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Food Insecurity and Children: How Food Insecurity Affects Mental Health in Children

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Running head: FOOD INSECURITY AND MENTAL HEALTH

Food Insecurity and Children: How Food Insecurity Affects Mental Health in Children

by

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DEDICATION

This thesis is dedicated to my family and friends who have supported me every step of the way. A special thank you to my mother Tanea Jenkins, my father Rodney Campbell, and my sisters Brittany Jordan and Brooklynn Jenkins. I would also like to thank my advisor, Dr. Dawn Witherspoon, on her never-ending support and encouragement while working on this project.

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Abstract

Being without the financial means to have reliable access to enough food to sustain members of a household is known as Food Insecurity (FI; Gundersen, 2013). Previous research has linked FI to obesity and depression (Adams, Grummer-Strawn, & Chavez, 2003; Bronte-Tinkew, Zaslow, Capps, Horowitz, & Mcnamara, 2007; Huddleston-Casas, Charnigo, & Simmons, 2009; Kim & Frongillo, 2007). Although there have been findings about FI being related to depression and obesity, little research has used African Americans; even less research has used young adolescents as the target population. This study had five aims: 1) Observe the impact of FI on health, 2) Observe the impact of weight status on depression, 3) Observe gender effects, 4) Testing mediation effects of child and caregiver depression, and 5) Observe income effects on FI. There were 228 participants ($M_{age}=13.27$) recruited from a large Mid-Atlantic city. Self-administered questionnaires were used to assess psychosocial functioning, and caregivers answered the Two-Item Screening Questionnaire for Food Insecurity to assess FI status. FI was not significantly related to child depression but was related to caregiver depression. There was no relation between FI and weight status. Obese children reported higher levels of depression than normal and overweight children; weight had no relation to caregiver depression. Female children had higher rates of depression, overweightness, and obesity. Poverty was not related to FI or depression in children and caregivers. With more FI research, advances can be made to reduce the negative impact of this issue.

Keywords: depression, obesity, food insecurity, children, African American

Food Insecurity and Children: How Food Insecurity Affects Mental Health in Children

Food Insecurity

Hunger is an issue that is typically thought to only occur in underdeveloped countries. This misconception has led many to believe that hunger does not affect countries that are developed like the United States. Although the United States is a developed country, based on the 2016 U.S. Census Bureau's estimates, 43.1 million Americans live in poverty. Of that total number of impoverished Americans, 13.3 million are children. In addition to poverty, there is a hunger issue the United States is experiencing that has a financial aspect. This issue is called food insecurity, and it is a growing concern in the world (Barrett, 2010). Food insecurity (FI) is defined as not having the financial means to access enough food to sustain members of a household (Gundersen, 2013). There is a misconception that poverty leads to FI. However, research shows that most people who are FI do not live in poverty, while those who live in poverty are typically not FI (Feeding America, 2018). This disproportion is likely due to those who are above the poverty line not qualifying for federal assistance programs that help with providing access to nutritious food. For example, the 2018 federal poverty level for a family of three is \$20,780 of household income per year (Health Care, 2018). This level of poverty does specify if the family of three includes two working parents with one child or one working parent with two children. The ability to take care of a family with \$20,780 is particularly more difficult for a single working parent with two children. When the single parent accumulates slightly income more than what the federal government has set for their family size's annual income, the family is less likely to receive the federal aid that could be available for food provisions. Such is the dilemma of the working poor.

As of 2016, 28.3 million adults and 12.9 million children suffer from FI. As a growing concern, it is important that research is done to find ways to combat this issue. The stigma and shame that is associated with FI makes many sufferers tuck away their need and

keep others from being made aware of their situation (David, 2017). Research has shown that FI has led many sufferers to be forced to choose between food and other necessities in life (Feeding America, 2014). Decisions such as eating food that may be expired or not eating at all, paying utility bills or being able to put food on the table, and paying for transportation or paying for food are difficult situations that many Americans suffering from FI have to face every day (Feeding America, 2014).

According to the United States Department of Agriculture (USDA; 2017), food security can be categorized into four levels: high food security, marginal food security, low food security, and very low food security. High food security indicates that there are no reported food-access problems or limitations. Marginal food security is the level where distress over food begins. This level is characterized as having one or two indications of anxiety – anxiety of having a sufficient amount of food in the home or shortage of food in the home. However, there are little to no changes in diet or food intake at this level. Low food security (formerly known as FI without hunger) is categorized by having reports of reduced quality, variety, or desirability of diet. Unlike marginal food security, low food security has changes in diet, but there are still little to no changes in food intake. Very low food security (formerly known as FI with hunger) reports multiple indications of disrupted eating patterns and reduced food intake due to limited access to resources. Due to the first two questions being most frequently endorsed among FI families, other researchers have combined the four groups into two categories (FI and FS) for research purposes (Hager, et al., 2010).

Studies have found that FI children are at least 1.4 times as likely to have asthma and twice as likely to report being in fair or poor health than are food secure (FS) children (Gundersen & Ziliak, 2015). Nutrient deficiencies, such as iron deficiency, are an outcome of FI that has been connected to causing impaired learning and decreased productivity in school-aged children (Ke & Ford-Jones, 2015).

Not only has FI been tied to poor health outcomes, but previous research has connected FI to diverse developmental outcomes as well. Jyoti, Frongillo, & Jones (2005) found that household FI directly affects academic performance, social skills, and weight gain (BMI). FI at kindergarten was found to predict impaired academic performance in reading and math for both boys and girls (Jyoti et al., 2005). Once known confounding variables were controlled for, only girls performed poorly in math and experienced higher BMI and weight gain (Jyoti et al., 2005).

FI is unevenly distributed among the races in the United States. The FI rate in African Americans is more than double that of Caucasian Americans (Feeding America, 2018). It is estimated that one in four African Americans are FI, while it occurs in about one in eleven Caucasian Americans (Feeding America, 2018). African American children also experience FI at a disproportionate rate. About one in every four African American children are FI while an estimated one in eight Caucasian American children are FI (Feeding America, 2018).

Families and Food Insecurity

Studies have shown that there is slight “inter-rater agreement” between mothers and children on FI status (Nalty, Sharkey, & Dean, 2013). Nalty and colleagues found in their study that when 80% of mothers indicated being FI, only 64% of children reported being FI. This study alludes to the fact that parents could be acting as a buffer to protect their children from the effects of FI. There have been research findings that support the idea of parents protecting their children from FI. An investigation by McIntyre and colleagues (2003) found that mothers compromised their own nutritional intake to ensure the adequacy of their child’s health.

Although FI is an issue that families experience year-around, some programs have been created to help children have access to food over the summer when school is no longer in session. Programs such as the National School Lunch Program (NSLP) and the Summer

Food Service Program (SFSP) have been created to assist with this need. Studies have found food assistance programs are effective for child FI during the summer (Nord & Romig, 2006). Nord and Romig (2006) found that NSLP and SFSP reduced the prevalence of FI during the summer months.

Depression

Depression is a very common and treatable mental disorder (Center for Disease Control and Prevention, 2018). The Center for Disease Control and Prevention (CDC; 2018) states that the disorder exhibits changes in mood and cognitive and physical symptoms lasting over a two-week period. The American Psychiatric Association (APA; 2017) describes depression as a common and serious medical illness that negatively affects how you feel, the way you act, and the way you think. The APA also states that the disorder causes feelings of sadness and loss of interest in activities once enjoyed. Losing interest in everything in life that was previously enjoyed is known as anhedonia, and many people diagnosed as having depression report these feelings (APA, 2013).

Depression is known to take many forms. Severe bouts of depressive symptoms lasting two weeks or more is typically diagnosed as Major Depressive Disorder (APA, 2013). *The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) has criteria set for accurate depression diagnoses. Some of the symptoms that are part of the criteria are having a depressed mood most of the day lasting nearly every day, markedly diminished interest or pleasure in all or almost all activities most of the near occurring nearly every day, insomnia, feeling fatigued, feeling worthless, diminished ability to think or concentrate, or recurrent thoughts of death and suicide ideation (thoughts of killing oneself) (APA, 2013).

