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### The Impact Food Insecurity Has on Children in Elementary School

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**The Impact Food Insecurity Has on Children in Elementary School**

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A Synthesis Project

Presented to the

Department of Kinesiology, Sport Studies, and Physical Education

SUNY Brockport

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In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Education

(Physical Education)

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by

Kyle Bouchard

5/10/2021

SUNY BROCKPORT  
BROCKPORT, NEW YORK

Department of Kinesiology, Sport Studies, and Physical Education

The Impact Food Insecurity Has on Children in Elementary School

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*Dan Raimondo*

May17, 2021

Instructor Approval

Date

Accepted by the Department of Kinesiology, Sport Studies, and Physical Education, SUNY Brockport, in partial fulfillment of the requirements for the degree Master of Science in Education (Physical Education).

*Cathy Houston-Wilson*

5/20/2021

Chairperson Approval

Date

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### **Abstract**

Food insecurity is an issue that impacts many people, and these impacts present themselves in many different ways when it comes to elementary school students. This synthesis was conducted by coming up with specific search criteria in order to find out what was being presented in the current research. As a result of this search and analysis, it was found that elementary school students who experienced food insecurity during childhood were negatively impacted in the areas of academic performance, physical health, behavioral health, mental health, and emotional health. Something else that was found was that these children who experienced food insecurity may have been at a higher risk for food insecurity during young adulthood as a result of these experiences. Although there were many negative impacts identified as a result of food insecurity, there was also research found that stated food assistance programs can be utilized in a way that helps children and families deal with this issue. Going forward, it is suggested that food assistance programs be updated and supported by those in positions of power in order to help families and decrease some of the negative impacts seen among children in elementary school. In the end, the purpose of this synthesis project was to review the literature on the impact food insecurity has on children in elementary school.

## Chapter 1: Introduction

Food insecurity has long been a persistent issue in many different countries, and policymakers in these countries continue to work to help families become financially secure so that they can have appropriate access to food sources. In order to put the issue of food insecurity into a clearer context, it is reported that as recently as the early 2000's there were nearly 17 million households in the United States alone that reported experiencing financial difficulties that led to inadequate access to proper food sources. In addition to these households and families not having adequate access to proper food sources, it is reported that children are particularly impacted in multiple areas as a result of hunger and poor nutrition (Howard, 2011).

Food insecurity can result in many specific outcomes, and this synthesis will examine these specific outcomes for elementary school students, their families, and their households. One example of a specific outcome for elementary school students is in the area of academic performance. Esfandiari et al. (2018) reports that when studying the overall household, food insecurity resulted in lower grades in all subjects studied. These researchers also report that when they studied the individual elementary student they found that there was a significant association between low food security and lower grades in all the subjects they studied. According to Jyoti et al. (2005), food insecurity for elementary school students in Kindergarten resulted in hindered academic performance for both boys and girls in the specific areas of reading and math.

In addition to impacts on academic performance, it has also been reported that there are impacts seen in the area of physical health and well-being. Jyoti et al. (2005) reports that food insecurity among elementary school students is associated with weight gain and increased body mass index (BMI), specifically for girls. Kimbro and Denney (2015) also reports that parents in households where food insecurity is present reported their child's overall physical health being worse as compared to parents reporting from a food secure household.

There are other areas of an individual's health that are also affected by food insecurity. These areas include behavioral, mental, and emotional health and well-being. Kimbro and Denney (2015) reports that elementary school students who experience food insecurity may struggle with external behaviors such as aggression, as well as internal behaviors such as depression and anxiety. Jyoti et al. (2005) also reports findings in the areas of behavioral, mental, and emotional health as it relates to food insecurity. These researchers report that food insecurity can act as a psychological and emotional stressor, and that these stressors being present as a result of food insecurity can lead to negative behaviors.

While focusing on how food insecurity impacts elementary school students, it becomes more apparent that some of these experiences during childhood may lead to issues presenting themselves during young adulthood. Wolfson et al. (2020) reports that young adults had a lower chance of being food insecure if, during their childhood, they had parents who had at least a medium level of nutritional knowledge. These researchers also reported that young adults had a lower chance of being food insecure if their parents involved them in the food preparation process during their childhood. In the end, Wolfson et al. (2020) reports that elementary school students being involved in food preparation, and having parents who have a



certain level of nutritional knowledge, can help them moving forward in their own lives as young adults.

Although these issues are present, there are many different programs that currently exist in order to combat food insecurity. Campbell et al. (2019) makes the case for updating and expanding programs such as the special supplemental nutrition program for women, infants, and children (WIC); the child and adult care food program; the national school lunch and breakfast programs; the summer nutrition programs; the fresh fruit and vegetable program; and the farm to school grant program. Corcoran et al. (2016) also makes the case for updating and implementing the school breakfast program by moving school breakfast time from the cafeteria into the classroom. Frongillo et al. (2006) also reports that elementary school students who are experiencing food insecurity benefit academically if they are actively involved in the food stamp program. All of these researchers agree that programs exist to combat this issue and that they need to be put to use in order to benefit elementary school students, their families, and their households.

### **Statement of the Problem**

It is well reported across the literature that food insecurity has a negative impact on elementary school students in many different areas of their lives. Food insecurity may specifically impact elementary school students in areas such as lower grades in all or certain subjects, gains in weight and BMI, externalizing negative behaviors, internalizing negative behaviors, and increases in psychological and emotional stress (Esfandiari et al., 2018; Jyoti et al., 2005; Kimbro & Denney, 2015). It is also reported across the literature that the more

children are involved in the food preparation process, and the more nutritional knowledge parents have, the more likely these children will have food security during young adulthood (Wolfson et al., 2020). Although these issues are present in our society today, the literature also points out that programs currently exist that can aid elementary school students and their families who may be struggling with food insecurity (Campbell et al., 2019; Corcoran et al., 2016). In the end, there are many potential negative outcomes for elementary school students and their families, but there are also many potential improvements that could be made through existing support programs.

### **Purpose of the Synthesis**

The purpose of this synthesis is to review the literature on the impact food insecurity has on children in elementary school.

### **Operational Definitions**

1. Elementary School Students – Children who attend school and are in grades K-8.
2. Food Security – “The assured access of all people to enough food for a healthy and active life.” (Bartfeld & Collins, 2017).
3. Food Insecurity - “Not having access at all times to enough food for a healthy, active lifestyle.” (Kimbrow & Denney, 2015).

### **Research Questions**

The following questions will be used in order to guide the primary focus of this synthesis review:

1. Does food insecurity impact students in elementary school? If so, how many elementary school students and families are impacted by this issue?
2. Does food insecurity specifically impact elementary school students when it comes to their academic performance?
3. Does food insecurity specifically impact elementary school students when it comes to their physical health and well-being?
4. Does food insecurity impact elementary school students when it comes to their behavioral, mental, and emotional health and well-being?
5. What can be done during childhood in order to give elementary school students a better chance of being food secure in their own lives as young adults?
6. Are there existing programs out there to help elementary school students and their families battle food insecurity? If so, how would these programs specifically go about turning this issue of food insecurity around?

### **Delimitations**

1. All articles used in this synthesis were peer-reviewed and an accurate representation of the consensus thinking as it pertains to this topic.
2. This synthesis focuses on elementary school students, their families, and their households.
3. Peer reviewed scholarly articles not only focus on elementary school students, their families, and their households. They also focus on academic performance, physical health and well-being, mental health and well-being, behavioral health and well-being,

emotional health and well-being, impacts of childhood food insecurity on young adults, and existing programs designed to combat this issue of food insecurity.

