger Identification Project (CCHIP). Food insufficiency was defined as an inadequate amount of food intake due to a lack of resources (Alaimo et al., 1998). CCHIP conducted a series of studies to develop a questionnaire-based measure of food insufficiency that has been shown to have good



specificity and sensitivity when screening for hunger and food insufficiency (Frongillo, Rauschenbach, Olson, Kendall, & Colmenares, 1997). Three categories of hunger were established: hungry, at-risk, and not hungry. The Pediatric Symptom Checklist (PSC) was used to identify children with emotional or behavioral symptoms. To assess whether there was a higher rate of psychosocial symptoms at different levels of food insufficiency, a chi-square test of case rates and one-way analysis of variance of PSC scores were conducted. Children identified as “hungry” were significantly more likely to score as dysfunctional on the PSC (21%) than those children in the other two categories (3-6%). Significantly more hungry children were receiving special education services and had a history of receiving mental health services. The highest correlations of PSC items with the “hungry” category reflected anxiety, depression, and conduct disorder. A limitation of this study was the parent-reported nature of the questionnaires (Kleinman et al., 1998).

Alaimo et al., (2001a) recognized the need to examine the household level of food insufficiency and its relation to the cognitive development and academic performance in school-aged children. Data from the Third National Health and Nutrition Examination Survey (NHANES III) for children ages 6 to 11 and 12 to 16 were utilized. These data did not include homeless families who were at very high risk for food insecurity, however, these data did provide large sample sizes for each age group (n >2,000). Families were classified as food insufficient or sufficient from answers to a question about having enough to eat. Regression analysis was employed to test for food insufficiency’s relationship to cognitive, academic, and psychosocial outcome measures. Confounding variables were controlled in the analyses. Both groups of students were found to have lower intelligence and achievement scores if they were in the food

insufficient classification, were more than twice as likely to have repeated a grade, and missed more school days. The food insufficient teenagers were more likely to have seen a psychologist, have been suspended, had difficulty getting along with others, and were less likely to have friends. The results of this study support the concept that food insecurity of a household is a stressor that ultimately has an impact on both academic and psychosocial outcomes.

A fine distinction in outcomes related to children being categorized as food insecure without hunger or at risk for hunger can be found embedded in some publications. Kleinman et al. (2002) studied Boston Public School children (grades 3-6) participating in a universal free breakfast program to determine if there were improvements in nutrient consumption and academic or psychosocial functioning with program participation. They interviewed the inner city children (n = 97) and their parents at the start of the program and 6 months later. Children were classified as being at nutritional risk if caloric intake was less than 50% of the Recommended Dietary Allowance (RDA) and/or had an intake of <50% RDA for 2 or more nutrients. This classification created two groups, low nutrient intake and adequate nutrient intake, for analysis. Parents completed the CCHIP survey to identify children as hungry, at risk for hunger, or not hungry. The children also completed the Child Hunger Index Child Report (CHI-C) companion survey that classified children in the same three categories. The standardized Pediatric Symptom Checklist (PSC) to screen for psychosocial problems and a companion version for child report were also completed. Academic records for each child were obtained from the schools. Pearson chi-square was utilized to analyze the groups for associations among categorical variables and one-way analysis of variance

was employed for differences among dietary intake variables for the groups. Children with low nutrient intakes were found to have significantly higher scores on the PSC and a lower mean grade point average. Children at risk for hunger scored similarly to those who were classified as hungry on the standardized PSC instrument. Nutritionally at risk rates were five times higher in children identified as hungry. Children classified as “hungry” had the strongest associations with negative outcomes of academic performance such as lower grade point averages and increased absenteeism and tardiness. Lack of generalizability is a limitation of this study because of the low rate of enrollment of eligible participants and small sample size.

To evaluate the impact of food insufficiency in adolescents, Alaimo, Olson, and Frongillo (2002) analyzed data from the Third National Health and Nutrition Examination Survey (NHANES III). The Diagnostic Interview Schedule (DIS) for 754 15-16 year olds along with food sufficiency responses were utilized. The DIS asks questions about lifetime history of depressive symptoms, dysthymia, and symptoms of suicide. Chi-square tests were used to determine differences in DIS responses and logistic regression models were employed to test for differences among demographic and income variables as well as the association of food insufficiency to depression, dysthymia, and suicide symptoms. The employment status of the family head of household was associated with symptoms in adolescents. Adolescents were twice as likely to have had a depressive disorder, dysthymia, or have attempted suicide if the head of the household was unemployed. Food insufficient adolescents were four times as likely to have had dysthymia, two times more likely to think about death, 3.4 times more likely to have had a desire to die, and five times more likely to have attempted suicide

compared to food sufficient adolescents. A limitation of this study includes the inability to control for other variables known to be associated with depressive disorders. The authors suggested future research designed to assess if these symptoms are a biological outcome of food insufficiency or a result of food insufficiency as a stressor, or the result of a confounding factor.

The above studies affirm that food insufficiency and hunger can have a negative impact on academic and psychosocial outcomes of all school-aged children. Younger children reported psychosocial dysfunction, absenteeism, and lower academic scores, and they required mental health services and special education. Adolescents were also more likely to have utilized the services of a psychologist, been suspended from school, and reported depression symptoms. Intervention focused on household food insufficiency to alleviate child food insufficiency and hunger may not only impact their food sufficiency status but the need for additional services related to this group of children.

Alaimo et al. (2001b) assessed the association between family income, food insufficiency, and child health measures utilizing NHANES III data from 6,154 preschool children aged 1-5 years and 5,667 children aged 6-16 years. Proxy-reported health status questions were used to categorize the children's health status for analysis. Frequency of headaches, stomachaches, ear infections, colds, and impairment of activities or school attendance was collected. Iron deficiency was determined by blood work collected as part of the NHANES III examination. Food sufficiency status had two categories: food sufficient or food insufficient. Logistic regression models were utilized to test whether food insufficiency was a predictor of health outcomes. Based on this analysis low-income preschoolers were more likely to be reported as being in poor or fair health, to always

(range: always, frequently, sometimes, never/rarely) have headaches, and to have been iron deficient compared to high-income preschoolers. Food insufficient children from both age groups were significantly more likely to have stomachaches and headaches, iron deficiency, and be reported to have activity-limiting impairments and be in poorer health than food sufficient children. Ear infections were not increased in low-income or food insufficient children. This study affirms a possible relationship between food insufficiency and income to health outcomes in children.

Weinreb et al. (2002) recognized the contribution of environmental and household factors, including hunger, to children's health status. In a study of homeless and low-income housed mothers and children (229 school-aged and 180 pre-school aged), the researchers attempted to control for environmental factors to correlate changes in outcomes with hunger as an independent factor. Hunger was measured utilizing items from the Childhood Hunger Identification Project survey, health conditions identified by the National Health Interview Survey, Child Health Supplement, and the Child Behavior Checklist. Families were classified into three hunger categories: no hunger, adult or moderate child hunger, or severe child hunger. Multivariate regression was utilized to analyze the data. Severe hunger was found to be significantly associated with chronic illness in school-aged children when controlling for housing, mother's distress, low birth weight and child life events. Common factors associated with hunger in this population such as low birth weights, parent-reported anxiety, behavioral problems, and presence of illnesses were identified. The consequences of food insecurity in this study were behavioral, emotional, and physical and may indicate an alteration in a family's ability to cope with food security in a productive way.

The identification of risk factors and protective factors of child hunger and a relationship to female head of household characteristics was evaluated in a study of housed and homeless women participating in the Worcester Family Research Project (Wehler et al., 2004). A subset of the full study sample included 354 women with at least one child present who were recruited from homeless shelters, welfare hotels, and from the Department of Public Welfare office. The women were interviewed regarding their families' food sufficiency status, health status and psychosocial information.

Measurement tools included the CCHIP measure of hunger, the Personal Assessment of Social Support and Inventory of Socially Supportive Behaviors, the Ways of Coping Questionnaire, the Parental Bonding Instrument, Parenting Daily Hassles, Medical Outcome Study Short Form for health status, and the Structured Clinical Interview for the DSM-III-R for mental health outcomes. Multinomial logistic regression was used to create models predicting hunger status. The three hunger categories used in this study included no hunger, adult hunger, and child hunger. The researchers noted that, consistent with the literature, adult hunger occurred without child hunger, but child hunger occurred with adult hunger present. Women who had experienced childhood sexual molestation were more than four times as likely to have experienced adult hunger as those without this history. Receiving a housing subsidy and having lived in the current location for less than a year were identified as risk factors resulting in households being twice as likely to experience child hunger. The mother's good health status, a coping style focused on taking responsibility and financial assistance from siblings was protective against child hunger. The mother's good health status was not protective against adult hunger. The authors suggested that maternal and environmental factors may determine why not all

low-income families experience hunger as these factors impacted the mother's ability to manage family resources. The finding that a coping style is protective against child hunger supports the need for further investigation of this relationship and the interrelationships of coping resources, strategies, and behaviors with food security.

To assess the relationship between child and adolescent quality of life with food security status, a study was conducted in the Mississippi Delta region of Arkansas, Louisiana, and Mississippi (Casey et al., 2005). Household food security status was measured by the U.S. FSSM and child health related quality of life (CHRQOL) was measured by the Pediatric Quality of Life Inventory tool via a cross-sectional telephone survey. Due to limited observations of very low food security, food security status was categorized into two groups for analysis: food secure and food insecure. The quality of life tool assessed both physical and psychosocial functioning and had previously been found to be reliable and valid in healthy and ill children from 2-18 years of age. T-test comparisons and linear regression were employed for analysis of data. Of the 399 children, African American children made up 58.1% of the participants, both genders were similarly represented, 74.4% of the participant families were food secure, 25.6% were food insecure. Findings included a significantly lower CHRQOL score on both physical and psychosocial functioning for children in food insecure households. When grouped by age (3-8, 9-11, and 12-17), the food insecure in the youngest group scored significantly lower in physical functioning, and the food insecure teenagers scored significantly lower in psychosocial functioning than corresponding food secure groups. This relationship was not seen in the group of 9-11 year olds. Food insecure African American males scored significantly lower than Caucasian males on physical functioning

and total CHRQOL scores. Though not statistically significant, lower scores in psychosocial functioning of both food insecure African American males and females were noted when compared to their Caucasian counterparts, and for the total CHRQOL scores of food insecure African American females. A linear regression analysis of CHRQOL on food security status indicated a significant association of CHRQOL and physical functioning with food security status. This study supported a conclusion that household food insecurity was a risk factor or stressor for child health.

Jyoti, Frongillo, and Jones (2005) conducted a study utilizing data from the Early Childhood Longitudinal Study-Kindergarten Cohort to explore the relationship of food insecurity over time (four years) to academic performance, weight changes, and social skills. Children entered the study in kindergarten and were followed until they reached the 3rd grade. Gender was an additional variable analyzed in the study. The USDA Household Food Security Survey Module was used to measure household food insecurity. Food insecurity during kindergarten was found to be a predictor of impaired academic performance in reading and mathematics, lower teacher ratings of social skills for boys, and greater weight gain and Body Mass Index gains for girls. Changes in food insecurity over the three year period and the amount of time experiencing food insecurity had an impact on the results. For example, reading scores did improve for those who were food insecure in kindergarten but who had become food secure by the third grade. Girls from households that transitioned from secure to insecure showed smaller gains in social skills compared to those who were from consistently food secure households. A limitation of the data for weight and Body Mass Index was the lag time between collections. Nevertheless, this well-designed study provided further evidence for a



relationship between food insecurity and poor health outcomes and academic hardships for children.

In a follow-up study, Frongillo, Jyoti, and Jones (2006) investigated whether participation in the Food Stamp Program (FSP) would have an impact on the outcomes related to food insecurity in this same group of children followed longitudinally. Participants were identified as food secure or food insecure and whether they transitioned between the groups during the course of the study was determined. Rotated factor analysis was used to calculate “need” scores that included the variables of parental educational level, poverty index ratio, computer presence, and food security status. Score changes from kindergarten to third grade were computed. Beginning participation in the FSP resulted in greater improvements in mathematics and reading scores when compared to those who stopped participation during that same time period. More significant improvements were noted for the female students in this group. This study also found that FSP participation was associated with slightly less weight gain in children when compared to those ceasing participation. This study supports the concept that food insecurity has both health and well-being consequences. The FSP may represent a coping resource that may be accessed (coping practice) to positively influence the outcomes of insecurity.

The relationship between food insecurity and health status has been further investigated employing BMI as a health indicator. In a study of all children 3-17 years of age (6,995), Casey et al. (2006) looked for an association between household and child food security and weight status utilizing the NHANES 1999-2002, U.S. FSSM, and BMI percentiles. Ethnicity, family poverty index, gender, and age were also included as

variables to be analyzed or controlled. These researchers did find a significant association of food insecurity with the group of at-risk for overweight ( $\geq 85^{\text{th}}$  but  $< 95^{\text{th}}$  percentile for gender and age) children aged 12 to 17, with Caucasian girls in this same age group, and with those who belonged to households with incomes below 100% of the poverty line or greater than 400% of the poverty line. Similar findings emerged with child food insecurity status. Associations of child food insecurity with overweight or greater status were found in the younger group of children 3-5 years of age, Mexican-American children, and boys. While associations were found, the authors were unable to confer causality because of the cross-sectional nature of the NHANES. Research on children's weight status is also complicated by growth patterns, a lack of control over food procurement, and the environment.

Rose and Bodor (2006) utilized the Early Childhood Longitudinal Study Kindergarten (ECLS-K) cohort 1999, which included the U.S. FSSM to assess whether there was an association between food insecurity and overweight in children when considering variables such as household income, demographics, maternal education, birth weight and breakfast and evening meal data. No measures of physical activity were available. Data for the ECLS-K were collected at four time points or waves over two academic years, kindergarten and first grade. Obesity was defined as gender specific BMI for age  $> 95^{\text{th}}$  percentile. The sample size was 16,889 but decreased to 12,890 for analysis related to height and weight, as these variables were not obtained until the second wave of data collection and there were some dropouts by wave four of data collection. Multivariate logistic regression and chi-square statistics were used to assess the relationships between the variables. They found that food insecure children were less

active and watched more television, but were less likely to be overweight when compared to their food secure counterparts. However, lower income children were more likely to be overweight compared to those in households with income greater than five times the FPL, although not statistically significant for all lower income levels. Predictors of overweight were found to be low physical activity, watching television more than two hours per day, having a high birth weight, being African American or Latino, and being of low-income families. While the authors did not find an association between food insecurity and BMIs greater than the 95th percentile, they did not examine the “at-risk for overweight” defined as the 85th-95th percentile for an association with food insecurity. This percentile range has been shown in other studies to be associated with food insecurity. It was not known if the food insecure children changed their eating behaviors from when they were food secure or whether these children would become overweight older children or adolescents because of these behaviors. The authors concluded that growth may have mitigated weight status.

A convenience sample of low-income families was utilized by Martin and Ferris (2007) in a cross-sectional retrospective study to assess the risk of overweight in children and obesity in adults in households experiencing food insecurity. Two hundred parents and 212 children participated in the study. The children ranged in age from 2-12 years. The U.S. FSSM measured food security status and a Body Mass Index (BMI)  $> 30$  defined adult obesity and BMI for age  $> 95$ th percentile defined childhood overweight status. Chi-square tests were employed to assess relationships between the variables, which included gender and income, and multinomial logistic regression models were calculated to evaluate risk factors for adult obesity and childhood overweight. The

researchers found that food insecure adults were more likely to be obese; however, food insecurity overall did not increase odds of childhood overweight in this study. Children with family incomes below 100% of the poverty line were half as likely to be overweight compared to those with higher incomes. Future research should consider why household members in the same food security environments have different outcomes related to weight status, and whether it may be related to coping tactics used by family members. Martin and Ferris (2007) provided evidence of outcomes related to food insecurity among children and adults. Others have also contributed to the current understanding of adult consequences of food insecurity.

#### Consequences of Food Insecurity among Adults

Townsend, Peerson, Love, Achterberg, and Murphy (2001) utilized the 1994-1996 Continuing Survey of Food Intakes by Individuals (CSFII) and the question measuring household food sufficiency used in that survey to explore weight status in food insecure women. The single question used to determine food sufficiency had four responses describing the food eaten in the household in the previous three months. The possible responses were enough of the kinds of foods we want to eat, enough but not always the kinds of foods we want to eat, sometimes not enough to eat, and often not enough to eat. Each identified a level of food security: no food insecurity, mild, moderate, or severe insecurity, respectively. Participant BMI was based on self-reported body weights of 4,509 women. The authors found that those women who were mildly food insecure were 30% more likely to be overweight. The prevalence of overweight among mildly and moderately food insecure women was significantly higher than for other groups. Participation in the FSP was also related to a higher prevalence of

overweight. The researchers felt that overweight status appeared to be related to involuntary temporary food restriction used as a coping tactic within the “food stamp cycle” (Townsend et al., 2001, p. 1743). The food stamp cycle was described as the experience of have adequate resources to acquire foods in the first three weeks of a month, then having a limited quantity or selection of food availability in the fourth week of the month as resources dwindle, only to be restored in the first week of the following month. As households with marginal incomes may also “cycle” food intake based on income payment schedules, they too may be a population whose coping strategies and practices can inform investigators about the consequences of food insecurity.

To assess the dynamics of weight change, Wilde and Peterman (2006), conducted a study of cross-sectional design, utilizing data from the U.S. FSSM administered as part of NHANES 1999-2002. BMI was used to evaluate weight and weight change was measured in pounds gained or lost over the previous year to correspond with the year for which food security status was measured. Food security status was categorized by the U.S. FSSM as food secure, marginally food secure, food insecure without hunger and food insecure with hunger. The initial sample consisted of 4,549 women and 4,202 men with no missing data for BMI assessment. Change in weight over time included those deemed “good reporters” (Wilde & Peterman, 2006, p. 1398) based on accuracy of self-reported weight compared to measured weight along with a lack of missing data values. The final sample was 3,569 women and 3,337 men. Multivariate logistic regression was used while controlling for education, race/ethnicity, income, and health status. The lowest prevalence of overweight and obesity was found among food secure women when compared to those in the marginal food secure and food insecure with and without hunger

groups. Obesity was significantly higher only for women in the marginally food secure and the food insecure without hunger groups, which were deemed “intermediate categories”(Wilde & Peterman, 2006, p. 1396). For men, those that were marginally food secure also had a higher obesity rate than men who were food secure. Weight gain findings were grouped as five pound and ten pound weight gains. A five pound weight gain over the year was significantly higher in marginally food secure women compared to the other three groups of women, while differences in weight gain for men were not significantly different amongst the food secure categories. While the literature related to the relationship between obesity and food insecurity contains conflicting evidence, this study supports the importance of considering the marginally food secure and food insecure categories in future research. Research consideration should be given to the possibility that these groups begin to employ coping strategies to alleviate food insecurity that impacts weight status.

Whitaker and Sarin (2007) were also interested in the dynamic of weight change as it relates to food security. They conducted a longitudinal study of 1,707 mothers of preschoolers over a two-year period. The U.S. FSSM was utilized to determine food security status and a BMI of 30 or greater was defined as obese. The subjects were assessed at baseline and at a two-year follow-up. Two food security categories were used: fully food secure and not fully food secure based on any positive response to the food security questions. At the onset of the study, 41% of the subjects were obese, while only 31% were food insecure and 45% had incomes below the FPL. Chi-square tests and t-tests were used to compare data from different categories of subjects. Linear regression models were used to compare weight changes over time. There were no significant

differences found between food security level and weight change over a two-year period. There was no significant relationship found between food security status change over a two-year period and a weight change over that same period. The researchers concluded that this study did not support a direct causal relationship between food security status and weight change in mothers with preschool children. A limitation of this study was that food security categories did not include a “marginally” insecure or “intermediate” level category as have other studies which have shown a relationship of these categories to weight status.

To explore the differences in energy consumption of adults at varying food security levels, Zizza, Duffy, and Gerrior (2008) used the 1999-2002 NHANES data, which included the U.S. FSSM and dietary information from a 24-hour recall to determine nutrient intake and dietary behaviors. The sample included 5,640 men and women between the ages of 18-60 years who completed the 8-question U.S. FSSM. The four categories of food security were food secure, marginally food secure, food insecure without hunger, and food insecure with hunger. Chi-square tests were performed to evaluate distribution of variables among food security groups. Multivariate adjusted mean values stratified by gender were used in regression analysis to assess the relationship between food security status and dietary outcomes. No difference was found in total energy intake among the various food security groups of men and women; however, meal and snack intake patterns differed within and between the groups. Women who were food insecure with or without hunger had fewer meals than food secure women, but the energy provided by these fewer meals was higher and therefore their energy intake did not differ significantly. Food insecure women with hunger had higher

intakes of total and saturated fat than food secure women. The number of snacks and energy from snacks were higher among food insecure men, but like the women, the number of meals was lower among the food insecure men. No differences were found for food group sources of energy between the levels of food security for men or women. The researchers concluded that the increase in snacking and meal energy intake compensated for the reduction in number of meals seen in both the men and women who were food insecure. While this study did not assess whether the differences in meal and snack patterns or the increase in fat intake was a change that occurred as food insecurity was experienced, it may represent changes in food quality as a consequence of decisions made when resources are reduced or limited.

Stuff et al. (2004) studied the relationship of food insecurity status with adult health status. A two-stage stratified cluster sample from counties in the Lower Mississippi Delta yielded a sample of 1,488 households with complete data for this analysis. Food security status was determined by the 18-question U.S. FSSM. The households were categorized into food secure and food insecure for analysis due to the low number of food insecure with hunger households. Mental and physical health status was measured using the Short Form 12-item Health Survey (SF-12). Significant findings indicated that food insecure adults were more likely to report their health status as fair/poor and had lower SF-12 scores for both the physical and mental subscales than those adults who were food secure. Overall, self-reported health status was associated with food security status among this sample.

Kim and Frongillo (2007) studied the relationship of participation in food assistance programs with weight, food security, and depression as a quality of life



indicator among the elderly. National Institute on Aging data set, which included the U.S. FSSM, was utilized to study more than 15,000 elderly persons. An increase in food insecurity was found to be associated with an increase in weight and depression. However, participation in food assistance programs modified that relationship as it decreased depression and was not associated with an increase in weight. Food assistance programs have the potential to not only address food insecurity, but also to improve the quality of life of elders, and participation may represent a successful coping strategy. However, this study did not intend to assess potential effective coping strategies or practices employed to alleviate food insecurity and its consequences. It did show that food insecurity was associated with quality of life and therefore can be considered a stressor. The stress that food insecurity places on individuals at different ages should be a focus of future studies.

Heflin, Siefert, and Williams (2005) sampled welfare recipients in Michigan (n = 753) to examine whether a change in food insufficiency was associated with a change in mental health in single mothers, as having mental health issues is associated with reduced employment and impaired social functioning. The study sample was obtained as part of a larger study, the Women's Employment Study that surveyed participants prospectively each year, over a three year period. Food insufficiency was determined by a single question asking respondents to describe the amount of food the household had to eat by selecting one of three responses: enough to eat, sometimes not enough to eat, often not enough to eat. Food insufficiency status was assigned to those responding to "sometimes" or "often" not enough to eat. Mental health was determined by the presence of major depression in the previous 12 months using the World Health Organizations Composite

International Diagnostic Interview; mastery was measured utilizing the Pearlin Mastery scale. Stressful life circumstances were measured by an adaptation of the Difficult Life Circumstance scale. Data on neighborhood hazards, discrimination, and domestic violence were also obtained. The prevalence of food insufficiency over the three years was between 22.9% and 25%. Depression was measured to be at the level of 26% in the first year and 17-18% in the second and third year. Fixed effect models were estimated for change in mental health status. A change in food sufficiency was found to be significantly associated with depression, but not with a change in mastery scores. However, an increase in monthly income was associated with an increase in mastery scores. The findings support the possibility that food insufficiency may contribute to depression as a stressor; however, more research is warranted. The authors suggested that because those who have experienced depression are at risk for relapse, reducing food insufficiency may be an important component of prevention strategies.

As part of a larger study, Food Insecurity in Poor, Female-Headed Families in five Alabama Black Belt Counties, Zekeri (2010) investigated the association of depression with food insecurity among single mothers. The 6-item short form of the U.S. FSSM was used to measure food security status, and the Center for Epidemiologic Studies Depression Scale (CES-D) was used to measure depression symptoms. Face-to-face in-home structured interviews were conducted to obtain data. Data were analyzed using multiple regression methods. Three hundred female headed households were randomly selected from lists of those participating in the food stamp program or receiving welfare assistance. Approximately 65% were African Americans, 32% had no education beyond high school, 46% had no health insurance, and 50% earned less than

\$10,000. Food insecurity was experienced by 35.7% of the participants. Food insecurity was found to be significantly positively associated with depression among the sample. Food insecurity accounted for 10.3% of the variation seen in depression. The author suggested that this study added to the current knowledge by confirming food insecurity as a stressor that may predict depression in rural women, where mental health services are limited. Limitations of this study include its cross-sectional design and self-reported conditions.

Laraia, Siegaariz, Gundersen, and Dole (2006) investigated psychosocial and socioeconomic factors associated with food security status among pregnant women. The condition of pregnancy poses an additional nutritional burden on women and food insecurity may affect the pregnancy outcome. Data were obtained as part of the Pregnancy, Infection and Nutrition study conducted in North Carolina. The U.S. FSSM was used to determine food security status and traditional socioeconomic and demographic variables were obtained. Psychosocial measures focused on perceived stress, anxiety and depression symptoms, and personal disposition variables associated with coping with food insecurity. Tools used to determine these measures included Cohen's Perceived Stress Scale, Spielberger's Trait Anxiety Inventory, Center for Epidemiologic Studies Depression Scale (CES-D), Rosenberg's Self Esteem Scale, Pearlin's Mastery Scale, Levenson's IPC Locus of Control questionnaire, and The Chances Scale. All scales except the CES-D were considered unlikely to be affected by household food security status as the scales measured static personal characteristics. Descriptive statistics and t-tests were used to evaluate continuous variables for significance between food security status and predictor variables. A chi-square test was

used to test for significance between food security status, coping variables, and food assistance programs. Logistic regression models were used to model predictors of food security. The study sample included 606 pregnant women from households with income less than or equal to 400% of the FPL. Seventy-five percent of the subjects were classified as food secure, 15% were marginally food secure, and 10% were food insecure. Income, race, and age were found to be predictors of food insecurity. Perceived stress, symptoms of depression, trait anxiety, and locus of control attributed to chance were positively associated with food insecurity. Mastery and self-esteem were inversely associated with food insecurity. Among the participants, 36.6% participated in the WIC program and 15.9% were receiving food stamp support. Data in this study also included three coping behaviors which were reported by 14.5% of the subjects. Borrowing food was reported by almost 12% of the subjects, received food from food bank or church by 5.8%, and sent children to family or neighbors for meals by 2%. Participation in food assistance programs and coping behavior data were not entered into the statistical model as the researchers felt that these variables were accounted for in the food security measure. Overall findings appear consistent with the current literature in that an association was found between food insecurity and mental health indicators. It also revealed a relationship with psychosocial indicators. Limitations of the study included having a sample from the U.S. South who sought prenatal care at community and public hospitals, which may not be generalizable to all pregnant women. The researchers concluded that there was a need to further investigate the comprehensive experience of food insecurity, which included coping behaviors and mental health indicators to best identify needs and prevention strategies such as counseling services. To expand the

current knowledge of food insecurity as a stressor, future research should include an examination of the impact of coping behaviors on food insecurity and its consequences.

Available research indicates that there is a relationship between food security status, health outcomes, and psychosocial functioning. Future research should include the investigation of how people at various levels of food security put into action coping responses and behaviors in order to maintain food security or minimize the impact of food insecurity.

#### Coping Responses and Practices Related to Food Insecurity

Reports regarding coping strategies and practices employed by the food insecure most often were related to food management and acquisition practices at various levels of food security and/or the frequency and riskiness of these practices (Anater et al., 2011; Kempson et al., 2003; McLaughlin et al., 2003; Wood et al., 2009; Wood et al., 2006). The intent of these studies was not to characterize the influence of personal resources on the coping responses chosen in the presence of food insecurity challenges. Further, what has not been clearly elucidated is the dynamic nature of these relationships, the practices associated with specific populations or communities, nor whether these strategies and practices have the ability to stabilize food security status and/or prevent more severe insecurity. Of interest is the possibility that strategies and practices may inform efforts to promote coping capacity in households and communities through sustainable interventions for food security.