Major Depressive Disorder is characterized by having one or more major depressive episodes. This consists of at least two weeks of depressed mood or loss of interest

accompanied by at least four additional symptoms of depression (APA, 2013). Nestler and colleagues (2002) found that those who suffer from Major Depressive Disorder also report changes in appetite. Some people with depression lose their appetite, while others eat more or binge eating. Sufferers may also experience changes in their sleep patterns. Whether it is sleeping more than they previously slept or finding it difficult to fall asleep, changes in sleep patterns are common with depression (Nolen-Hoeksema & Marroquin, 2017).

The National Institute for Mental Health (NIMH) stated that an estimated 16.2 million American adults have had at least one episode of major depression in their lives (NIMH, 2019). The prevalence rate of major depression is higher among adult females (8.5%) than adult males (4.8%) (NIMH, 2019). The CDC reports that Asian adults have the lowest prevalence rate of depression (3.1%) when compared to Hispanic (8.2%), non-Hispanic White (7.9%), and non-Hispanic Black (9.2%) adults (Brody, Pratt, & Hughes, 2018).

Depression is the most common mental disorder in the United States (NIMH, 2019). Research suggests that it is caused by genetic, biological, psychological, and environmental factors (NIMH, 2019; Schatzberg, 2002). Risk factors for depression include personal or family history of depression, major life changes, stress, trauma, and certain illnesses and medications.

Persistent Depressive Disorder (formerly known as Dysthymic Disorder and Chronic Major Depressive Disorder in DSM-IV) is another form of depression has symptoms that last for at least two years or more (APA, 2013; Sansone & Sansone, 2009). Persistent depressive disorder is characterized by at least two years of depressed mood for more days than not, accompanied by additional depressive symptoms that do not meet the criteria for Major Depressive Disorder (APA, 2013). In adulthood, women are two to three times more likely to develop Persistent Depressive Disorder than are men. Prevalence of the disorder (with or

without superimposed Major Depressive Disorder) is approximately 6% (NIMH, 2017).

Research shows that the prevalence rate of Persistent Depressive Disorder is higher among African Americans (7.50%) when compared to White (5.70%) and Mexican American (7.40%) participants (Riolo, Nguyen, Greden, & King, 2005).

Depression in Children

Depression does not only affect adults. It has been debated in past research whether children experience diagnosable depression (Garber, Gallerani, & Frankel, 2009). Garber and colleagues stated that the answer to this debate is that children can experience depression and have been diagnosed with the disorder. The prevalence rate of depression differs greatly in children when compared to adults. Major Depressive Disorder is very uncommon in infants and young children, but this prevalence increases drastically during adolescence (Garber et al., 2009). Costello, Mustillo, Erkanli, Keeler, Angold (2003) concluded that the overall prevalence estimate of depression in children is 2.8%, ranging from .03% to 3.0%. This rate varies by age. Among very young children (ages 2–5), prevalence rates have been found to be 1.4% for Major Depressive Disorder and 0.6% for persistent depressive disorder (Costello et al., 2003). More recent studies have found that 2.1% of children aged 5 to 17 have been diagnosed with depression (Perou et al., 2003).

In children, Persistent Depressive Disorder occurs equally in males and females. The result of this disorder is an impairment on school performance and social interaction (APA, 2013). The APA (2013) has stated in the DSM-V that children and adolescents with this disorder are usually irritable and cranky as well as depressed. They have low self-esteem and poor social skills and are pessimistic.

Depression and Stress

Stress is a normal physical and psychological reaction to both positive and negative changes in one's life or environment (Hall-Flavin, 2017). Many sufferers of stress lack

effective coping strategies and develop other mental health disorders. Depression has been linked to stress in many research cases. Previous research has indicated that stress can cause depression in adults (Chiba et al., 2012). Stress has been linked to increasing biological factors, such as glucocorticoids, which are related to depressive disorders (Chiba et al., 2012). Previous research suggests that stress does not always lead to negative outcomes, and some people are not negatively affected by stress (Caspi et al., 2003). Researchers have found that many people are genetically predisposed to their stressful situations leading to depression. An individual that has one or two copies of the short allele 5-HTT promoter polymorphism displayed more depressive symptoms and diagnosable depression in relation to stressful events than those who have two long alleles (Caspi et al., 2003).

Food Insecurity and Depression

As defined earlier, FI is lacking the confidence of having enough food for the household (Gundersen, 2013). Depression was also said to begin after the onset of a stressful situation (Chiba et al., 2012). Previous research has indicated that FI is related to depression and could potentially contribute to the disorder's development (Kim & Frongillo, 2007). In older adult populations, FI was positively correlated to depression (Kim & Frongillo, 2007). This study showed that those who were FI were more likely to be depressed than those who were food secure.

Another research project examined the relationship between FI and maternal depression (Huddlestone-Casas, Charnigo, & Simmons, 2009). Researchers wanted to know the temporal precedence of FI and depression in rural, low-income women. The authors noted a positive relationship between FI and depression. These findings support the notion that depression preceded by FI is not strictly limited to older adults.

Bronte-Tinkew, Zaslow, Capps, Horowitz, & Mcnamara (2007) found that households that were FI had higher levels of depression for young children. Other researchers

have also found links to child psychological disorders caused by FI. Melchior and colleagues (2012) found that FI contributed to several mental disorders in children (depression, anxiety, inattention, and hyperactivity). This study found that children who grow up in FI families are twice more likely to have high levels of persistent symptoms of hyperactivity/inattention than children who are food secure (Melchior et al., 2012). To protect children from poor mental health, the reduction of FI could help decrease the burden of mental health problems in school-aged children.

Anxiety

Similar to depression, anxiety is one of the most common mental disorders in the United States (Bandelow & Michaelis, 2015). Particularly, Generalized Anxiety Disorder is the most prevalent type of anxiety (Spitzer, Kroenke, Williams, & Lowe, 2006). Generalized Anxiety Disorder is diagnosed when an individual excessively worries about several routine activities or issues in a manner of “floating concerns” for 6 months (NIMH, 2018). Those who suffer have difficulty staying calm and relaxing. Sufferers go through their day with great worry and tension. They also may have difficulty feeling comfortable in social situations and maintaining employment (NIMH, 2018). Generalized Anxiety Disorder affects roughly 6.8 million people, and about 1 in every 5 people suffer from the disorder (McLean, Asnaani, Litz, & Hofmann, 2011; NIMH, 2018). This disorder occurs nearly twice as frequently in women than men (McLean et al., 2011).

Anxiety in Children

The study and treatment of adult anxiety have historically received more theoretical and empirical attention in psychology and psychiatry than child anxiety. The treatment and diagnosis of anxiety in children is believed to be one of the most neglected areas of research in psychopathology (Dadds, Heard, & Rapee, 1991). Although adults receive more attention than children in anxiety research, children make up a large portion of patients treated at

mental health centers (Miller, Boyer, & Rodoletz, 1990). Although Generalized Anxiety Disorder is still most common amongst children, there are other forms of anxiety that children may have. Common types observed in children are Generalized Anxiety Disorder, Separation Anxiety Disorder, Social Anxiety Disorder, and specific phobias (intense and irrational fears towards a particular object such as animals, storms, heights, water, etc.) (NIMH, 2018).

Depression and Anxiety

The relationship between depression and anxiety has been said to cause much controversy (Gorman, 1997). The symptoms of these disorders are very similar and at time make it difficult to make a diagnosis, perform treatments, and conduct research (Gorman, 1997). Previous research indicates that depression and anxiety are often comorbid. About 85% of patients who suffer from depression also have significant anxiety, and 90% of patients with anxiety disorders also have depression disorder (Gorman, 1997). Consistent with the findings of Gorman, Tiller (2013) found similar comorbidity rates. Gorman (1997) states that patients with comorbid depression and anxiety have more severe symptoms and a lower response to treatment than patients suffering from only one disorder. Hirschfeld (2001) found that between 10% and 20% of adults in any given 12-month period visit their primary care physician during an anxiety or depressive disorder episode. More than 50% of these patients suffer from a comorbid second depressive or anxiety disorder (Hirschfeld, 2001).