## Chapter 2: Methods

The purpose of this chapter is to review the methods and procedures used to determine the impact food insecurity has on children in elementary school. More specifically, these methods and procedures were used to find out how food insecurity impacted children in specific areas such as academic performance, physical health and well-being, and behavioral/mental/emotional health and well-being. In addition to these specific areas, it was a goal of this synthesis to study severity of the issue, connections between childhood experiences and young adulthood experiences, and existing programs and how these programs could potentially help with the issue of food insecurity. This chapter will go into greater detail about how this information was specifically gathered in order to provide information that fits the purpose of this synthesis.

In order to collect studies for this synthesis, the online database center through SUNY Brockport's Drake Memorial Library was used. The next step in the process was to click on the "databases by subject" heading on the library's homepage. Under this heading there were three subjects chosen: Education; Kinesiology, Sports, and Phys. Ed. (KSSPE); and Public Health & Health Ed. Under the education section the only database that was used was the education source database. Once entered into the education source database, the keywords used to find specific articles were "food insecurity and elementary students." Using these keywords resulted in 42 total results, and three of these articles were used in this synthesis. The criteria used to select these three articles included finding articles that described how food insecurity impacted elementary school children in the areas of overall health and well-being, non-cognitive development, and participation in food assistance programs.

The next subject that was chosen for database selection was KSSPE (Kinesiology, Sports, & Phys. Ed.). Under the KSSPE section there were three separate databases used: SPORTDiscus, ScienceDirect, and Academic Search Complete. Once entered into the SPORTDiscus database, the keywords used to find specific articles were “food insecurity and academic performance.” Using these keywords there were 19 total results, and two of these articles were used in this synthesis. The criteria used to select these two articles included finding articles that mainly focused on how food insecurity impacted elementary school children in areas such as academic performance, weight, and social skills.

After the SPORTDiscus database was used, ScienceDirect was the next database that was used. The keywords used to find specific articles in ScienceDirect were “food insecurity and elementary students.” This resulted in over 800 different results, so the next step taken was to filter for only research articles. Using these keywords, and filtering for only research articles, the search found 474 total results, and one of these articles was used in this synthesis project. The criteria used to select this one article was more specific, and it included finding articles that mainly focused on how child nutrition programs could be used and improved in order to fight the issue of food insecurity.

Academic Search Complete was the next database that was used. There were two separate sets of keywords used to find specific articles in Academic Search Complete: “food insecurity and elementary school students” and “food insecurity and student behavior.” Using the keywords “food insecurity and elementary school students” resulted in 77 total results, and one of these articles was used in this synthesis. The criteria used to select this one article was more specific, and it included finding articles that mainly focused on how different financial

difficulties and coping strategies impacted food insecurity status among elementary school students and their families. Using the keywords “food insecurity and student behavior” resulted in 188 total results, and one of these articles was used in this synthesis. The criteria used to select this one article was more specific, and it included finding articles that mainly focused on food insecurity among elementary school students and how this related to their behavior in school and overall health status.

The next subject that was chosen for database selection was Public Health & Health Ed. Under the Public Health & Health Ed. section the only database that was used was the PsycInfo database. There were two separate sets of keywords used to find specific articles in PsycInfo: “food insecurity and young adulthood” and “food insecurity and school breakfast.” Using the keywords “food insecurity and young adulthood” resulted in 21 total results, and one of these articles was used in this synthesis. The criteria used to select this one article was more specific, and it included finding articles that mainly focused on how different childhood experiences with food insecurity may impact those same children as they enter into young adulthood. Using the keywords “food insecurity and school breakfast” resulted in 16 total results, and one of these articles was used in this synthesis. The criteria used to select this one article was more specific, and it included finding articles that mainly focused on how school breakfast programs may function more efficiently if students eat the breakfast in the classroom rather than the cafeteria.

After all these databases were used, further articles were needed in order to complete this synthesis. In order to do this a general search was conducted through the library’s main search bar on the homepage. One set of keywords was used to find specific articles through the

search bar, and the keywords were typed in as follows: “food insecurity and elementary school students.” The results were then filtered down into only peer reviewed journal articles and only those that fell between the years 2011 and 2021. Using the keywords “food insecurity and elementary school students,” as well as applying the filters, resulted in 947 total results. Out of these 947 results, three articles were used as part of this synthesis. The criteria used to select these three articles were more specific because they needed to provide more data in specific areas of this review. The criteria included finding articles that mainly focused on the severity of food insecurity, how childhood experiences can impact young adults, and how food insecurity impacts physical health and well-being.

The next step in the synthesis process was to break down the individual articles more specifically. From the education source database there were three articles used in this synthesis. The first article written by Frongillo et al. (2006) came from *The Journal of Nutrition*, and the subjects studied in this article included 21,260 students who were then narrowed down into a group of 10,600 students. Parents and teachers were surveyed and students were directly assessed in order to gather meaningful results. Multiple linear regression, logarithmic transformations, means, regression coefficients, SAS surveyreg procedures, cross-tabulation, trend analysis, and some text analysis were all methods used to analyze the data in this article.

Another article by Howard (2011) came from the *Economics of Education Review*, and the subjects studied in this article included 4,710 children in grades 1, 3, and 5. Questionnaires were given to teachers to fill out and return as they observed specific areas of student behavior. Descriptive statistics, combined with previously developed specific criteria, were used to analyze the data in this article.



The next article by Ryu and Bartfeld (2012) came from the *American Journal of Public Health*, and the subjects studied in this article included 21,260 students who were included in the previously developed Early Childhood Longitudinal Study-Kindergarten Cohort. The researchers then developed criteria for different levels of food insecurity and connected these levels of food insecurity with different health outcomes. Statistical analysis methods and logistic regression models were the methods used to analyze the data in this article.

Two articles from the Sportdiscus database were used in this synthesis. Esfandiari et al. (2018) can be found in the *Journal of Nutrition Education and Behavior*, and subjects included a cross-sectional study of 803 students across 43 primary schools. Direct observations, questionnaires, and background data analysis were methods used in order to gather data on these subjects. Linear regressions and multinomial regressions were both methods used to analyze the data in this article. The research by Jyoti et al. (2005) came from *The Journal of Nutrition*, and the subjects studied in this article included approximately 21,200 students from the Early Childhood Longitudinal Study-Kindergarten Cohort. Areas such as height, weight, and academic performance were directly assessed while social skills were observed and reported on by teachers. Lagged, dynamic, and difference models were all used to analyze and synthesize the data in this article.

The ScienceDirect database was the next database to be searched, and this search provided one article that was found and used in this synthesis. Campbell et al. (2019) is published in the *Journal of the Academy of Nutrition and Dietetics*, and specific child nutrition programs that needed to be updated and reauthorized were the main subjects of this study. These researchers focused on these specific programs while advocating for governmental

support in updating and reauthorizing them. Relational content analysis was used throughout this article to analyze the relationships between these child nutrition programs and different food insecurity outcomes.

Two more articles were found that applied to this synthesis, and these articles were found in the Academic Search Complete database. Bartfeld and Collins (2017) authored an article in the *Journal of Consumer Affairs*, and these authors studied families through the Wisconsin Survey of Household Food Needs. In order to gather data, the researchers used surveys from students and families across 26 elementary schools, most of which were considered low income and located in a mix of rural and urban areas. Logistic regressions and analogous models were both methods used to analyze the data. Kimbro and Denney (2015) authored the second article that was in *Health Affairs (Project Hope)*, and parents, teachers, and administrators at different elementary schools were their main subjects. Parent interviews, direct assessments, and questionnaires were all used to gather specific data on food insecurity. Bivariate relationships, t-tests, weighted ordinary least squares regression models, and school fixed effects were all used to analyze the data in this article.