A food resource management model was utilized by Wood and colleagues (2006) as the framework for studying coping strategies and practices employed at the individual, household, and community levels in relation to household food security status. A goal of

the researchers was to discern whether or not more risky practices were employed to acquire food at more severe levels of food insecurity. Their intent was to utilize findings to assist with food pantry client education regarding effective coping strategies and practices. Food security was measured by the six-question short form (Blumberg, Bialostosky, Hamilton, & Briefel, 1999) that classified households as food secure, food insecure without hunger, or food insecure with hunger as part of a self-administered questionnaire that included 48 coping practices categorized into two major strategy domains, internal and external. The internal strategy domain included personal and household level practices such as stretching existing household food, stretching money for food, reducing the quality and quantity of food eaten, and supplementing the food supply by gathering or raising food. The external strategy domain included practices utilizing public and private community aid or social network resources such as borrowing money from family or friends, obtaining extra work to earn more money, using emergency assistance, and participating in food assistance programs. The questionnaire also included items to determine food pantry use and personal and household characteristics. The questionnaire was administered to 103 food pantry clients at two sites in the state of Washington. Participants' food security status was reported as follows: 15% food secure, 33% food insecure without hunger, and 52% food insecure with hunger. The authors reported frequency of use of practices related to food shopping and handling of food and meals. Of the internal strategies, the most common meal practice was the saving of leftovers by 93% of respondents; 55% ate more inexpensive and filling foods, and one-half served smaller portions to children so food would not be wasted. Seventy-eight percent put off paying other bills to have money for food. Of interest is that

44% reported obtaining food by hunting or fishing, 38% used home or community gardens, and 30% gleaned food. Fifty-five percent preserved foods, 25% gathered wild food, and 12% raised animals for food. Risky strategies reported by 25-30% of respondents included buying food that was out of date and buying dented cans or damaged packages at a discount. Thirteen percent reported using spoiled food, 6% searched dumpsters or garbage for food, 3% used road kill, and 1% used pet food. The most prevalent practices in the external strategy domain were borrowing money from friends and family (64%), securing additional paid work (63%), receiving information from others about where to find food (42%), and trading different types of food with others (42%). Overall, both internal and external strategies were found to be utilized more frequently as food insecurity became more severe. Riskier strategies (financial and food safety) were employed as the food insecurity level became more pronounced. While the researchers did note that a significant number of respondents could benefit from learning some coping strategies and practices they had not yet utilized, this study lacked the ability to distinguish practices that may be effective in preventing households from becoming food insecure or more severely insecure.

Grutzmacher and Braun (2008) sought to study the relationship between food security status and food and financial management skills in rural families. These low-income rural families were studied over a five-year period in an attempt to establish the relationship between the variables of interest to food insecurity over time. Low-income was defined as eligibility for participation in WIC or the food stamp program (SNAP). Data were collected in three waves from 243 mothers across 13 states; all participated in all three data collections. Convenience sampling was employed among mothers who were

eligible for Food Stamps or WIC. Semi-structured interviews were conducted that included open-ended questions and a standardized survey, which resulted in both qualitative and quantitative data. The USDA 18-item U.S. FSSM was used to determine food security status. The standard four categories of food security were then condensed to two: food secure and food insecure. Participants' income in relation to poverty and household size was calculated with an income-to-needs ratio (poverty threshold/monthly earnings). Participants answered yes/no questions regarding four food resource management skills: ability to make a family budget, manage bills, stretch groceries at the end of the month, and prepare balanced meals. To assess differences between the food-secure and food-insecure groups in relation to multiple variables, independent samples t-tests were conducted. While a difference was found between food secure and food insecure mothers in their ability to make a family budget and manage bills in the first wave of data collection, no significant differences in food resource management skills were found with the two following data collections. The authors described a limitation of this study with regard to the self-report of food management skills such as "stretching groceries," (Grutzmacher & Braun 2008, p. 89) which may be influenced by the food security status of the household. Those from food secure households may report having the skill because they can meet the food needs of their families, while those from food insecure households may possess food management skills but are unable to successfully "stretch" their food supply to meet the household needs. Therefore, despite having adequate food resource management skills, food insecure subjects may have reported not having the skill. Other resource variables influencing the participants' success at meeting household food needs were not measured. Additionally, potential differences in the



definition of food resource management skills among the subjects, the frequency of and barriers to skill use, and the influences related to participation in food assistance programs were not reported (Grutzmacher & Braun, 2008). Future studies are needed that include more specific criteria for food management skills and that evaluate the relationships with other variables influencing skill employment and success.

Wood et al. (2009) conducted a further analysis of the data from the 2006 study (Wood et al., 2006) to identify coping practice patterns within the internal and external strategy domains and a relationship to personal and household risk factors and level of food security among the 103 food pantry clients. Descriptive statistics were computed and principal component factor analysis was used to identify patterns. Factor patterns were evaluated using factor loadings and factor scores for each pattern were assessed for relationships with personal and household characteristics using Kendall's tau B or the t-test. To address internal coping strategies, respondents were asked about shopping practices performed when they had money to spend as well as meal preparation practices. Practices to obtain additional funds for food or to obtain assistance from others were asked about in order to explore external coping strategies. Three patterns accounting for 56% of the variance emerged from data analysis. The patterns were a) planned and shopped to save money, b) targeted multiple stores and bought food items in bulk, and c) used a convenience store. Analysis of internal strategy factors related to food handling and meal management yielded two factor patterns: a) limited the food given out and used or b) prepared extra food. How food pantry clients shopped was not found to be significantly related to either the level of food security or personal and household characteristics. Food strategies of limiting food served to family members and preparing

extra food to be utilized later showed a significant positive association to both food insecurity and food insecurity with hunger. These strategies were also shown to have a significant positive correlation to not having a telephone and having no health insurance for the children of the household, both indicators of material hardship.

Analysis of external strategy factors related to getting more funds for food yielded three factor patterns accounting for 63% of the variance. The patterns were a) sold or pawned items for money, b) got cash from extra work or a loan, and c) used cash assistance programs. Selling or pawning personal or household items for money were practices associated with younger respondents and those more likely to be disabled. Getting cash from extra work or a loan was related to having no health insurance for children in the household and to not receiving food stamp benefits. More children in the household were significantly associated with an increase in the frequency of using cash assistance programs. External strategy factors related to getting food were a) used a family or friend network for food or meals and b) received charitable food. External strategy factors related to getting more food was not associated with personal or household characteristics. Selling or pawning items for money, obtaining extra work, and getting a loan were financial strategies that increased as food insecurity worsened. Asking family and friends for assistance to obtain food or meals also increased with the severity of food insecurity. Shopping practices were not related to level of food insecurity, but reliance on social networks, cash assistance programs, and charitable food did increase with worsening levels of food insecurity. The researchers suggested that despite ongoing efforts at reducing grocery costs, inadequate resources may remain the reason why some households are not successful at maintaining food security. Whether or

not earlier or consistent use of these strategies could stabilize household food security status and/or prevent households from slipping into more severe levels of food insecurity is unknown.

Kempson et al. (2003) studied food acquisition and management coping strategies and practices in adults with limited resources who utilized a variety of public assistance agencies in New Jersey. Focus groups were conducted with 62 individuals to determine practices employed by the participants or those practices known by the participants that had been utilized by others. The researchers then compared the reported practices to those identified previously by nutrition educators. Sixty-five food acquisition practices and 30 food management practices were identified through the focus groups, 83% of which had been previously identified by the nutrition educators. When comparing practices reported by participants to those reported by nutrition educators, 10 new coping practices were identified. The researchers further identified those practices that posed risks. Some practices resulted in a food safety risk, or put the user at nutritional, financial, or physical risk. Some practices either were illegal or were noncompliant with program regulations, such as food stamp misuse. This study organized the coping practices into food acquisition and food management strategy categories. Food acquisition categories included reliance on resources offered in the community, interaction with informal support systems, supplementation of financial resources, and lowering of food costs by using shopping strategies. Food management categories included managing the food supply and regulating eating patterns. The categorization allowed researchers to validate the practices more easily, but did not explore interrelationships or use based on severity of food insecurity status.

Studies offering insight into the purchasing decisions of low-income households also provide insight into influences on food acquisition coping practices among food insecure households. The inclusion of fruits, vegetables, and whole grains in the diet support positive health outcomes; however, actual purchase of these items by low-income households who are more likely to be food insecure may be limited. Income as a resource and the cost of fruits, vegetables, or whole grains are barriers to healthful food purchases specific to this population. Stewart and Blisard (2008) analyzed data from the 2003 U.S. Consumer Expenditure Survey using statistical models of demand based on Engel models. They found that fruits and vegetables were not given a high priority for purchasing in low-income households (<130% of the poverty line). Given a 10% rise in income, the study model predicted that there was a 2.53% increase in meat expenditures and a 1.45% increase in frozen food item expenditures with no change in fruit or vegetable purchases. Not until income reached above 130% of the federal poverty line did the model predict an increase in fruit and vegetable purchases (Stewart & Blisard, 2008). To explore how the cost of fruits and vegetables influence their purchase, Dong and Lin (2009) investigated the potential of subsidizing healthy foods to encourage increased purchases and intake of fruits and vegetable by low-income people. Statistical models were developed for analyzing price elasticities for household fruit and vegetable purchases with an ability to distinguish between those above or below 130% of the poverty line. The models suggested that a 10% reduction in price would have a small but statistically significant effect on consumption and would cost the government approximately \$308 million dollars in fruit subsidies and \$274 million dollars in vegetable subsidies per year (Dong & Lin, 2009). While the increase in predicted

consumption was found to be small (2-5%) at a 10% reduction in price, the authors concluded that the impact on health would be measured over years of consumption and the increase may prove to encourage increased intake when low-income families experience increases in incomes or other supplemental resources. Both income and food costs have an impact on food acquisition practices of low-income households.

With a focus on the quality of food purchased, Dammann and Smith (2010) sought to explore the factors related to food purchases of a racially diverse group of low-income women in Minnesota recruited from community sites and homeless shelters. A survey was administered to 448 women that asked participants to identify which of 30 food groups they had purchased in the past month. The food groups were derived from the USDA Thrifty Food Plan. Information regarding type of grocery store used and community food pantry use in the past month was also collected. Food security status using the USDA 18-item U.S. FSSM was identified. More than 75% of the participants were deemed to be of low to very low food security status. Food pantry usage was associated with an increased purchase of perishable items such as fish, meat, and dairy products from grocery stores as food pantries could easily provide non-perishable food items. While the use of food pantries may have allowed for household funds to be used for perishable items, produce purchases did not increase with the use of food pantries. Participants shopping at discount grocery stores were more likely to purchase fish products and convenience items, those shopping at large retailers such as Target or Walmart stores were less likely to purchase vegetables and more likely to purchase sweetened beverages and snacks. Racial differences were found in the purchase of meat products but not with fruits, vegetables, or whole grains. As expected, homelessness was

associated with less perishable items being purchased. The researchers concluded that nutrition education of low-income and food insecure individuals should include information regarding the local food environment and the types of foods that could be provided by or purchased from its agencies and stores. The goal of the education would be to facilitate the best use of resources in order to acquire quality foods for the low-income household (Dammann & Smith, 2010). This study illustrates the importance of understanding the coordination of resources by community agencies and at the household level by its members. Additional investigation is needed to gain insight into whether the local food environment and/or resource coordination at the household level is associated with the choice of coping behaviors.

Anater et al. (2011) developed a survey instrument to collect data regarding food acquisition practices of the food insecure and to examine the relationships of these practices with influencing factors. The survey and an interview were completed by 492 adult clients of emergency food provider agencies in New Jersey. Food security status was determined utilizing the 18-item U.S. FSSM. The survey included questions regarding food acquisition practices over three time periods: the respondent's lifetime, during the past 12 months, and during the past 30 days. Eighty-two percent of the respondents were food insecure in the previous 12 months, 21% had low food security, and 61% were classified as very low food security. Eleven percent were classified as having marginal food security, and the remaining 7% were classified as having high food security status. Seventy-eight previously identified food acquisition practices were included in the survey. The use of each of these practices was confirmed by the respondents. Of the top 10 practices reported for the three time periods, seven were noted

to be common for all periods. These were use of food pantries, meals with low-cost foods, food item purchases because they were on sale, food item purchases because they were inexpensive, purchasing food at dollar stores, avoiding fresh fruit or meat purchases because of the expense, and utilizing coupons for food purchases. More than 25% reported pawning or selling items to buy food, hiding or locking up food for later use, removing mold from foods prior to consumption, and going to stores specifically to eat free food samples. Risky behaviors reported were similar to other studies and included buying food directly from homes or roadsides (18%); 12% had begged for food money, shoplifted, or gone to shelters for meals, 11% hunted for game, 10% had eaten food that had been thrown away and removed slime from meat, 5-7% reported eating road kill and removing insects from grains. The researchers felt that by identifying the food acquisition practices and prevalence, education could be developed that would encourage the less-risky practices and discourage the risky practices (Anater et al., 2011). The identification of repeated, common food acquisition practices across various time periods in this study provides clues to which practices are deemed successful; however, the study did not assess whether the same respondents were repeating the practices. It also did not report the relationships of the practices with the levels of food security status or sociodemographic variables. The prevalence of risky behaviors is evidence that additional efforts need to be made in research and education to identify effective food acquisition coping strategies so that these practices are not necessary. However, some may argue that behaviors such as hunting and fishing are far less risky than some purchasing practices and food recovery practices reported by these participants assuming

that individuals experienced in hunting and fishing practices possess knowledge of safe food handling practices.

Understanding food purchasing differences between low and higher income shoppers may shed further light on strategies used when resources are limited. The availability of handheld portable scanning devices in conjunction with consumer panels has made possible the creation of databases by third party companies related to food expenditures. The Nielsen data set has collected food expenditure information along with quantity measures at the household level rather than the typical store level, which allows for evaluation of the data across income levels. Leibtag and Kaufman (2003) used a nationally representative sample of households from October of 1997-October 1998 Nielsen data set to compare food expenditure practices. Purchased items (n = 1,535) were divided into “fixed-weight” products such as boxed cereals and packaged cheeses and “random-weight” products such as fresh meats, fruits, and vegetables. Households were divided into four income groups for the fixed-weight products: <\$25,000, \$25,000-\$34,999, \$35,000-\$49,999, and greater than or equal to \$50,000. Households were divided into three income groups for the random-weight products: < \$35,000, \$35,000-\$49,999, and greater than or equal to \$50,000. Total food expenditure, quantity in pounds of food purchased, and price per pound of each food category were tabulated. For random-weight products, the low-income households spent a greater proportion of the food dollars and purchased a larger quantity on promotional items (using coupons, sales, and other promotions) than those households at higher income levels, with the exception of poultry being purchased at similar levels with the middle income level households. For fixed-weight product promotions, low-income households purchased less boxed cereals



and cheeses. The authors hypothesized that low-income households may have been saving in this category by purchasing private-label items that do not have many promotions. When assessing private-label spending, the results of data analysis confirmed that low-income households spent more on private-label cereals than higher income households. The pattern found was similar for cereals and packaged cheeses; less was spent on private label products as income level increased. Low-income households did not buy larger packages of food items, which may have lower per-unit prices when compared to higher income households. The authors suggested that this may be due to access/transportation issues, inadequate budget resources available to stock up, and storage limitations. The study was unable to account for the influence of food assistance programs such as WIC. Food assistance programs may dictate sizes and amounts of food items, precluding participants' ability to take advantage of promotional items and volume pricing. The researchers suggested that buying lower priced produce and meat products may mean a reduction in overall quality and/or variety of the foods purchased and consumed in the household. This study provided a direct measure of purchases as compared to other published literature that relied on participant reporting. The documentation in purchase differences by income identified more clearly food acquisition practices and the relationship to income. A limitation of this study was its inability to relate the practices specifically to food security status.

Household food supply characteristics may be related to personal resources and food insecurity, reflecting both food adequacy and quality. To investigate these relationships, a cross sectional survey of low-income Latino households with children in California was conducted (Kaiser et al., 2003). A convenience sample of 274 families

was recruited from community agencies. The survey included the U.S. FSSM and a 171 item self-reported household food inventory. Maternal education and household income were found to have a significant inverse correlation with food security. There was also a significant positive correlation between a past experience of food insecurity in the mother's childhood and current food insecurity. No acculturation variables correlated with food insecurity or food inventory scores. With an increase in food insecurity severity, a decrease in food item variety in the food inventory was noted. Specifically, while Mexican food staples remained present in households, fruit and vegetable items were decreased. Consistent with other literature, these findings support the need for nutrition educators and programs to coordinate resources to enhance the provision of produce, to facilitate the acquisition of low cost, nutritious, culturally appropriate foods, and to educate the food insecure on strategies to maintain or increase household intake of quality food items. The reduction of fruits and vegetables as way of coping with limited food resources needs further study, specifically, whether households are choosing to reduce fruits and vegetables or if the reduction is related to the available resources.

Time is a personal resource that is needed if low-income households are expected to stretch food dollars by cooking more meals utilizing basic ingredients similar to those included in the USDA Thrifty Food Plan. Utilizing the American Time Use Study (ATUS) data from 2003-2004, Mancino and Newman (2007) explored the relationships between personal and family characteristics and time allocated to food preparation for women of all income levels. The ATUS used interviews of a random, nationally representative sample of households completing the CPS. The questions related to activities of the previous day for 24 hours beginning at 4 a.m. The sample for this study

included only male or female head of households and included 30,058 respondents. Low-income level was defined as less than or equal to 130% FPL ( $n = 5,357$ ), and full time employment was considered to be more than 35 hours per week. Multivariate analysis was used to evaluate the effect of influencing variables on the quantity of time spent in food preparation, controlling for other household and individual characteristics. Time spent preparing food included preparing and serving food and drinks, food and kitchen cleanup, and storing food and drinks. Men spent about 1/3 less time in food preparation compared to women. Across incomes, there were no significant influencing variables associated with how much time men spent in food preparation. For women, time was an influencing variable. As time allocated to employment increased, its allocation to food preparation decreased. For example, women working full time spent approximately 62 minutes preparing food compared to the 102 minutes spent by non-working women. Income was also found to be an influencing variable among women. Overall, as income increased, women decreased time spent preparing meals. However, this did not hold true for the low-income group when assessed separately. Time spent in food preparation did not decrease significantly with an increase in income, possibly related to low-income women being less able to substitute money for time when compared to higher income women. An increase in weekly income of \$100 for high income women equated to a decrease of nine minutes in food preparation. Having additional healthy adults in the household did not affect time spent preparing food; however, having an unhealthy adult in the household increased food preparation time among women who worked part-time regardless of income and decreased for those working full-time. Having children in the household was also an influencing factor. The presence of children increased time spent

on food preparation for all income levels. Overall, time resources had a greater impact than monetary resources on time spent in food preparation. The authors noted that because the Thrifty Food Plan requires 80 minutes per day to 16 hours per week to prepare the recipes, there may be a need to develop a plan that incorporates more convenience items or time efficient recipes to assist low-income households with adult workers. In this study, working low-income women spent approximately 40 minutes per day preparing food. This study did not report on low or middle income workers who may have work hours that interfere with mealtime and may also be working more than one lower paying job. The researchers only collected total hours worked and did not differentiate when the work hours occurred during the day, which may influence food and meal-related activities. This study supports the need to consider the resource of personal time as an important factor in planning and executing food-related coping strategies if those strategies are expected to be successful in improving or stabilizing food security status.

Employment demands such as long or irregular working hours of low-to-moderate income parents have been shown to impact food and meal choices for themselves and their families (Devine et al., 2009). In a pilot telephone survey, working parents were recruited from low-to-moderate income zip codes in upstate New York. Inclusion criteria were 20 hours or more per week employment, having a child less than 16 years of age in the household, and having a family income less than the median for the area. Fifty (females = 25, males = 25) participants completed the interviews regarding food choice strategies for managing meals at home and at work. Five categories of food choice coping strategies were investigated: foods prepared at/away from home, missing meals,

individualizing meals, speeding up, and planning. Twenty-two items assessed the use of the food choice coping behaviors with additional items used to assess food choices at work. Participants included an equal number of African American, Hispanic, and Caucasian mothers and fathers in the northeast United States. Both mothers and fathers reported skipping meals themselves, utilizing foods prepared away from home, consuming quick items at work instead of meals, eating in the car, and cooking more on days when they were not working. Children were reportedly fed separately from parents by 44% of fathers and 52% of mothers, and many ate while watching television. There were reports of limited access to healthy food items or adequate appliances for refrigerating and reheating foods in the work setting as well. In this pilot study, work schedules including overtime hours and non-traditional hours had an impact on food choice coping strategies. Because low-to-moderate income parents in this study were working long hours with limited food choices at work, the researchers suggested that further study on the relationship between employment characteristics and food choice strategies is necessary to get a better sense of its impact on low-moderate income households.

Home food preparation activity was examined in a secondary data analysis of a Toronto study of 153 women requesting food assistance as home food preparation was thought to be a skill that may assist with minimizing food insecurity (McLaughlin et al., 2003). Food security status of the participants was measured using the U.S. FSSM. Over one month, three 24-hour dietary recalls were conducted on different days of the week. Foods eaten were coded for place and how they were prepared. For foods prepared for more than the one person, recipes were gathered that included ingredients and preparation

descriptions. Prepared foods were scored based on number of food preparation techniques required, and then were categorized as high, medium, or low food preparation activities associated with an eating occasion. The researchers found that 97% of the participants had prepared at least one food item from scratch during the three days of recalls, 57% ate from scratch food items on all three days, 26% on two days, and 14% on one day. This study did not find a relationship between the frequency of foods prepared from scratch and level of food security; however, the more complex preparation of foods was greater in households without reported hunger. While the literature contains data from self-reported food preparation activities, this study provides a more direct measure of food preparation activity among low-income women. The authors noted that results supported the presence of food preparation skills in low-income households and that these existing skills should be considered when planning interventions for this group. It may be beneficial to explore whether having the ability and/or time to prepare more complex food items or from scratch items more frequently could have a positive impact on household food security status or if the exchange of time for food preparation is valuable to these households.

Personal characteristics that assist with stress resistance and coping with stress are optimism and self-efficacy (DiClemente et al., 2009; Hobfoll, 1998). Optimism is “the extent to which people hold generalized favorable expectancies for the future” (Carver et al., 2010, p. 879). Self-efficacy has been described as an “optimistic sense of personal competence” (Scholz, Doña, Sud, & Schwarzer, 2002, p. 242). Optimism has been positively associated with social networks, reduced stress, improved quality of life, and more adaptive responses to difficult situations (Brissette et al., 2002; Carver et al., 2010;

Harju & Bolen, 1998; Schou et al., 2005; Smith & Freedy, 2000). Optimism affects how one appraises a situation and behavior related to coping with situations and is associated with positive management of stressful situations (Nes & Segerstrom, 2006; Prati & Pietrantonio, 2009). Self-efficacy has been extensively studied and is important to changing coping behaviors and improved health related outcomes (Cicognani, 2011; Nápoles et al., 2011). It is also considered a coping resource as increased self-efficacy has been associated with increased problem-solving coping behaviors and coping capacity (Trouillet et al., 2011; Turner et al., 2012). Self-efficacy has also been identified as important to the practical aspects of managing the home food environment (Devine et al., 2006; Kolopaking et al., 2011). Coping with food insecurity as a stressor may be affected by the personal resources of self-efficacy and optimism.

Suratkar et al. (2010) conducted a cross-sectional study of 175 low-income African American adults in the city of Baltimore to explore the relationship of food security to food-related psychosocial factors and food-related behaviors including food acquisition and preparation behaviors. The participants were recruited as a sample of convenience from supermarkets, corner stores, and community action centers. The Consumer Impact Questionnaire developed for this study included sections for gathering sociodemographic and socioeconomic data, food procurement and preparation, food knowledge, healthy eating self-efficacy, and healthy eating intentions. Food security status was measured using the Radimer/Cornell scale. The sample included food secure participants (32%), those with household food insecurity (28.6%), adult-level food insecurity (29.7%), and households with child hunger (9.7 %). Food knowledge was found to be lowest in households with child hunger; healthy eating intention scores were

lowest in those with household-level food insecurity. The researchers found that food insecure participants ate foods more often from carry-out or fast food restaurants than the food secure group. No significant differences were found in healthy food acquisition between the groups. Food insecure households used less healthy food preparation methods when compared to food secure households. Interestingly, there was a negative association between acquiring healthier food items and healthy food preparation. Acquiring healthy food items did not result in consistent healthful preparation. These findings support the need for building healthy, cost effective food preparation and food selection skills in urban African American households.

Utilizing food banks has been identified as a practice for supplementing a household food supply during times of limited resources. Michalski (2003) identified coping practices employed by food bank clients in the Greater Toronto area as part of a study that also identified the economic status of those clients. A secondary data analysis was performed utilizing data obtained from interviews with a random sample of 800 food bank clients. Descriptive statistics were used to evaluate the data. The study sample was 54.6% female, with 46% of households having children under the age of 18 years. Twenty percent of the participants were disabled, 33% were unemployed, and 12.5% were working either full or part-time; 10.1% were parenting at home, 9.9% were attending school, 3.4% were retired, and the “other” category accounted for 3.6%. Eighty-seven percent rented housing, which was the largest budgetary expenditure for the household consuming 62 % of the budget, higher than what was considered affordable for the area. Because of the study design, all participants utilized a food bank to increase foods available to the household as a coping practice. Michalski (2003) found that 60%



of the participants went hungry at least once per month and utilized a food bank at least once per month. More than 40% reduced transportation costs by walking, allowed children to go hungry once per month, and spent no income on recreational activities. Approximately 37% borrowed money from family, 16.5% received financial or food gifts from friends or family, 12.9% received informal or charitable help, and 26% did without telephone service. The author noted that those clients receiving government support were not different from those not receiving support in choices of strategies and practices. Both used the informal support of family, friends, and community food banks, which illustrated the value of informal support as a coping resource for the food insecure.

Food security is linked to formal and informal social support systems that include food assistance programs, social networks, family and friends. It is also impacted by the availability of transportation to acquire food and/or participate in food assistance programs. These resources are of great importance in rural areas. Garansky et al. (2006) studied randomly sampled rural households in the Midwestern U.S. from counties with poverty rates above the state average to study food access and food insecurity among rural residents. The six-question USDA Food Security Short Form was used to establish food security status along with a mailed survey to evaluate the relationships of the resources provided by the local food environment, transportation, and formal and informal social support systems with food security. Formal social support was considered to be food assistance programs delivered via government agencies. Informal social support was measured by questions including the number of people one could call on if help was needed, whether or not respondents had shared or received food from family and/or friends with some indication of if the food was produce from a garden, meat from

a farm, or fish from a pond or stream. The survey was returned by 793 households (62% response rate) of which 562 were complete and able to be utilized in the analysis.

Descriptive statistics and regression analysis were computed. The rural food environment (high food prices with fewer stores), informal social support, and transportation significantly predicted food insecurity in this rural environment, but formal social support did not. Households outside the city limits were less likely to be food insecure, and most reported the ability to shop for food outside of the county. Two informal social support indices predicted food security: being able to rely on others and the sharing of foods. Survey respondents were more likely to report sharing food rather than receiving food, and it was unusual that sharing food was found to relate to food insecurity but receiving food did not (Garansky et al., 2006). Perhaps a coping strategy of relying on others for food resources and the practice of participating in the rural “norm” of exchanging food, if it exists in a community, helps to stabilize food security. The impact of participation in these norms on food security warrants further study.