Depression and Anxiety Health Outcomes

Studies have shown that chronic stress and anxiety experienced early in life affect the development of the body's stress response system (Shonkoff et al., 2010). Previous research has connected three brain areas with being involved in anxiety and depression: hippocampus, amygdala, and prefrontal cortex (McEwin, 2003; Shonkoff et al., 2010). During stressful situations like depression and anxiety, cortisol is released into the bloodstream as a response

to the stress (McEwin, 2003). The hippocampus is the portion of the brain that is responsible for storing memories and regulating the production of cortisol and aids in interpreting what is stressful (McEwin, 2003). When the hippocampus is exposed to cortisol over a long period of time, neurogenesis - the production of new neurons - is slowed and causes the hippocampus to shrink in mass (Moica, Gligor, & Moica, 2016). This shrinkage has been linked to increased memory problems (McEwin, 2003).

The amygdala is the portion of the brain responsible for facilitating emotional responses (i.e. pleasure and fear), and with prolonged exposure to cortisol, the amygdala becomes enlarged and increases in activity (McEwin, 2003; Rotella, et al., 2014). This could result in disturbances in sleep and activity patterns (McEwin, 2003). Martin, Ressler, Binder, and Nemeroff (2009) have found that patients suffering from panic disorder had increased cerebral blood flow (CBF) in the hippocampus and amygdala during a panic attack. Consistent with the findings of Martin and colleagues (2009), Hasler and colleagues (2007) found that short immediate threats increased CBF in the left amygdala, but sustained anxiety increased CBF in the right hippocampus. When CBF increases, the blood vessels in the brain are dilated and pressure increases (Cipolla, 2009). Adverse health outcomes have been linked to the increase of CBF (Cipolla, 2009). Edema formations (brain swelling) are the underlying cause of conditions such as hypertensive encephalopathy (sudden elevation of arterial pressure usually preceded by severe headache and followed by convulsions, coma or a variety of transitory cerebral phenomena) (Cipolla, 2009; Finnerty, 1972).

Food Insecurity and Anxiety

Similar to the findings of depression and FI, FI has also been shown to relate to anxiety (Whitaker, Phillips, & Orzol, 2006). This study found that mothers who reported being food insecure also displayed characteristics of having Generalized Anxiety Disorder. Some researchers have examined FI and its relationship to anxiety on a global level. Hadley

and Patil (2007) examined seasonal FI (FI due to crop availability) in a rural African setting. Their findings not only indicated that FI predicted anxiety, but that seasonal FI also was related to anxiety.

Purpose

Substantial research has supported an association between FI and depression. These relationships hold true across the levels of age as well (Weinreb et al., 2002). Previous research has been able to examine the role of FI in mental health but only within certain populations. As discussed earlier, children are notably overlooked when it comes to depression research. Previous research has implied that minorities are less willing to participate in health-related studies and therefore is the reason that they are underrepresented (Wendler et al., 2006). However, researchers have found that there is not a significant difference in willingness to participate between minorities and non-minorities (Wendler et al., 2006). Some research has been conducted to examine the relationship of FI and depression, but not with underrepresented groups and children as the target population. The African-American population has often been left out of many psychological research trials.

Although anxiety was originally proposed as a study variable, it was not available in this sample. Instead, obesity, which has been linked to both FI and depression by previous research, was included as an important factor for this population (Assari, 2014; Jyoti et al., 2005). It is especially important to consider obesity in this population because African Americans have some of the highest rates of obesity in the United States (Abraham, Kazman, Zeno, & Deuster, 2013). The purpose of this research study is to examine the impact of food insecurity on psychosocial outcomes in African American children. Intergenerational effects were examined by measuring the impact of FI on both child and caregiver physical and mental health. After the establishment of this relationship, more efforts can be made to ensure

food insecurity is lessened as much as possible and ensure that children who suffer from depression are able to receive the proper mental health services they require.

Hypothesis

Aim 1. Observe the impact of food insecurity on indicators of mental and physical health in children and parents.

Hypothesis 1: FI families were expected to have poorer mental health functioning than were the FS families.

Hypothesis 1a. FI children were expected to report higher levels of depression than FS children.

Hypothesis 1b. FI caregivers were expected to report higher levels of depression than FS caregivers.

Hypothesis 2: FI families were expected to have poorer physical health functioning.

Hypothesis 2a. FI children were expected to have higher weight statuses and/or BMI than FS children.

Hypothesis 2b. FI caregivers were expected to have higher weight statuses and/or BMI than FS caregivers.

Aim 2. Observe the impact of weight status on depression in children and caregivers.

Hypothesis 3: Depressed individuals were expected to be more likely to be obese or have higher BMI, than non-depressed individuals.

Hypothesis 3a. Children with higher levels of depression were expected to have higher weight statuses and/or BMI than children with lower levels of depression.

Hypothesis 3b. Caregivers with higher levels of depression were expected to have higher weight status and/or BMI than caregivers with lower levels of depression.

Hypothesis 4: Children and caregivers physical and mental health were expected to be related.

Hypothesis 4a. As caregivers report higher levels of depression, their children were expected to also report higher levels of depression.

Hypothesis 4b. As caregivers have higher weight statuses and/or BMI, their children were expected to also have higher weight statuses and/or BMI.

Aim 3. Observe gender effects in the relationship between mental and physical health functioning.

Aim 4. Testing Model 1 (see Figure 1) and Model 2 (see Figure 2).

Hypothesis 5: Child depression was predicted to mediate the relation between FI and obesity in children (see Figure 1).

Hypothesis 6: Caregiver depression was predicted to mediate the relation between FI and child depression (see Figure 2).

Aim 5. Observe income effects on food security status.

Research has shown that most people who are FI do not live in poverty, and those who live in poverty are typically not FI (Feeding America, 2018). This relationship was tested in our sample.

Method

Participants

This study recruited participants from two settings. The first was a longitudinal study of growth and development (Black, Dubowitz, Krishnakumar, & Starr 2007), and the second was from middle schools in a low-income urban community (Black et al., 2010). There were 228 African American middle school students from communities in a large Mid Atlantic city. The criteria for eligibility included English fluency, age (11-16 years), and residence in the

low-income communities surrounding the medical center. Weight was not a requirement for participant enrollment.

Procedures

Participants were recruited at the beginning of the school year. Ethical procedures were approved by the university and public-school system. Due to the inability to randomly assign participants to having depression, obesity, or being FI, each participant received the same surveys. Before the participants were given the surveys, the written consent and assent forms were signed assuring participants of their rights to stop the survey at any time and the protection of their anonymity. Measures were administered during after school sessions; all measures were self-administered on a computer with questions presented both aurally on headphones and visually on the screen. Responses were selected with the mouse. Trained data collectors assisted participants with computer use. Youth were compensated for their participation.

Measures

Demographics. The demographics were assessed by using caregiver and child questionnaires. Child participants reported their race/ethnicity and date of birth. Caregivers provided answers that assigned food security level, poverty status, income level, marital status, highest level of education completed, number of individuals in the home, and other information used to determine socioeconomic status.

Food insecurity. The same methodology used by the United States Department of Agriculture (USDA) was used to measure FI. The USDA Core Food Security Module is an 11-item measure that asks if certain statements apply to one's household in the last 12 months. Some of the items ask questions regarding hunger the children have been experiencing during the last 12 months as well. These items can be found in the Appendix A. Possible responses to the statements are "never true, sometimes true, often true, or don't

know” (Hamilton et al., 1997). Scores approaching 0 would deem households as food secure, while scores closer to 11 would indicate FI.

For this experiment, a revised two-item version of the USDA Core Food Security Module was used. The Two-Item Screening Questionnaire for Food Insecurity identified families at risk for FI and demonstrated sensitivity, specificity, and convergent validity (Hager et al., 2010). Items from this measure can be found in the Appendix B.

Caregiver responses from The Two-Item Screening Questionnaire for Food Insecurity were used to measure FI (Hager et al., 2010). Affirmative answers (sometimes true or often true) to both questions placed the children in the food insecure category.