In addition to the already mentioned articles, a detailed search of the PsycInfo database resulted in two articles being used in this synthesis. Corcoran et al. (2016) had their article appear in the *Journal of Policy Analysis & Management*, and they studied students and specific school breakfast programs located in New York City. Researchers studied these students and specific programs in order to gather data on how each of these programs potentially impacted students' lives in different areas. Difference-in-differences regression models and cross-tabulation analysis were the analytical methods used in this article. Wolfson et al. (2020)

authored another article used in this synthesis and this article came from the *American Journal of Preventive Medicine*. The subjects studied in this article were part of the Panel Study of Income Dynamics' Child Development Supplement. These subjects also included those who had full food insecurity data available from childhood and adulthood, as well as those who were living independently as of 2015. Simple and multivariable logistic regression analyses were both used as analytical methods throughout this article.

In addition to the previous searches for articles, a general search was performed through the main library homepage search bar. This general search resulted in three more articles that were applicable to the topic. Gee and Asim (2019) was published in the *Journal of Family Issues*, and this article studied 18,200 students in kindergarten and first grade and their parents. These subjects were interviewed and given surveys in order to collect data for this study. First-difference regression and mediation analysis were both methods used to analyze the data in this article. Jackson et al. (2017) wrote an article that appeared in *Health Education and Behavior*, and this article included parents of 186 elementary school students. These parents were given surveys, and researchers directly assessed "anthropometrics" for all the children. Data analysis performed in this article included logistic and linear regressions. Lee et al. (2018) submitted an article to a publication called *Nutrition*, and it pulled 8,167 students from the existing Early Childhood Longitudinal Study-Kindergarten Cohort. Their parents and teachers were included in the study as well. Surveys and "anthropometric data" were used in order to gather data. SAS 9.4, survey regression adjusted means analyses, and survey logistic analyses were all different analytical methods used by the researchers.

While searching these databases, there were some limitations and challenges that presented themselves. For example, there seemed to be a lot of results for the different searches that were performed. It was challenging to comb through these results and find articles that were relevant to the topic of study. One limitation of this article search was the fact that many articles studied students in very similar ways. This limited the ability to see different research methods and procedures, and how these different methods and procedures impacted the results.

### **Chapter 3: Review of Literature**

The purpose of this chapter is to present a review of literature on the impact food insecurity has on children in elementary school. More specifically, the following topics will be reviewed: severity of the issue, impact of food insecurity on academic performance, impact of food insecurity on physical health, impact of food insecurity on behavioral health, impact of food insecurity on mental health, impact of food insecurity on emotional health, childhood experiences and how they relate to food insecurity in young adulthood, and food insecurity support programs and how they can help students and families. As a result of reviewing the literature it is agreed upon that food insecurity has major impacts in all of these specific areas.

When we think about food insecurity, people know it is an issue that faces many individuals. What these people sometimes don't realize is how severe this issue truly is and how this issue can impact young students in such crucial areas of their lives. Before going into these specific impacts in crucial areas, it is important to first start with information on just how severe the issue of food insecurity truly is.

#### **Severity of the Issue**

To start off in a more general sense, it is important to look at the issue of food insecurity and try to understand the severity of the issue. Bartfeld and Collins (2017) talk about the severity of food insecurity through the lens of financial struggles and financial coping strategies, and how these different factors may impact elementary school children and their families. Researchers collected surveys from families through the Wisconsin Survey of Household Food Needs. Surveys were sent home with students and were asked to be completed and returned

anonymously by parents/guardians. Researchers collected surveys from students across 26 elementary schools. Schools were mainly low income, and also located in a mix of urban and rural areas. 2,803 surveys were returned in total, with 2,778 surveys bringing back useable results.

As a result of these methods and procedures, the researchers found that the issue of food insecurity can be a severe issue among elementary school students and their families, and this can lead to serious implications related to different aspects of financial hardship. Going forward the researchers suggest that public assistance programs continue to assist families with this issue, and they also recommend families be assisted more financially going forward (Bartfeld & Collins, 2017).

Lee et al. (2018) adds support to the idea that food insecurity is a very prevalent issue. This article discusses the severity of the issue in a more general sense, but it also goes into specifics about how food insecurity impacts students and their weight status. These researchers pulled data from the Early Childhood Longitudinal Study-Kindergarten Cohort, and they narrowed down their subject pool into 8,167 students, their teachers, and their parents. In order to collect data from these subjects, surveys were handed out to teachers and parents. Researchers also studied existing “anthropometric data” in order to gain a better understanding of the students. In a more analytical sense, the researchers implemented methods such as SAS 9.4, survey regression adjusted means analyses, and survey logistic analyses.

As it relates to severity of the issue specifically, it is suggested that food insecurity impacts about 10 percent of families who have a child in kindergarten. Food insecurity was also

found to be most present in low-income households, with about 22% of respondents coming from these low-income households. On the other hand, food insecurity does still impact those coming from households that are not considered low-income. In the end, it is noted that food insecurity is a severe issue that has impacted children and families from multiple backgrounds, and assistance programs need to be strengthened and more accessible in order to help this issue going forward (Lee et al., 2018).

### **Impact of Food Insecurity on Academic Performance**

After studying the general severity of the issue of food insecurity, the next topic that will be examined is how food insecurity impacts elementary school students in the specific area of academic performance. Esfandiari et al. (2018) sets out to examine the relationships between food insecurity, academic performance, and weight status in elementary school students who live in urban areas. In order to study these relationships, these researchers recruited a total of 803 students from 43 different primary schools. This pool of 803 students included 419 boys and 384 girls, and all students were in the range of 10-12 years old.

The researchers started by first assessing which level of food insecurity students and their families were at. They did this by examining a validated household food security survey, which included 18 different identifying items. After they determined levels of food insecurity, they studied the impact food insecurity had on academic performance for these students. The researchers did this by having teachers use a 20-item questionnaire in order to assess students' academic performance. Students were evaluated qualitatively and quantitatively in the areas of math, reading, science, spelling, composition, and social science. The grades that students

earned in these subjects earned them a score of 0-20 on the quantitative scale, and general teacher observations of the specific students earned these students a score of 1-7 on the qualitative scale. Researchers also used linear and multinomial regression models in order to analyze the data they collected (Esfandiari et al., 2018).

As a result of these methods and procedures, researchers found that food insecurity resulted in lower achievement in all subjects that were studied. Even when the researchers accounted for different factors that could have impacted the results, they still found a significant association between food insecurity and academic performance. There were also three major factors identified that could explain why there is such a strong association between these two items: decreased quantity and quality of diet, malnutrition, and hunger (Esfandiari et al., 2018).

In addition to the information found in Esfandiari et al. (2018), food insecurity's impact on academic performance is found in other sources. For example, Jyoti et al. (2005) sets out to investigate how food insecurity impacts math and reading scores, weight and BMI, and social skills in elementary school children. In order to study these different factors, the researchers used existing data from the Early Childhood Longitudinal Study-Kindergarten Cohort. This study included approximately 21,200 children who were in grades K-3. Data was not collected through experimental methods, and instead was collected through surveys and direct assessments. In order to determine severity of food insecurity status, the researchers surveyed parents and placed students and their families into four categories: persistent food secure, persistent food insecure, became food insecure, and became food secure. In order to study academic performance specifically, the researchers assessed students using mathematical



proficiency tests and reading proficiency tests. The researchers also used lagged, dynamic, and difference models in order to analyze the data collected.