Social networks, social support, and community norms are considered a part of social capital. Social capital has been defined as “the resources available to individuals through their social behaviors and membership in community networks” (Kawachi, Kennedy, & Glass, 1999, p. 121). Indicators of social capital have been developed and related to health status and have been measured at the household and community levels. To examine a relationship between social capital and food insecurity at the household and community levels, Martin et al. (2004) conducted a study in an urban population with incomes less than 185% of the federal poverty level. Surveys were completed by a random sample of 330 participants by door-to-door trained interviewers with an

instrument that gathered data for food security status (U.S. FSSM), social capital (social cohesion and trust), and demographic information. A previously validated scale was utilized as an index of social capital and included questions about willingness to help neighbors, ability to ask for help from neighbors, and personal relationships with neighbors that reflected a perceived sense of trust and reciprocity. The mean household-level social capital score was used as a community neighborhood score. Descriptive statistics and regression analysis were conducted. Forty-eight percent of participants were food secure, 28% were food insecure, and 24% had at least one household member who experienced hunger in the previous 12 months. At the household level, 58% were classified as having low social capital and 69% had no family members engaged in social or civic organizations. In households with high social capital scores, 57% were engaged in civic or social organization. Sixty-nine percent of households having an elderly family member were classified as having high social capital. Household social capital was associated with significantly decreased odds of being hungry, households were less likely to experience hunger in communities with high social capital, and households with an elderly member were less likely to experience hunger. When social capital was included in the regression model, no demographic or socioeconomic variable was a significant predictor of hunger. Interestingly, high household social capital was associated with the ability to borrow a car, but not with owning a car. Transportation is an important resource for food acquisition. The authors felt that income alone did not measure the resources of the elderly and that the elderly members had lived in the communities for longer lengths of time and had built social capital (Martin et al., 2004). This study supports the importance of social capital as a resource for food security in an urban setting. The

researchers did not consider the knowledge and skills that the elderly may have gained from salient historical experiences regarding food management that may prove to be protective against hunger. Even though social support and social networking are aspects of social capital, this study did not consider participants satisfaction with these or with overall social capital.

Food insecurity coping strategies have been investigated internationally in an effort not only to assist communities at the local level, but to also assist worldwide agencies in decision making during times of crisis. A Coping Strategy Index (CSI) was developed for rapid data collection and analysis in crisis-affected areas utilizing locally applicable coping strategies (Maxwell, Caldwell, & Langworthy, 2008). Maxwell and colleagues (2008) analyzed coping strategy data from 14 surveys conducted in chronically food insecure or crisis-affected areas in Sub-Saharan Africa. The intent was to identify a sub-set of applicable coping behaviors across all of the studies and to determine if this sub-set of behaviors could serve as a proxy for food insecurity. Frequency and severity of behaviors were considered as was a range of causes of food insecurity in both urban and rural settings. Eleven coping behaviors were identified, and five of these were most frequently employed during times of similar levels of food insecurity severity across the studies. The behaviors that occurred most frequently were those that were easily reversible such as reducing portion sizes or eating less preferred foods. These behaviors were perceived as being less severe compared to those employed at higher levels of perceived food insecurity severity, which included sending children out to beg, eating seed stock, and eating wild foods or hunting. It was found that the five common behaviors and frequencies correlated with the original, longer version of the CSI

and could be utilized for rapid assessment of crisis situations for allocation of resources (Maxwell et al., 2008). The researchers identified future areas for further investigation that included whether there is a level of coping by which a household can be identified as food secure or food insecure. The nature of “reversibility” of some coping behaviors may be an additional means by which to identify severity of food insecurity and/or the positive or negative nature of the coping behavior.

The U.S. FSSM was utilized in an Indonesian study to assess household level food security status in both rural and urban areas in five separate studies which were combined in order to map the country’s food insecurity prevalence (Usfar, Fahmida, & Februhartanty, 2007). All respondents were from households with children under the age of five. Three of the studies provided information about coping strategies, one was a food security survey and two were program evaluation studies. A total of 3,704 households were surveyed, 97% were headed by males, and urban households had more regular income and higher incomes than rural households. A majority of the households were food insecure: 84% in rural areas and 77% in the urban areas. The authors found that as food insecurity became more severe, more coping strategies were employed. Borrowing money from family was the most common strategy employed overall. In urban areas, that was followed by lessening food portion sizes, getting an additional job, then selling small assets. Urban residents also sent children to work and moved to other towns to gain employment. In the rural areas, the food insecure also sought additional employment, borrowed money from non-relatives, cooked with whatever foods were available and sold large farm animals. The authors were able to determine that in the urban food secure households, 45% employed coping strategies. Due to a lack of data, utilization of coping

strategies in the rural food secure category could not be determined. This was a limitation of utilizing previously collected data from multiple studies. The authors suggested that when coping strategies were employed over time they became “adaptive mechanisms” rather than a short term response and may have been practiced continuously in order to prevent food insecurity or to stabilize food security status (Usfar et al., 2007, p. 373). It is possible that these coping behaviors appear when households begin to worry about not having enough food and warrants further research on the impact of the duration of coping behaviors at various levels of food security.

#### Conservation of Resources Theory and its Application to Food Security

Conservation of Resources (COR) theory was developed by Hobfoll in an effort to incorporate the impact of resource losses and gains on the stress process and overall individual well-being (DiClemente et al., 2009). The underlying assumption or tenet of the COR theory is that individuals “strive to obtain, retain, protect, and foster those things they value or their resources” (Hobfoll, 2001, p. 341). Stress occurs when an individual’s resources are threatened with loss, are lost, or there is a failure to gain resources after an investment of resources (Hobfoll, 2001). COR theory evolved from a need to incorporate both the “perceived and the objective environment” into the coping process (DiClemente et al., 2009, p. 133). Hobfoll intended the coping process to be more clearly defined by COR theory. Understanding the coping process in terms of coping demand and coping capacity enhances the evaluation of needed coping resources that impact the outcomes of health and well-being. People are believed to utilize resources to “conduct regulation of self, their operation of social relations, and how they organize, behave, and fit into the greater context of organizations and culture itself” (Hobfoll, 2012, p. 228). Many

cognitive-behavioral theories rely on the perceptions of individuals which are most relevant when economic, social, and personal resources are adequate, but less so when personal, social, and environmental barriers are significant. COR theory posits that resources determine an individual's perception and ability to cope with a stressful situation. Therefore, those with adequate resources may be successfully coping with stressful situations while those with limited resources in the same situation have a greater challenge, which may exceed their coping capacity (DiClemente et al., 2009).

COR theory is predictive in nature in that it examines the dynamic nature of losses and gains. Hobfoll (2001) has concluded that "resource loss is the principal ingredient in the stress process" (p. 337). Resources are those things that are valued and are categorized as "objects, personal characteristics, conditions or energies" (Hobfoll, 1998, p. 57). Objects are valued because they meet a physical demand or because of their impact on status. Personal characteristics are those that assist with stress resistance and include skills that protect valued resources and personal traits which tend to be learned such as optimism, self-efficacy, and mastery. Conditions or energies aid in obtaining other resources or can be exchanged for resources in the other three categories and include money, time, and knowledge (DiClemente et al., 2009; Hobfoll, 1998). Hobfoll (1998) suggested that this structural classification may be used in combination with a hierarchical classification that describes resources based on "proximity to survival" (p. 58). Primary resources would include "adequate food, clothing, and mastery to negotiate the environment" (Hobfoll, 1998, p. 58). Secondary resources include social support, hope, and optimism, which contribute to the primary resources. Tertiary resources are those that are symbolically related to the primary and secondary resources such as

money, social status, and workplace conditions (Hobfoll, 1998). The addition of a hierarchical categorization may provide additional information regarding how much these resources are valued and the relative impact of the various resources on losses and gains.

COR theory also suggests that having one major resource is typically linked to having others. This is referred to by Hobfoll (2012) as “resource caravans” (p.227). Hobfoll proposed that resources develop together and therefore come in caravans, rather than as single resources. For example, having a high level of self-efficacy will be found with a sense of optimism and social support, which may result in better coping skills or styles. COR theory also suggests that a lack of coping skills may be due in part to diminished confidence related to personal circumstances (Hobfoll & Lilly, 1993). The construct of resource caravans is important such that when resource loss occurs there is an effect on several resources making the impact of the loss and the resulting coping behaviors complex.

Two primary principles and four corollaries emerge from the central tenet of COR theory (Hobfoll, 2001; Hobfoll, 2012):

Principle 1: The Primacy of Resource Loss

Resource loss is disproportionately more salient than resource gain.

Principle 2: Resource Investment

People must invest their resources to protect against loss, recover from losses, and gain resources.

Corollary 1: Those with greater resources are less vulnerable to resource loss and are more capable of organizing resource gain.

Corollary 2: Those who lack resources are not only more vulnerable to resource



loss, but that initial loss begets future loss.

Corollary 3: Those who possess more resources are more capable of gain, and that initial resource gain begets further gain.

Corollary 4: Those who lack resources are likely to adopt a defensive posture to conserve their resources.

Hobfoll (1998) developed a list of resources to be used in testing the principles by asking groups of students, community members, church group members, hospital patients, and psychologists to identify things they valued. Additional groups added resources to the preliminary list of items of value and deleted those thought not to be widely valued. Subsequent groups were also allowed to combine or split apart previously listed items. The process included approximately 50 small groups which eventually compiled a list of 74 resources, as seen in Table 1 (Hobfoll, 2001). Amongst these resources one finds adequate food, personal transportation, necessary home appliances, sense of optimism, and feelings of independence, goal accomplishment, control over my life, being of value to others, and adequate personal health, social support, and self-efficacy (Hobfoll, 2001). The resources identified may affect the choice, nature, and effectiveness of coping strategies related to resource management. These resources support an individual's ability to strategically prevent or minimize food insecurity or improve food security.

A model for the COR theory was developed that includes both a resource path and an action path related to resources as depicted in Figure 2 (Hobfoll, 2001). The resource path indicates that following chronic or acute losses, coping strategies are chosen based on anticipated outcomes; the employment of those strategies initiates an action path that

utilizes available resources. If the strategy results in an unsuccessful adaptation, then the individual may experience secondary losses as the initial investment of resources is lost, making them less able to stabilize following further losses. Loss spirals have been identified as occurring when there are inadequate resources prior to a resource loss or when the loss results in inadequate remaining resources to meet subsequent needs (DiClemente et al., 2009). With strategies resulting in successful adaptations, the individual experiences secondary gains, which reinforce or replenish the resource pool.

Table 1

*Conservation of Resources Theory Valued Resources*

---

Personal transportation	Adequate food	Adequate financial credit
Feeling that I am successful	Larger home than I need *	Feeling independent
Time for adequate sleep	Sense of humor	Companionship
Good marriage	Stable employment	Financial assets
Intimacy with one or more family members	Feeling that I have control over my life	Knowing where I am going with my life
Feeling valuable to others	Adequate home furnishings	Affection from others
Family stability	Intimacy with spouse or partner	Financial stability
Free time	Role as a leader	Extras for children
Adequate clothing	Ability to communicate well	Money for transportation
More clothing than I need *	Providing children's essentials	People I can learn from
Sense of pride in myself	Feeling that my life is peaceful	Advancement in education or job training
Hope	Acknowledgement of my accomplishments	Feeling that my life has meaning/purpose
Feelings that I am accomplishing my goals	Ability to organize tasks	Help with tasks at work
Time for work	Positive feeling about myself	Support from co-workers
Time with loved ones	Motivation to get things done	Medical insurance
Loyalty of friends	Intimacy with at least one friend	Involvement with church, synagogue, etc.
Necessary tools for work	Money for extras	Sense of commitment
Necessary home appliance	Self-discipline	Feeling I know who I am
Children's health	Financial help if needed	Help with tasks at home
Spouse/partner's health		Help with child care
Stamina/endurance		Status/seniority at work
Feeling that my future depends on me		

---

Table 1 (continued).

Understanding from my employer/boss	Positively challenging routine	Involvement in organizations with others who have similar interest
Adequate income		
Personal health	Savings or emergency money	Health of family/close friends
Sense of optimism	Housing that suits my needs	

\*Luxury resources included because of person repeatedly invested more resources in these two than other resources they deemed more important. S.E. Hobfoll (1998).

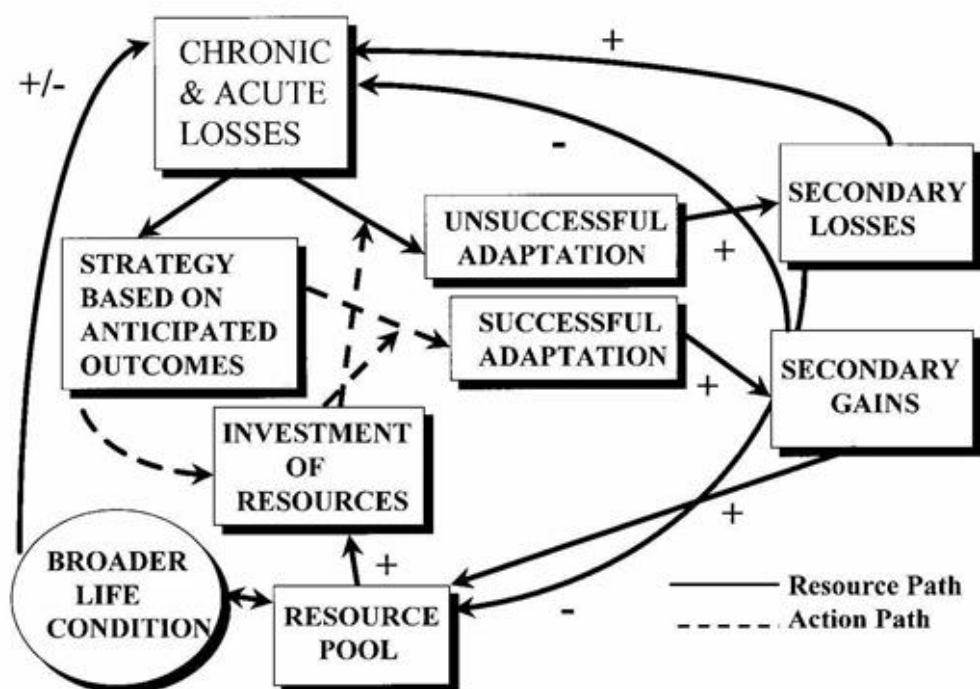


Figure 2. Conservation of Resources Theory Model (Hobfoll, 2001).

COR theory provides a framework for conceptualizing resource losses and gains within one's environment that includes broad life conditions. Hobfoll (1998, 2001) discussed the "nested-self" when describing resources, the threatened loss, actual loss and the reinvestment of resources for gain. Because individuals rely on personal resources such as social support for well-being, research may be conducted at the individual level,

but the individual must be studied in the context of the culture and community, in other words, where the individual is “nested” (Hobfoll 1998, 2001). For example, the extent to which the community has public transportation may impact the level of social networking opportunities for an individual.

Resources are utilized to manage loss or stressors through coping processes. Early research on stress concluded that stress consisted of two processes: cognitive appraisal and coping (Folkman, Lazarus, Gruen, & DeLongis, 1986). Because cognitive appraisal is composed of primary and secondary appraisal, some have described Lazarus’ work as delineating three processes of stress (Carver, Scheier, & Weintraub, 1989). Carver et al. (1989) describes the processes as follows: “Primary appraisal is the process of perceiving a threat to oneself. Secondary appraisal is the process of bringing to mind a potential response to the threat. Coping is the process of executing that response” (p. 267).

Moos and Holahan (2003) described the concept of coping as having stable coping styles and coping responses or skills that are called upon during stressful occurrences. Researchers have conceptualized coping in both dispositional and contextual terms. Dispositional approaches relate coping styles with responses. Contextual approaches place importance on the coping response as it relates to a specific stressful situation (Moos & Holahan, 2003). Moos and Holahan (2003) integrated both perspectives into a framework that attempted to describe coping in a comprehensive manner that supports the concept that dispositional and contextual factors influence coping skill employment, which can affect personal outcomes, including resources. They also theorized that a person’s ability to act in response to a stressor shapes the outcome of that situation. This framework supports COR theory in that it provides a

conceptualization of coping styles and behaviors being altered by resource losses that may be ongoing or transitory. Resources and resource losses that impact behaviors related to food security may also be ongoing or transitory. The framework also integrates coping styles into the personal resource system that is related to coping behaviors and ultimately health and well-being. The Moos and Holahan (2003) framework supports the proposed application of COR theory to food security.

Research has been published using COR theory as a framework to study the impact of resource loss and coping on psychological distress and well-being in a variety of settings, such as after the occurrence of natural disasters, work burnout, loss of wellness, and pregnancy amongst others (Benight et al., 1999; Ehrlich et al., 2010; Freedy et al., 1992; Wadsworth et al., 2009; Zamani et al., 2006). While valued resources such as the adequacy of food, employment, social support, transportation, income, and education have been identified by the theory, the use of COR theory to specifically address the relationship amongst these and other resources known to influence food security has not been found in the literature. The importance of establishing the underpinnings of the theory to food security lies in its potential ability to support future intervention research efforts that utilize COR theory principles in resource-based intervention programs. Hobfoll contends that interventions based on behaviors must also address resources because they are necessary for success (as cited in DiClemente et al., 2009).

To begin to investigate the application of the theory to food security, relationships among resources need to be established. Food insecurity can be considered a condition that causes distress and impacts well-being. It is often associated with a loss of resources,

but may also be a chronic condition. With this consideration, it is important to initially investigate the relationship of both the level of resources and their losses to food security as described by the resource construct of Principle 1 and Corollary 1 of COR theory. The preferred coping responses are postulated to impact food related practices and ultimately food security status. The coping response relationships investigated by the current study addressed the resource investment and conservation construct described in Principle 2 and Corollary 4 of COR theory. The proposed conceptual model (Figure 1) depicts these relationships. Relationships among/between variables within the model were assessed by path analysis to determine consistency with the proposed model. To determine if the proposed model was influenced by coping response behaviors, the model was supposed to be analyzed for consistency across the coping response groups, problem-focused and emotion-focused, as identified by the survey instrument using invariance model testing methods.

CHAPTER III  
METHODOLOGY  
Research Design

The purpose of the study was to investigate the applicability of the Conservation of Resources theory (COR) to food security. A model-testing design was employed to evaluate the theorized impact of the resource pool and resource loss on an individual's food security status and on food practices which may influence food security status. A survey was designed to collect cross-sectional data that were used to evaluate the relationships among/between variables within the model. The proposed model was assessed by path analysis to determine consistency with sample data. To determine if the proposed model was influenced by coping response behaviors, the data were analyzed for consistency across coping response groups using invariance model testing methods. Approval was obtained from the Human Subjects Protection Institutional Review Board at The University of Southern Mississippi prior to data collection.

Sample and Sampling Procedure

Subjects were recruited utilizing the non-probability technique of network or snowball sampling (Burns & Grove, 2005a) . The researcher initiated personal contacts that provided further contacts for a variety of informal social groups including card-playing groups, book clubs, volunteer groups, private non-profit organizations and other social or civic clubs. Adults greater than 18 years of age were eligible to participate. Contacts were asked to refer participants from all socioeconomic groups in order to capture data from all levels of food security. To ensure a diversity of participants, initial contacts were selected from a variety of adult age groups and income levels across the

gulf coast of Louisiana. Participants were asked to refer new participants until the target number of subjects was obtained. There were 11 variables in the proposed model and one control or background variable (coping response). To ensure an adequate sample size for testing the path model, the recommended ratio for sample size was 20 observations per variable measured or a minimum sample size of 240 observations (Marsh & Balla, 1994; Stage, Carter, & Nora, 2004). Accounting for approximately 20% missing data, the target number of observations was 288 to yield a final sample size of 240 observations. A total of 286 surveys were collected. Two surveys were removed from the sample. One participant was unable to complete a survey due to a transportation schedule; the second survey removed belonged to a participant whose responses on the survey were fabricated. The final sample size was 284. Participants were residents of the following parishes: Acadia, Assumption, Beauregard, Calcasieu, Iberia, Jefferson Davis, Lafayette, Lafourche, St. Martin, St. Mary, Terrebonne, and Vermilion. The sample was not expected to be representative of a larger population as this was an exploratory study.

#### Survey Administration

The survey was conducted utilizing an interviewer-assisted administration technique. For those participants with identified low literacy level or for those who requested assistance, the survey was read to them. Small incentives were given for participation such as pencils, notepads, first aid travel kits, and purse accessories. When the survey was conducted in a group setting, snacks and beverages were offered, and the researcher provided small door prizes such as gift cards, thermal cups, and/or small gift baskets of toiletries or household products. The consent statement and instructions were read prior to any group or individual survey administration.



## Survey Development and Variable Measures

Variables were measured with a single survey instrument created by combining multiple previously validated instruments and sociodemographic data items (see Appendix A for survey instrument). The survey was reviewed for clarity, readability, and duration by a small group that included researchers, nutrition students, and community members. Food secure reviewers were able to complete the survey in 25-30 minutes. The suggestions provided for survey improvement were incorporated. The survey instrument was then pretested with a group of low-income elderly women as they were considered to be comparable to a subset of the final sample that could have difficulty completing the survey. This group was able to complete the survey in 45 minutes. They shared suggestions with the researcher regarding survey instructions and length. Review of the submitted surveys provided additional insight regarding length. Revisions were incorporated into the final version of the survey instrument. These revisions included clarifying and streamlining some written instructions and formatting to reduce respondent burden.

The study variable definitions and measurement units are shown in Table 2. The following are descriptions of the survey measurements for each model variable.

### *Resource Pool*

*Income.* Household income levels were measured utilizing the categories established by the United States Census Bureau: under \$15,000, \$15,000 to \$24,999, \$25,000 to \$34,999, \$35,000 to \$49,999, \$50,000 to \$74,999, \$75,000 to \$99,999, and \$100,000 and over. A household was defined as all persons occupying a housing unit

and includes all related family members as well as all unrelated persons (U.S. Census Bureau, 2012) .

*Education.* To determine the level of formal education achieved by the participant, each was asked to identify the highest grade, level of school, or highest degree completed. The question was modeled after the question used for the 2011-2012 National Health and Nutrition Examination Survey (NHANES) (Centers for Disease Control and Prevention, 2012). The response range was from 0 (never attended/kindergarten only) to 21 (doctoral degree).

*Optimism.* Carver et al. (2010) described optimism/pessimism as a construct that describes one's expectancy for the future. These researchers view optimism and pessimism as opposites along a continuum of the same dimension. To measure the level of optimism, the Life Orientation Test (LOT) was developed followed by a revision, the Life Orientation Test – Revised (LOT-R) (Scheier, Carver, & Bridges, 1994). When tested with a group of undergraduate students, the LOT-R exhibited an acceptable level of internal consistency for the six items, producing a Cronbach's alpha of .78 and test-retest correlations of .68, .60, .56, and .79 over intervals of four months, 12 months, 24 months, and 28 months. The LOT-R was highly correlated with the original LOT ( $r = .95$ ) (Scheier et al., 1994). The LOT-R asked respondents to indicate the extent to which they were in agreement with 10 statements. The response scores ranged from 0, which indicated strong disagreement, to 4 which indicated strong agreement with the statements. Because only six items were scored (four items were included as filler statements) the final score range was 0-24 with the higher scores representing greater optimism.

Table 2

*Variable Definitions and Measurement Units*

Variable	Definition	Measurement Unit	Variable Type	Data Source
Income	Annual Household Income	<\$15,000, \$15,000-\$24,999, \$25,000-\$34,999, \$35,000-\$49,999, \$50,000-\$74,999, \$75,000-\$99,999, \$100,000 +	Categorical	Survey Question
Education	Level of Formal Education	0-21	Continuous	Survey Question
Optimism	Rating of expectancy for the future	0-24	Continuous	LOT-R
Social Support Satisfaction	Appraisal of social support	6 point scale responses; total score range 6-36	Continuous	SSQ6
Self-efficacy	Perceived self-efficacy; belief in ability to complete new or difficult tasks, face adversity	4 point scale responses; total score range 0-40	Continuous	GSE
Time	Time typically spent in food shopping and preparation	Minutes/day	Continuous	Survey Question
Experience	Cumulative years of food responsibility of household members.	Number of years	Continuous	Survey Question
Program Participation	History of participation in any public or private food assistance program	Yes/No	Dichotomous	Survey Question

Table 2 (continued).

Variable	Definition	Measurement Unit	Variable Type	Data Source
Adaptive Food Practices	Frequency of engaging in delineated food acquisition and management practices	5 point scale responses; total score range 95-475	Continuous	Survey Question
Food Security	Access at all times to enough food for an active healthy life	0-6 score	Continuous	6-item Short Form U.S. FSSM
Coping Response	Response to stressful situations in the past year; Problem-focused or Emotion-focused	4 point scale; categorical score range of 6-24	Categorical	Brief COPE
Resource Loss	Resource loss or threat of loss	0-360	Continuous	COR-E

Note: LOT-R=Life Orientation Test-Revised; SSQ6=Social Support Questionnaire, six-item; GSE=General Self-Efficacy Scale; COR-E=Conservation of Resources Evaluation; U.S. FSSM= U.S. Food Security Survey Module

*Social support.* The shortened version (six-item) of the Social Support Questionnaire (SSQ6) developed by Sarason and colleagues (Sarason, Sarason, Shearin, & Pierce, 1987) was utilized to measure the participants appraisal of their social support. This version was shortened from the original Social Support Questionnaire (SSQ) that consisted of 27 items, which has been shown to be valid and reliable. The SSQ6 has been shown to have high internal reliability (Cronbach's alpha = 0.97), inter-item correlations for the satisfaction scores ranged from 0.21-0.74 (coefficient alpha = 0.94) and was highly correlated with the 27-item SSQ (Sarason, Levine, Basham, & Sarason, 1983). Each item on the questionnaire had two parts. The first part asked the participant to

identify people they could count on for support by listing initials (not to exceed nine per item), the second part asked the participant how satisfied they were with the overall support for that item using a 6-point Likert scale (1 = very dissatisfied to 6 = very satisfied). To score the SSQ6, the mean of the total number of people identified for all six items was the SSQ Number Score (SSQNS) and would have a range of 0-54. To obtain the overall satisfaction score (SSQS), the mean of the satisfaction scores for the six items would be obtained and summed to yield a score range of 6-36. While only the overall satisfaction score (SSQS) was used for the model analysis in this study, the identification of the number of people participants could count on for support was retained in the instrument, as this was believed to assist with more accurate appraisal of satisfaction by the participant and was a part of the original reliability of this tool.

*Self-efficacy.* Self-efficacy was measured using the General Self-Efficacy Scale (GSE) developed by Schwarzer and Jerusalem (1995). The GSE assesses perceived self-efficacy and was designed for adult and adolescent populations. It consisted of 10 items with 4-point scale responses; a rating of 1 signified an item was “not at all true” to 4, which signified the item was “exactly true” for the participant. Responses were summed and had a range from 0-40. The GSE could be self-administered as part of a larger survey and has been reported as valid and reliable in multiple studies in several countries (Cronbach alphas ranging from .76 to .90; test-retest reliability  $r = .47-.75$ ; correlations of .45-.58 with scales of similar dimensions) (Luszczynska, Scholz, & Schwarzer, 2005; Scholz et al., 2002; Schwarzer, 2011). The higher the score on the GSE, the greater the perceived self-efficacy of an individual.

*Time.* Participants were asked if they were the person in the household who usually prepares the meals or snacks for the household, then were asked to enumerate the amount of time spent each day in that activity. Food preparation included time spent in preparation, eating and drinking, and cleaning items used for meals and snacks. If they were not the primary person in the household who engaged in food preparation, they were still asked to enumerate their time spent on these activities. The question format was modeled after the American Time Use Study (U.S. Department of Labor, 2012) and resulted in a continuous variable of minutes.

*Number of residents in household and food practices experience (Experience).* To determine the number and age of residents in the household, participants were asked to list household members by initials and indicate ages. Participants were also asked to identify the number of years each household member had any responsibility for meals or snacks for themselves and/or other household members. This was asked in an attempt to identify the individual and cumulative food practice experience of household members. The cumulative experience in years for the household was used as the variable in the initial proposed model. The household characteristics data were used for descriptive data and model modifications. A household was defined as consisting of all people occupying a single housing unit, whether or not they were related to the participant. This definition was consistent with that utilized by the U.S. Census Bureau (U.S. Census Bureau, 2012).

*History of participation in food assistance programs.* Participants were asked how frequently they had participated in any public or private food assistance program in the past year. Examples of programs were provided such as the Special Supplemental Nutrition Program for Women's Infants and Children (WIC), Reduced or Free School

Lunch programs, Supplemental Nutrition Assistance Program (SNAP), or the food stamp program. Utilizing congregate meal services, food banks, or other private food programs were also included. Response options were in the form of a 5-point scale with 5 signifying participation “all of the time” to 1 signifying “never” participating in food assistance programs. Any positive item response (2-5) was used to categorize the participant as having participated in a food assistance program when participation was used as a dichotomous variable in the analyses. Item responses were summed to yield the variable score as were other adaptive practice items when frequency was used in the analyses. Participation in food assistance programs was intended as a proxy for experience with food insecurity and a way to account for exposure to education or information related to food practices for coping with food security. History of participation was explored as a factor that influenced food acquisition and food management practices.