Depressive symptoms. Depressive symptoms for children and caregivers were assessed by using the Beck Depressive Inventory, 2nd Edition (BDI-2; $\alpha=0.92$; Beck, Steer, & Brown, 1996). The BDI-II is a self-report measure that is normalized for ages 13 to 80 years. The BDI-II can be self-administered or administered verbally by a trained professional and scored in paper-and-pencil, computer-based, and online versions. Its content validity is ensured because most of its items are equivalent to the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition* (DSM-IV; American Psychiatric Association, 1994) criteria for depression. Its construct validity has also been tested successfully by comparing scores with other measures for depression. Previous research using low-income African Americans found a reliability of $\alpha=0.90$ (Grothe et al., 2005). Usage of the BDI-II with the current sample had a reliability of $\alpha=0.88$. The 21 items of the BDI-II are statements arranged in increasing severity about a symptom of depression. In this forced-choice measure, participants selected a statement that was closest to how they had been feeling during the past two weeks. Possible choices for the depressive symptom “crying” were “I don’t cry any more than I used to,” “I cry more than I used to,” “I cry over every little thing,” and “I feel like crying, but I can’t.” Items from this measure can be found in the Appendix C.

Responses to the BDI-II ranged in point values from 0 to 3 points and were totaled to create a composite score. BDI-II test instructions have designated cutoffs for depression levels based on total scores. Scores of 0 to 13 points indicated minimal depression, 14 to 19 indicated mild depression, 20-28 indicated moderate depression, and 29-63 indicated severe depression. The composite scores and cutoffs for the four levels were used for analyses in this study.

Body mass index. The Center for Disease Control (CDC; 2015) defines Body Mass Index (BMI) as a person's weight in kilograms divided by the square of height in meters. A high BMI can be an indicator of high body fatness. BMI can be used to screen for weight categories that may lead to health problems. Participants' weights were measured to the nearest 100 g with a Tanita digital scale, and heights were measured to the nearest 0.5 cm with a wall-mounted stadiometer. BMI was calculated, and the values were converted to BMI z-scores and percentiles based on the 2000 Centers for Disease Control and Prevention age- and gender-specific tables using algorithms provided at <http://www.cdc.gov/growthcharts> (CDC, 2000).

Weight status. Participants were divided into categories based on their BMI percentiles: Normal weight (<85th percentile), overweight (\geq 85th and <95th percentile), and obese (\geq 95th percentile).

Data Analysis Plan

Responses to the Two-Item Screening Questionnaire for Food Insecurity, child and caregiver BDI-II responses, and demographic questionnaire (age, race/ethnicity, poverty status, income level, marital status, highest level of education completed, number of individuals in the home, and other information used to determine socioeconomic status) were inserted into the Statistical Package for the Social Sciences (SPSS Version 25). Depressive

levels and total scores were calculated following the scoring instructions for the BDI-II for further data analysis.

Preliminary Analyses. Analyses were run to obtain demographic information (gender, age, food security status, poverty status, child and caregiver BMI and/or weight class, and child and caregiver depression total scores and levels) about the sample. To examine if child age would be a predictor of child depression, a bivariate correlation and an ANOVA were conducted.

Aim 1. Observe the impact of FI on indicators of mental and physical health in children and parents.

Hypothesis 1a. To test the hypothesis that FI is related to poorer mental health functioning in children, an ANOVA was conducted.

Hypothesis 1b. To test the hypothesis that FI is related to poorer mental health functioning in caregivers, an ANOVA was conducted. An ANOVA was conducted to determine features of FI that were significantly related to caregiver depression.

Hypothesis 2a. To test the hypothesis that FI is related to poorer physical health functioning in children, an ANOVA was conducted between child BMI and FI.

Hypothesis 2b. To test the hypothesis that FI is related to poorer physical health functioning in caregivers, an ANOVA between caregiver BMI and FI was conducted.

Aim 2. Observe the impact of weight status and BMI on depression in children and caregivers.

Hypothesis 3a. To test the hypothesis that children with higher depression total scores will have higher weight statuses, an ANOVA was conducted.

Hypothesis 3b. To test the hypothesis that caregivers with higher depression total scores will have higher weight statuses, an ANOVA was conducted.

Hypothesis 4a. To test the hypothesis that caregivers that report higher levels of depression will have children that also report higher levels of depression, a chi-square test for independence was conducted

Hypothesis 4b. To test the hypothesis that caregivers that have higher BMI will have children that also have higher BMI, a bivariate correlation was conducted

Aim 3. Observe gender effects in the relationship between mental and physical health functioning.

To analyze gender differences in child depression levels, an ANOVA was performed.

To analyze gender differences in child weight statuses, an ANOVA was performed.

To test if females were more likely to be overweight or obese than males, a chi-square analysis was conducted.

Aim 4. Testing Model 1 (see Figure 1) and Model 2 (see Figure 2).

Hypothesis 5. A regression analysis was used to investigate the hypothesis that child depression mediates the relation between FI and obesity in children

Hypothesis 6. A regression analysis was used to investigate the hypothesis that caregiver depression mediates the relation between FI and child depression

Aim 5. Observe income effects on food security status.

To test the relation between poverty status and FS in this sample, a chi-square test for independence was conducted.

To analyze the impact of poverty status on child and parent depression and the relation between annual income and food security status, ANOVAs were used.

Results

Preliminary Analyses

There were 116 (50.9%) males and 112 (49.1%) females in this sample. Participant age ranged from 11 to 16 years ($M= 13.27$, $SD=1.03$). There were 68 (29.8%) participants

that reported being FI. One hundred sixteen (50.9%) participants reported living at or below the poverty line.

Of the sample, 61.4% ($n=140$) of the children were normal weight, 12.3% ($n=28$) were overweight, and 26.3% ($n=60$) were obese.

Caregivers' weight statuses were placed into four categories: underweight, normal weight, overweight, and obese. There were 6 (2.7%) underweight caregivers, 48 (21.2%) normal weight caregivers, 53 (23.5%) overweight caregivers, and 119 (52.7%) obese caregivers.

To verify if child age would be a predictor of child depression in our analyses, a bivariate correlation was conducted, and there was not a significant relation, $r(226)=0.12$, $p=0.85$. An ANOVA examined the relation between age and depression level also found that there was no significant difference in age between depressed children ($M=13.35$, $SD=1.06$) and non-depressed children ($M=13.25$, $SD=1.03$), $F(1,226)=0.29$, $p=0.59$.

Aim 1. Observe the impact of FI on indicators of mental and physical health in children and parents.

Hypothesis 1a. To test the hypothesis that FI is related to poorer mental health functioning in children, we compared depression total scores in FI children and FS children. An ANOVA did not find a significant association between FI and depression, $F(1,221)=0.02$, $p=0.88$.

Hypothesis 1b. To test the hypothesis that FI is related to poorer mental health functioning in caregivers, an ANOVA found that FI caregivers ($M=4.99$, $SD=5.18$) expressed higher levels of depression than FS caregivers ($M=3.35$, $SD=4.42$), $F(1,220)=5.79$, $p=0.02$. The features of FI that were significantly related to caregiver depression include: the worry that food would run out before there was money to buy more ($F(3,210)=4.36$, $p=0.005$) and the inability to afford balanced meals ($F(3,95)=3.37$, $p=0.02$). A significant relation also was

found between caregiver depression levels and total affirmative responses related to child hunger. There were significant differences between minimal ($M=1.44$, $SD=1.68$), mild ($M=1.75$, $SD=1.75$), moderate ($M=5.50$, $SD=3.53$), and severe ($M=1.00$, $SD=0.00$) levels of depression and the total number of affirmative responses relating to child hunger, $F(3,114)=3.76$, $p=0.01$.

Hypothesis 2. To test the hypothesis that FI is related to poorer physical health functioning in children, an ANOVA conducted between child BMI and FI, with results reflecting a non-significant relation, $F(1,221)=0.08$, $p=0.78$. Similarly, to test the hypothesis that FI is related to poorer physical health functioning in caregivers, an ANOVA between caregiver BMI did not have a significant relation to FI, $F(1,219)=2.22$, $p=0.14$.