As a result of these methods and procedures, the researchers found that food insecurity among these students led to lower academic achievement in both math and reading for both boys and girls. More specifically, the presence of food insecurity early on in kindergarten had the greatest impact on students having lower academic achievement across grades K-3 (Jyoti et al., 2005).

### **Impact of Food Insecurity on Physical Health and Well-Being**

In addition to food insecurity having major impacts on academic performance, there are also impacts reported when it comes to the physical health and well-being of elementary school students. Ryu and Bartfeld (2012) set out to examine food insecurity patterns and connect these patterns with overall health status in elementary school students. In order to examine these connections, the researchers pulled data from the Early Childhood Longitudinal Study-Kindergarten Cohort. Researchers placed students and families into different categories of food insecurity based on reported levels of this food insecurity over a four year period. Researchers gathered data on students, parents, and administrators and they mostly used data they collected through surveys given to parents of students in kindergarten, third grade, fifth grade, and eighth grade. Researchers also selected only those students who had full data during all four grade levels, and then they further limited their selection pool by limiting it to only students who had full health status information for both kindergarten and eighth grade.

Statistical analysis methods, including logistic regression models, were used in order to analyze the data collected.

As a result of these methods and procedures, researchers found that food insecurity presented itself more as a transitional issue as compared to a permanent/persistent issue. When looking at those students impacted by transitional states of food insecurity, researchers found that food insecurity did not have as great of an impact on overall physical health status. On the other hand, researchers found that if food insecurity was more permanent and persistent then this lead to significant impacts on physical health status for students by the time they reached eighth grade (Ryu & Bartfeld, 2012).

Similarly, Kimbro and Denney (2015) reported on the relationships between food insecurity and factors such as behavioral problems and overall health status in elementary school students. In order to gather data for this study, researchers interviewed parents, directly assessed students, and handed out questionnaires to administrators. Data was collected during the spring of kindergarten and first grade for students. Instead of using the entire pool of students, researchers limited their study pool to only those students who had valid assessments in the spring of first grade and those who had valid parent assessment information in the spring of both kindergarten and first grade. Bivariate relationships, t-tests, weighted ordinary least squares regression models, and school fixed effects were all used in order to analyze and synthesize the data collected.

As a result of these methods and procedures, researchers found that parents who had students living in a food insecure household rated their child's overall health worse as

compared to parents who had students living in a food secure household. Researchers determined that more specific, advanced studies need to be performed and more comprehensive data needs to be collected in order to truly understand the impacts of food insecurity on overall physical health and well-being (Kimbrow & Denney, 2015).

Jackson et al. (2017) did not study the large quantity like similar studies, but the research does have a similar purpose and the results mirror what has been seen in other studies. The purpose of this article was to study the connections between family home nutrition and physical activity (FNPA) and obesity as a result of food insecurity in rural settings. The subject pool included parents of only 186 children in elementary school. In addition to surveys being handed out to these parents, researchers also studied “anthropometrics” for all children involved in the study. In order to analyze the data, the researchers used logistic and linear regressions methods.

After going through all these methods and procedures, the researchers found that about 37% of children were either overweight or obese, and about 43% of families were at a higher risk for food insecurity. Also, there were benefits seen in the areas of overweight and obesity when families limited TV time and intake of unhealthy foods. Children should be given more opportunities for healthy eating, more resources should be given to these families for assistance, and further research needs to be conducted in order to understand the specifics of the issue going forward (Jackson et al., 2017).

### **Impact of Food Insecurity on Behavioral, Mental, and Emotional Health and Well-Being**

In addition to students being impacted by food insecurity in the areas of academic performance and physical health and well-being, food insecurity negatively impacts students in the areas of behavioral, mental, and emotional health and well-being. Howard (2011) sets out to investigate how food insecurity, and varying levels of severity, can impact the non-cognitive performance of students in elementary school. In order to investigate this issue, the researchers took an analytic sample of 4,710 students in first grade, third grade, and fifth grade. The teachers of these students were all given questionnaires and they observed and reported on students in four main categories: interpersonal relations, self-control, approaches to learning, and externalizing problem behaviors. Students were rated on a scale of 1 (never) to 4 (very often), and this skill rating system was taken from a system that was already in place. Researchers also used descriptive statistics and this specific criteria in order to analyze the data they collected.

As a result of these methods and procedures, the researchers found that food insecurity negatively impacts non-cognitive skills in elementary school students. These researchers found significant negative impacts on a child's development in the areas of self-control, interpersonal relations, and approaches to learning. On the other hand, these researchers did not find a significant relationship between food insecurity and externalizing problem behaviors. They suggest going forward that students and their families need more access to welfare programs that assist them in obtaining the necessary amount of resources needed to get out of a food insecure state (Howard, 2011).

As was stated earlier in this review, Kimbro and Denney (2015) reported on the relationships between food insecurity and factors such as behavioral problems and overall health status in elementary school students. Physical health and well-being of students was the focus of the earlier review, and this time the focus was on behavioral, mental, and emotional health and well-being. The methods and procedures are the same as were described in the earlier review.

As a result of these methods and procedures, researchers found significant impacts in the areas of interpersonal skills and self-control. Their results differ from those discussed in Howard (2011) because Kimbro and Denney (2015) discovered these outcomes as a result of transitions in and out of food insecurity. When it comes to more persistent food insecurity, these researchers discovered that this persistence lead to students struggling with internalizing behaviors such as anxiety and depression. These researchers recommend more advanced studies be conducted in order to gather more detailed data as it pertains to how food insecurity specifically impacts students in elementary school (Kimbro & Denney, 2015).

### **Childhood Experiences and How They Relate to Food Insecurity in Young Adulthood**

Although we have already seen some of the areas in which food insecurity can impact elementary school students, it is important to also point out that these experiences with food insecurity during childhood can have an impact on people as they enter young adulthood. Wolfson et al. (2020) sets out to examine how parental and behavioral factors during childhood may impact experiences with food insecurity in young adulthood. In order to gather data, the researchers used the Panel Study of Income Dynamics' Child Development Supplement.

Subjects studied included individuals who had fully available food insecurity data from childhood, as well as those young adults who were living independently as of 2015. The researchers used multiple analysis methods in order to study parental nutritional knowledge, food preparation during childhood, and time spent involved in shopping for food during childhood. Existing interview data, follow up interview data, and information from time diaries filled out during middle childhood were all used in order to gather data in these different areas.

As a result of these methods and procedures, the researchers found that if parents had at least a medium level of nutritional knowledge then children had a lower chance of becoming food insecure during young adulthood. The same result was true when it came to children being involved in the food preparation process. On the other hand, the researchers did not find a significant connection between being involved in food shopping during childhood and young adulthood food insecurity. Researchers suggest that going forward parents need to educate themselves nutritionally and involve their children in the food preparation process as much as possible in order to set them up for success when they eventually go out on their own as young adults (Wolfson et al., 2020).

Although Gee and Asim (2019) does not directly connect childhood experiences and how these experiences impact food insecurity in young adulthood, this article does portray some of the negative situations children may encounter. These experiences are generally a result of the behavior of their parents, which is an important factor in other similar articles. This specific study sets out to study how food insecurity can impact the moods and behaviors of parents, and how these moods and behaviors may potentially impact children. A pool of 18,200 students in kindergarten and first grade were pulled from the 2010/2011 years of the Early

Childhood Longitudinal Study-Kindergarten Cohort. Surveys and interviews with children and their parents were the main sources of data collection in this study. In order to analyze the collected data, these researchers used methods such as first-difference regression and mediation analysis.