#### *Resource Losses and Threat of Losses*

Resource losses and threat of losses were measured using a modified version of the Conservation of Resources Evaluation (COR-E) tool developed by Hobfoll (1988). The COR-E measures resource losses, threat of loss, and resource gains. For this study, only resource loss and threat of loss were measured. The original tool included a list of 74 resources with the subscales of interpersonal, personal, material, work, health, children, time, and meaning categories. Test-retest measures ranged from .55 to .64 for recent losses and gains and .64 to .67 for losses and gains over the past year. Losses within subcategories have internal reliabilities reported to be over .70 (Wells, Hobfoll, & Lavin, 1999). Subsequently, the tool was used in a variety of studies with researchers

reducing the list of resources to fit the particular study. In a study of male and female adults in a Florida community that had just experienced losses from a hurricane, the tool was reduced to 40 items and exhibited a Cronbach's alpha of .94 (Benight et al., 1999). In a study of depression in postpartum women of south Louisiana, the 40-item scale was again used, which resulted in a Cronbach's alpha of .96 (Ehrlich et al., 2010). For the present study, the COR-E resource list was reduced to 45 resources addressing the variables under investigation. The chosen resources were from all subscales except the "children" subscale. These items are addressed more generally in other categories as "family" resources. For example, "health of family/close friends" was included in the tool but "health of children" was omitted. Choices related to omissions were made to reduce participant burden while addressing the overall loss to all types of family structures. Each resource loss or threat of loss was rated separately by the participants on a 4-point scale with a rating of 1 signifying to a small degree to a rating of 4 signifying loss or threat of loss to a great degree. Zero indicated no loss, no threat, or not applicable. The possible total scores ranged from 0-360, and the possible score ranges for losses and threat of losses was 0-180.

*Coping response.* To measure the coping response of the participants, the Brief COPE, a shortened version of the COPE Inventory, was incorporated into the survey instrument. The Brief COPE and the COPE Inventory were both developed by Carver and others (Carver, 1997; Devries, Hamadeh, Phillips, & Tarnopolsky, 2006). The original COPE Inventory contained 13 conceptually distinct subscales, each corresponding to four items. It was tested in a university population and exhibited Cronbach's alphas ranging from .45-.92 for the subscales. Test-retest reliabilities ranged



from .42-.89 (Devries et al., 2006). The Brief COPE contains 14 subscales, each measured by two items. The added subscale in this version was a self-blame scale. The response scores range from 1 indicating “I haven’t been doing this at all” to 4, indicating “I’ve been doing this a lot.” Each subscale response had a range of 2 to 8. The instrument was tested for reliability and validity in an adult population that had recently experienced a hurricane. The subscales of the Brief COPE are self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame. The analyses for reliability of the subscales resulted in Cronbach’s alpha’s greater than or equal to .5, with 11 of the 14 subscales exceeding .6. Exploratory factor analysis yielded nine factors accounting for 72.4% of the variance observed and the factor loadings were similar to the original COPE Inventory (Carver, 1997). The time reference was the “past year.” Researchers have chosen several of the subscales of this tool and similar tools to create the categorical variables of problem-focused and emotion-focused coping responses (Alarcon, Edwards, & Menke, 2011; Lifa, Chao-Hung, Yaw-Sheng, Hsiu-Hung, & Jew-Wu, 2007; Trouillet, Gana, Lourel, & Fort, 2009). For this study, the subscales utilized for problem-focused coping were active coping, planning, and using instrumental support. The subscales used for emotion-focused coping were denial, behavioral disengagement, and self-blame. The total of six subscales yielded 12 items on the survey instrument. The range of scores for problem-focused and emotion-focused coping was 6-24. The highest score between the two categories was used to represent the participant’s preferred coping response and the coping group in which the participant was placed.

*Practices.* Food practices identified by Kempson et al. (2003), Wood et al. (2006), and Anater et al. (2011) were combined and adjusted for regional differences and redundancy. Then the practices were categorized as reported by Kempson et al. (2003) into two broad categories of practices, food acquisition, and food management. These broad categories were further subdivided. The food acquisition category was subdivided into the practice groups related to reliance on community resources, interaction with informal support systems, supplement financial resources, and lower food costs. The food management category was subdivided into practice groups related to managing the food supply and regulating eating patterns. For this study participants were asked to identify how often they engaged in the delineated practices. Response options for each practice were in the form of a 5-point scale with 5 signifying engagement in the practice “all of the time” to 1 signifying “never” engaging in this practice. A total of 68 acquisition practices and 34 management practices yielded a possible score range for food acquisition practices of 68-340, a range of 34-170 for food management practices, and 102-510 for a total score range.

*Food security.* To reduce respondent burden, the six-item short form of the U.S. FSSM (Bickel, Nord, Price, Hamilton, & Cook, 2000) was administered as part of the study instrument. The items on the short form are a subset of the U.S. FSSM 18-item instrument. To create the short form, items specific to households with children were removed. Items that discriminated between the two most severe levels of food insecurity with hunger, moderate or severe, became less reliable with a reduction of items from 18 to 6 (Blumberg et al., 1999). The current categorization nomenclature, which combined these two levels into “very low food security,” eliminated the need to identify these

subcategories. Data collected from the April 1995 Current Population Survey (U.S. Department of Labor, 1994) was used to evaluate the short form. The short form correctly categorized food security status for 97.7% of all households, 99% of households without children, and 95.6% of those with children (Blumberg et al., 1999). The food security measure on this form was a continuous scale of 0-6 and also provided an interval-level measure for the categories of high or marginal food security, low food security, and very low food security. A raw score of 0-1 was considered food secure, 2-4 was low food security and 5-6 was very low food security. Because this study's survey was planned to be interviewer-assisted, the question format was slightly revised for readability using the question format developed for self-administration in youths over 12 years of age (Connell, Nord, Lofton, & Yadrick, 2004). The raw scores were utilized for analyzing the proposed model.

### Analysis

Survey data were initially entered into a dataset utilizing Microsoft EXCEL. Once entered, the data were screened for data entry errors using sorting functions and descriptive statistics for each item. Corrections were made for entry errors and missing data were confirmed. The dataset was then uploaded to SPSS version 21 with AMOS version 22 module for analysis.

The analysis began by calculating descriptive statistics of the participants' demographic, background, model variable data and assigning participants to preferred coping response groups based on the highest of the two subscores from the Brief COPE. Because the calculation of model fit indices requires complete data, missing data were imputed using linear trend of point imputation.

To test the associations between the resource pool variables, food practices and food security as well as resource loss with food practices and food security, and food practices with food security, the proposed theoretical model (Figure 3) was evaluated by conducting structural equation modeling (SEM) based on the maximum likelihood method and fit indices were utilized to estimate the model's fit to the data. To evaluate the adequacy of proposed model fit to the sample data, the following general criteria were used to determine a good fit:  $0 \leq \chi^2 \leq 2 \text{ df}$  with  $.05 < p\text{-value} \leq 1$ ;  $0 \leq \text{RMSEA} \leq .05$ ;  $.10 < \text{PCLOSE} \leq 1$ ;  $.95 \leq \text{NFI} \leq 1$  (Schermelleh-Engel, Moosbrugger, & Muller, 2003).

Results were examined to determine the need for model respecification. The initial model fit was not acceptable. The original analysis strategy was to evaluate the respecified model across the coping response groups (problem-focused vs. emotion focused) for invariance once the model fit was confirmed. However, the unexpected finding of 79% ( $n = 196$ ) of the participants with complete data for the Brief COPE were classified as problem-focused left too few emotion-focused observations to conduct invariance testing. The 196 problem-focused participant observations were deemed adequate, from a power perspective, to test the respecified model's fit to that data.

Results are discussed in Chapter IV.

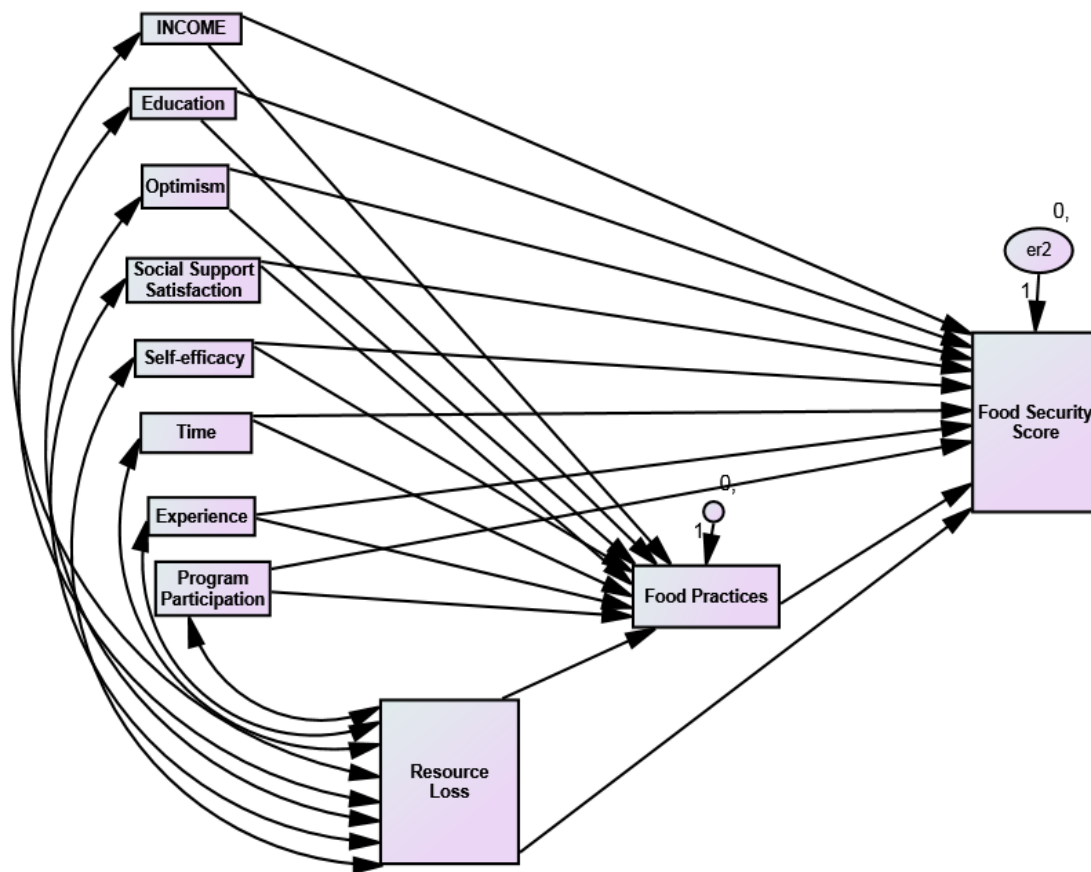


Figure 3. Theoretical Model. Note: All exogenous variables were correlated.

The adaptive food practices variable in the model was created by combining items reported by Kempson et al. (2003), Wood et al. (2006), and Anater et al. (2011). These practices were adjusted for regional wording differences and redundancy, then coded into the same two categories as Kempson et al. (2003): food acquisition and food management. The purpose of the next analysis was to determine if there was an underlying factor structure and whether the number of food practice items could be reduced to a smaller set for future use.

An exploratory factor analysis using principal axis factor analysis with an oblique rotation was conducted. A correlation matrix determinant  $>.00001$  was considered

appropriate for moving forward with the analysis. When the correlation matrix did not yield a determinant  $>.00001$ , the matrix was reviewed for item correlations  $>0.8$ , which were considered for possible removal of one of the pair of items. Items with communalities below 0.5 were also considered for removal in an effort to meet the determinant criteria. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was calculated and adequacy was considered a value greater than 0.7. Bartlett's Test for Sphericity was considered acceptable if significant ( $p<.05$ ), indicating that the correlation matrix was not an identity matrix. Items with eigenvalues  $>1$  were retained for rotation if supported by the associated scree plot (Field, 2005). Factor loadings higher than 0.4 were considered in the final solutions (Burns & Grove, 2005b). A higher cut-off of 0.5 was used for one subscale in order to yield a less complex factor structure. The resulting subscales identified by the factor solutions were tested for reliability. Cronbach's alpha was utilized to test for reliability. A Cronbach's alpha  $> 0.7$  is generally considered to be an indicator of acceptable internal consistency (Field, 2005). However, lower numbers have been deemed acceptable in some instances, as Cronbach's alpha can be affected by test length or number of items and could also reflect multidimensional data (Tavakol & Dennick, 2011).

## CHAPTER IV

### MANUSCRIPT I: INFLUENCE OF RESOURCES, RESOURCE LOSS, AND COPING RESPONSE ON FOOD MANAGEMENT PRACTICES AND FOOD SECURITY

#### Background

In recent years, environmental events and changes in the United States (U.S.) economy have moved some segments of society from a food secure existence to one that is insecure as can be evidenced by the decrease in national prevalence of food security from 89% in 2007 (Nord et al., 2007) to 85.5% in 2012 (Coleman-Jensen et al., 2013). At some time in 2012, 14.5% of U.S. households were food insecure with 8.8% being classified as low food security status and 5.7% as very low food security status. In households with children, 10% of the children were food insecure (Coleman-Jensen et al., 2013). In the state of Louisiana, the average prevalence of food insecurity from 2010-2012 was 15.7% of the population with 4.8% being classified as having very low food security (Coleman-Jensen et al., 2013). Food security is defined by the U.S. Department of Agriculture (USDA) as “access by all people at all times to enough food for an active healthy life” (Coleman-Jensen et al., 2011, p. 2). Food insecure households are further classified as either “low food security” or “very low food security” (Coleman-Jensen et al., 2011, p. 4). Low food security refers to those households with food access issues, but no disruption in food intake. Very low food security households report both reduced food intake and altered eating patterns related to lack of resources (Coleman-Jensen et al., 2011). Accurate measurement and characterization of food security status has broad policy implications, particularly at a time of reduced appropriations for food assistance programs.

Food insecurity has been viewed as a predictor of health conditions, a stressor associated with changes in performance and productivity at school or work, and as a condition associated with negative parenting behaviors. Food insecurity has also been associated with alterations in diet quality and other health behaviors, which may not be consistent with health promotion and disease prevention efforts (Alaimo et al., 2001b; Alaimo et al., 2001c; Alaimo et al., 2001d; Devine et al., 2009; Duffy et al., 2009; Kleinman et al., 2002; Kleinman et al., 1998; Lee & Frongillo, 2001; Wehler et al., 2004; Weinreb et al., 2002). Additionally, in previous literature, food security status has been associated with adaptive food practices, education level, optimism, social support satisfaction, time spent on food preparation, experience with food practices, and participation in food assistance programs (Herman et al., 2004; Rose, 1999; Weigel et al., 2007; Yu et al., 2010).

Many factors influence food security status. While income is a significant predictor, food security status is also influenced by household characteristics such as the number, gender, and age of adults in a household, the presence of children, and homelessness (Coleman-Jensen et al., 2011; Heflin et al., 2009; Himmelgreen & Romero-Daza, 2010; Lee & Greif, 2008; Rose, 1999). It is also influenced by the cost of housing including heating and cooling (Kirkpatrick & Tarasuk, 2011; Nord & Kantor, 2006), geography (Bartfeld & Dunifon, 2006), individual employment characteristics (Coley et al., 2007), participation in food assistance programs both governmental and non-governmental (Bartfeld & Hong-Min, 2011; Bhattarai et al., 2005; Jones & Frongillo, 2006; Kim & Frongillo, 2007), and sociocultural factors such as norms, beliefs, social



networks, and cohesion (Chilton & Booth, 2007; Chung et al., 2012; Lee & Frongillo, 2001; Lee & Greif, 2008).

Coping with food insecurity may be affected by the personal resources of self-efficacy and optimism (DiClemente et al., 2009; Hobfoll, 1998). Optimism has been positively associated with the extent of social networks, reduced stress, improved quality of life, and more adaptive responses to difficult situations (Brissette et al., 2002; Carver et al., 2010; Harju & Bolen, 1998; Schou et al., 2005; Smith & Freedy, 2000). Optimism affects how one appraises a situation, the behavior related to coping with situations, and is associated with positive management of stressful situations (Nes & Segerstrom, 2006; Prati & Pietrantonio, 2009). Self-efficacy is considered a coping resource; an increase in self-efficacy has been associated with increased problem-solving behaviors, coping capacity, and improved health related outcomes (Cicognani, 2011; Nápoles et al., 2011). Self-efficacy has also been identified as important to the practical aspects of managing the home food environment (Devine et al., 2006; Kolopaking et al., 2011).

Time is a personal resource that is needed if low-income households are expected to stretch food dollars by cooking more meals using basic ingredients similar to those included in the USDA's Thrifty Food Plan. Utilizing the American Time Use Study (ATUS) data from 2003-2004, Mancino and Newman (2007) found that as income and time allocated to employment increased, time allocation to food preparation decreased. However, this inverse relationship did not hold true for low-income women (less than or equal to 130% of the federal poverty level). The authors proposed this difference was possibly related to low-income women being less able to substitute money for time. Employment demands such as long or irregular working hours of low-to-moderate

income parents was shown to impact food and meal choices for themselves and their families (Devine et al., 2009). In a pilot telephone survey, working parents from zip codes in upstate New York where annual family incomes were < \$60,000, were found to skip meals, utilize foods prepared away from home, consume quick items at work instead of meals, eat in the car, and cook more on days when they were not working. The findings from Devine et al. (2009) and Mancino and Newman (2007) supported the need to consider time as an influencing factor in food related practices.

Food security has been linked to formal and informal social support systems that include food assistance programs, social networks, family, and friends. Garansky et al. (2006) studied randomly sampled rural households in Midwestern U.S. counties with poverty rates above the state average to evaluate the relationships of resources provided by the local food environment, transportation, and formal and informal social support systems with food security. Two informal social support indices were found to predict food security: being able to rely on others and the sharing of foods. Perhaps coping practices of relying on others for food resources and participating in the rural norm of exchanging food helped to stabilize food security. Social support is also considered a resource of value for coping with stressors (Hobfoll, 1985; Hobfoll et al., 2003; Schwarzer & Knoll, 2007). The loss of social support has been shown to negatively impact the outcomes of coping efforts (Hobfoll et al., 2003). Social capital has been described as “resources available to individuals through their social behaviors and membership in community networks” (Kawachi, 1999, p. 121). To examine a relationship between social capital and food insecurity, Martin et al. (2004) conducted a study in an urban population with incomes less than 185% of the federal poverty level.

Higher household social capital and the presence of an elderly member were found to be associated with decreased odds of experiencing hunger. The researchers did not evaluate whether the knowledge and skills that the elderly possess regarding food practices may be protective against hunger.

Participation in formal food assistance programs has had positive associations with food security status (Herman et al., 2004; Metallinos-Katsaras et al., 2011). Participation often includes education related to food practices, thereby potentially affecting those practices beyond the time spent in a food assistance program. Having the experience of coping with food insecurity may influence food practices; therefore, participation in food assistance programs was considered a resource in the current study.

Effective acquisition and management of food resources may influence a household's food security. Household members at all ages can contribute to these efforts. Bowen and Devine (2011) documented the influence of intergenerational factors that influence the transfer of food related knowledge and skills. Fram et al. (2011) determined that children were aware of food security issues in a household and took some responsibility for managing food resources. High school students also contributed to the food shopping duties of a household (McCullum & Achterberg, 1997). There is a need to explore the impact of the years of responsibility for food related practices as a resource on adaptive food practices and food security.

Reports regarding coping strategies and adaptive food practices employed by the food insecure most often are related to food management and acquisition practices at various levels of food security, and the frequency and riskiness of these practices (Anater et al., 2011; Kempson et al., 2003; Kempson et al., 2002a, 2002b; McLaughlin et al.,

2003; Wood et al., 2009; Wood et al., 2006). The intent of these studies was not to characterize the influence of personal resources on the coping strategies chosen in the presence of food insecurity challenges. No one has examined the relationships of resources, adaptive food practices, and food security status simultaneously.

#### *Conservation of Resources Theory as a Framework*

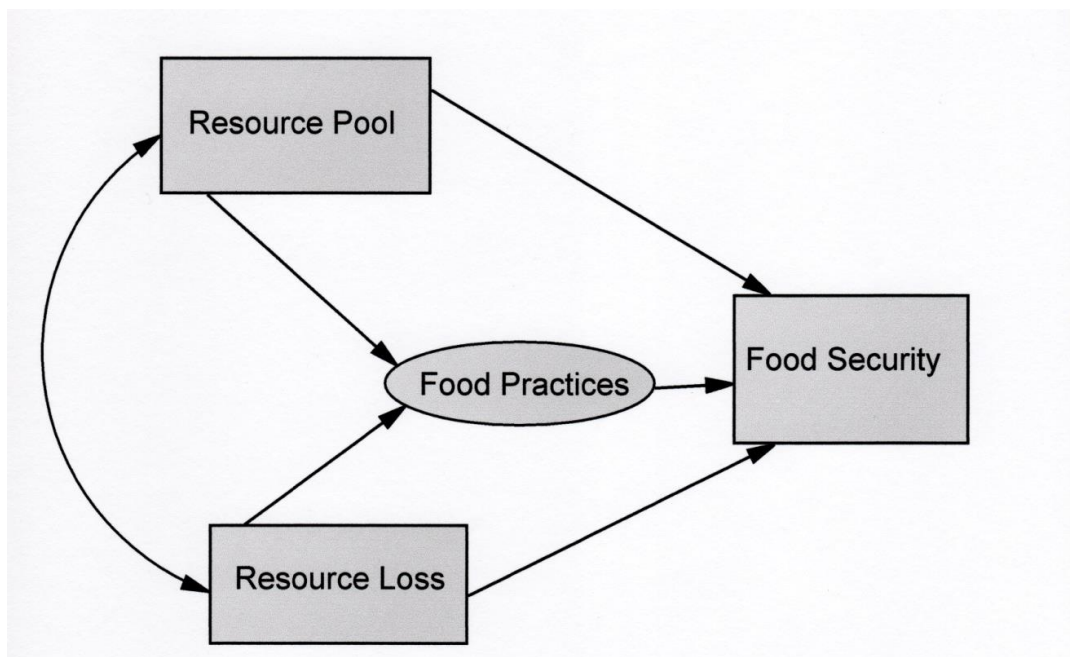
The Conservation of Resources (COR) theory was used as a framework for this study, conceptualizing resources and resource losses as they relate to food security. COR theory was developed by Stevan Hobfoll (1989) in an effort to incorporate the impact of resource losses and gains on the stress process and overall individual well-being (DiClemente et al., 2009). The underlying assumption or tenet of the COR theory is that individuals “strive to obtain, retain, protect, and foster those things they value or their resources” (Hobfoll, 2001, p. 341). Stress occurs when an individual’s resources are threatened with loss, are lost, or there is a failure to gain resources after an investment of resources (Hobfoll, 2001). COR theory evolved from a need to incorporate both the “perceived and the objective environment” into the coping process (DiClemente et al., 2009, p. 133). People are believed to utilize their resources to “conduct regulation of self, their operation of social relations, and how they organize, behave, and fit into the greater context of organizations and culture itself” (Hobfoll, 2012, p. 228). COR theory posits that resources will determine an individual’s perception and ability to cope with a stressful situation. COR theory is predictive in nature in that it examines the dynamic nature of losses and gains. Research has shown that “resource loss is the principal ingredient in the stress process” (Hobfoll, 2001, p. 337).

Hobfoll (1998) developed a list of 74 valued resources to be used in testing the theory principles. Among these resources one finds adequate food, personal transportation, necessary home appliances, sense of optimism, and feelings of independence, goal accomplishment, control over my life, being of value to others, and adequate personal health, social support, and self-efficacy. The resources identified may affect the choice, nature, and effectiveness of coping strategies related to resource management. Some of these resources are the same as or similar to those identified in the literature as influencing food security status.

Research has been published using COR theory as a framework to study the impact of resource loss and coping on psychological distress and well-being in a variety of settings such as after the occurrence of natural disasters, work burnout, loss of wellness, and pregnancy, among others (Benight et al., 1999; Ehrlich et al., 2010; Freedy et al., 1992; Wadsworth et al., 2009; Zamani et al., 2006). The use of COR theory to specifically address the relationships among resources or resource loss known to influence food security has not been found in the literature to date. The importance of establishing how the theory underpins food security lies in its potential ability to support future intervention research efforts that utilize COR theory principles in resource-based intervention programs. Hobfoll (as cited in DiClemente et al., 2009) contended that interventions based on behaviors must also address resources because resources are necessary for success.

As previously described, food insecurity can be considered a condition that causes distress and impacts well-being. It is often associated with a loss of resources, but may also be a chronic condition. With this consideration, it was important to investigate the

relationship of both the level of resources and resource losses to food security, the current study's stressful situation. The individuals' preferred coping response (problem-focused or emotion-focused) was postulated to affect food related practices and ultimately food security status. The proposed conceptual model (Figure 4) depicts these theorized relationships.



*Figure 4.* Conceptual Model of Resources, Practices, and Food Security.

The purpose of this study was to assess the direct and indirect effects of resources and resource loss on food practices and food security. It was hypothesized that the resource pool variables of income, level of education, optimism, social support satisfaction, self-efficacy, food practices experience, time spent on meal preparation management, and a history of participation in a food assistance program would be negatively associated with the frequency of engaging in adaptive food practices and lower food insecurity. It was also hypothesized that the loss or threat of loss of resources would be positively associated with engaging in adaptive food practices and higher food insecurity. An increase in engaging in adaptive food practices was postulated to be

associated with a higher level of food insecurity. The influence of the individuals' preferred coping response (problem-focused or emotion-focused) on the model was also explored.

### Research Design

This study employed a descriptive, correlational design using cross-sectional data to test a conceptual model of the relationships among resources, loss of resources, food practices and food security. Additionally, invariance testing was planned to assess differences in these relationships associated with preferred coping response behaviors.

### Method

#### *Sample and Sampling Procedure*

Subjects were recruited utilizing the non-probability technique of network sampling (Burns & Grove, 2005a). The researcher initiated personal contacts that provided further contacts for a variety of informal social groups including card-playing groups, book clubs, volunteer groups, private non-profit organizations, and other social or civic clubs. Free-living adults greater than 18 years of age were eligible to participate. To ensure diversity of participants, contacts were asked to refer participants from all socioeconomic and adult age groups across 12 parishes along the Gulf Coast of Louisiana. Participants were asked to refer new participants until the target number of subjects was obtained. To ensure an adequate sample size for testing the theoretical model, a minimum sample size of 240 observations (20 observations per variable) was determined to be optimal (Marsh & Balla, 1994; Stage et al., 2004). Projecting approximately 20% missing data, the target number of participants was determined to be 288 to yield a sample size of 240 observations. A total of 286 surveys were collected.

Two surveys were determined to be unusable and were removed from the sample: one from a participant unable to complete the survey due to transportation scheduling; the second from a participant who was uncooperative. This yielded a total initial sample size of 284. Approval was obtained from the Human Subjects Protection Institutional Review Board at The University of Southern Mississippi prior to data collection.

### *Survey Development*

Variables were measured with a single survey instrument created by combining multiple previously validated instruments and demographic data items. The survey was reviewed for clarity, readability, and length of time to complete by a small group that included researchers, nutrition students, and community members. Food secure reviewers were able to complete the survey in 25-30 minutes. The suggestions provided for survey improvement by this group were incorporated. The survey instrument was then pretested with a group of low-income elderly women, as they were considered to be comparable to a subset that could have difficulty completing the survey. This group was able to complete the survey in 45 minutes, and also shared suggestions with the researcher regarding survey instructions and length. Revisions were incorporated into the final version of the survey instrument that included clarifying and streamlining some written instructions and formatting to reduce respondent burden.

### *Survey Administration*

The survey was administered utilizing an interviewer-assisted technique. The survey was read to those participants with an identified low literacy level or for those who requested assistance at the time of administration.



### *Measures*

Household *income* levels were measured utilizing the categories established by the United States Census Bureau. A household was defined as all persons occupying a housing unit including all related family members and all unrelated persons, for this and all items in the survey (U.S. Census Bureau, 2012).

To determine the level of formal *education* achieved by the participant, each person was asked to identify the highest grade, level of school or highest degree completed (Centers for Disease Control and Prevention, 2012).