Aim 2. Observe the impact of weight status and BMI on depression in children and caregivers.

Hypothesis 3a. To test the hypothesis that children with higher depression total scores will have higher weight statuses, an ANOVA found that normal weight and overweight children ($M=6.77$, $SD=8.53$) reported fewer depressive symptoms than did obese children ($M=9.68$, $SD=8.76$), $F(1,226)=5.07$, $p=0.03$. Once this relationship was separated by gender, results were no longer significant: males ($F(1,114)=1.48$, $p=0.23$) and females ($F(1,110)=2.07$, $p=0.15$).

Hypothesis 3b. To test the hypothesis that caregivers with higher depression total scores will have higher weight statuses, an ANOVA indicated that there were no significant findings to relate caregiver depression to caregiver weight status, $F(3,221)=0.24$, $p=0.87$.

Hypothesis 4a. To test the hypothesis that caregivers who report higher levels of depression will have children who also report higher levels of depression, a chi-square test for independence was conducted with caregivers who reported minimal depression more often had children who endorsed lower levels of depression than did caregivers who reported

mild to severe levels of depression, $\chi^2(1)=3.88, p=0.05$. Due to the high skewedness of depression total scores of this sample (see Figure 4), correlation analyses could not be used to predict this relationship.

Hypothesis 4b. To test the hypothesis that caregivers who have higher BMI will have children who also have higher BMI, a bivariate correlation found a significantly positive relation, $r(226)=0.22, p=0.001$.

Aim 3. Observe gender effects in the relationship between mental and physical health functioning.

Because previous research has found higher prevalence rates of Major Depressive Disorder in females (NIMH, 2019), we expected similar results would be found in our sample. To analyze gender differences in child depression levels, an ANOVA was performed. We found a significant difference in male ($M=6.31, SD=7.45$) and female ($M=8.81, SD=9.65$) child depression severity, $F(1,226)=4.83, p=0.03$, and also a significant difference in the number of depressive symptoms in male ($M=3.58, SD=2.19$) and female ($M=4.21, SD=2.38$) children, $F(1,224)=4.38, p=0.04$.

Male and female children had differing weight status ratios. There were 81 (69.8%) normal weight males and 59 (52.7%) normal weight females, 13 (11.2%) overweight males and 15 (13.4%) overweight females, and 22 (19.0%) obese males and 38 (33.9%) obese females. To test if females were more likely to be overweight or obese than males, a chi-square analysis was conducted and revealed significant results, $\chi^2(2)=7.80, p=0.02$ (see Table 1).

Aim 4. Testing Model 1 (see Figure 1) and Model 2 (see Figure 2).

Hypothesis 5. A regression analysis was used to investigate the hypothesis child depression mediates the relation between FI and obesity in children (see Figure 1). Results indicated that child depression was not a significant mediator between FI and child obesity.

As reported earlier, FI was not significantly related to child depression ($B=-0.19, p=0.88$) or child obesity ($B=0.22, p=0.80$).

Hypothesis 6. A regression analysis was used to investigate the hypothesis that caregiver depression mediates the relation between FI and child depression (see Figure 2). Results indicated that parent depression was not a significant mediator between FI and child depression. As reported earlier, FI was significantly related to caregiver depression ($B=1.64, p=0.02$) but not child depression ($B=-0.19, p=0.88$).

Aim 5. Observe income effects on FS status.

To test the relation between poverty status and FS in this sample, a chi-square test for independence found that poverty status and FS status were not significantly related ($\chi^2(1)=0.34, p=0.56$) (see Figure 3). When analyzing the impact of poverty status on child and parent depression, results were also not significant ($F(1,205)=0.21, p=0.65; F(1,204)=0.02, p=0.89$). An ANOVA was conducted to measure the annual income of FI families to FS families. Results found that annual household income and FS status were significantly related, with FI families having significantly less annual income than did FS families ($F(1,220)=5.39, p=0.02$).

Discussion

The first aim of this study was to observe the impact of FI on indicators of mental and physical health in children and parents. It was hypothesized that FI families would have poorer mental health functioning. This hypothesis was partially supported. FI children did not report poorer mental health, but FI caregivers did. David (2017) stated that the stigma and shame associated with FI makes many sufferers tuck away their need and keep others from becoming aware of their situation. Chiba and colleagues (2012) indicated that stress can cause depression in adults. Added stress from the FI could be what has caused the depression in the caregivers in this sample, but not in the children. Previous research has found that

parents can act as protective factors against their children feeling the impact of food insecurity by having more personal resources to cope with the stresses of financial constraints, and this could have occurred in this sample (Wehler et al., 2004).

The current investigators predicted that FI families will have poorer physical health functioning. Although past studies have found household FI to directly affect BMI in children (Jyoti et al., 2005), when testing for a significant relation between BMI and food security status in children and caregivers in this sample, the results were not significant. This could be due to the differing proportion of African American participants used in the study done by Jyoti and colleagues (2005) and the current study. Jyoti and colleagues used a racially representative sample of the United States which the U.S. Census Bureau (2005) estimated at 12.8% during this time. Research has found higher rates of obesity in the African American population when compared to the general population (Abraham et al, 2013), and if a study included other ethnic groups, a relation could have been found where none existed for African Americans. Vedovato et al. (2016) utilized an African American sample to relate obesity and food security status but found no significant results.

The second aim of this study was to observe the relationship between depression and weight in children and caregivers. It was predicted that depressed individuals would be more likely to be obese or have higher BMI, than non-depressed individuals. This hypothesis was only partially supported. Obese children reported higher levels of depression than the normal weight and overweight children, but there was no relation between obesity and depression for the caregivers. Previous studies have tried to explain the link between depression and obesity in children. Reeves, Postolache, and Snitker (2008) attribute sedentary lifestyles to this relation. One feature of depression is the decreased interest and motivation in all or almost all activities (APA, 2013). About 30% of youths that are diagnosed with Major Depressive Disorder have been found to use the internet at least three hours a day (Reeves et al., 2008). It

is possible that the lack of spare time adults possess has contributed to the difference we observed.

Previous research has found that depression and obesity were significantly related in African American adults (Assari, 2014), but this was not found when using the caregivers in this sample. This could be due to the BMI and depressive measures being self-report. Previous researchers have found that while some self-report depression symptom measures are reliable and valid, studies that have used African American samples have indicated that participants were not very open to acknowledging psychological problems (Sanchez-Villegas et al., 2008; Ward, Wiltshire, Detry, & Brown, 2013). Ward and colleagues (2013) found that African Americans were very concerned about the stigma associated with mental illnesses, and this underreporting would explain the skewedness of the participants' depressive symptoms. Previous studies also have deemed self-report weight measures as unreliable due to underreporting (Bowring et al., 2012). If caregiver weight and depressive symptoms were underreported, this could have affected the BMIs and depression scores calculated from these reports.

It was hypothesized that child and caregiver physical and mental health would be related. Supporting this hypothesis, caregivers that reported minimal depression had more children that reported lower levels of depression than caregivers that reported mild to severe levels of depression. This supports previous studies that found positive correlations between maternal and daughter depression (Fergusson, Horwood, & Lynskey, 1995).

Similarly, caregivers that had higher BMIs also had children with higher BMIs. Previous studies that investigated African American urban individuals found that maternal or caregiver BMI was a significant predictor of child BMI (Winkler, Bennett, & Brandon, 2017). This could be because parents and children often experience the same environmental factors and share similar genes.

The third aim of this study was to observe gender effects in the relationship between mental and physical health functioning. Because previous research has found higher prevalence rates of major depressive disorder in females (NIMH, 2019), we expected similar results would be found in our sample. Female child participants reported higher levels of depression than male child participants. Gender differences were also found regarding weight status. There were significantly more overweight and obese females than males. This finding supports recent studies that have found gender differences in obesity prevalence for adults and youths ages 2 to 19 (Ogden, Carroll, Fryar, & Flegal, 2015).