Researchers found that children in first grade who were experiencing negative situations as a result of food insecurity had parents who were experiencing a heightened level of frustration/aggravation. It is suggested that parents who are experiencing stress be given more support, and this may in turn help their children with negative outcomes associated with seeing stress in parents (Gee & Asim, 2019).

### **Food Insecurity Support Programs and How They Can Help Students and Families**

Food insecurity has been shown to have various impacts on elementary school students when it comes to outcomes such as academic performance, physical health, emotional health, behavioral health, mental health, and young adulthood food insecurity. Although there are many negative impacts when it comes to food insecurity, there are programs out there that could potentially help improve this issue. Campbell et al. (2019) sets out to detail the importance of child nutrition programs in relation to food insecurity, as well as advocate for the reauthorization of these programs by the appropriate government agencies. Instead of going through and performing research studies on specific subjects, these authors instead dove deep into multiple child nutrition programs. They analyzed these programs and broke them down in order to advocate for and express their importance in the fight against food insecurity. These authors looked at programs such as The Special Supplemental Nutrition Program for Women,

Infants, and Children (WIC), the child and adult care food program, the national school lunch and breakfast programs, and many more. In order to analyze these programs, the authors used a relational content analysis approach.

As a result of these methods and procedures, the authors found that child nutrition programs are very helpful in supporting those who struggle with food insecurity. These researchers also found that these programs are long overdue for a reauthorization (Campbell et al., 2019).

In addition to an overall view of various food insecurity support programs, Corcoran et al. (2016) focuses in on the School Breakfast Program and if moving this program into the classroom impacts academic performance, BMI/weight status, consumption, and nutrition. These researchers pulled data from four different sources that were connected to school breakfast programs in New York City. The researchers then used analytical approaches such as difference-in-differences regression models and cross-tabulation analysis in order to analyze the impacts of school breakfast being moved into the classroom on these different outcomes.

There were no significant impacts found after moving breakfast into the classroom in the areas of BMI/weight status, math and reading scores, and overall academic achievement, but researchers did report an increase in consumption of breakfast and nutritional levels. Researchers suggest moving school breakfast into the classroom in order to increase consumption and nutrition, even though they do not report any major benefits in academics and specific health areas (Corcoran et al., 2016).



In addition to focusing on these programs and how they impact students, Frongillo et al. (2006) dives deeper into the Food Stamp Program and how participation in this program can improve struggles with food insecurity and improve academic performance. 21,260 children from the Early Childhood Longitudinal Study-Kindergarten Cohort were narrowed down into a group of 10,600 children in kindergarten and third grade. Both parents and teachers were given surveys in order to assess students in certain areas, and students were directly assessed in other areas in order to gather data. Methods such as multiple linear regression, logarithmic transformations, means, regression coefficients, SAS surveyreg procedures, cross-tabulation, trend analysis, and text analysis were used in order to analyze and synthesize the data collected.

As a result of these methods and procedures, the researchers found strong connections between participation in the Food Stamp Program and positive impacts on academic learning, especially during the first four years of elementary school (Frongillo et al., 2006).

### **Summary**

There are many peer-reviewed articles that conclude that food insecurity impacts elementary school students and their families in multiple ways. These impacts can be seen in the areas of academic performance, physical health, emotional health, mental health, behavioral health, and transitions into young adulthood. Compared to food secure peers, these food insecure students achieved lower in specific subjects, had a higher risk of weight gain and obesity, internalized negative behaviors, externalized negative behaviors, struggled with social

interaction, and had a higher risk of becoming food insecure in young adulthood. These negative outcomes were dependent on different individual risk factors.

The individual risk factors that resulted in negative outcomes for students included level/severity of food insecurity, financial stability, access to support programs, involvement in food preparation, level of nutritional knowledge, stress level/frustration, and many more. Children saw the severity of their outcomes differ depending on these different risk factors, and there were differences in how students and parents responded in comparable situations. Although there were negative outcomes found, there are suggestions that could help improve these outcomes if deployed correctly.

Going forward it is suggested that food insecurity support programs be updated and more easily accessible for students and families. These programs do not always directly lead to more positive outcomes for students, but they do provide students and families a way to get started on the right track. It is also suggested that children become involved in the food preparation process as much as possible, and that parents educate themselves when it comes to nutrition. Almost all researchers who provided information on this topic suggested that more research needs to be conducted in order to truly understand the specific ways in which elementary school students and their families are impacted by this issue.

#### **Chapter 4: Discussion, Conclusions, Limitations, and Recommendations for Future Research**

The purpose of this chapter is to summarize and discuss the results of the literature found on the impact food insecurity has on children in elementary school. In addition to discussing the results of the literature, this chapter will also discuss the limitations of the articles described in the literature review and give recommendations for future research.

The results of the literature review included similar findings across multiple areas. One area in which results were presented was in the area of food insecurity and the impact on academic performance. In this area, it was found that children in elementary school who experienced persistent food insecurity achieved less in most subject areas. The literature also showed that food insecurity negatively impacted children in the area of physical health, by increasing their risk of being overweight or obese. In addition to impacting students' physical health, food insecurity also negatively impacted students when it came to their emotional, mental, and behavioral health. The literature found that students who experienced persistent food insecurity had a more difficult time by internalizing negative behaviors, externalizing negative behaviors, and interacting socially with their peers. Researchers also found that experiencing persistent food insecurity during childhood had the potential to lead to struggles with food insecurity during young adulthood.

In addition to the results being discussed, there are also limitations of the literature reviewed that need to be discussed. As a result of these limitations, there are a few recommendations that will be presented in order to improve on these limitations going forward.

## Discussion

### Interpretations

The first research question that was posed had to do with whether or not food insecurity impacts children in elementary school, and if so, how severe is the issue. Bartfeld and Collins (2017) found correlations between financial hardship, financial coping strategies, and food insecurity among children and their families. Specifically, this article states that families who struggle financially have a more difficult time meeting food needs. Lee et al. (2018) also provided results in the area of severity of the issue, and this article found similar results. The authors suggested that food insecurity impacts about 10 percent of families who have a child in kindergarten, especially those children and families who come from low-income backgrounds. There were similarities found between these two sources because both articles portrayed the severity of the issue and that this severity is related to financial struggles and low income. These are the results that were expected when this synthesis project was started, and the financial aspect was not surprising at all. One thing that was unexpected was that food insecurity also impacts students who do not come from low-income families (Lee et al., 2018). These unexpected results have significance because it allows us to take a step back and to not judge children and their families by thinking this is only a low-income issue. We need to help those families who are most vulnerable, while at the same time realizing the issue goes beyond just these families and not forget about all students who may be struggling.

To get more specific in the review of the impacts of food insecurity, the next research question looked at the impacts of food insecurity on academic performance. Esfandiari et al.

(2018) found that students who were food insecure had lower grades in all subjects studied. Jyoti et al. (2005) also found that students in grades K-3 who experienced food insecurity had lower academic achievement, especially in reading and math. The common themes across these two articles included finding negative correlations between food insecurity and academic performance among elementary school students. The subjects where the most impact was found was in reading and math. It was expected that students would achieve lower in academics, but it was unexpected to only see significant impacts in math and reading. Going into this it was expected that students would struggle in all subjects due to this issue, not only reading and math. This has significance, because it allows us to help students in these concentrated areas going forward. Other subjects may need some focus, but we at least know the two that need the most so we can provide more support in these areas.