Level of *optimism* was measured with the Life Orientation Test – Revised (LOT-R) (Scheier et al., 1994). The LOT-R asked respondents to indicate the extent to which they were in agreement with the test statements. The higher the score on the LOT-R, the more optimistic the individual. Similar to the previous literature, in the present study the LOT-R produced a Cronbach's alpha of .76.

The shortened version of the Social Support Questionnaire, the SSQ6 (six-item) developed by Sarason and colleagues (1987) was utilized to measure the participants' appraisal of their *social support*. Each item on the questionnaire asked the participant to identify people they could count on for support in a particular situation and then asked how satisfied they were with that support using a 6-point Likert scale (1= very dissatisfied to 6 = very satisfied). To obtain the overall social support satisfaction score (SSQS), the mean of the satisfaction scores for the six items was calculated. In the present study, the SSQ6 produced a Cronbach's alpha of .92.

*Self-efficacy* was measured using the General Self-Efficacy Scale (GSE) developed by Schwarzer and Jerusalem (1995). It consisted of 10 items with 4-point scale

responses, a rating of 1 indicated an item was “not at all true” to 4 which signified the item was “exactly true” for the participant. The higher the GSE score, the greater the perceived self-efficacy of an individual. Internal reliability testing in this study produced a Cronbach’s alpha of .90.

To measure *time*, participants were asked if they were the household member responsible for preparing meals or snacks; then, they were asked to enumerate the amount of time spent each day in that activity. Food preparation included time spent in preparation, eating and drinking, and cleaning items used for meals and snacks (U.S. Department of Labor, 2012) and resulted in a continuous variable of minutes.

To measure *experience* with food activity responsibility, participants were asked to list household members by gender and age; then, they were asked to identify the number of years each household member had any responsibility for meals or snacks for themselves and/or household members. These questions were intended to identify the individual and cumulative food practice experience of household members in years.

Participants were asked how frequently they had participated in any public or private food assistance programs in the past year. Such program examples as the Special Supplemental Nutrition Program for Women’s Infants and Children (WIC), Reduced or Free School Lunch programs, Supplemental Nutrition Assistance Program (SNAP) or the food stamp program, congregate meal or food bank services, or any other private food program were provided. Response options were in the form of a 5-point scale with 5 signifying participation “all of the time” to 1 signifying “never” participating in food assistance programs. Any positive item response (2-5) was used to categorize the participant as having participated in a food assistance program when participation was

used as a dichotomous variable in the analyses. Item responses were summed to yield the variable score as were other adaptive practice items when frequency was used in the analyses. Program participation was intended as a proxy for experience with food insecurity and a way to account for exposure to education or information related to adaptive food practices for coping with food security.

#### *Resource Losses and Threat of Losses*

Resource losses and threat of losses were measured using a modified version of the Conservation of Resources Evaluation (COR-E) tool developed by Hobfoll (1988). The COR-E measures resource losses, threat of loss, and resource gains. For this study, only resource loss and threat of loss were measured. For the present study, the COR-E 74-item resource list was reduced to 45 resources related to the variables under investigation. The chosen resources were from all subscales except the “children” subscale, as these items were addressed more generally in other categories as “family” resources. For example, “health of family/close friends” was included in the tool but “health of children” was omitted. Each resource loss or threat of loss was rated separately by the participants on a 4-point scale with a rating of 0 indicating no loss or not applicable to a rating of 4 signifying loss or threat of loss to a great degree. The resource ratings were summed, yielding a single score for the resource loss variable. Internal reliability testing for this variable in the current study produced a Cronbach’s alpha of .98.

To measure the preferred *coping response* of the participants, the Brief COPE was incorporated into the survey instrument (Carver, 1997; Devries et al., 2006). For this study, six of the 14 subscales were utilized. Problem-focused coping was measured using

the active coping, planning, and using instrumental support subscales. Emotion-focused coping was measured using the denial, behavioral disengagement, and self-blame subscales. This yielded 12 items on the survey instrument. The highest score between the two subscales was used to categorize the participants into a preferred coping response group. For this study, reliability testing for the problem-focused items produced a Cronbach's alpha of .79 and a Cronbach's alpha of .71 for the emotion-focused items.

*Adaptive food practices* reported by Kempson et al. (2003), Wood et al. (2006), and Anater et al. (2011) were combined and adjusted for regional wording differences and redundancy. Food practices from these studies were reported by low-income study participants with varying degrees of food insecurity. For this study, these practices were identified as "adaptive" practices. The current survey asked participants how often they engaged in the resulting 102 practices. Response options were in the form of a 5-point scale with 5 signifying engagement in the practice "all of the time" to 1 signifying "never" engaging in this practice. Item responses were summed to yield the variable score used in the analyses. Reliability testing produced a Cronbach's alpha of .95 and a split-half reliability alpha of .90.

The six-item short form of the U.S. FSSM (Bickel et al., 2000) was administered as part of the study instrument to measure *food security*. These items yielded a food security score of 0-6 and also provided an interval-level categorization of high or marginal food security, low food security, or very low food security. The question format was revised slightly for readability, using the format developed for self-administration in youths over 12 years of age (Connell et al., 2004). Raw scores were used for analyzing the proposed model.

## Analysis

All data analyses were performed utilizing IBM SPSS version 21 and AMOS version 22 software. Descriptive statistics of the participants' demographic and model variable data were obtained, and participants were assigned to one of the two coping response groups. Because a small percentage of the variable data were missing and the missing data appeared to be missing at random, linear trend of point imputation of the dataset was performed. Structural equation modeling was chosen, as it allows multiple variables to be associated with a dependent variable in a model in order to compare the fit of the model to the study dataset. SEM was used to test the associations between the resource pool variables, food practices, and food security as well as resource loss with food practices and food security, and food practices with food security, as depicted in the proposed theoretical model (Figure 5). The analysis strategy was to evaluate the original model for consistency with the dataset and if results did not yield acceptable fit statistics, then a respecification of the original model would be explored using the same procedure. The retained model would then be assessed across coping response groups (problem-focused and emotion-focused). To evaluate the adequacy of proposed model fit to the sample data, the following general criteria were used to determine a good fit:  $0 \leq \chi^2 / df \leq 2$  with  $.05 < p\text{-value} \leq 1$ ;  $0 \leq RMSEA \leq .05$ ;  $.10 < PCLOSE \leq 1$ ;  $.95 \leq NFI \leq 1$  (Schermelleh-Engel et al., 2003).

## Results

Characteristics of the full sample and the model variables can be found in Tables 3 and 4, respectively.

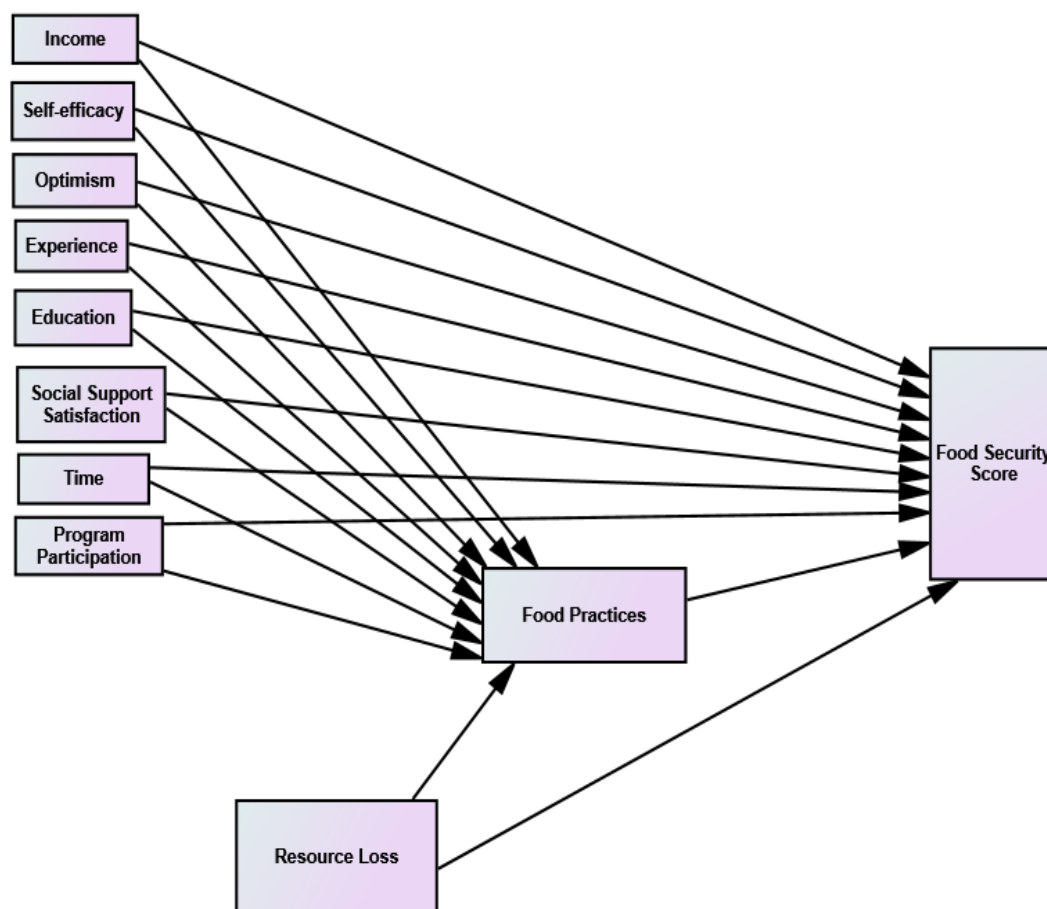


Figure 5. Theoretical Model. All exogenous variables were correlated.

Table 3

*Characteristics of the Full Sample (n = 284)*

	n	%
<b>Age</b>		
19-29	28	9.9
30-39	28	9.9
40-49	46	16.2
50-59	56	19.7
60-69	43	15.1
70-79	62	21.8
>80	21	7.4
Missing	0	0

Table 3 (continued).

	n	%
<b>Sex</b>		
Male	24	8.5
Female	260	91.5
Missing	0	0
<b>Race</b>		
White	229	80.6
African American	39	13.7
Hispanic	3	1.1
American Indian	1	.4
Other	2	.7
Missing	10	3.5
<b>Education</b>		
<high school	47	16.5
high school graduate	65	22.9
GED or Equivalent	9	3.2
some college	42	14.8
associate degree, vocational	33	11.6
associate degree, academic	7	2.5
4 year college degree	48	16.9
> college	22	7.7
Missing	11	3.9
<b>Income, annual</b>		
Under \$15,000	56	19.7
\$15,000-24,999	29	10.2
\$25,000-34,999	27	9.5
\$35,000-49,999	21	7.4
\$50,000-74,999	51	18.0
\$75,000-99,999	31	10.9
\$100,000 and over	25	8.8
Missing	44	15.5

Table 3 (continued).

	n	%
<b>Food Security Score</b>		
0	163	57.4
1	34	12
2	32	11.3
3	6	2.1
4	8	2.8
5	16	5.6
6	21	7.4
Missing	4	1.4
<b>Food Assistance Program Participation</b>		
Yes	79	27.8
No	188	66.2
Missing	17	6.0
<b>Coping Response Preference</b>		
Problem-focused	196	69.0
Not Problem-focused	51	18.0
Missing	37	13.0

Table 4

*Means and Standard Deviations for Model Variables, Full Sample (n = 284)*

Variable	Scale	n	Mean	SD	Range
Optimism (LOT_R)	0-24	257	15.23	5.42	0-24
Social Support Satisfaction (SSQ6)	6-36	269	5.26	1.071	0-6



Table 4 (continued).

Variable	Scale	n	Mean	SD	Range
Self-Efficacy (GSE)	0-40	264	31.36	5.65	10-40
Time-food shopping and preparation	Minutes/day	271	171.9	113.77	0-1046
Experience-household cumulative years	Number of years	248	56.54	31.41	0-234
Respondent Experience years	Number of years	259	36.58	18.19	0-84
Adaptive Food Practice frequency	95-475	262	168.72	40.48	99-326
Resource Loss (COR-E)	0-360	177	57.73	61.94	0-275

### *Results of Model Analyses*

The initial proposed model was estimated with the complete dataset (n = 284). Because the model had zero degrees of freedom and, therefore has a perfect fit, the chi-square was zero. The significant paths noted to have a positive direct effect on FSS scores were food assistance program participation and adaptive food practice frequency, while income had a negative direct effect on FSS scores. Program participation, household food experience, self-efficacy, resource loss, and time spent on food activities had positive direct effects on adaptive food practice frequency and, therefore, indirect effects on FSS

scores. Income had a negative direct effect on adaptive food practices and, therefore, an indirect effect on FSS scores.

### *Model Modifications*

In reviewing the findings of the initial model estimation, it was noted that program participation was associated with a higher FSS score or level of food insecurity. The original intent of this variable was to capture the influence of previous experience with food insecurity or food-related education obtained by participation in food assistance programs on food security. This influence was expected to be associated with greater food security, which would produce a negative relationship to FSS scores. A positive rather than a negative association with the FSS score indicated that program participation was behaving as an “adaptive food practice”; therefore, it was included in the food practices variable. The frequency scores for the seven program participation items were added to the food practices score. This change was the first modification to the model. The second model modification was to the “experience” variable. The initial model estimation did not reveal a significant effect of years of household experience with food responsibilities on FSS scores. Because 69.5% of the total household experience with food responsibilities was attributed to the survey respondents, and 67.9% of the food preparation and 75% of the food shopping responsibilities were also attributed to the survey respondents, the total household years of experience variable was modified to be the respondent years of experience. In an effort to make the model more parsimonious, the non-significant path from social support satisfaction to FSS scores was removed, but the path from social support satisfaction to food practices was retained since literature supports the relationship of social support with behaviors employed for coping with

stressors (Hobfoll, 1985; Kawachi, 1999; Schwarzer & Knoll, 2007). The non-significant path from Time on Food Activities to FSS scores was also removed, but its path to adaptive food practices was retained, as its relationship to food practices is also supported in the literature (Mancino & Newman, 2007). The modified model had eight observed exogenous variables (income, self-efficacy, optimism, respondent experience, education, social support satisfaction, time, resource loss) and two observed endogenous variables (food practices including program participation and FSS). The chi-square associated with this modified model was not significant (chi-square = .571, df = 2, p = .752) suggesting that this model was consistent with the sample data. The model exhibited satisfactory fit statistics: root mean square error of approximation (RMSEA) = 0.00, PCLOSE = 0.866, NFI = .999. The finding of an acceptable model fit was likely with a low degree of freedom. The modified model estimation is depicted in Figure 6. The modified model's regression estimates and standard errors can be found in Table 5.

Initially, the analysis strategy was to assess the retained model across the two coping response groups (problem-focused vs. emotion-focused). However, the unexpected finding of 79% (n = 196) of the participants with available data being classified as problem-focused left too few emotion-focused observations to achieve an acceptable ratio of observations per variable to estimate an SEM with that group for comparison. The sample of 196 participants yielded an acceptable model-testing ratio of 16.3 observations per variable. After finding an acceptable fit of the modified model for the complete dataset, the model was estimated using only the problem-focused participant data. Sociodemographic statistics for the problem-focused subgroup and their variable data are shown in Tables 6 and 7, respectively.

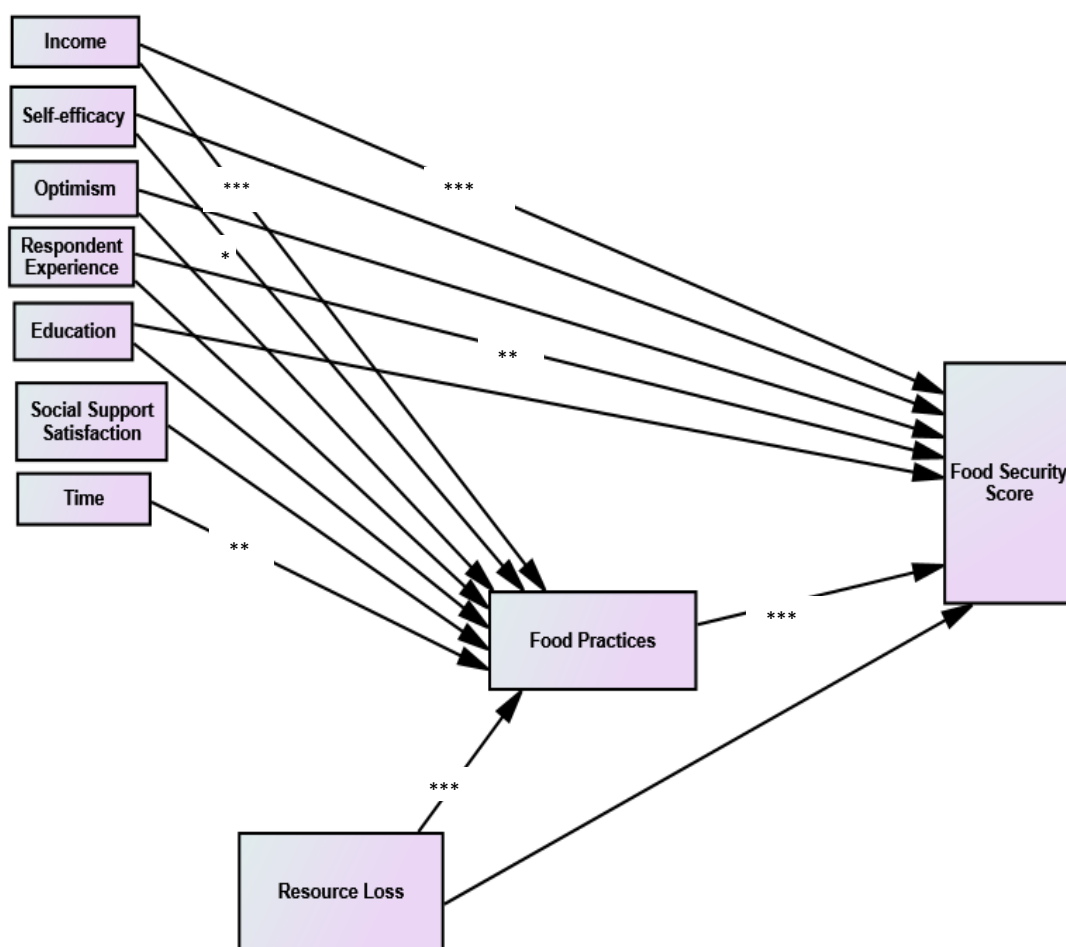


Figure 6. Modified Model Estimates (n = 284). Significant paths are noted; \* $p \leq .05$ ; \*\* $p \leq .01$ , \*\*\* $p \leq .001$ ; All exogenous variables were correlated.

Table 5

Modified Model Regression Estimates (n = 284)

Variable	Standardized Estimate	p-value
Food Security Score		
Income	-.21	***
Education	-.05	n.s.
Optimism	-.07	n.s.
Adaptive Food Practices	.57	***
Respondent Experience	-.12	**
Self-efficacy	.03	n.s.
Resource Loss	.02	n.s.

Table 5 (continued).

Variable	Standardized Estimate	p-value
Adaptive Food Practices		
Income	-.32	***
Education	-.05	n.s.
Optimism	-.06	n.s.
Time on Food Activities	.13	**
Respondent Experience	-.08	n.s.
Self-efficacy	.13	*
Social Support Satisfaction	-.03	n.s.
Resource Loss	.43	***

Note. \* $p \leq .05$ ; \*\* $p \leq .01$ ; \*\*\* $p \leq .001$ ; n.s. = non-significant

Table 6

*Sociodemographics of the Problem-focused Sample (n = 196)*

Characteristic	n	%
<b>Age</b>		
19-29	26	13.3
30-39	24	12.2
40-49	40	20.4
50-59	41	20.9
60-69	27	13.8
70-79	32	16.3
>80	6	3.1
Missing	0	0
<b>Sex</b>		
Male	17	8.7
Female	179	91.3
Missing	0	0

Table 6 (continued).

Characteristic	n	%
<b>Race</b>		
White	152	77.6
African American	32	16.3
Hispanic	3	1.5
American Indian	1	0.5
Other	2	2.0
Missing	6	3.1
<b>Education</b>		
<high school	29	14.8
high school graduate	37	18.9
GED or Equivalent	5	2.6
some college	31	15.8
associate degree, vocational	27	13.8
associate degree, academic	3	3.1
4 year college degree	39	19.9
> college	16	8.2
Missing	6	3.1
<b>Income, annual</b>		
Under \$15,000	48	24.5
\$15,000-24,999	19	9.7
\$25,000-34,999	19	9.7
\$35,000-49,999	11	5.3
\$50,000-74,999	37	18.9
\$75,000-99,999	26	13.3
\$100,000 and over	20	10.2
Missing	16	8.2
<b>Food Security Score</b>		
0	106	54.1
1	20	10.2
2	27	13.8
3	3	1.5
4	6	3.1
5	13	6.6
6	18	9.2
Missing	3	1.5

Table 6 (continued).

Characteristic	n	%
<b>Food Assistance Program Participation</b>		
Yes	65	33.2
No	127	64.8
Missing	4	2.0

Table 7

*Means and Standard Deviations for Model Variables of Problem-focused Sample (n = 196)*

Variable	Scale	n	Mean	SD	Range
Optimism (LOT_R)	0-24	189	15.61	5.48	0-24
Social Support Satisfaction (SSQ6)	6-36	191	5.31	1.02	0-6
Self-Efficacy (GSE)	0-40	190	31.99	5.37	10-40
Time-food shopping and preparation	Minutes/day	189	170.10	111.93	0-1046
Experience-household cumulative years	Number of years	182	54.67	32.65	0-234
Respondent Experience years	Number of years	189	33.7	17.52	0-84

Table 7 (continued).

Variable	Scale	n	Mean	SD	Range
Food Practice frequency	97-485	191	179.18	42.78	103-338
Resource Loss (COR-E)	0-360	141	56.35	58.19	0-275

The chi-square associated with the problem-focused data was not significant (chi-square = 0.255,  $df = 2$ ,  $p = .88$ ), suggesting that this model was consistent with the data. The model exhibited satisfactory fit statistics: root mean square error of approximation (RMSEA) = 0.00, PCLOSE = 0.924, NFI = 1.0. Model estimates and standard errors can be found in Table 8 and significant paths are illustrated in Figure 7. The directionality of the significant bivariate correlations between variables (one-tailed) was as expected (Table 9).

#### *Path Findings Related to Hypotheses*

A modification of the initial theorized model based on COR theory was found to be consistent with the data; however, this was likely as the model had a low degree of freedom ( $df = 2$ ). For this reason, path coefficients were relied upon to interpret study findings.

For the full sample and the problem-focused subgroup, the resource pool variables of income and respondent years of food experience were found to have a significant negative association with food security score as hypothesized. Education and self-efficacy were not significantly associated with food security score. Optimism was not significantly associated with food security score for the full sample; however, it did have



a significant negative association with food security score for the problem-focused subgroup. For the full sample and the problem-focused subgroup, frequency of adaptive food practices had a direct positive effect on FSS score which supports the original hypothesis.

Table 8

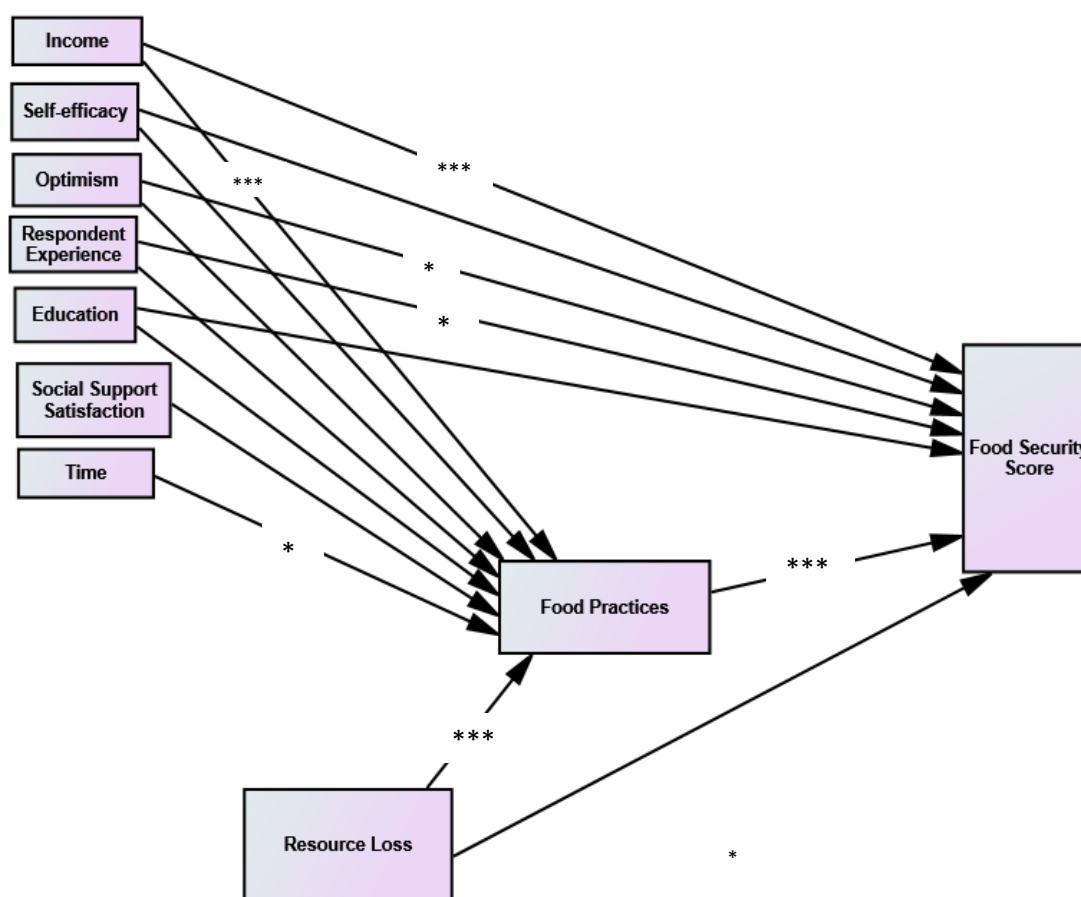
*Modified Model Regression Estimates for Problem-focused group (n = 196)*

Variable	Standardized Estimate	p-value
<b>Food Security Score</b>		
Income	-.25	***
Education	-.10	n.s.
Optimism	-.10	*
Adaptive Food Practices	.55	***
Respondent Experience	-.10	*
Self-efficacy	.04	n.s.
Resource Loss	.05	n.s.
<b>Adaptive Food Practices</b>		
Income	-.32	***
Education	-.10	n.s.
Optimism	-.10	n.s.
Time on Food Activities	.13	*
Respondent Experience	-.04	n.s.
Self-efficacy	.09	n.s.
Social Support	-.05	n.s.
Satisfaction		
Resource Loss	.43	***

Note. \* $p \leq .05$ ; \*\* $p \leq .01$ ; \*\*\* $p \leq .001$ ; n.s. = non-significant

For the full sample and the problem-focused subgroup, the resource pool variables of income and respondent years of food experience were found to have a significant

negative association with food security score as hypothesized. Education and self-efficacy were not significantly associated with food security score. Optimism was not significantly associated with food security score for the full sample; however, it did have a significant negative association with food security score for the problem-focused subgroup. For the full sample and the problem-focused subgroup, frequency of adaptive food practices had a direct positive effect on FSS score which supports the original hypothesis.



*Figure 7.* Modified Model for Problem-focused Group (n = 196). Significant paths are noted; \* $p \leq .05$ ; \*\* $p \leq .01$ , \*\*\* $p \leq .001$ ; All exogenous variables were correlated.

Table 9

*Correlations among variables in the model (n = 196)*

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Income	-	.52**	.09	.17**	.10	-.07	-.02	-.50**	-.25**	-.55**
2. Education		-	.21**	.10	.19**	-.16*	-.08	-.37**	-.17**	-.35**
3. Optimism			-	.25**	.31**	-.13*	.18**	-.28**	-.25**	-.29**
4. Social Support Satisfaction				-	.29**	-.03	.07	-.27**	-.35**	-.25**
5. Self- Efficacy					-	.03	-.10	-.14*	-.29**	-.10
6. Time						-	.05	.23**	.13*	.16*
7. Respondent Experience							-	-.11	-.17**	-.18**
8. Food Practices								-	.56**	.74**
9. Resource Loss									-	.47**
10. Food Security										-

Note. \*p < .05; \*\*p < .01

For the full sample and the problem-focused subgroup, there was an inverse relationship between income and frequency of adaptive food practices. The variable “time on food activities” was significantly positively related to frequency of adaptive food practices for both groups. For the full sample, self-efficacy was positively associated

with adaptive food practices, but not for the problem-focused subgroup. There were no other significant relationships between resource variables and adaptive food practices.