The fourth aim of this study was to test Model 1 (see Figure 1) and Model 2 (see Figure 2). It was predicted that depression mediated the relation between FI and obesity in children (see Figure 1). This hypothesis was not supported. When examining the pathways of this proposed mediation model, as previously reported, FI did not relate to child depression. To ensure that income and poverty status also were unrelated to child depression, additional regression analyses were run and were not significant. This result was surprising, as previous studies have found that FI contributed to several mental health disorders in children but namely depression (Melchior et al., 2012; Whitaker et al., 2006). These results could be possibly due to the low rates of depression found in this community sample. Using participants from a community sample and not a clinical sample likely contributed to the low rates of depression we observed. Perhaps additional processes or factors are at play to shape the previously found correlation within clinical populations. Model 2 predicted that caregiver depression mediated the relation between FI and child depression (see Figure 2). There was not enough evidence to support this model. When analyzing the pathways in this proposed model, FI was significantly associated with caregiver depression. However, the next pathway to analyze the relation between caregiver depression and child depression was not significant.

This was surprising because the chi-square analysis conducted earlier in this study revealed that caregiver depression was related to child depression.

The fifth aim of this study was to observe the relationship between income or poverty status and FI. Supporting previous findings, the relation between poverty status and food security was found not to be significant. This could be due to the fact that there are FI sufferers who are both above and below the poverty line set by the United States government (Feeding America, 2018). The reason behind this is likely due to those who are above the poverty line do not qualify for federal assistance programs that help provide access to nutritious food. It is important to note that poverty status calculated utilizing annual income and the number of individuals in the home living on that income.

An analysis conducted to compare annual incomes of FI families and food secure families found that FI families had significantly less income than food secure families. This finding coincides with the notion that FI families do not have the financial resources to access enough food to sustain members of a household (Gundersen, 2013).

Limitations

As with any research project, limitations were present in this study. To measure depression in both caregivers and children, the BDI-II was used. Although this measure had good reliability and validity, there is another measure that would have been better to measure child depression. The Children's Depressive Inventory, Second Edition (CDI-II) is a brief self-report measure made specifically for children ages 7 to 17 that helps assess cognitive, affective, and behavioral signs of depression in children and adolescents (Kovacs, 2011). This would allow future researchers to better capture child depression and have increased rates of child depression seen in this sample.

Weight statuses and BMI were calculated for child participants from researcher measurement in triplicate, but parent weight statuses and BMI were calculated based on the

self-reported information of the parents. This could have resulted in inaccurate weight reporting similar to other studies that utilized self-report weights (Blum et al., 2018).

This study was conducted in a low-income urban area that also was a food desert. Food deserts are areas where there is little to no access to fresh and nutritious foods (Walker, Keane, & Burke, 2010). Previous research has found that FI households tended to be located farther from grocery stores and closer to convenience stores (Thomas, 2010). Having the study take place in a food desert could have acted as a confounding variable when analyzing the relation between FI and health. Gunderson and Ziliak (2015) found that FI children are twice as likely to report being in fair or poor health (as opposed to good health) than are food secure children. As previously stated, FI has four levels (USDA, 2017). It is possible that some of the participants had low FS meaning that there is reduced quality, variety, or desirability of their diet. Because there are no changes in the food intake amount, low FS sufferers eat non-nutritious foods as their main food source. The nutrient deficiencies associated with FI (Ke & Ford-Jones, 2015) also may be related to living in a food desert.

Another limitation was that this study was conducted during the school year. This is a limitation because as long as school was in session, child participants could be receiving at least one meal per day. The school lunch program could have acted as a buffer between the effects of FI on child health. Programs such as the National School Lunch Program (NSLP) and the Summer Food Service Program (SFSP) have been created to assist with the need for food. Studies have found food assistance programs are effective for child FI during the summer (Nord & Romig, 2006). Nord and Romig (2006) found that NSLP and SFSP reduced the prevalence of FI during the summer months. This could potentially explain why significant findings were observed for caregivers concerning FI but not for children. It is possible that different results could be found if this project was conducted during the summer

break. Future studies should conduct this study during the summer break and compare results from the academic school year session.

Future Directions

Although depression and obesity are important constructs to study, there are others that could be important to the literature as they relate to FI research. Similar to depression, anxiety has been found to be one of the most common mental health disorders. Previous studies have found FI to relate to anxiety with FI mothers reporting characteristics of Generalized Anxiety Disorder (Whitaker et al., 2006). It would be beneficial to note how anxiety affects this relation in the African American population.

Due to the limited racial demographic used in this study, we were unable to measure racial differences in the relation between FI and health. While other studies will continue to use more diverse sampling, considering a targeted sample (e.g., only African American) may prompt researchers to alter research methods that are sensitive to the sample's overall tendencies. Future studies should add participants from varied backgrounds to increase the external validity of these results and observe any differences that may be present and also utilize techniques from previous researchers that implement culturally appropriate testing practices that incorporate cultural and ethnic identity (McGoldrick, Giordano, & Garcia-Preto, 2005; Suzuki & Ponterotto, 2007).

Since this study was conducted in a food desert, it is possible that food desert status was a mediating or moderating variable. This means that whether participants lived in a food desert would impact the relation between FI and obesity or FI and depression. As previously mentioned, food deserts are areas where there is little to no access to fresh foods which would mean that people living in this area would be subjected to eating fast food and food from convenience stores. Future studies should conduct this project in areas that are food deserts and areas that are not to compare them to one another. When comparing the food deserts to

non-food deserts, future studies should also compare within the food desert category and examine urban and rural food deserts. In an urban food desert, there are more places to obtain food whereas rural food desert sufferers must travel a longer distance for food.

In this study, caregivers were not required to be the biological parent of the child participants. If a child's primary caregiver was a grandparent, then the self-report questionnaires were completed using their information because this was the person feeding the child and whose income the child lived on. It would be beneficial to obtain results that included more information about the parents of the child participants. Information such as maternal/paternal self-report depression and weight measured using a scale could be used to see if there were biological and gender specific relationships between the parents and children.

School lunch programs may be a limitation in this study, and future research should conduct this study during the summer break. Although this would help reduce the confounding effect of the school lunch program, there are some areas of the United States that offer a service called the Summer Food Service Program (SFSP). Future researchers could compare cities that offer these programs to cities that do not. Previous studies have found that the summer food assistance programs are effective for reducing child FI (Nord & Romig, 2006).

Conclusion

The aim of this research was to observe the intergenerational effects of FI's impact on both child and caregiver physical and mental health. This study has found that FI affects caregiver depression. Although FI was not significantly related to child depression, previous studies have found parents to be protective factors against the effects of FI (Wehler et al., 2004). Similar to previous research, FI and obesity were not related in our sample (Vedovato et al., 2016). While weight status was related to child depression, weight status was not

related to caregiver depression. It was also determined that caregiver obesity and depression predict child obesity and depression. The high prevalence rates for FI, depression, and obesity in the African American population are cause for more research to combat these issues. With more research, federal assistance programs could be extended to all states to offer free lunch programs for children when school is not in session, and, with policy change, more can be done to prevent the negative impacts caused by FI.

Appendices

Appendix A

The USDA Core Food Security Module

USDA 1997, revised 2000

Hamilton, W., Cook, J., Thompson, W., Buron, L., Frongillo, J. E. A., Olson, C. M., & Wehler, C. (1997). Household food security in the United States in 1995: Summary report of the food security measurement project. Washington, DC: US Department of Agriculture.

Following are some statements people have made about their food situations. Please indicate how the statement applied to your household in the last 12 months.

1. We worried whether our food would run out before we got money to buy more.
 - Often true
 - Sometimes true
 - Never true
 - Don't know
2. The food that we bought just didn't last and we didn't have money to get more.
 - Often true
 - Sometimes true
 - Never true
 - Don't know
3. We couldn't afford to eat balanced meals.
 - Often true
 - Sometimes true
 - Never true
 - Don't know
4. We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food.
 - Often true
 - Sometimes true
 - Never true

- Don't know

5. We couldn't feed our children a balanced meal because we couldn't afford that.

- Often true

- Sometimes true

- Never true

- Don't know

6. My/our children are not eating enough because we couldn't afford enough food.

- Often true

- Sometimes true

- Never true

- Don't know

7. In the last 12 months, since this time last year, did you or any other adult in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?