The next research question that was posed had to do with food insecurity in elementary school students and how this impacted their physical health. Ryu and Bartfeld (2012) found that if food insecurity was more persistent and permanent, then this led to worse overall physical health for children in elementary school. Kimbro and Denney (2015) did not find significant impacts in the area of academic performance, but it did find negative impacts on overall physical health status. The third article included in this part of the review, Jackson et al. (2017), found that 37% of their subjects were either overweight or obese. They also found that 43% of families studied were at risk of suffering from food insecurity. The commonalities between the results of these three articles included finding negative correlations between food insecurity and overall physical health status. This was expected because it makes sense that families who struggle with food insecurity may be forced to seek out cheaper and less healthy food. Eating

this type of food inevitably leads to a lower overall health status for individuals. A result that was unexpected was that the impacts of food insecurity were the strongest when food insecurity was a more persistent and permanent state (Ryu & Bartfeld, 2012). I would have thought food insecurity had negative impacts on students regardless of whether it was a more permanent state or a more transitional state. This is significant because it allows us to find a starting point and to at least help families transition from persistent food insecurity into a more temporary state. Eventually, we would want to transition families into a place of food security, but knowing these results at least provides a realistic goal at which to start.

After the question relating to physical health, the next research question focused on how food insecurity impacted behavioral, mental, and emotional health. Howard (2011) concluded that children who experience food insecurity are negatively impacted when it comes to their non-cognitive skill development. Also, the findings of Kimbro and Denney (2015) said that students saw significant negative impacts in the areas of behavioral outcomes, interpersonal skills, self-control, externalizing behaviors, and internalizing behaviors. The findings across these articles were very similar in the fact that they both portray the severity of the issue of food insecurity as it relates to behavioral control and emotional health for children. It was a little surprising to see just how severe these impacts were. It was expected things like focus and attention would be impacted, but it was very surprising to see that children this young were externalizing and internalizing negative behaviors. These results are significant because they can show us to not judge students when helping them through behaviors. Many times we can't understand why children are acting out, and these results will open our eyes and make us take a step back and understand where a student is coming from. Going forward we

need to help students through behaviors and understand they may be struggling with something like food insecurity instead of blaming them and pushing them further in the wrong direction.

The next research question focused more on how childhood experiences impacted young adults. Wolfson et al. (2020) focused on the impacts childhood food insecurity experiences may have on these same children as they enter young adulthood. These authors said that if parents had at least a medium level of nutritional knowledge, and if these children were regularly involved in the food preparation process, then these children had a lesser chance of being food insecure as a young adult. On the other hand, Gee and Asim (2019) focused more on the experiences with food insecurity that parents had and the stress they go through, and whether the resulting attitudes of these parents impacted their children. The results of these articles are connected because they both focus on how parent involvement can impact food insecurity and other aspects of a child's life. It was expected that parents held a high level of responsibility when it comes to food insecurity, but something that was unexpected was the importance of being involved in food preparation. As a result of knowing that children can be better set up for success if they help prepare meals and see their parents show fewer negative moods as a result of stress, parents can begin to adjust their moods and start involving their children more. Sometimes parents get caught up in their busy lives and they don't realize that their actions can impact their children, so hopefully these results will open their eyes.

The final research question in this synthesis looked at support programs and how these programs can help with the issue of food insecurity. Campbell et al. (2019) detailed multiple

child nutrition programs and found that these programs are very helpful in assisting students and families with food insecurity. These authors also found that these programs are in serious need of updating and reauthorization. Corcoran et al. (2016) focused more on moving school breakfast programs out of cafeterias and into classrooms. There were no major impacts as a result of moving breakfast programs into classrooms, but these authors did find that breakfast consumption increased. The third article included in this section of the review, Frongillo et al. (2006), focused specifically on the Food Stamp Program and how participation in this program positively impacts academic performance for children. All these articles present results that say food insecurity assistance programs provide resources that prove to be helpful for children and their families. One result that was unexpected was that food insecurity assistance programs seem to be out of date. It is concluded that these programs help, and it seems simple enough to allocate the proper resources in order to make these programs as strong as they can possibly be.

### **Implications**

Now that the results have been broken down and interpreted, it is important to dive into what exactly these results mean. Most previous research agrees with the current results that have been presented as a result of this synthesis review. It is agreed upon that persistent food insecurity has negative impacts on outcomes such as academic performance, physical health, behavioral health, emotional health, and mental health. This review also has similarities in the area of food assistance programs and how these programs can help move students into a more positive phase of food security. One thing that is added to the field, as a result of this review, is the literature review on how childhood experiences may impact children in a negative



way as they move into young adulthood. This is an aspect of food insecurity that was not studied in-depth in previous research, and it adds another dimension when studying the overall topic.

The findings of this review are not completely different from other findings in the field, but there are areas that are expanded upon which had not been examined extensively in previous research. Many studies may only look at one aspect of food insecurity and present the research on how this one outcome is impacted. This review paints a broader picture of the issue of food insecurity, and this may help those in positions of power better understand the issue. This may be the case because most previous research has a hypothesis on what the main negative outcome is as a result of food insecurity, whereas this review just takes information from multiple areas and presents it to the reader. This will hopefully allow those in positions of power to help more children and their families because more research will be done in more areas.

The results of this synthesis generally confirm what is found in existing theories. Although the approach and depth may differ from other studies, the results seem to agree with what others have presented in the field. The fact that this synthesis confirms what others have presented goes to show the legitimacy of the results, as well as the seriousness of the issue of food insecurity.

There will hopefully be practical implications as a result of this synthesis review. These would include increasing nutritional food intake, increasing parental nutritional knowledge, cutting down on negative academic outcomes, decreasing internalized and externalized

behaviors, and opening the eyes of those in power who can update food assistance programs and make them more accessible. As a result of painting a broader picture with these results, this will hopefully lead to more practical implications in more areas. This will help to increase the likelihood of making truly positive impacts in the lives of those who may be struggling.

### **Limitations and Recommendations for Future Research**

Although the results of the review are legitimate and provide vital information to the readers, there are some limitations within the studies that were used. One major limitation was that the research only studied how food insecurity impacts elementary school-age children. There could be many more people who suffer with this issue, but these studies only limited themselves to impacts on children. Another limitation was gathering data in very similar ways. There were many surveys handed out, and data was pulled from these existing surveys. There may sometimes be a disconnect or misinterpretation when not collecting your own data. Another limitation of the research was only analyzing the outcomes when it comes to food insecurity, instead of really diving deep into the reasons as to why these factors may lead to negative outcomes.

As a result of these limitations, there are a few recommendations for future research that should be considered. The following are recommendations that should be taken into account going forward:

1. Researchers should expand their subject pool to include older children, as well as young adults and older adults. This will help to understand the issue from more points of view than just young children.

2. The next recommendation would be to perform more original research, instead of depending on the data sets of other researchers. This will lead to a more updated data pool, as well as cut down on potential misinterpretations.
3. Another important recommendation for future research would be to break down the reasons as to why food insecurity specifically impacts various outcomes for individuals. For example, we now know that food insecurity can impact academic performance for students. Future research should go further and tell us exactly how and why this is the case.