Resource loss did not have a direct effect on FSS score; however, resource loss did have a significant direct effect on frequency of adaptive food practices and, therefore, an indirect effect on FSS score for both the full sample and the problem-focused subgroup.

### Discussion

The research hypotheses were supported by the findings from this study. There were significant direct relationships between several resource pool variables and FSS scores. Income and respondent years of experience were related to FSS score for the full sample and the problem-focused subgroup, and there were direct relationships of income and time with the frequency of performing adaptive food practices for both groups. For the full sample, a direct relationship between self-efficacy and adaptive food practices was found. This was not found in the problem-focused subgroup. However, a significant direct relationship was found between optimism and FSS score for the problem-focused subgroup.

Income is known to be a key factor in predicting food insecurity and associated food practices (Coleman-Jensen et al., 2011). An increase in income level was associated with a decreased frequency of adaptive food practices previously reported by individuals seeking food assistance (Anater et al. 2011; Kempson et al., 2003; Wood et al. 2006). In the study reported here, income had a greater effect on food practices than on FSS. This may be in part due to food activity choices afforded by additional income, as described by Devine et al. (2009). Devine et al. (2009) found that low-to-moderate income

working parents utilized foods prepared away from home and consumed quick items instead of meals. Mancino and Newman (2007) also found that as time was allocated to employment, less time was spent on food preparation. An increase in income may mitigate the prohibitive cost of time-saving, pre-prepared food ingredients and meal components. In the current study, time spent on food activities incorporated both food acquisition and preparation activities. Time was considered a personal resource, as being able to allocate time to food activities may be protective of the food budget and ultimately food security. In the current study, an increase in time spent on meal activities was found to be directly related to an increase in frequency of adaptive food practices as hypothesized. Additional time is needed to perform the more labor-intensive, adaptive food acquisition and preparation activities when funds are limited, though some may perform these activities proactively to protect their income. The relationship between income and time was not examined in this study's model, as both were considered exogenous resource pool variables. Future research efforts are needed to explore the influence of time and income on the employment of specific adaptive food practices, as this model addressed practice frequency of both acquisition and management practices. Additionally, research is needed to explore the influence of factors other than income on the allocation of time to food practice activities. The current findings appear to support the consideration of time as a valued resource as described by the COR theory (Hobfoll, 2001) in the context of food security and point to the need for additional research on this resource.

The positive relationship between self-efficacy and frequency of adaptive food practices was found for the full sample but not the problem-focused group. This was

unexpected considering that self-efficacy has been associated with increased problem-solving behaviors and coping capacity (Trouillet et al., 2011; Turner et al., 2012). In addition, self-efficacy has also been identified as important to the practical aspects of managing the home food environment (Devine et al., 2006; Kolopaking et al., 2011). This finding in the current study may be related to the fact that the adaptive food practices variable contains both food acquisition and management practices. Those participants with higher self-efficacy scores may utilize more practices in the management category, similar to what was described in the previous literature. This finding may also be related to the fact that in the current study, the adaptive food practices variable included both practices reported to be positive problem-solving or coping behaviors and those that were considered risky and not recommended, such as consuming expired, unsafe foods. Those participants with increased problem-focused behaviors may engage in fewer overall adaptive practices, as well as less risky food practices. This lack of a relationship between self-efficacy and adaptive food practices for the problem-focused group in this study warrants further investigation.

The inverse relationship between optimism and food insecurity in the problem-focused subgroup may be related to the loss of optimism as one's living situation (i.e., food security status) worsens. COR theory identified optimism as a personal resource that affects coping with stressors (Hobfoll, 1998) and has been associated with more adaptive responses to difficult situations (Smith & Freedy, 2000). It may also be that more optimistic people report less food insecurity. Optimism has been shown to affect one's appraisal of a situation (Nes & Segerstom, 2006; Prati & Pietrantonio, 2009) and has been defined as "the extent to which people hold generalized favorable expectancies for the

future” (Carver et al., 2010, p. 879). In the context of food security, being optimistic may result in anticipated improvement in the situation and/or support effective coping behaviors, resulting in less reporting of food insecurity or reporting less severe food insecurity. The cross-sectional nature of the data in the present study did not allow assessment of changing levels of optimism and food security reporting over time.

An increase in years of respondent experience with food activities was associated with a decrease in FSS score. Both Rose (1999) and Martin et al. (2004) have reported that having older adults as household members was protective against food insecurity. To some degree this relationship may be related to their experience with food acquisition and management activities; however, age was not part of the resource pool in this model so its relationship to years of respondent experience was not investigated. The present model did not find respondent years of experience to have a significant effect on frequency of adaptive food practices used by the food insecure. One might expect that those with experience would utilize some of these practices to protect against food insecurity; however, the use of both positive protective practices and more risky practices in the adaptive practices variable of this study limits the current findings. The relationships among experience with food activities, adaptive food practices and food security warrant further investigation. To adequately describe these relationships, the adaptive food practices variable will need to be refined in order to identify those practices deemed positive or protective.

Resource loss was positively associated with the frequency of engaging in adaptive food practices as measured in this study and found to be common to low-income, food insecure people (Anater et al., 2011; Kempson et al., 2003; Wood et al.

2006); however, it was not directly associated with FSS score in this study. This finding suggests that as resources are lost, food acquisition and management behaviors change in order to maintain adequacy of food supplies and intake. This finding is consistent with the COR corollary that “those who lack resources are likely to adopt a defensive posture to conserve their resources” (Hobfoll, 2001, p. 356). Thus, in this study sample, resource loss appears to indirectly effect food security through adaptive food practices.

The resource pool variables of “education” and “social support satisfaction,” while important to overall model fit, did not result in significant paths to adaptive food practices or FSS score. Educational attainment may have less of an influence when a model includes resource losses, as education cannot prevent or predict many losses, such as those due to natural disasters or job losses, and is not necessarily related to food practice knowledge and skills that may have been gained informally and are protective of food security. The social support satisfaction paths may have been affected by the high ratings reported by the participants and the subsequent reduced variability in the data for this resource. Social support was chosen for this model, as it had been related to coping with stressors, while food insecurity had previously been related to social capital in the literature (Hobfoll et al., 2003; Martin et al., 2004; Schwarzer & Knoll, 2007). In future research efforts, consideration may need to be given to the impact of various measures and definitions of social capital and social support, in the context of food security.

This sample yielded a high percentage (69%) of participants preferring problem-focused coping response behaviors. The network sampling method may have produced selection bias as the sample was obtained from a specific geographical region that had a recent history of resource losses triggering problem-focused responses. Future research is



needed with a larger sample to determine if this model would be reflective of an emotion-focused population sample.

The purpose of this study was to assess the direct and indirect effects of resources and resource loss on food practices and food security. The findings support the developed model that included a resource pool with direct effects on FSS scores and adaptive food practices. This model also included a resource loss variable that was shown to have a significant effect on those same adaptive food practices, which appear to mediate the relationship between resource loss and food security status in this study sample. The findings support the importance of adaptive food practices and their potential to be protective of food security. It will be necessary to clearly identify which practices are protective in order to focus intervention efforts on those resources and practices that will produce the most sustainable positive outcomes.

Currently there is a paucity of research that looks at the interactions of the predictor variables with personal characteristics of individuals from the perspective of these personal characteristics as resources. This study contributes to the literature by utilizing a model developed within the framework of the Conservation of Resources theory that allowed investigation of the presence and loss of both material and personal resources simultaneously. This study also began to establish how the theory underpins food security and provided a broader understanding of food security status. Findings can inform the design of comprehensive interventions that include the recognition that adaptive food practices are influenced by personal and material resources and appear to have the ability to mitigate the effects of a lack of or loss of resources on food security. The shift in perspective required for this conceptually is that there must be an

acknowledgment that personal characteristics are resources and should be treated as such in future research and intervention efforts.

### *Limitations*

This study utilized a convenience sample that was delimited geographically to south Louisiana using network sampling. The type of sample and sampling technique limited the generalizability of the results to a more diverse population, although the sample was sociodemographically diverse. The data were cross-sectional in nature and, therefore, cannot predict causality. The data were collected by self-report, and there was no secondary source of data for validation.

### Conclusions

Because food security is influenced by both personal and material resources, investigating them simultaneously was believed to be important to providing a broader understanding of their influence on food security status. The model developed using COR theory as a framework to conceptualize how resources and resource loss influence adaptive food practice behaviors and food security in this research effort appears appropriate to food security. The shift in perspective conceptually with this model is the need to acknowledge that personal characteristics can function as resources and should be treated as such in research and design of interventions addressing food security. The model's potential lies in its ability to support future intervention research efforts that utilize COR theory principles in resource-based intervention programs. Hobfoll (as cited in DiClemente et al., 2009) contended that interventions based on behaviors must also address resources because they are necessary for success.

## CHAPTER V

### MANUSCRIPT II: USING FACTOR ANALYSIS TO IDENTIFY SUBSCALES OF FOOD ACQUISITION AND MANAGEMENT PRACTICES

#### Background

Acquisition and management of food resources have been influenced by household food security. Reports regarding coping strategies and practices employed by the food insecure most often describe food management and acquisition practices at various levels of food security, and the frequency and riskiness of these practices (Anater et al., 2011; Kempson et al., 2003; Kempson et al., 2002a, 2002b; McLaughlin et al., 2003; Wood et al., 2009; Wood et al., 2006). Although numerous practices are mentioned in the literature, lacking in these studies is any attempt to characterize the coping strategies chosen in the presence of food insecurity challenges. The purpose of this analysis was to examine food practices measured as part of a larger study of resources, resource loss, and food security, to better characterize coping strategies that may be protective in the face of food insecurity.

#### Method

The data for this analysis was collected as part of a descriptive correlational research study that collected cross-sectional data to determine the impact of resources and resource loss on food practices and food security in a sociodemographically diverse population in southern Louisiana. An instrument to measure food acquisition and management practices was created using items reported by Kempson et al. (2003), Wood et al. (2006), and Anater et al. (2011) in studies with low-income participants of varying degrees of food insecurity. The practices from these reports were compiled into a single

instrument and adjusted to accommodate regional wording differences and eliminate redundancy. Kempson et al. (2003) previously divided the identified practices in their study into two broad categories, food acquisition and food management. The practices compiled in this instrument were categorized a priori into Kempson's categories of acquisition and management. Kempson further subdivided the food acquisition category into groups related to a) reliance on community resources, b) interaction with informal support systems, c) supplementing financial resources, and d) lowering food costs. The food management category was subdivided into groups related to a) managing the food supply and b) regulating eating patterns. For the current study, participants were asked to identify how often they engaged in each practice. Response options were in the form of a 5-point scale with 5 signifying engagement in the practice "all of the time" to 1 signifying "never" engaging in this practice. A total of 68 acquisition practices and 34 management practices were included in the instrument.

Participants were recruited utilizing the non-probability technique of network or snowball sampling (Burns & Grove, 2005a). The researcher initiated personal contacts with a variety of informal social groups. Adults greater than 18 years of age were eligible to participate. To ensure a diversity of participants, initial contacts were selected from a variety of adult groups and income levels across the Gulf Coast of Louisiana. Participants were asked to refer new participants until the target number of subjects was obtained (Marsh & Balla, 1994; Stage et al., 2004). The final sample size was 284.

The survey was conducted utilizing an interviewer-assisted administration technique in community settings, which included a variety of informal social groups such as book clubs, volunteer groups, private non-profit organizations, and other social or

civic clubs. Sociodemographic data collected on study participants is presented in Table 10.

Table 10

*Sociodemographics of the Full Sample (n = 284)*

	n	%
<b>Age</b>		
19-29	28	9.9
30-39	28	9.9
40-49	46	16.2
50-59	56	19.7
60-69	43	15.1
70-79	62	21.8
>80	21	7.4
Missing	0	0
<b>Sex</b>		
Male	24	8.5
Female	260	91.5
Missing	0	0
<b>Race</b>		
Caucasian	229	80.6
African American	39	13.7
Hispanic	3	1.1
American Indian	1	.4
Other	2	.7
Missing	10	3.5
<b>Education</b>		
<high school	47	16.5
high school graduate	65	22.9
GED or Equivalent	9	3.2
some college	42	14.8
associate degree, vocational	33	11.6
associate degree, academic	7	2.5
4 year college degree	48	16.9
> college	22	7.7
Missing	11	3.9

Table 10 (continued).

	n	%
<b>Income, annual</b>		
Under \$15,000	56	19.7
\$15,000-24,999	29	10.2
\$25,000-34,999	27	9.5
\$35,000-49,999	21	7.4
\$50,000-74,999	51	18.0
\$75,000-99,999	31	10.9
\$100,000 and over	25	8.8
Missing	44	15.5
<b>Food Security Score</b>		
0	163	57.4
1	34	12
2	32	11.3
3	6	2.1
4	8	2.8
5	16	5.6
6	21	7.4
Missing	4	1.4

Survey data were initially entered into a Microsoft EXCEL file. Once entered, the data were screened for data entry errors using sorting functions and descriptive statistics for each item. Corrections were made for entry errors and missing data were confirmed. The dataset was then uploaded to SPSS version 21 for analysis.

The analysis of the food practices categories began by calculating descriptive statistics for the participants' sociodemographic data. A principal axis factoring analysis with Kaiser Normalization and a Direct Oblimin rotation excluding cases listwise was conducted to identify the factor structures for each of the food practice categories, management and acquisition. A finding of a correlation matrix Determinant  $>.00001$  was considered appropriate for moving forward with conducting the factor analysis (Pett et

al., 2005). Because the Determinant criterion was not met initially by either subscale, item correlations and communalities were reviewed for determination of item removal from the analysis. Review of the correlation matrices did not identify any correlations  $>0.8$  for either subscale. In a series of steps, items with communalities below .40 were removed as well as items with mean scores of  $<1.40$  until the appropriate Determinant, Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity were achieved (Field, 2005; Pett et al., 2003). The mean scores of  $<1.40$  indicated that participants never-rarely engaged in these activities, with  $\leq 80\%$  of those removed indicating "never" as the frequency. Because the list of practices was developed to be exploratory and included all items found in previous studies of this nature and with the goal of item reduction in mind, it was deemed acceptable to remove those items. The KMO measure of sampling adequacy was calculated and adequacy was considered at/with a value greater than 0.7. Bartlett's Test for Sphericity was considered acceptable if significant ( $p < .05$ ), indicating that the correlations matrix was not an identity matrix. Number of factors in the final solutions were supported by the associated scree plot (Field, 2005). Factor loadings higher than 0.4 were included in the final solutions (Burns & Grove, 2005b). The chosen factor loading cut-off was based on the result that would yield the least complex factor structure. The resulting subscales identified by the factor solutions were then tested for reliability. Cronbach's alpha was utilized to test for reliability, with  $>0.7$  considered to be an indicator of acceptable internal consistency (Field, 2005).

## Results

Results for the management category of food practices are discussed first.

Following item removal steps for communalities  $<0.4$  and means  $<1.4$ , the remaining 19

of 34 total items were analyzed. This analysis resulted in an acceptable Determinant of 0.00009, KMO = .90, and a significant ( $p < .001$ ) Bartlett's Test of Sphericity. The analysis resulted in a three-factor solution which converged in 9 iterations and was supported by the scree plot. This solution explained 56.18% of the variance in the data. Table 11 presents the rotated factor loadings for the management category of food practices solution. Subscale reliability was measured by Cronbach's alpha (see Table 13 for results).

The naming of the food management factors was informed by the previous work of Kempson and colleagues (2002a, 2002b, 2003). Seven items loaded onto factor one. These items relate to restricting intake or provision of food. This factor was labeled "Restricted Food Supply." Items 67 and 59, "ate expired food items" and "added water to food items or beverages to make them last," seemed conceptually different; however, these items may represent a change in the practice of consuming food and thus be related to restriction of food. The internal consistency measure was acceptable for this factor with a Cronbach's alpha of .86. The four items that loaded onto factor two described obtaining food from others or participating in food activities with others. This factor was labeled "Obtain Food Opportunistically." Item 8, "ate the same foods over and over" appears to be describing the behavior of choosing food because it is available and, therefore, taking advantage of an opportunity. The Cronbach's alpha for factor two was .73. The eight items that loaded onto factor three related to food preparation and cycling food choices. This factor was labeled "Strategize Food Preparation and Choices." The Cronbach's alpha for this factor was .88.



Table 11

*Rotated Factor Loading of Management Category of Food Practices (n = 238)*

Item	Variable	F1	F2	F3
60	Limited amount of food and/or limit second helpings	.80		
65	Limited number of eating occasions/meals/snacks	.73		
58	Avoided inviting guests when food would be expected	.67		
67	Ate expired food items	.64		
59	Added water to food items or beverages to make them last	.62		
56	Locked up or hid food so all was not eaten	.61		
63	Deprived self of food so others will have more	.60		
37	Ate at others' home		.75	
35	Cooked with other people		.65	
9	Ate other people's leftovers		.58	
8	Ate the same foods over and over		.45	
15	Ate low-cost foods at home			-.83
79	Spread out money for food or food stamps to last the whole month			-.75
82	Ate more foods that were cheap and filling			-.75
88	Cooked low-cost dishes			-.68
69	Served small portions at a time so food wasn't wasted			-.68
12	Limited the variety of foods at the end of the month			-.67
16	Ate low-cost foods when eating outside the home			-.67
87	Canned or froze foods to preserve for later use			-.42
Total variance (%) explained by factors				56.18%

Note. Factor labels: Factor 1 – Restricted Food Supply, Factor 2 – Obtain Food Opportunistically, Factor 3 – Strategize Food Preparation and Food Choices

Similar to the management practices category, following item removal steps for communalities <0.4 and means <1.4, the resulting 21 of 68 items were analyzed. This analysis resulted in an acceptable Determinant of .00003, KMO = .88, and a significant ( $p < .001$ ) Bartlett's Test of Sphericity. This analysis was constrained to a four factor solution that converged in 10 iterations and was supported by the scree plot. This solution

explained 57.42% of the variance in the data. Table 12 presents the rotated factor loadings for the acquisition category of food practices solution. Subscale reliability was measured by Cronbach's alpha (see Table 13 for results).

Seven items loaded onto factor one of the food acquisition practices category. These items identified practices that conserved money for food by adjusting household bill payments, reducing services, and seeking informal sources of funds. It was labeled "Conserve Money for Food" and yielded a Cronbach's alpha of .84. The six items that loaded onto factor two describe shopping strategies; therefore, the factor was labeled "Shopping Strategies." This factor yielded a Cronbach's alpha of .86. Three items loaded onto factor three. These dealt with acquiring food assistance from external sources, was labeled "External Sources of Support," and resulted in a Cronbach's alpha of .77. Five items loaded onto factor four. These items describe more extreme shopping choices made to obtain food at lower costs; it was labeled "Lower Food Costs." It exhibited a Cronbach's alpha of .76.

Factor scores were generated from the items selected for inclusion in each food practice category. The mean scores for both the food acquisition and management factors were computed for each food security level and are presented in Table 14. It was noted that as food insecurity became more severe, the mean factor scores for both factors increased. This represents an increase in frequency of adaptive food acquisition and management practices with increasing severity of food insecurity as previously hypothesized. The total factor score mean was also significantly correlated with food security scores,  $r(230) = .74, p < .01$ , also indicating an increase in frequency of adaptive food practices with increasing severity of food insecurity.

Table 12

*Rotated Factor Loading of Acquisition Category of Food Practices (n = 240)*

Item	Variable	F1	F2	F3	F4
98	Reduced or stopped TV services to save money	.83			
43	Rotated payment of bills or put off bills to have money for food	.74			
99	Reduced or stopped phone services to save money	.71			
36	Got money from family or friends that you did not have to pay back	.63			
47	Got information from others about where to get food	.58			
31	Shopped with others to save money	.54			
102	Reduced transportation costs by walking, bicycling, carpooling, or using public transportation	.52			
77	Bought store brand or generic items to save money		.84		
78	Went to more than one store to find good food prices		.73		
75	Stocked up on food when it was on sale		.71		
70	Bought food items on sale		.65		
76	Used a shopping list		.62		
80	Bought only necessary food items		.53		
48	Participated in the food stamp/SNAP program			-.84	
54	Used food pantries/banks			-.82	
49	Participated in Head Start, school lunch or breakfast programs, or WIC Program (Women, Infants, & Children)			-.52	
7	Bought nearly expired foods				.61
1	Purchased food from discount stores (dollar stores, price clubs)				.60
71	Bought food with dented or damaged packages				.60
5	Bought inexpensive foods				.56
6	Bought items with coupons				.53
Total variance (%) explained by factors					57.42%

Note. factor labels: Factor 1 – Conserve Money for Food, Factor 2 - Shopping Strategies, Factor 3 – External Sources of Support, Factor 4 – Lower Food Cost Sources

Table 13

*Cronbach's Alphas for Subscales of Management and Acquisition Categories of Food Practices*

Factor	<u>Management</u> alpha	<u>Acquisition</u> alpha
1	.86	.84
2	.73	.86
3	.88	.77
4	NA	.76

Table 14

*Mean Food Acquisition and Management Factor Scores by Food Security Level*

	n	Mean	SD
<b>Acquisition Factor</b>			
High Food Security	140	1.86	.38
Marginal Food Security	28	2.16	.47
Low Food Security	43	2.55	.57
Very Low Food Security	34	3.38	.77
<b>Management Factor</b>			
High Food Security	141	10.67	2.63
Marginal Food Security	29	12.89	3.06
Low Food Security	41	14.68	3.57
Very Low Food Security	32	20.39	4.12

## Discussion

Findings from this factor analysis inform the discussion regarding the underlying structure of food practices reported by individuals. For the management category of food practices, a three factor structure was revealed. The management factor subscales included practices that restricted the food supply or food provision, practices that allowed one to obtain food opportunistically, and strategies for food preparation and for cycling the food supply and food costs. The acquisition factor structures included food shopping strategies, identifying lower cost food sources, actions that resulted in conserving money for food and relying on external sources of support.

Several subscales contain items that may represent more than one intent for these practices. The management factor “strategize food preparation” contained the items “cooked extra food for future meals” and “canned or froze foods for future use.” The intent for engaging in these practices may include saving time, money or both. The management factor “obtain food opportunistically” contained items that could be interpreted as having a social support dimension in addition to a practice performed to save money for food. Acquisition factor four, “External Sources of Support,” contained items that were both formal and informal forms of external support. Refinement of item wording may be needed to minimize the multidimensionality of these items in future research. Refinement of some items, such as adjusting “bought nearly expired food” to “bought foods labeled for quick sale” may remove the negative connotation and improve the clarity of the item, which may have been a reason this practice was not reported as frequently as expected by these participants. This may also prove to strengthen future research efforts.

The identified factors for both categories contained subscales that were similar to previously reported studies (Kempson 2002a, 2002b, 2003; Wood 2009). This study therefore, lends support to Kempson's (2003) categorizations of acquisition and management and verifies factors previously described by Wood (2009). The subscales also represent participant choices to engage in these food-related activities. Successful outcomes, in this case improved levels of food security, related to these activities may have been dependent on skill level. The measurement of a person's skill or capacity related to food practices may inform future efforts to discern which practices are effective in the context of food security. The concept of food choice capacity developed by Bisogni and colleagues (Bisogni, Jastran, Shen, & Devine, 2005; Sobal & Bisogni, 2009) posits that behaviors related to food are dynamic and often situational. In this current study, the situation considered was food security level. It was found that as food insecurity became more severe, whether measured by food security category or raw scores, the frequency of food practices increased. Consideration should be given to the use of food security scores in addition to categories, as they may better represent subtle situational changes in food security and may allow for identification of those practices deemed protective.

The current study included participants from all levels of food security and a wide range of income levels and other personal characteristics, therefore adding to the previous literature on food practices and coping strategies, which was limited to food insecure and low-income participants. Factor subscale scores in this study indicate that as food insecurity worsens, food acquisition and management practices commonly performed to mitigate food insecurity increase in frequency. The current study participants resided in a

primarily rural setting, which may have cultural norms that could have influenced their choices of adaptive food practices. Use of a broader sample expands the possibility of identifying practices that are adaptive in responding to threats of food security and thus protective against food insecurity. To further the discussion on strategies employed at varying levels of food security, it would be beneficial to investigate the relationships among the factor subscale scores and the characteristics of this sample such as personal resources, resource loss, and food insecurity to begin to address issues of predictive validity.

### Conclusions

Exploratory factor analysis procedures were useful in reducing the large number of items in a food practices instrument to a more parsimonious group of items. Factor patterns were discovered in both categories of practices, management and acquisition. This may enable researchers to develop shorter surveys for future use, reducing participant burden. Additional research is needed to refine the items in the instrument that appeared to be multidimensional. Future research is also needed to establish the relationship of these factors to the sociodemographic characteristics of the study sample.

### *Limitations*

The participant sample was a purposeful convenience one and, thus, the results may not be representative of a more diverse population. It would be reasonable to maintain some of the marginal items for re-testing of the underlying factor structure with a sample from a different geographical region and/or more ethnically diverse population.

## CHAPTER VI

### CONCLUSIONS

Food security remains a significant contemporary issue. Food insecurity can be considered a condition that causes distress and impacts well-being and is often associated with a loss of resources, but it may also be a chronic condition. In recent years, environmental events and changes in the U.S. economy have moved some segments of society from a food secure existence to one that is insecure (Coleman-Jensen et al., 2013). There has been modest success at best with modifying the causes of food insecurity and/or designing comprehensive interventions with sustainable positive outcomes. Much of the available literature regarding food security has concerned itself with conceptualizing and predicting the condition of food security, as well as delineating behaviors or practices related to food security. However, there is a paucity of research that looks at the interactions of predictor variables with personal characteristics of individuals from the perspective of these as resources and the effect of loss of these resources. Because food security is influenced by both personal and material resources, investigating them simultaneously was believed to be important to providing a broader understanding of their influence on food security status. In turn, this understanding would assist in the future design of comprehensive interventions that would be sensitive to the need for individualization. The shift in perspective required for this conceptually is that there must be an acknowledgement that personal characteristics are personal resources and should be treated as such in research.

The purpose of the current study was to investigate the relationships among the set of variables known to influence or predict food security status and the behaviors



reported by food insecure individuals. The Conservation of Resources theory was chosen as a framework because it recognizes both material and personal characteristics as resources. The Conservation of Resources theory evolved from a need to incorporate both the “perceived and the objective environment” into the coping process (DiClemente et al., 2009, p. 133) and posits that resources will determine an individual’s perception and ability to cope with a stressful situation (Hobfoll, 2001). Hobfoll (as cited in DiClemente et al., 2009) contended that interventions based on behaviors must also address resources because resources are necessary for success. Food insecurity has been considered a stressor that has had effects on the health and wellness of adults and children.

The use of COR theory to specifically address the relationships among resources or resource loss known to influence food security to date had not been found in the literature. The current study contributes to the literature by beginning to establish the underpinnings of the theory to food security, and its importance lies in the potential ability to support future intervention research efforts. A survey was designed to collect data in this descriptive, correlational study to test a conceptual model of the relationships among resources, loss of resources, adaptive food practices and food security. It was hypothesized that the resource pool variables of income, level of education, optimism, social support satisfaction, self-efficacy, experience with food responsibilities, time spent on meal management, and a history of participation in a food assistance program would be negatively associated with adaptive food practices and food security scores. It was also hypothesized that the loss or threat of loss of resources would be positively associated with adaptive food practices and food security scores. Additionally, adaptive food practices would be positively associated with food security scores.

A modified model was found to be consistent with the data obtained from those study participants who preferred problem-focused coping responses. The model results supported the resource hypotheses by finding significant direct effects of income, optimism, and respondent years of food responsibility experience on FSS score, as well as the direct effects of income and time on the frequency of food practices. Income related findings were consistent with the current literature (Anater et al., 2011; Coleman-Jensen et al., 2011; Kempson et al., 2003; Wood et al. 2006). Income had a greater effect on food practices than on FSS. This may be due to the labor-intensive food acquisition and meal preparation activities performed to save money as well as the time required for those activities since increasing income has been reported to result in less time spent on food activities (Mancino & Newman 2007). These study findings support the consideration of time as a valued resource as described by the COR theory. Thus time has an impact on ability to cope with stressors (Hobfoll 2001), such as food insecurity.