- Yes

- No

- Don't know

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

- Yes

- No

- Don't know

9. In the last 12 months, did you lose weight because you didn't have enough money for food?

- Yes

- No

- Don't know

10. In the last 12 months, did you lose weight because you didn't have enough money for food?

- Yes

- No

- Don't know

11. In the last 12 months, did you or another adult in your household ever not eat for a whole day because there wasn't enough food?

- Yes

- Now
- Don't know

Appendix B

Two-item Screening Questionnaire for Food Insecurity

Hager, E. R., Quigg, A. M., Black, M. M., Coleman, S. M., Heeren, T., Rose-Jacobs, R., & Frank, D. A. (2010). Development and validity of a 2-item screen to identify families at risk for food insecurity. *Pediatrics*, *126*(1), e26-e32. doi: 10.1542/peds.2009-3146

1. We worried whether our food would run out before we got money to buy more.
 - often true
 - sometimes true
 - never true
2. The food that we bought just didn't last and we didn't have money to buy more.
 - often true
 - sometimes true
 - never true

Appendix C

Beck Depression Inventory – II (BDI-II)

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the Beck Depression Inventory-*

II. San Antonio, TX: Psychological Corporation.¹

- | | |
|---|---|
| <p>1. Sadness</p> <p>0 I do not feel sad</p> <p>1 I feel sad much of the time</p> <p>2 I am sad all the time</p> <p>3 I am so sad or unhappy that I can't stand it</p> <p>2. Pessimism</p> <p>0 I am not discouraged about my future</p> <p>1 I feel more discouraged about my future than I used to be</p> <p>2 I do not expect things to work out for me</p> <p>3 I feel my future is hopeless and will only get worse</p> <p>3. Loss of Pleasure</p> <p>0 I get as much pleasure as I ever did from the things I enjoy</p> <p>1 I don't enjoy things as much as I used to</p> <p>2 I get very little pleasure from the things I used to enjoy</p> <p>3 I can't get any pleasure from the things I used to enjoy</p> <p>4. Guilty Feelings</p> <p>0 I don't feel particularly guilty</p> <p>1 I feel guilty over many things I have done or should have done</p> <p>2 I feel quite guilty most of the time</p> <p>3 I feel guilty all of the time</p> | <p>5. Suicidal Thoughts or Wishes</p> <p>0 I don't have any thoughts of killing myself</p> <p>1 I have thoughts of killing myself, but I would not carry them out</p> <p>2 I would like to kill myself</p> <p>3 I would kill myself if I had the chance</p> <p>6. Crying</p> <p>0 I don't cry any more than I used to</p> <p>1 I cry more than I used to</p> <p>2 I cry over every little thing</p> <p>3 I feel like crying, but I can't</p> <p>7. Agitation</p> <p>0 I am no more restless or wound up than usual</p> <p>1 I feel more restless or wound up than usual</p> <p>2 I am so restless or agitated that it's hard to stay still</p> <p>3 I am so restless or agitated that I have to keep moving or doing something</p> <p>8. Loss of Interest</p> <p>0 I have not lost interest in other people or activities</p> <p>1 I am less interested in other people or things than before</p> <p>2 I have lost most of my interest in other people or things</p> <p>3 It's hard to get interested in anything</p> |
|---|---|

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Table 1

Child and Caregiver Weight Statuses

Variable	<i>n</i> (%)
Child Weight (Male)	
Normal	81 (69.8%)
Overweight	13 (11.2%)
Obese	22 (19.0%)
Child Weight (Female)	
Normal	59 (52.7%)
Overweight	15 (13.4%)
Obese	38 (33.9%)

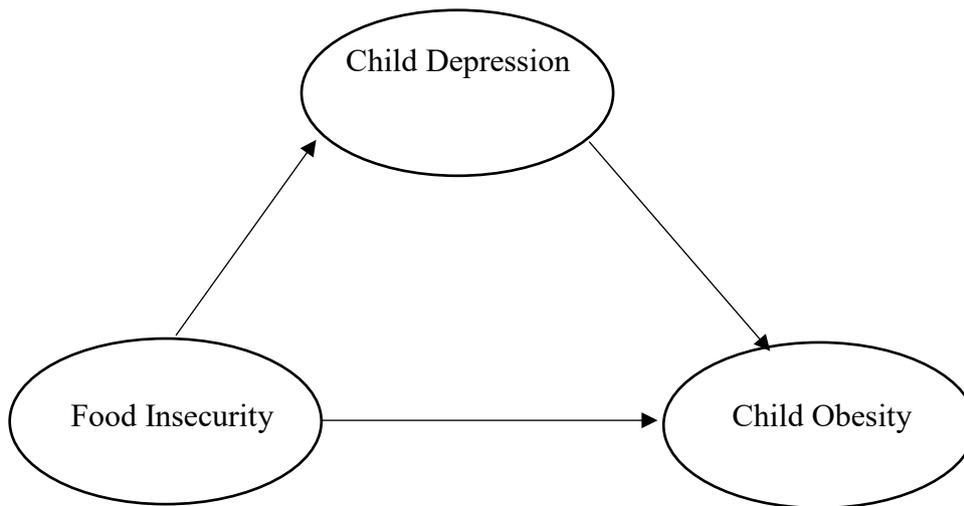


Figure 1. Depression is predicted to mediate the relation between food insecurity and obesity in children.

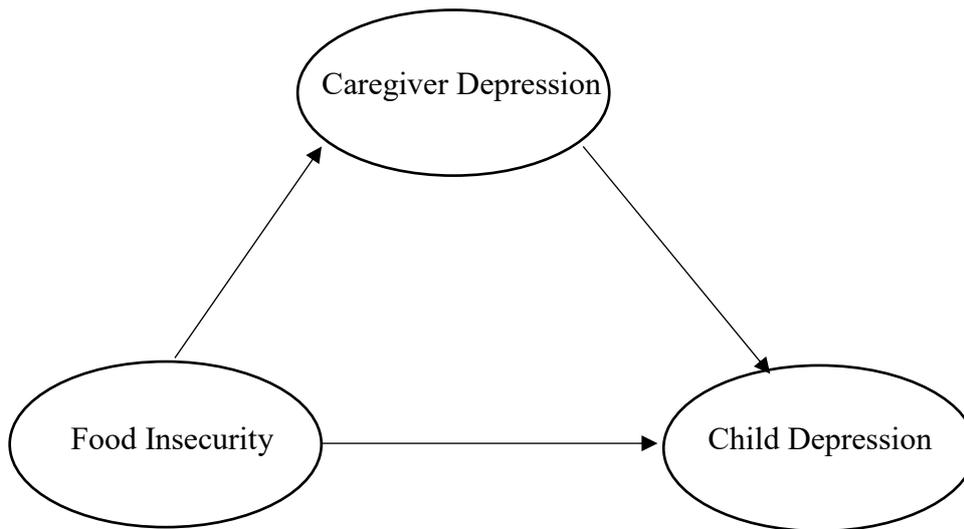


Figure 2. Caregiver depression is predicted to mediate the relation between food insecurity and child depression.