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**Appendix A**  
**Synthesis Article Grid**

Author	Title	Source	Purpose	Methods & Procedures	Analysis	Findings	Discussion/Recommendations/Notes	Research Commonalities/Differences
Bartfeld, J., & Collins, J. M. (2017)	Food insecurity, financial shocks, and financial coping strategies among households with elementary school children in Wisconsin.	<i>Journal of Consumer Affairs</i>	To examine the relationships between food insecurity, financial stability, and potential financial strategies and how these factors impact food security status of elementary school children and their families.	Researchers collected surveys from families through the Wisconsin Survey of Household Food Needs. Surveys were sent home with students and were asked to be completed and returned anonymously by parents/guardians. Researchers collected surveys from students across 26 elementary schools. Schools were mainly low income,	Logistic regressions models used to analyze financial situations and food insecurity and food hardship. Other models were used to analyze financial coping strategies and how these relate to food insecurity levels. Analogous models were also used to examine which support programs these families benefitted from.	Results of this study state that families who struggle with low income and high expenses have a more difficult time meeting their food needs. The results also state that food insecurity is associated with multiple financial coping strategies. Finally, these results state that programs such as SNAP are main sources of food	In the end, it seems as though the main point this article wants to touch on is the severity of the relationships between food insecurity and different aspects of financial hardship. The researchers recommend public assistance programs continue to aid with this issue, and they also recommend more stable	Commonalities included studying impacts of food insecurity on elementary school students and using logistic regression models to analyze data. Differences included only focusing on financial impacts and coping strategies, as well as only studying low income subjects.

				and also located in a mix of urban and rural areas. 2,803 surveys were returned in total, with 2,778 surveys bringing back useable results.		support among low income families.	financial assistance be given to those who may be struggling.	
Campbell, E., Crulich, S., & Folliard, J. (2019)	A call for action to address food insecurity by strengthening child nutrition programs.	<i>Journal of the Academy of Nutrition and Dietetics</i>	To detail the importance of child nutrition programs in relation to food insecurity, and to advocate for the reauthorization of these programs by the appropriate government agencies.	Researchers identified the relationship between food insecurity and child nutrition programs. They then went into detail about which programs they believe specifically impact this issue. Once they identified and detailed these programs, they went on to advocate for government	Researchers used a type of relational content analysis where they study the specific content involved with each individual child nutrition program, as well as the relationships between these programs and food insecurity.	Researchers found that child nutrition programs are very helpful in supporting those who struggle with food insecurity. These researchers also found that these programs are long overdue for a reauthorization.	In the end, these researchers want to express the importance of child nutrition programs as they relate to food insecurity. They are trying to make a case for why these programs are important and why they should be supported. Going forward,	Commonalities included studying relationships between food insecurity and different outcomes, as well as expressing the importance of child nutrition programs. Differences included analyzing data in a more qualitative way rather than quantitative.



				ntal support in updating and reauthorizing these programs.			they recommend that congress take steps to reauthorize these programs to the appropriate levels.	
Corcoran, S. P., Elbel, B., & Schwartz, A. E. (2016)	The effect of breakfast in the classroom on obesity and academic performance: Evidence from New York City.	<i>Journal of Policy Analysis &amp; Management</i>	To examine the Breakfast in the Classroom program and its different impacts on academic performance, attendance, engagement, and weight status.	Researchers studied data from four different sources related to program participation in New York City. The researchers then consolidate all of the data into an analytic model in order to show the different impacts participation has on students' lives.	Researchers used analytical approaches such as difference-in-differences regression models. Cross-tabulation analysis is also used to draw comparisons between data sets.	Researchers found no major impact on BMI/weight status, and they also found no significant impact on math and reading scores when breakfast was moved to the classroom. Moving breakfast to the classroom did not significantly impact achievement, but it did increase consumption and nutrition.	In the end, these researchers suggest moving breakfast into the classroom so students have a greater opportunity to consume a healthy breakfast. There is no significant impact on academic achievement, so teachers do not need to worry about devoting classroom time to breakfast.	Commonalities included studying how nutrition programs may impact students suffering from food insecurity. Differences included this article not finding strong correlations between food insecurity and the different factors studied.

<p>Esfandiari, S., Omidvar, N., Eini-Zinab, H., Doustmohammadian, A., &amp; Amirhamidi, Z. (2018)</p>	<p>Associations among food insecurity, academic performance, and weight status in primary school children in Tehran, Iran: A cross-sectional study.</p>	<p><i>Journal of Nutrition Education and Behavior</i></p>	<p>To examine the relationships between food insecurity and academic performance/weight status in elementary students who live in urban areas.</p>	<p>Researchers used a cross-sectional study to examine 803 students across 43 primary schools. Selected nutritionists collected data on students through methods such as observations, questionnaires, and background data analysis.</p>	<p>Researchers used linear and multinomial regressions in order to analyze the different sets of data that were collected.</p>	<p>Food insecurity resulted in lower grades in all subjects studied across all genders, and it resulted in more cases of overweight only among girls.</p>	<p>Researchers suggest programs and policies be implemented in order to improve the diets and food security status of children. They also suggest performing future research in order to study specific impacts on academic performance.</p>	<p>Commonalities included focusing on how food insecurity impacted academic performance, as well as different regression models in order to analyze data. Differences included studying a lower number of subjects compared to other articles.</p>
<p>Frongillo, E. A., Jyoti, D. F., &amp; Jones S. J. (2006)</p>	<p>Food stamp program participation is associated with better academic learning among school children.</p>	<p><i>The Journal of Nutrition</i></p>	<p>To understand the relationship between food insecurity and the Food Stamp Program, particularly as it relates to how this program can help improve</p>	<p>21,260 children were studied, then cut down into a group of 10,600 students in grades K and 3. Parents and teachers were surveyed, and students were</p>	<p>Multiple linear regression, logarithmic transformations, means, regression coefficients, and SAS surveyreg procedures as well as cross-tabulation, trend analysis, and some</p>	<p>Results of this study provide the strongest data yet that proves participation in the Food Stamp Program has positive impacts on academic learning for</p>	<p>The Food Stamp Program should be used as a way to improve academic learning for children, as well as food expenditures and access.</p>	<p>Commonalities included using different regression models to analyze data. Differences included focusing on the food stamp program and how that</p>

			food insecurity levels and school performance.	directly assessed in specific areas.	text analysis.	children, especially in their first four years of school.		impacts food insecurity.
Gee, K. A., & Asim, M. (2019)	Parenting while food insecure: Links between adult food insecurity, parenting aggravation, and children's behaviors.	<i>Journal of Family Issues</i>	To investigate the relationships between food insecurity in parents and how this impacts their moods and behaviors. Also, to investigate how these potential impacts on parents influenced their children.	18,200 students who were studied in the fall of 2010 and spring of 2011. Students were all in Kindergarten and first grade. Researchers broke down the 18,200 even further when controlling for certain areas they wanted to study. Surveys and interviews with students and parents were the main methods of data collection.	First-difference regression and mediation analysis were the main methods used in order to analyze the data collected.	Results showed that children in first grade who experienced food insecurity had parents who were experiencing increased aggravation compared to food secure children. Researchers also found that food insecurity among parents did not directly relate to child behaviors, and instead aggravation as a result of this food insecurity led to	Researchers suggest including more support for parents in order to help decrease stress. Supporting parents to reduce stress related to food insecurity can in turn help their children with behavior control and other negative outcomes.	Commonalities included studying the Early Childhood Longitudinal Study-Kindergarten Cohort in order to gather data on children. Multiple analytical regression models were also used, as in other articles reviewed. Differences included studying specific impacts on how parent mood impacts student behavior.