The current study found that as the personal characteristic of optimism increases, the food security scores improve. This established optimism as not only a characteristic, but also as a resource. This finding may be related to the loss of optimism as one's living situation worsens. It may also be that more optimistic people report less food insecurity. Optimism has been shown to affect one's appraisal of a situation (Nes & Segerstom, 2006; Prati & Pietrantonio, 2009). More recently, optimism has been positively associated with diet quality (Hingle et al., 2014). In the context of food security, being optimistic may result in anticipated improvement in the situation and/or support effective coping behaviors, resulting in less reporting of food insecurity or reporting less severe food insecurity.

Similarly, an increase in years of respondent experience with food activities was associated with a decrease in FSS score; however, this model did not find respondent years of experience to have a significant effect on frequency of adaptive food practices. One might expect that those with more experience would utilize these practices to protect against food insecurity. The relationships between food experience and adaptive food practices and food security may warrant further investigation.

Resource loss was positively associated with an increase in the frequency of engaging in food practices common to low-income, food insecure people (Anater et al., 2011; Kempson et al., 2003; Wood et al. 2006); however, it was not directly associated with FSS score. This finding may suggest that as resources are lost, food acquisition and management behaviors change in order to maintain adequacy of food supplies and intake. This finding is consistent with the COR corollary stating that “those who lack resources are likely to adopt a defensive posture to conserve their resources” (Hobfoll, 2001, p. 356). It appears that resource loss indirectly affects FSS score through food practices.

Refinement of some items, such as adjusting “bought nearly expired food” to “bought foods labeled for quick sale” may remove the negative connotation and improve the clarity of the item, which may have resulted in less reporting than expected by participants. This may also prove to strengthen the reliability of the factors in future research efforts.

The current study can inform the work of practitioners who design and implement interventions in food insecure populations or with those who experience losses. Findings support the need to acknowledge the importance of optimism and food management experience to food related behaviors and to design interventions that readily identify

potential positive outcomes of participants' efforts. The findings also suggest the possible need to intervene when resource losses occur to ward off potential food insecurity, as those who reported losses also reported an increase in adaptive food practices originally reported by those who were food insecure.

Overall, the findings from this study support the use of the COR framework for investigating food security. Future research is needed to determine if the model in the current study is consistent with a broader population and with diverse ethnicities. It would also be beneficial to explore in-depth the adaptive food acquisition and management practices that are most affected by the model variables and those practices that would have the greatest protective effect on food security.

APPENDIX A  
SURVEY INSTRUMENT  
FOODCOPE Survey

Thank you for considering participation in this survey, which is part of my dissertation research. This survey will be used to gather your thoughts about how you have managed your food resources over the past year. It will take approximately 30-40 minutes to complete. Your participation is completely voluntary and you may stop the survey or refuse to answer any questions without penalty at any time.

The survey is anonymous as no personal identification information will be gathered. Only the researcher and the research assistants will have access to the forms during the data gathering and analysis process. The completed forms will be kept in a locked file cabinet at all times other than during transport. Upon completion of the research study, the survey forms will be destroyed.

There are no direct benefits to you for participation, and the risks are minimal with only the inconvenience of the time needed to complete the survey. Completion of this survey will serve as your consent to participate in this study.

Should you have any questions or concerns about the research you can contact Simone Camel at [simone.camel@eagles.usm.edu](mailto:simone.camel@eagles.usm.edu) or 713-540-8412.

"This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820."

## FOODCOPE SURVEY

This survey will be used to gather your thoughts about how you have managed your food resources over the **past year**. Your responses are very important. Be assured that your responses will remain **strictly confidential** and **anonymous**.

Completion of this survey will serve as your consent to participate in this study. Thank you for taking the time to complete this survey.

### Section I

I am interested in the members of your household and how long they have had any responsibility for meals or snacks. Note: Household includes the related family and all the unrelated people who live in your house.

Please list your household members by gender, age, and how many years each member has had any food responsibilities in your household.

	Household Member (M/F)	Age	Number of Years of meal/snack responsibility
Ex:	F	52	35
1)	<b>Self</b> _____	_____	_____
2)	_____	_____	_____
3)	_____	_____	_____
4)	_____	_____	_____
5)	_____	_____	_____
6)	_____	_____	_____
7)	_____	_____	_____
8)	_____	_____	_____

### Section II

I am interested in finding out more about how people fit meals and snacks into their schedules.

1. Are you the person who usually does the food shopping in your household? (Circle correct answer.)

- a. Yes      b. No      c. I split the responsibility with other household member(s)

2. About how long do you spend shopping for food each week?

\_\_\_\_\_ hours and \_\_\_\_\_ minutes each **week**

3. Are you the person who usually prepares the meals in your household?  
(Circle correct answer.)

- a. Yes      b. No      c. I split the responsibility with other household member(s)

4. About how long do you spend preparing meals/snacks, eating meals/snacks, and cleaning up after meals/snacks each day?

\_\_\_\_\_ hours and \_\_\_\_\_ minutes each **day**

### **Section III**

	<p>These items deal with ways you've been <b>coping with the stress</b> in your life over the past year. Obviously, different people deal with things in different ways, but I'm interested in how <b>YOU</b> try to deal with it.</p> <p>I want to know <b>how much</b> <i>or</i> <b>how frequently</b> you've been doing what the item says. <b>Do not answer on the basis of whether it seems to be working or not—just whether or not you are doing what is asked.</b></p>	I <u>haven't</u> been doing this at all	I've been doing this a <u>little bit</u>	I've been doing this a <u>medium amount</u>	I've been doing this a <u>lot</u>
1.	I've been concentrating my efforts on doing something about the situation I'm in.				
2.	I've been saying to myself "this isn't real."				
3.	I've been giving up trying to deal with it.				
4.	I've been taking action to try to make the situation better.				
5.	I've been refusing to believe that it has happened.				
6.	I've been getting help and advice from other people.				
7.	I've been criticizing myself.				
8.	I've been trying to come up with a strategy about what to do.				
9.	I've been giving up the attempt to cope.				
10.	I've been trying to get advice or help from other people about what to do.				
11.	I've been thinking hard about what steps to take.				

12.	I've been blaming myself for things that happened.				
-----	--	--	--	--	--

### **Section IV**

Please indicate the <b>extent of your agreement</b> with the following statements.  Be as honest and as accurate as you can. Try not to let a response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.					
	<b>I agree a lot</b>	<b>I agree a little</b>	<b>I neither agree nor disagree</b>	<b>I disagree a little</b>	<b>I disagree a lot</b>
1. In uncertain times, I usually expect the best.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. It's easy for me to relax.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. If something can go wrong for me, it will.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I'm always optimistic about my future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I enjoy my friends a lot.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. It's important for me to keep busy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I hardly ever expect things to go my way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I don't get upset too easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I rarely count on good things happening to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Overall, I expect more good things to happen to me than bad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### **Section V**

The following questions ask about people in your life who provide you with help or support. Each question has two parts. For the first part, identify the number of people whom you can count on for help or support in the manner described.

For the second part, circle **how satisfied you are with the overall support** you have for each question.



If you have no support for a question, check the words “No one,” but still rate your level of satisfaction.

**EXAMPLE:**

**Question: How many people do you know whom you can trust with information that could get you in trouble?**

Answer:      3 (Number of people) or      No one

How satisfied? Circle one.

6 – very satisfied	<b>5 – fairly satisfied</b>	4 – a little satisfied	3 – a little dissatisfied	2 – fairly dissatisfied	1 – very dissatisfied
-----------------------	---------------------------------	---------------------------	------------------------------	----------------------------	--------------------------

1. How many people can you really count on to be dependable when you need help?

     (Number of people) or      No one

How Satisfied? Circle one.

6 – Very Satisfied	5 – Fairly Satisfied	4 – A little Satisfied	3 – A little Dissatisfied	2 – Fairly Dissatisfied	1 – Very Dissatisfied
-----------------------	-------------------------	---------------------------	------------------------------	----------------------------	--------------------------

2. How many people can you really count on to help you feel more relaxed when you are under pressure or tense?

     (Number of people) or      No one

How Satisfied? Circle one.

6 – Very Satisfied	5 – Fairly Satisfied	4 – A little Satisfied	3 – A little Dissatisfied	2 – Fairly Dissatisfied	1 – Very Dissatisfied
-----------------------	-------------------------	---------------------------	------------------------------	----------------------------	--------------------------

3. How many people accept you totally, including both your worst and your best points?

     (Number of people) or      No one

How Satisfied? Circle one.

6 – Very Satisfied	5 – Fairly Satisfied	4 – A little Satisfied	3 – A little Dissatisfied	2 – Fairly Dissatisfied	1 – Very Dissatisfied
-----------------------	-------------------------	---------------------------	------------------------------	----------------------------	--------------------------

4. How many people can you really count on to care about you, regardless of what is happening to you?

     (Number of people) or      No one

How Satisfied? Circle one.

6 – Very Satisfied    5 – Fairly Satisfied    4 – A little Satisfied    3 – A little Dissatisfied    2 – Fairly Dissatisfied    1 – Very Dissatisfied

5. How many people can you really count on to help you feel better when you are feeling generally down-in-the dumps?

\_\_\_ (Number of people) or \_\_\_ No one

How Satisfied? Circle one.

6 – Very Satisfied    5 – Fairly Satisfied    4 – A little Satisfied    3 – A little Dissatisfied    2 – Fairly Dissatisfied    1 – Very Dissatisfied

6. How many people can you count on to console you when you are very upset?

\_\_\_ (Number of people) or \_\_\_ No one

How Satisfied? Circle one.

6 – Very Satisfied    5 – Fairly Satisfied    4 – A little Satisfied    3 – A little Dissatisfied    2 – Fairly Dissatisfied    1 – Very Dissatisfied

## Section VI

Please indicate the extent of your agreement with the following statements.  There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.		Not at all true	Hardly true	Moderately true	Exactly true
1.	I can always manage to solve difficult problems if I try hard enough.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	If someone opposes me, I can find the means and ways to get what I want.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	It is easy for me to stick to my aims and accomplish my goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	I am confident that I could deal efficiently with unexpected events.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Thanks to my resourcefulness, I know how to handle unforeseen situations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	I can solve most problems if I invest the necessary effort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	I can remain calm when facing difficulties because I can rely on my coping abilities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8.	When I am confronted with a problem, I can usually find several solutions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	If I am in trouble, I can usually think of a solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	I can usually handle whatever comes my way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### **Section VII**

The following questions are about the food situation in your home. Please tell me whether the statement was **often true, sometimes true, or never true** for you or your household in the **last 12 months**, that is since last spring.

1. The food that I bought just didn't last, and I didn't have money to get more.

Often true                       Sometimes true                       Never true

2. I couldn't afford to eat balanced meals.

Often true                       Sometimes true                       Never true

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

- Yes, almost every month  
 Yes, some months but not every month  
 Yes, only 1 or 2 months  
 No

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

Yes                       No

5. In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food?

Yes

No

**You are doing great, only a few more sections to go. Hang in there!**



### **Section VIII**

I am interested in finding out how you have managed the foods in your household. Thinking about the past year, please tell me how often you have performed the following practices.

Please check the box that best describes how often you did the following in the past year.		All of the time	Most of the time	Some of the time	Rarely	Never
1	Purchased food from discount stores (dollar stores, price clubs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Purchased food from convenience stores	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Purchased foods from private individuals , roadside stands or vendors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Bought foods or ingredients in bulk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Bought inexpensive foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Bought items with coupons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Bought nearly expired foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Ate the same foods over and over	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Ate other people's leftovers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Ate roadkill (deer, turtle, etc. not hunted)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Ate fresh foods first, canned and packaged products later in the month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12	Limited the variety of foods at the end of the month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Ate out at the beginning of the month, at home later	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Relied on emergency food supplies at the end of the month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Ate low-cost foods at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Ate low-cost foods when eating outside the home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Maintained a food garden (can be with family/friends)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Obtained food from hunting or fishing activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Used multiple food pantries/banks in a single month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Obtained food discarded from groceries/restaurants/households	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	Committed crime to be sent to jail to obtain meals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Provided foster care (formal or informal) for additional income	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Earned food in exchange for work or service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	Pawned or sold items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	Earned unreported income	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	Engaged in illegal activities for money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27	Gambled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please check the box that best describes how often you did the following in the past year.		<b>All of the</b>	<b>Most of</b>	<b>Some of</b>	<b>Rarely</b>	<b>Never</b>
28	Sold blood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29	Begged/panhandled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30	Participated in research projects for income or food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31	Shopped with others to save money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32	Asked friends and family to borrow food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33	Sent household members to family or friends house for a meal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34	Asked support system members to borrow money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35	Cooked with other people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36	Got money from family or friends that you did not have to pay back	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37	Ate at others' home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

38	Got food from workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39	Trusted in God or a higher power for providing food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40	Borrowed food stamps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41	Identified someone to live with to save money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42	Established store credit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43	Rotated payment of bills or put off bills to have money for food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44	Sold surplus food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45	Traded forms of public assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46	Sold food stamps/SNAP benefits for money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47	Got information from others about where to get food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48	Participated in the food stamp/SNAP program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49	Participated in Head Start, school lunch or breakfast programs, or WIC Program (Women, Infants, & Children)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50	Attended church events to obtain free food(a)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51	Attended nutrition education class to obtain food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52	Attended happy hour at bars to obtain food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53	Went to stores offering samples	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54	Used food pantries/banks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55	Used local church meal/dinner programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56	Added water to food items or beverages to make them last	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57	Set aside food for particular household members/ label food with names	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Please check the box that best describes how often you did the following in the past year.	<b>All of the time</b>	<b>Most of the time</b>	<b>Some of the time</b>	<b>Rarely</b>	<b>Never</b>
58	Avoided inviting guests when food would be expected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59	Locked up or hid food so all was not eaten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60	Limited amount of food and/or limit second helpings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61	Got subsidized housing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62	Obtained Temporary Assistance for needy families (TANF)/welfare or Supplemental Security Income (SSI)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63	Deprived self of food so others will have more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

64	Went completely without food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65	Limited number of eating occasions/meals/snacks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66	Ate as much as possible when food was available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67	Ate expired food items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68	Ate nonfood items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69	Served small portions at a time so food wasn't wasted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70	Bought food items on sale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71	Bought food with dented or damaged packages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72	Bought expired food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73	Shoplifted food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74	Switched price tags on food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75	Stocked up on food when it was on sale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76	Used a shopping list	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77	Bought store brand or generic items to save money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78	Went to more than one store to find good food prices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79	Spread out money for food or food stamps to last the whole month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80	Bought only necessary food items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81	Planned menus before going shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
82	Ate more foods that were cheap and filling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83	Cooked extra food for future meals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
84	Got extra work for pay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85	Got a cash advance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
86	Took leftovers home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87	Canned or froze foods to preserve for later use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
88	Cooked low-cost dishes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Please check the box that best describes how often you did the following in the past year.	<b>All of the time</b>	<b>Most of the time</b>	<b>Some of the time</b>	<b>Rarely</b>	<b>Never</b>
89	Removed slime from lunch meat and other meats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
90	Removed insects or mold from grains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

91	Removed mold from cheese	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
92	Removed spoiled parts from fruits/vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
93	Used local soup kitchens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
94	Utilized local shelters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
95	Relocated to be closer to public assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
96	Relocated to have better employment opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
97	Relocated to live in inexpensive housing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
98	Reduced or stopped TV services to save money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99	Reduced or stopped phone services to save money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100	Raised animals for food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
101	Gathered wild foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
102	Reduced transportation costs by walking, bicycling, carpooling or using public transportation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### **Section IX**

I am interested in the degree to which you have experienced **actual loss** or **threat of loss** in any of the resources listed over the past year.

**Actual loss** of resources occurs when the resource has decreased in availability to you.

Circle Both

**Threat of loss** occurs when you thought a loss might happen but no actual loss has occurred.

0= not at all / not applicable
1= to a small degree
2= to a moderate degree
3= to a considerable degree
4= to a great degree

	I am interested in the <b><u>change</u></b> in the availability of the resource.	Extent of <b><u>Actual loss</u></b>	Extent of <b><u>Threat of loss</u></b>
	<b>Resources</b>	<b>Circle</b>	<b>Circle</b>
1	Personal transportation (car, truck, etc.)	0 1 2 3 4	0 1 2 3 4
2	Time for adequate sleep	0 1 2 3 4	0 1 2 3 4
3	Adequate clothing	0 1 2 3 4	0 1 2 3 4
4	Free time	0 1 2 3 4	0 1 2 3 4
5	Time for work	0 1 2 3 4	0 1 2 3 4



6	Time with loved ones	0 1 2 3 4	0 1 2 3 4
7	Hope	0 1 2 3 4	0 1 2 3 4
8	Feeling that I am successful	0 1 2 3 4	0 1 2 3 4
9	Necessary home appliances	0 1 2 3 4	0 1 2 3 4
10	Sense of optimism	0 1 2 3 4	0 1 2 3 4
11	Personal health	0 1 2 3 4	0 1 2 3 4
12	Adequate food	0 1 2 3 4	0 1 2 3 4
13	Sense of humor	0 1 2 3 4	0 1 2 3 4
14	Stable employment	0 1 2 3 4	0 1 2 3 4
15	Feeling that I am valuable to others	0 1 2 3 4	0 1 2 3 4
16	Feelings that I am accomplishing my goals	0 1 2 3 4	0 1 2 3 4
17	Adequate home furnishings	0 1 2 3 4	0 1 2 3 4
18	Feeling that I have control over my life	0 1 2 3 4	0 1 2 3 4
19	Ability to communicate well	0 1 2 3 4	0 1 2 3 4
20	Ability to organize tasks	0 1 2 3 4	0 1 2 3 4
21	Acknowledgement of my accomplishments	0 1 2 3 4	0 1 2 3 4
22	Money for extras	0 1 2 3 4	0 1 2 3 4
23	Self-discipline	0 1 2 3 4	0 1 2 3 4
24	Savings or emergency money	0 1 2 3 4	0 1 2 3 4
25	Motivation to get things done	0 1 2 3 4	0 1 2 3 4
26	Adequate income	0 1 2 3 4	0 1 2 3 4
27	Adequate financial credit	0 1 2 3 4	0 1 2 3 4
28	Feeling independent	0 1 2 3 4	0 1 2 3 4
29	Companionship	0 1 2 3 4	0 1 2 3 4
30	Financial assets (stocks, property, etc.)	0 1 2 3 4	0 1 2 3 4
31	Knowing where I am going with my life	0 1 2 3 4	0 1 2 3 4
32	Financial stability	0 1 2 3 4	0 1 2 3 4
33	Feeling that my life has meaning/purpose	0 1 2 3 4	0 1 2 3 4
34	Positive feelings about myself	0 1 2 3 4	0 1 2 3 4
35	People I can learn from	0 1 2 3 4	0 1 2 3 4
36	Money for transportation	0 1 2 3 4	0 1 2 3 4
37	Involvement with church, synagogue, etc.	0 1 2 3 4	0 1 2 3 4
38	Medical Insurance	0 1 2 3 4	0 1 2 3 4
39	Help with tasks at home	0 1 2 3 4	0 1 2 3 4
40	Loyalty of friends	0 1 2 3 4	0 1 2 3 4

41	Money for self-improvement or advancement (education, starting a business, etc.)	0 1 2 3 4	0 1 2 3 4
42	Involvement in organizations with others	0 1 2 3 4	0 1 2 3 4
43	Financial help if needed	0 1 2 3 4	0 1 2 3 4
44	Health of family/close friends	0 1 2 3 4	0 1 2 3 4
45	Family stability	0 1 2 3 4	0 1 2 3 4

### **Section X**

1. Circle your Gender: **Male** or **Female**      **Age:**\_\_\_\_\_

2. Circle your race/ethnicity:

**Caucasian**

**African American**

**Hispanic**

**American Indian**

**Alaska Native**

**Native Hawaiian/Pacific Islander**

**Asian Indian**

**Asian**

**Other**

3. Circle the highest grade or level of school you have completed or the highest degree you have received.

<b>NEVER ATTENDED/</b>	<b>0</b>	<b>SOME COLLEGE, NO DEGREE</b>	<b>15</b>
<b>1ST GRADE</b>	<b>1</b>	<b>ASSOCIATE DEGREE: OCCUPATIONAL, TECHNICAL, OR VOCATIONAL PROGRAM</b>	<b>16</b>
<b>2ND GRADE</b>	<b>2</b>	<b>BACHELOR'S DEGREE (EXAMPLE: BA ,BS)</b>	<b>17</b>
<b>3RD GRADE</b>	<b>3</b>	<b>ASSOCIATE DEGREE: ACADEMIC PROGRAM</b>	<b>18</b>
<b>4TH GRADE</b>	<b>4</b>	<b>MASTER'S DEGREE (EXAMPLE: MA, MS, MEng, MEd, MBA)</b>	<b>19</b>
<b>5TH GRADE</b>	<b>5</b>	<b>PROFESSIONAL SCHOOL DEGREE (EXAMPLE: MD, DDS, DVM, JD)</b>	<b>20</b>
<b>6TH GRADE</b>	<b>6</b>	<b>DOCTORAL DEGREE (EXAMPLE: PhD, EdD)</b>	<b>21</b>
<b>7TH GRADE</b>	<b>7</b>		
<b>8TH GRADE</b>	<b>8</b>		
<b>9TH GRADE</b>	<b>9</b>		
<b>10TH GRADE</b>	<b>10</b>		
<b>11TH GRADE</b>	<b>11</b>		
<b>12TH GRADE, NO DIPLOMA</b>	<b>12</b>		
<b>HIGH SCHOOL GRADUATE</b>	<b>13</b>		
<b>GED OR EQUIVALENT</b>	<b>14</b>		

4. Please **circle** the annual income for your household.

under \$15,000	\$25,000 to \$34,999	\$75,000 to \$99,999
\$15,000 to \$24,999	\$35,000 to \$49,000	\$100,000 and over
	\$50,000 to \$74,999	

**Thank you for taking the time to complete this survey!**

APPENDIX B  
 INSTITUTIONAL REVIEW BOARD APPROVED APPLICATION  
 AND APPROVAL LETTER



**INSTITUTIONAL REVIEW BOARD**  
 118 College Drive #5147 | Hattiesburg, MS 39406-0001  
 Phone: 601.266.6820 | Fax: 601.266.4377 | www.usm.edu/irb

**NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.  
 Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **13051401**  
 PROJECT TITLE: **Influence of Resources, Resources Loss and Coping Response  
 on Food Management Practices and Food Security**  
 PROJECT TYPE: **Dissertation**  
 RESEARCHER(S): **Simone Camel**  
 COLLEGE/DIVISION: **College of Health**  
 DEPARTMENT: **Nutrition & Food Management**  
 FUNDING AGENCY/SPONSOR: **N/A**  
 IRB COMMITTEE ACTION: **Expedited Review Approval**  
 PERIOD OF APPROVAL: **05/14/2013 to 05/13/2014**

**Lawrence A. Hosman, Ph.D.**  
**Institutional Review Board**

## REFERENCES

- Alaimo, K., Briefel, R. R., Frongillo, E. A., Jr., & Olson, C. M. (1998). Food insufficiency exists in the United States: Results from the third National Health and Nutrition Examination Survey (NHANES III). *American Journal of Public Health, 88*, 419-426.
- Alaimo, K., Olson, C. M., & Frongillo, E. (2002). Family food insufficiency, but not low family income, is positively associated with dysthymia and suicide symptoms in adolescents. *Journal of Nutrition, 132*, 719-725.
- Alaimo, K., Olson, C. M., & Frongillo, E. A., Jr. (2001a). Food insufficiency and American school-aged children's cognitive, academic, and psychosocial development. *Pediatrics, 108*, 44-53.
- Alaimo, K., Olson, C. M., & Frongillo, E. A., Jr. (2001b). Low family income and food insufficiency in relation to overweight in US children: is there a paradox? *Archives of Pediatric and Adolescent Medicine, 155*, 1161-1167. doi: poa00560
- Alaimo, K., Olson, C. M., Frongillo, E. A., Jr., & Briefel, R. R. (2001c). Food insufficiency, family income, and health in US preschool and school-aged children. *American Journal of Public Health, 91*, 781-786.
- Alarcon, G. M., Edwards, J. M., & Menke, L. E. (2011). Student burnout and engagement: A test of the conservation of resources theory. *Journal of Psychology, 145*, 211-227. doi: 10.1080/00223980.2011.555432
- Anater, A., McWilliams, R., & Latkin, C. (2011). Food acquisition practices used by food-insecure individuals when they are concerned about having sufficient food

- for themselves and their households. *Journal of Hunger & Environmental Nutrition*, 6(1), 27-44. doi: 10.1080/19320248.2011.549368
- Bartfeld, J., & Dunifon, R. (2006). State-level predictors of food insecurity among households with children. *Journal of Policy Analysis & Management*, 25, 921-942. doi: 10.1002/pam.20214
- Bartfeld, J., & Hong-Min, A. (2011). The school breakfast program strengthens household food security among low-income households with elementary school children. *Journal of Nutrition*, 141, 470-475. doi: 10.3945/jn.110.130823
- Benight, C. C., Swift, E., Sanger, J., Smith, A., & Zeppelin, D. (1999). Coping self-efficacy as a mediator of distress following a natural disaster. *Journal of Applied Social Psychology*, 29, 2443-2464.
- Bhattarai, G. R., Duffy, P. A., & Raymond, J. (2005). Use of food pantries and food stamps in low-income in the United States. *Journal of Consumer Affairs*, 39, 276-298.
- Bickel, G., Nord, M., Price, C., Hamilton, W., & Cook, J. T. (2000). *Guide to measuring household food security, revised 2000*. Alexandria, VA: U.S. Department of Agriculture.
- Bisogni, C. A., Jastran, M., Shen, L., & Devine, C. M. (2005). A biographical study of food choice capacity: Standards, circumstances, and food management skills. *Journal of Nutrition Education & Behavior*, 37, 284-291.
- Blumberg, S. J., Bialostosky, K., Hamilton, W. L., & Briefel, R. R. (1999). The effectiveness of a short form of the household food security scale. *American Journal of Public Health*, 89, 1231-1234.

- Bowen, R. L., & Devine, C. M. (2011). "Watching a person who knows how to cook, you'll learn a lot": Linked lives, cultural transmission, and the food choices of Puerto Rican girls. *Appetite*, 56, 290-298. doi: 10.1016/j.appet.2010.12.015
- Brissette, I., Scheier, M. F., & Carver, C. S. (2002). The role of optimism in social network development, coping, and psychological adjustment during a life transition. *Journal of Personality & Social Psychology*, 82, 102-111.
- Burns, N., Grove, S.K. (2005a). Sampling. In L. Henderson (Ed.), *The practice of nursing research: Conduct, critique, and utilization*, 5th ed. (pp. 341-367). St. Louis, Missouri: Elsevier Saunders.
- Burns, N., Grove, S.K. (2005b). Using statistics to examine relationships. In L. Henderson (Ed.), *The practice of nursing research: Conduct, critique, and utilization*, 5th ed. (pp. 483-499). St. Louis, Missouri: Elsevier Saunders.
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief COPE. *International Journal of Behavioral Medicine*, 4(1), 92-100. doi: 10.1207/s15327558ijbm0401\_6
- Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review*, 30, 879-889. doi: 10.1016/j.cpr.2010.01.006
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 56, 267-283. doi: 10.1037/0022-3514.56.2.267
- Casey, P. H., Simpson, P. M., Gossett, J. M., Bogle, M. L., Champagne, C. M., Connell, C., Weber, J. (2006). The association of child and household food insecurity with

childhood overweight status. *Pediatrics*, *118*, e1406-1413. doi:  
10.1542/peds.2006-0097

Casey, P. H., Szeto, K. L., Robbins, J. M., Stuff, J. E., Connell, C., Gossett, J. M., & Simpson, P. M. (2005). Child health-related quality of life and household food security. *Archives of Pediatric and Adolescent Medicine*, *159*, 51-56. doi:  
10.1001/archpedi.159.1.51

Centers for Disease Control and Prevention. (CDC). (2012). *National Health and Nutrition Examination Survey Questionnaire*. Hyattsville, MD: National Center for Health Statistics (NCHS). Retrieved from  
[http://www.cdc.gov/nchs/nhanes/nhanes\\_questionnaires.htm](http://www.cdc.gov/nchs/nhanes/nhanes_questionnaires.htm).