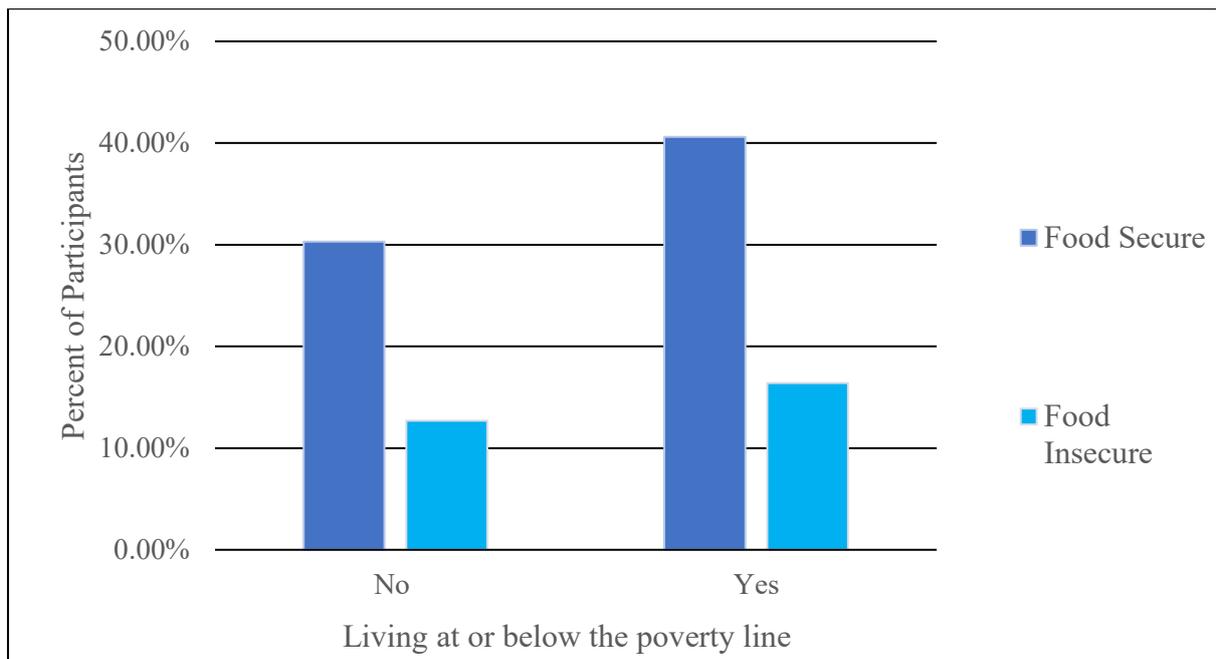


Figure 3. Sufferers from food insecurity can be found living both at or below the poverty line and above the poverty line.

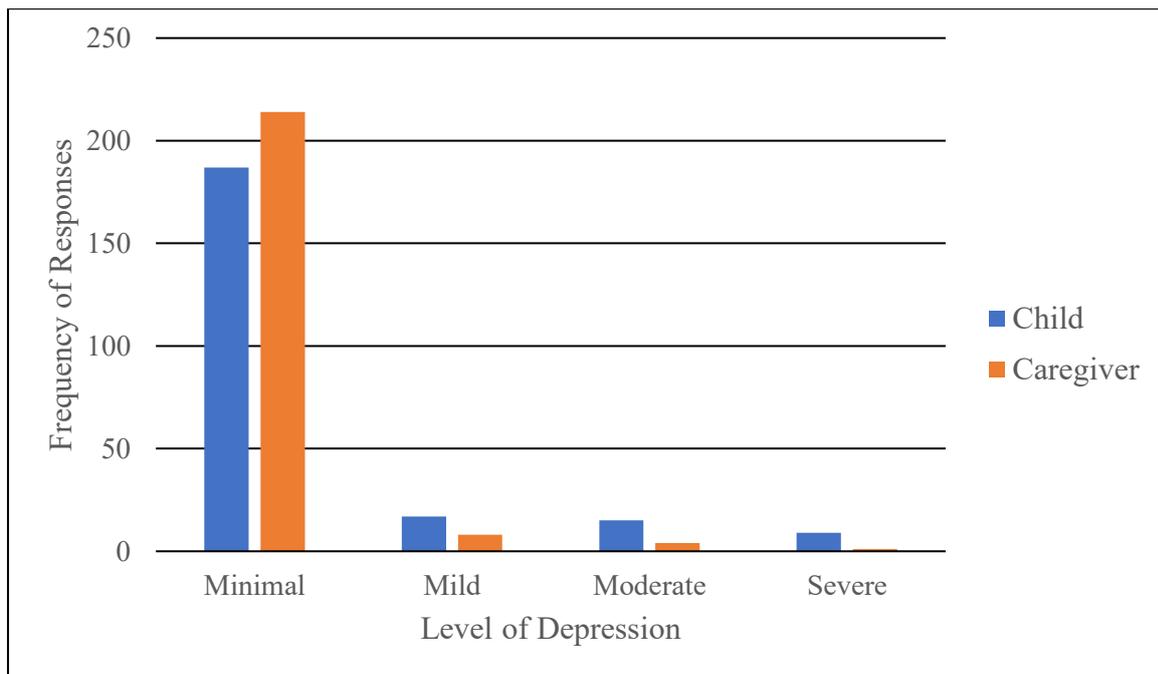


Figure 4. Skewedness of child and caregiver depression levels.

Curriculum Vita

BRIANNA L. JORDAN**EDUCATION**

Master of Science in Psychological Sciences | University of North Florida | Jacksonville, FL

- April 2019
- GPA: 3.64

Bachelor of Science in Psychology | Florida State University | Tallahassee, FL

- May 2017
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Bachelor of Arts in Spanish | Florida State University | Tallahassee, FL

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RESEARCH EXPERIENCES

University of North Florida | Jacksonville, FL

Master's Thesis & Graduate Research Lab Leader, Supervised by Dawn Witherspoon, PhD, 2017-2019

Duties: Lead monthly lab meetings; supervise undergraduate students and assist with conference and poster presentation preparation; aid undergraduate students in finding articles for literature reviews; train undergraduate lab member in various research methods

Florida State University | Tallahassee, FL

Undergraduate Research Assistant: The Role of Oxytocin in Social Exclusion and Suicidal Behavior, Supervised by Carol Chu, M.S. & Thomas Joiner, PhD, Apr. 2016 – Dec. 2016

Duties: Recruited and interviewed participants; performed phlebotomies for blood samples; aided in data collection and data entry

Florida State University | Tallahassee, FL

Undergraduate Research Assistant: The Effect of Social Exclusion on Close Relationships, Supervised by Michael Ent, PhD & Roy Baumeister, PhD, Jan. 2016 – Aug. 2016

Duties: Recruited and interviewed participants; aided in data collection and data entry

RESEARCH INTERESTS

Depression; Anxiety; Suicide; African American Mental Health; Social Exclusion; Food Insecurity

MANUSCRIPTS IN PREPARATION

Jordan, B., & Witherspoon, D. (2018). *Food Insecurity and Children: How Food Insecurity Affects Mental Health Children.* Manuscript in preparation.

Jordan, B., Witherspoon, D., & Chu, C. (2018). *The relationship between parental bonding in childhood and suicide ideation in young adults.* Manuscript in preparation.

PRESENTATIONS

Jordan, B., Witherspoon, D., & Black, M. (March, 2019). *Food insecurity and children: How food insecurity affects mental health in children*. Poster to be presented at the biennial meeting of the International Convention of Psychological Science, Paris, France.

Witherspoon, D., **Jordan, B.**, Ronderos, S., & Black, M. (March, 2019). *Obesity and psychosocial functioning in pre-adolescent African American girls*. Paper to be presented at the annual meeting of the Southeastern Psychological Association, Jacksonville, FL.

Monagas, K., **Jordan, B.**, & Witherspoon, D. (March, 2019). *Disordered eating and obesity in male and female AA adolescents*. Poster to be presented at the annual meeting of the Southeastern Psychological Association, Jacksonville, FL.

Monagas, K., **Jordan, B.**, & Witherspoon, D. (February, 2019). *Disordered eating in male and female African American adolescents*. Poster presented at the annual meeting of the Society for Cross-Cultural Research, Jacksonville, FL.

Jordan, B., Witherspoon, D., & Black, M. (February, 2019). *How food insecurity affects child health*. Poster presented at the annual meeting of the Society for Cross-Cultural Research, Jacksonville, FL.

Jordan, B., Witherspoon, D., & Chu, C. (April, 2018). *The relationship between parental bonding in childhood and suicide ideation in young adults*. Poster presented at the annual meeting of the American Association of Suicidology, Washington, D.C.