						decreased behavior control for children.		
Howard, L.L. (2011)	Does food security at home affect non-cognitive performance at school? A longitudinal analysis of elementary student classroom behavior.	<i>Economics of Education Review</i>	To investigate how food insecurity, and varying levels of severity, can impact the non-cognitive performance of students in elementary school.	4,710 children in 1 <sup>st</sup> , 3 <sup>rd</sup> , and 5 <sup>th</sup> grade were used in an analytic sample. Questionnaires were handed out to the teachers and these teachers observed the students. Researchers focused on four main non-cognitive areas: interpersonal relations, self-control, approaches to learning, and externalizing problem behaviors.	Researchers used descriptive statistics, along with applying specific criteria previously developed, to study relationships between food insecurity and non-cognitive school performance.	Researchers found that food insecurity negatively impacts non-cognitive skill development in elementary school students.	There are many potential benefits to welfare spending when it comes to food insecurity. The researchers also suggest that children would fare much better in non-cognitive skill areas if they were given more access to these welfare programs.	Commonalities included studying children in elementary school, using statistical analysis to analyze data, and using forms of assessment such as questionnaires. Differences included studying non-cognitive areas such as behavior and social skills.
Jackson, J. A., Smit, E., Branscum, A., Gunter, K., Harvey, M.,	The family home environment, food insecurity, and body mass	<i>Health Education and Behavior</i>	To examine family home nutrition and physical activity (FNPA), and their	Surveys were handed out to and completed by parents of 186 children in elementary school.	Logistic and linear regressions were used in order to analyze the data collected.	Researchers found that approximately 37% of students were either overweight or obese,	Researchers suggest children be given more opportunities for healthy eating at	Commonalities included studying connections between food insecurity and

<p>Manore, M. M., &amp; John D. (2017)</p>	<p>index in rural children.</p>		<p>connections to food insecurity and obesity in rural settings.</p>	<p>Researchers also directly assessed “anthropometrics” for these same 186 children.</p>		<p>and 43% of families had an increase risk of food insecurity. Also, families who limited TV time and unhealthy food intake had children who were less likely to be overweight or obese.</p>	<p>home, more resources be used in order to assist these families, and more research be done in order to better understand the specific connections.</p>	<p>overweight/obesity. Differences included studying a smaller sample size of only 186 children in elementary school.</p>
<p>Jyoti, D. F., Frongillo, E. A., &amp; Jones S. J. (2005)</p>	<p>Food insecurity affects school children’s academic performance, weight gain, and social skills.</p>	<p><i>The Journal of Nutrition</i></p>	<p>To investigate how food insecurity impacts math and reading scores, weight and BMI, and social skills in elementary school children.</p>	<p>Researchers pulled data from the Early Childhood Longitudinal Study-Kindergarten Cohort, which study about 21,200 children from grades K-3. Academic performance, height, and weight were directly assessed, while teachers reported</p>	<p>Researchers used lagged, dynamic, and difference models in order to analyze and synthesize the existing data.</p>	<p>Food insecurity among students in grades K-3 lead to lower academic performance in reading and math for both girls and boys, decline in social skills for boys, and increased weight and BMI for girls.</p>	<p>Food insecurity has very serious developmental consequences, both nutritional and non-nutritional. Food insecurity should be studied further, and programs should be implemented in order to combat this issue.</p>	<p>Commonalities included using the Early Childhood Longitudinal Study-Kindergarten Cohort to gather data. Differences included using analysis methods such as lagged, dynamic, and difference models.</p>

				social skill results.				
Kimbro, R. T., & Denney, J. T. (2015)	Transitions into food insecurity associated with behavioral problems and worse overall health among children.	<i>Health Affairs</i>	To examine the relationship between food insecurity and factors such as behavioral problems and overall health associated with children.	Interviews with parents, direct assessments, and questionnaires handed out to administrators and teachers were used to gather data on food insecurity. Researchers then used multiple analytical strategies to synthesize the data and come up with numbers for students in kindergarten and third grade.	Bivariate relationships, t-tests, weighted ordinary least squares regression models, and school fixed effects were all used to analyze the data.	There was no significant impact on academic achievement for first graders in relation to food insecurity. On the other hand, serious impacts were found in the areas of behavioral outcomes, interpersonal skills, self-control, externalizing behaviors, internalizing behaviors, and overall health status.	More advanced studies need to be conducted in regards to food insecurity, and more comprehensive data needs to be gathered. Food insecurity is not a simple, one-dimensional issue that only impacts one population, and instead it impacts students across different areas.	Commonalities included using methods such as direct assessments, interviews, and questionnaires to gather data. Differences included using uncommon analysis methods in order to analyze and synthesize data.
Lee, A. M., Scharf, R. J., & DeBoer, M. D. (2018)	Associations between kindergarten and first-grade food	<i>Nutrition</i>	To examine the potential impact of food insecurity on obesity potential	Early Childhood Longitudinal Study-Kindergarten Cohort, from 2011, was used to gather data. 8,167	SAS 9.4, survey regression adjusted means analyses, and survey logistic analyses were all	Children from food insecure households had a higher chance of obesity and increased	Food insecurity is a severe issue that impacts children in multiple ways, and	Commonalities included using the Early Childhood Longitudinal Study-Kindergarten

	insecurity and weight status in U. S. children.		in children in the U. S.	children were included in the study, along with their parents and teachers. Surveys and “anthropometric data” were methods used in order to collect data.	methods used in order to statistically analyze the data collected.	BMI during grades K-3.	assistance programs need to be strengthened in order to help these children and their families.	ten Cohort in order to gather data. Also, studying severity and impacts on physical health are common research practices. Differences included including much more statistical analysis as compared to other similar studies.
Ryu, J. H., & Bartfeld, J. S. (2012)	Household food insecurity during childhood and subsequent health status: The early childhood longitudinal study-Kindergarten	<i>American Journal of Public Health</i>	To examine food insecurity patterns and connect these patterns with overall health status among children.	Data was collected from the Early Childhood Longitudinal Study-Kindergarten Cohort. The researchers then categorized different levels of food insecurity and determined the	Statistical analysis included logistic regression models in order to connect food insecurity outcomes with different health outcomes.	Researchers found that food insecurity was more impactful if it was a permanent state rather than a temporary state. If food insecurity was more permanent for children, it resulted in	Severity of food insecurity is very underestimated, permanent food insecurity is a crucial public health issue for children, and there need to be more policies put in	Commonalities included using the Early Childhood Longitudinal Study-Kindergarten Cohort to gather data. Differences included focusing in on health

	garten cohort.			severity of food insecurity based on these parameters . Researcher s then connected these numbers with health outcomes for students in eighth grade.		worse overall health.	place to assist those strugglin g with food insecurity .	outcomes instead of academic and behaviora l outcomes.
Wolfson, J. A., Insler, N., & Cohen A. J. (2020)	Childhood food involvement: Protection against food insecurity in young adulthood.	<i>American Journal of Preventative Medicine</i>	To examine how parental and behavioral factors during childhood may impact experiences with food insecurity in young adulthood.	Researchers gather existing data from the Panel Study of Income Dynamics' Child Development Supplement. Subjects included those who had full food insecurity data from childhood and young adulthood, and who also were living independently as of 2015. Time diary samples	Simple and multivariable logistic regression analyses were used to study existing data and categorize/synthesize this data.	If parents had at least a medium level of nutritional knowledge, then children had a lower chance of being food insecure as a young adult. Children also had a lower chance of being food insecure as a young adult if they were involved in the food preparation	Higher levels of nutritional knowledge among parents, and more time spent in the food preparation process resulted in more food secure young adults. Children need to spend more time learning cooking skills, and parents need to	Commonalities included using existing data in order to make a case for their argument, as well as using regression models to analyze data. Differences included focusing more on young adults instead of young children.



				that detailed activity informatio n were also taken into account.		n process as a child.	educate themselv es nutrition ally going forward.	
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