Chilton, M., & Booth, S. (2007). Hunger of the body and hunger of the mind: African American women's perceptions of food insecurity, health and violence. *Journal of Nutrition Education and Behavior*, *39*(3), 116-125. doi:  
10.1016/j.jneb.2006.11.005

Chung, W., Gallo, W., Giunta, N., Canavan, M., Parikh, N., & Fahs, M. (2012). Linking neighborhood characteristics to food insecurity in older adults: The role of perceived safety, social cohesion, and walkability. *Journal of Urban Health*, *89*, 407-418. doi: 10.1007/s11524-011-9633-y

Cicognani, E. (2011). Coping strategies with minor stressors in adolescence: Relationships with social support, self-efficacy, and psychological well-being. *Journal of Applied Social Psychology*, *41*, 559-578. doi: 10.1111/j.1559-1816.2011.00726.x



- Coleman-Jensen, A., Nord, M., Andrews, M., & Carlson, S. J. (2011). *Household food security in the United States in 2010*. (ERR-125). U.S. Department of Agriculture, Economic Research Service, September 2011.
- Coleman-Jensen, A., Nord, M., Andrews, M., & Carlson, S. J. (2012). *Household Food Security in the United States in 2011*. (ERR - 141). U.S. Department of Agriculture, Economic Research Service, September 2012.
- Coleman-Jensen, A., Nord, M., & Singh, A. (2013). *Household food security in the United States in 2012*. (ERR-155). U.S. Department of Agriculture, Economic Research Service, September 2013.
- Coley, R. L., Lohman, B. J., Votruba-Drzal, E., Pittman, L. D., & Chase-Lansdale, P. L. (2007). Maternal functioning, time, and money: The world of work and welfare. *Children & Youth Services Review, 29*, 721-741. doi: 10.1016/j.chilyouth.2006.12.003
- Connell, C. L., Nord, M., Lofton, K. L., & Yadrick, K. (2004). Food security of older children can be assessed using a standardized survey instrument. *The Journal of Nutrition, 134*, 2566-2572.
- Cook, J. T. (2002). Clinical implications of household food security: Definitions, monitoring, and policy. *Nutrition in Clinical Care, 5*(4), 152-167.
- Cook, J. T., Frank, D. A., Berkowitz, C., Black, M. M., Casey, P. H., Cutts, D. B., Heeren, T. (2002). Welfare reform and the health of young children: A sentinel survey in 6 US cities. *Archives of Pediatrics & Adolescent Medicine, 156*, 678-685.
- Cunyngham, K. E. (2011). *Reaching those in need: State supplemental nutrition assistance program participation rates in 2009*. (AG-3198-K-11-0005). United

States Department of Agriculture, Food and Nutrition Service, Mathematica Policy Research, December 2011.

Dammann, K. W., & Smith, C. (2010). Race, homelessness, and other environmental factors associated with the food-purchasing behavior of low-income women. *Journal of the American Dietetic Association, 110*, 1351-1356.

Denavas-Walt, C., Proctor, B. D., & Smith, J. C. (2011). Income, poverty, and health insurance coverage in the United States: 2010 current population reports. *Current Population Reports* (pp. 60-239): U.S. Census Bureau, Washington, DC : U.S. Government Printing Office.

Denavas-Walt, C., Proctor, B. D., & Smith, J. C. (2012). *Income, poverty, and health insurance coverage in the United States: 2011*. (P60-243). Washington, D.C.: U.S. Government Printing Office.

Devine, C. M., Farrell, T. J., Blake, C. E., Jastran, M., Wethington, E., & Bisogni, C. A. (2009). Work conditions and the food choice coping strategies of employed parents. *Journal of Nutrition Education and Behavior, 41*, 365-370. doi: 10.1016/j.jneb.2009.01.007

Devine, C. M., Jastran, M., Jabs, J., Wethington, E., Farrell, T. J., & Bisogni, C. A. (2006). 'A lot of sacrifices': Work-family spillover and the food choice coping strategies of low-wage employed parents. *Social Science & Medicine, 63*, 2591-2603. doi: 10.1016/j.socscimed.2006.06.029

Devries, M. C., Hamadeh, M. J., Phillips, S. M., & Tarnopolsky, M. A. (2006). Menstrual cycle phase and sex influence muscle glycogen utilization and glucose turnover during moderate-intensity endurance exercise. *American Journal of Physiology*,

*Regulatory, Integrative and Comparative Physiology*, 291, R1120-1128. doi:  
10.1152/ajpregu.00700.2005

DiClemente, R. J., Crosby, R. A., & Kegler, M. C. (Eds.). (2009). *Emerging theories in health promotion practice and research* (2nd ed.). San Francisco, CA: John Wiley & Sons, Inc.

Dong, D., & Lin, B.-H. (2009). *Fruit and vegetable consumption by low income Americans: Would a price reduction make a difference?* Economic Research Report No. 70, U.S. Department of Agriculture, Economic Research Service, January 2009.

Duffy, P., Zizza, C., Jacoby, & Tayie, F. A. (2009). Diet quality is low among female food pantry clients in eastern Alabama. *Journal of Nutrition Education and Behavior*, 41, 414-419.

Ehrlich, M., Harville, E., Xiong, X., Buekens, P., Pridjian, G., & Elkind-Hirsch, K. (2010). Loss of resources and Hurricane experience as predictors of postpartum depression among women in southern Louisiana. *Journal of Women's Health*, 19, 877-884.

Field, A. (2005). *Discovering Statistics using SPSS*. London, England: Sage Publications, Ltd.

Folkman, S., Lazarus, R. S., Gruen, R. L., & DeLongis, A. (1986). Appraisal, Coping, health status, and psychological symptoms. *Journal of Personality & Social Psychology*, 50, 571-579.

Fram, M. S., Frongillo, E. A., Jones, S. J., Williams, R. C., Burke, M. P., DeLoach, K. P., & Blake, C. E. (2011). Children are aware of food insecurity and take

responsibility for managing food resources. *Journal of Nutrition*, *141*, 1114-1119.  
doi: 10.3945/jn.110.135988

- Freedly, J. R., Shaw, D. L., Jarrell, M. P., & Masters, C. R. (1992). Towards an understanding of the psychological impact of natural disasters: An application of the conservation resources stress model. *Journal of Traumatic Stress*, *5*, 441-454.
- Frongillo, E., Jyoti, D., & Jones, S. (2006). Food stamp program participation is associated with better academic learning among school children. *Journal of Nutrition*, *136*, 1077-1080.
- Frongillo, E., Rauschenbach, B., Olson, C., Kendall, A., & Colmenares, A. (1997). Questionnaire-based measures are valid for the identification of rural households with hunger and food insecurity. *Journal of Nutrition*, *127*, 699-705.
- Furness, B. W., Simon, P. A., Wold, C. M., & Asarian-Anderson, J. (2004). Prevalence and predictors of food insecurity among low-income households in Los Angeles County. *Public Health Nutrition*, *7*, 791-794.
- Garansky, S., Morton, L. W., & Greder, K. A. (2006). The effects of the local food environment and social support on rural food insecurity. *Journal of Hunger and Environmental Nutrition*, *1*, 83-103.
- Grutzmacher, S., & Braun, B. (2008). Food security status and food resource management skills over time among rural, low-income mothers. *Journal of Hunger and Environmental Nutrition*, *2*(2/3), 81-92.
- Harju, B. L., & Bolen, L. M. (1998). The effects of optimism on coping and perceived quality of life of students. *Journal of Social Behavior & Personality*, *13*, 185-200.

- Heflin, C., Sandberg, J., & Rafail, P. (2009). The structure of material hardship in U.S. households: An examination of the coherence behind common measures of well-being. *Social Problems, 56*, 746-764.
- Heflin, C., Siefert, K., & Williams, D. (2005). Food insufficiency and women's mental health: Findings from a 3-year panel of welfare recipients. *Social Science and Medicine, 61*, 1971-1982.
- Herman, D. R., Harrison, G. G., Afifi, A. A., & Jenks, E. (2004). The effect of the WIC program on food security status of pregnant, first-time participants. *Family Economics & Nutrition Review, 16*, 21-29.
- Himmelgreen, D. A., & Romero-Daza, N. (2010). Eliminating "hunger" in the U.S.: Changes in policy regarding the measurement of food security. *Food and Foodways, 18*, 96-113.
- Hingle, M., Wertheim, B., Tindle, H., Tinker, L., Seguin, R., Rosal, M., & Thomson, C. (2014). Optimism and Diet Quality in the Women's Health Initiative. *Journal of the Academy of Nutrition & Dietetics, 114*, 1036-1045.
- Hobfoll, S. E. (1985). *Stress, social support, and women*. New York, NY: Hemisphere Publishing Corporation.
- Hobfoll, S. E. (1988). *The Ecology of Stress*. New York, NY: Hemisphere Publishing Corporation.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*, 513-524. doi: 10.1037/0003-066x.44.3.513
- Hobfoll, S. E. (1998). *Stress, culture, and community: The psychology and philosophy of stress*. New York, NY: Plenum Press.

- Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: Advancing Conservation of Resources theory. *Applied Psychology: An International Review*, *50*, 337-370. doi: 10.1111/1464-0597.00062
- Hobfoll, S. E. (2012). Conservation of resources and disaster in cultural context: The caravans and passageways for resources. *Psychiatry*, *75*, 227-232. doi: 10.1521/psyc.2012.75.3.227
- Hobfoll, S. E., Johnson, R. J., Ennis, N., & Jackson, A. P. (2003). Resource Loss, Resource Gain, and Emotional Outcomes Among Inner City Women. *Journal of Personality & Social Psychology*, *84*, 632-643. doi: 10.1037/0022-3514.84.3.632
- Hobfoll, S. E., & Lilly, R. S. (1993). Resource conservation as a strategy for community psychology. *Journal of Community Psychology*, *21*, 128-148.
- Jones, S. J., & Frongillo, E. A. (2006). The modifying effects of food stamp program participation on the relation between food insecurity and weight change in women. *The Journal of Nutrition*, *136*, 1091-1094.
- Jyoti, D. F., Frongillo, E. A., & Jones, S. J. (2005). Food insecurity affects school children's academic performance, weight gain, and social skills. *The Journal of Nutrition*, *135*, 2831-9.
- Kaiser, L. L., Melgar-Quinonez, H., Townsend, M. S., Nicholson, Y., Fujii, M. L., Martin, A. C., & Lamp, C. L. (2003). Food insecurity and food supplies in Latino households with young children. *Journal of Nutrition Education and Behavior*, *35*(3), 148-153.

- Kawachi, I. (1999). Social capital and community effects on population and individual health. *Annals Of The New York Academy Of Sciences*, 896, 120-130.
- Kawachi, I., Kennedy, B. P., & Glass, R. (1999). Social capital and self-rated health: A contextual analysis. *American Journal of Public Health*, 89, 1187-1193.
- Kempson, K., Keenan, D. P., Sadani, P. S., & Adler, A. (2003). Maintaining food sufficiency: Coping strategies identified by limited-resource individuals versus nutrition educators. *Journal of Nutrition Education and Behavior*, 35(4), 179-188.
- Kempson, K., Keenan, D. P., Sadani, P. S., Ridlen, S., & Rosato, N. (2002a). Educators' reports of food acquisition practices used by limited-resource individuals to maintain food sufficiency. *Family Economics & Nutrition Review*, 14(2), 44-55.
- Kempson, K., Keenan, D. P., Sadani, P. S., Ridlen, S., & Rosato, N. (2002b). Food management practices used by people with limited resources to maintain food sufficiency as reported by nutrition educators. *Journal of the American Dietetic Association*, 102, 1795-1799.
- Kendall, A., Olson, C. M., & Frongillo, E. A., Jr. (1995). Validation of the Radimer/Cornell measures of hunger and food insecurity. *Journal of Nutrition*, 125, 2793-2801.
- Kendall, A., Olson, C. M., & Frongillo, E. A., Jr. (1996). Relationship of hunger and food insecurity to food availability and consumption. *Journal of the American Dietetic Association*, 96, 1019-1024; doi: S0002-8223(96)00271-4 [pii] 10.1016/S0002-8223(96)00271-4.

- Kim, K., & Frongillo, E. A. (2007). Participation in food assistance programs modifies the relation of food insecurity with weight and depression in elders. *The Journal of Nutrition, 137*, 1005-1010.
- Kirkpatrick, S. I., & Tarasuk, V. (2011). Housing circumstances are associated with household food access among low-income urban families. *Journal of Urban Health, 88*, 284-296. doi: 10.1007/s11524-010-9535-4
- Kleinman, R. E., Hall, S., Green, H., Korzec, R., Patton, K., Pagano, M. E., & Murphy, J. M. (2002). Diet, breakfast, and academic performance in children. *Annals of Nutrition & Metabolism, 46*, 24-30. doi: 10.1159/000066399
- Kleinman, R. E., Murphy, J. M., Little, M., Pagano, M., Wehler, C. A., Regal, K., & Jellinek, M. S. (1998). Hunger in children in the United States: Potential behavioral and emotional correlates. *Pediatrics, 101*(1), E3.
- Kolopaking, R., Bardosono, S., & Fahmida, U. (2011). Maternal self-efficacy in the home food environment: A qualitative study among low-income mothers of nutritionally at-risk children in an urban area of Jakarta, Indonesia. *Journal of Nutrition Education & Behavior, 43*(3), 180-188. doi: 10.1016/j.jneb.2009.10.010
- Laraia, B. A., Siegaariz, A. M., Gundersen, C., & Dole, N. (2006). Psychosocial factors and socioeconomic indicators are associated with household food insecurity among pregnant women. *Journal of Nutrition, 136*, 177-182.
- Lee, B., & Greif, M. (2008). Homelessness and hunger. *Journal of Health & Social Behavior, 49*(1), 3-19.



- Lee, J., & Frongillo, E. A., Jr. (2001). Nutritional and health consequences are associated with food insecurity among U.S. elderly persons. *Journal of Nutrition, 131*, 1503-1509.
- Leibtag, E. S., & Kaufman, P. R. (2003). *Exploring food purchase behavior of low income households: How do they economize?* (Agriculture Information Bulletin No. 747-07). US Department of Agriculture, Economic Research Service, June 2003.
- Lifa, Y., Chao-Hung, C., Yaw-Sheng, L., Hsiu-Hung, W., & Jew-Wu, C. (2007). Testing a model of stress and health using meta-analytic path analysis. *Journal of Nursing Research, 15*, 202-214.
- Luszczynska, A., Scholz, U., & Schwarzer, R. (2005). The general self-efficacy scale: Multicultural validation studies. *Journal of Psychology, 139*, 439-457. doi: 10.3200/JRLP.139.5.439-457
- Mancino, L., & Newman, C. (2007). *Who has time to cook? How family resources influence food preparation.* (ERR-40) US Department of Agriculture, Economic Research Service, May 2007.
- Marsh, H. W., & Balla, J. (1994). Goodness of fit in confirmatory factor analysis: The effects of sample size and model parsimony. *Quality & Quantity, 28*, 185.
- Martin, K. S., & Ferris, A. M. (2007). Food insecurity and gender are risk factors for obesity. *Journal of Nutrition Education and Behavior, 39*, 31-36. doi: 10.1016/j.jneb.2006.08.021

- Martin, K. S., Rogers, B. L., Cook, J. T., & Joseph, H. M. (2004). Social capital is associated with decreased risk of hunger. *Social Science and Medicine*, *58*, 2645-2654. doi: 10.1016/j.socscimed.2003.09.026
- Maxwell, D., Caldwell, R., & Langworthy, M. (2008). Measuring food insecurity: Can an indicator based on localized coping behaviors be used to compare across contexts? *Food Policy*, *33*, 533-540.
- McCullum, C., & Achterberg, C. L. (1997). Food shopping and label use behavior among high school-aged adolescents. *Adolescence*, *32*(125), 181-198.
- McLaughlin, C., Tarasuk, V., & Kreiger, N. (2003). An examination of at-home food preparation activity among low-income, food-insecure women. *Journal of the American Dietetic Association*, *103*, 1506-1512. doi: 10.1016/S0002
- Metallinos-Katsaras, E., Gorman, K. S., Wilde, P., & Kallio, J. (2011). A longitudinal study of WIC participation on household food insecurity. *Maternal & Child Health Journal*, *15*, 627-633. doi: 10.1007/s10995-010-0616-5
- Michalski, J. H. (2003). The economic status and coping strategies of food bank users in the greater Toronto area. *Canadian Journal of Urban Research*, *12*, 275-298.
- Moos, R. H., & Holahan, C. J. (2003). Dispositional and contextual perspectives on coping: Toward an integrative framework. *Journal of Clinical Psychology*, *59*, 1387-1403.
- Nápoles, A. M., Ortíz, C., O'Brien, H., Sereno, A. B., & Kaplan, C. P. (2011). Coping resources and self-rated health among latina breast cancer survivors. *Oncology Nursing Forum*, *38*, 523-531.

- Nes, L. S., & Segerstrom, S. C. (2006). Dispositional optimism and coping: A meta-analytic review. *Personality & Social Psychology Review, 10*(3), 235-251. doi: 10.1207/s15327957pspr1003\_3
- Nord, M. (2003). Measuring the food security of elderly persons. *Family Economics & Nutrition Review, 15*(1), 33-46.
- Nord, M., Andrews, M., & Carlson, S. J. (2007). *Household food security in the United States, 2007*. (ERR-66) U. S. Department of Agriculture, Economic Research Service, November, 2007.
- Nord, M., Andrews, M., & Winicki, J. (2002). Frequency and duration of food insecurity and hunger in U.S. households. *Journal of Nutrition Education and Behavior, 34*(4), 194-200.
- Nord, M., & Kantor, L. S. (2006). Seasonal variation in food insecurity is associated with heating and cooling costs among low-income elderly Americans. *Journal of Nutrition, 136*, 2939-2944.
- Pett, M., Lackey, N., & Sullivan, J. (2003) *Making sense of factor analysis*. Thousand Oaks, CA: Sage Publications, Inc.
- Prati, G., & Pietrantonio, L. (2009). Optimism, social support, and coping strategies as factors contributing to posttraumatic growth: A meta-analysis. *Journal of Loss & Trauma, 14*, 364-388. doi: 10.1080/15325020902724271
- Quandt, S. A., & Rao, P. (1999). Hunger and food security among older adults in a rural community. *Human Organization, 58*, 28-36.
- Radimer, K. L., Olson, C. M., & Campbell, C. C. (1990). Development of indicators to assess hunger. *Journal of Nutrition, 120* (S11), 1544-1548.

- Ratcliffe, C., & McKernan, S.-M. (2010). How much does SNAP reduce food insecurity? (US Department of Agriculture, Economic Research Service, Contract Number 59-5000-7-0113) *Contractor and Cooperator Report Number 60* (pp. 1-30). Washington, DC: The Urban Institute.
- Ratcliffe, C., McKernan, S.-M., & Finegold, K. (2008). Effects of food stamp and TANF policies on food stamp receipt. *Social Service Review, 82*(2), 291-334.
- Ribar, D. C., & Hamrick, K. S. (2003). Dynamics of poverty and food sufficiency. *Food Assistance and Nutrition Research Report Number 36* (FANRR-36): USDA, Economic Research Service, September 2003.
- Rose, D. (1999). Economic determinants and dietary consequences of food insecurity in the United States. *Journal of Nutrition, 129* (2S), 517S-520S.
- Rose, D., & Bodor, J. N. (2006). Household food insecurity and overweight status in young school children: Results from the Early Childhood Longitudinal Study. *Pediatrics, 117*, 464-473. doi: 10.1542/peds.2005-0582
- Sarason, I. G., Levine, H. M., Basham, R. B., & Sarason, B. R. (1983). Assessing social support: The social support questionnaire. *Journal of Personality & Social Psychology, 44*, 127-139.
- Sarason, I. G., Sarason, B. R., Shearin, E. N., & Pierce, G. R. (1987). A brief measure of social support: practical and theoretical implications. *Journal of Social and Personal Relationships, 4*, 497-510.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of

the Life Orientation Test. *Journal of Personality and Social Psychology*, 67, 1063-1078. doi: 10.1037/0022-3514.67.6.1063

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research*, 8(2), 23-74.

Scholz, U., Doña, B. G., Sud, S., & Schwarzer, R. (2002). Is general self-efficacy a universal construct? Psychometric findings from 25 countries. *European Journal of Psychological Assessment*, 18(3), 242-251. doi: 10.1027//1015-5759.18.3.242

Schou, I., Ekeberg, O., & Ruland, C. M. (2005). The mediating role of appraisal and coping in the relationship between optimism-pessimism and quality of life. *Psycho-oncology*, 14, 718-727.

Schwarzer, R. (2011, May 30). General Self-Efficacy Scale (GSE). Retrieved, from <http://www.ralfschwarzer.de/>

Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35-37). Windsor, England: NFER-NELSON.

Schwarzer, R., & Knoll, N. (2007). Functional roles of social support within the stress and coping process: A theoretical and empirical overview. *International Journal of Psychology*, 42(4), 243-252.

Sharkey, J. R., & Schoenberg, N. E. (2005). Prospective study of black-white differences in food insufficiency among homebound elders. *Journal of Aging and Health*, 17, 507-527. doi: 17/4/507 [pii] 10.1177/0898264305279009

- Smith, B. W., & Freedy, J. R. (2000). Psychosocial resource loss as a mediator of the effects of flood exposure on psychological distress and physical symptoms. *Journal of Traumatic Stress, 13*, 349.
- Sobal, J., & Bisogni, C. A. (2009). Constructing food choice decisions. *Annals of Behavioral Medicine, 38*, 37-46. doi: 10.1007/s12160-009-9124-5
- Stage, F. K., Carter, H. C., & Nora, A. (2004). Path analysis: An introduction and analysis of a decade of research. *Journal of Educational Research, 98*(1), 5-12.
- Stewart, H., & Blisard, N. (2008). *Are lower income households willing and able to budget for fruits and vegetables*. U.S. Department of Agriculture, Economic Research Service (ERR-54), January 2008.
- Stuff, J. E., Casey, P. H., Szeto, K., Gossett, J. M., Robbins, J. M., Simpson, P. M., . . . Bogle, M. (2004). Household food insecurity is associated with adult health status. *The Journal of Nutrition, 134*, 2330-2335.
- Suratkar, S., Gittelsohn, J., Song, H., Anliker, J.A., Sharma, S., & Mattingly, M. (2010). Food insecurity is associated with food-related psychosocial factors and behaviors among low-income african american adults in Baltimore city. *Journal of Hunger and Environmental Nutrition, 5*, 100-119.
- Tavakol, M. & Dennick, R. (2011). Making sense of Cronbach's alphas. *International Journal of Medical Education, 2*, 53-55.
- Townsend, M. S., Peerson, J., Love, B., Achterberg, C., & Murphy, S. P. (2001). Food insecurity is positively related to overweight in women. *Journal of Nutrition, 131*, 1738-1745.

- Trouillet, R., Doan-Van-Hay, L. M., Launay, M., & Martin, S. (2011). Impact of age, and cognitive and coping resources on coping. *Canadian Journal on Aging, 30*, 541-550. doi: 10.1017/S0714980811000456
- Trouillet, R., Gana, K., Lourel, M., & Fort, I. (2009). Predictive value of age for coping: The role of self-efficacy, social support satisfaction and perceived stress. *Aging and Mental Health, 13*, 357-366. doi: 10.1080/13607860802626223
- Turner, J. E., Goodin, J. B., & Lokey, C. (2012). Exploring the roles of emotions, motivations, self-efficacy, and secondary control following critical unexpected life events. *Journal of Adult Development, 19*(4), 215-227. doi: 10.1007/s10804-012-9148-0
- U.S. Census Bureau, Statistical Abstract of the United States: 2012 (131st Edition) Washington, DC, 2011; <<http://www.census.gov/compendia/statab/>>.
- U.S. Department of Agriculture, Food and Nutrition Service, Program Reports, Analysis and Monitoring Branch. (2012). *Program information report: U.S. summary FY 2011-FY 2012*. Retrieved from <http://www.fns.usda.gov/sites/default/files/datastatistics/july-2012.pdf>.
- U.S. Department of Labor, Bureau of Labor Statistics. *American Time Use Survey Questionnaire 2011*. (2012). Retrieved from <http://www.bls.gov/tus/tuquestionnaire.pdf>.
- U.S. Department of Labor, Bureau of Labor Statistics. *Redesign of the sample for the Current Population Survey* (1994). Retrieved from: <http://www.bls.gov/cps/revisions1994.pdf>

- Usfar, A. A., Fahmida, U., & Februhartanty, J. (2007). Household food security status measured by the US-Household Food Security/Hunger Survey Module (US-FSSM) is in line with coping strategy indicators found in urban and rural Indonesia. *Asia Pacific Journal of Clinical Nutrition, 16*, 368-374.
- Wadsworth, M. E., Santiago, C. D., & Einhorn, L. (2009). Coping with displacement from Hurricane Katrina: Predictors of one-year post-traumatic stress and depression symptom trajectories. *Anxiety Stress Coping, 22*, 413-432. doi: 10.1080/10615800902855781
- Wehler, C., Weinreb, L. F., Huntington, N., Scott, R., Hosmer, D., Fletcher, K., . . . Gundersen, C. (2004). Risk and protective factors for adult and child hunger among low-income housed and homeless female-headed families. *American Journal of Public Health, 94*, 109-115.
- Weigel, M. M., Armijos, R. X., Hall, Y. P., Ramirez, Y., & Orozco, R. (2007). The household food insecurity and health outcomes of U.S.-Mexico border migrant and seasonal farmworkers. *Journal of Immigrant and Minority Health, 9*(3), 157-169. doi: 10.1007/s10903-006-9026-6
- Weinreb, L., Wehler, C., Perloff, J., Scott, R., Hosmer, D., Sagor, L., & Gundersen, C. (2002). Hunger: Its impact on children's health and mental health. *Pediatrics, 110*(4), e41-50. doi: 10.1542/peds.110.4.e41
- Wells, J. D., Hobfoll, S. E., & Lavin, J. (1999). When it rains, it pours: The greater impact of resource loss compared to gain on psychological distress. *Personality and Social Psychology Bulletin, 25*, 1172-1182.



- Whitaker, R. C., & Sarin, A. (2007). Change in food security status and change in weight are not associated in urban women with preschool children. *Journal of Nutrition*, *137*, 2134-2139.
- Wilde, P. E., & Peterman, J. N. (2006). Individual weight change is associated with household food security status. *The Journal of Nutrition*, *136*, 1395-400.
- Wolfe, W. S., Frongillo, E. A., & Valois, P. (2003). Understanding the experience of food insecurity by elders suggests ways to improve its measurement. *Journal of Nutrition*, *133*(9), 2762-2769.
- Wolfe, W. S., Olson, C. M., Kendall, A., & Frongillo Jr, E. A. (1996). Understanding food insecurity in the elderly: A conceptual framework. *Journal of Nutrition Education*, *28*(2), 92-100.
- Wood, D., Schultz, J. A., Butkus, S., & Ballejos, M. E. (2009). Patterns of food coping strategies among food pantry clients. *Journal of Hunger and Environmental Nutrition*, *4*(2), 185-202.
- Wood, D., Schultz, J. A., Edlefsen, M., & Butkus, S. N. (2006). Food coping strategies used by food pantry clients at different levels of household food security status. *Journal of Hunger and Environmental Nutrition*, *1*(3), 45-68.
- Wunderlich, G., & Norwood, J. L. (Eds.). (2006). *Food insecurity and hunger in the United States: An assessment of the measure*: Washington, DC: The National Academies Press.
- Yu, M., Lombe, M., & Nebbitt, V. E. (2010). Food stamp program participation, informal supports, household food security and child food security: A comparison of

African American and Caucasian households in poverty. *Children & Youth Services Review*, 32(5), 767-773. doi: 10.1016/j.childyouth.2010.01.015

Zamani, G. H., Gorgeivski-Duijvesteijn, M. J., & Zarafshani, K. (2006). Coping with drought: Towards a multilevel understanding based on conservation of resources theory. *Human Ecology*, 34, 677-692.

Zekeri, A. A. (2010). Household food insecurity and depression among single mothers in rural Alabama. *Journal of Rural Social Sciences*, 25(1), 90-102.

Zizza, C. A., Duffy, P. A., & Gerrior, S. A. (2008). Food insecurity is not associated with lower energy intakes. *Obesity*, 16(8), 1908-1913. doi: 10.1038/oby.2008.288