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Food Insecurity in the Flagship City: Access to Food in the 16501 Zip Code

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ABSTRACT

Food insecurity is one of the most pressing global health crises of the 21st century. A plethora of research has been dedicated to understanding the overarching mechanisms of the determinants and impacts of food insecurity. While food insecurity is reported and studied thoroughly at the national and state level, there is little data regarding food insecurity at the zip code level. Additionally, there is limited research that evaluates the lived experiences of individuals experiencing hunger. The current study aimed to give insight into the emotions and experiences of those living with food insecurity in the 16501 zip code in Erie, PA, which was previously named one of the poorest zip codes in the state according to census data. This research aims to answer the following questions: 1) What are the psychological impacts of food insecurity within the 16501 zip code? 2) What coping strategies and community resources do people utilize to access food and what is their perceived effectiveness? 3) How have the social, economic, and physical changes to the 16501 zip code changed food access in the area? These questions were evaluated through a mixed method survey distributed throughout the 16501 zip code. The results generally aligned with prior findings, but did yield some novel results regarding community based resources and offered a new depth of experience food insecurity at an individual level.

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Chapter 1

A Brief History of Food Insecurity

At the 1974 World Food Conference, US Secretary of State Henry Kissinger declared that “within a decade, no child will go to bed hungry” (United Nations, 1975). Unfortunately, 50 years later, approximately 2.4 billion men, women, and children globally experience food insecurity, or the lack of adequate physical, social, and economic access to food that supports an active and healthy life (Murtoff, 2025; USDA, 2025). According to the most recent data, over 44 million Americans are actively experiencing food insecurity (Feeding America, 2022). Following the end of pandemic-related expansions to federal and local support programs, the overall US food insecurity rate experienced the largest one-year increase since 2008, growing from 10.4% of the population in 2021 to 13.5% in 2022. Its prevalence and devastating impact on wellbeing has made food insecurity one of the most critical health and nutrition issues in the US (Gundersen & Ziliak, 2013).

While food insecurity is one of the most pervasive topics in current events, it also has a longstanding history as a subject of scholarly and public interest. Some scholars believe Thomas Malthus’ 1798 publication, “An Essay on the Principle of Population” to be the first documented research on food insecurity (Rowntree & Orr, 1936). However, the general scholarly consensus is that food insecurity’s current focus as an issue of international concern can be traced back to the 1940’s at the end of WWII as the war decimated agriculture and food production around the world (Sassi, 2018). The United Nations declared access to food as a fundamental human right in 1948 (United Nations, 1948). At this time, food insecurity was viewed only as an issue of the

national, physical availability of food and gave little consideration to socioeconomic factors (Sassi, 2018).

The United States' recognition of domestic food insecurity as a public issue occurred in the late 1960's following the Senate Subcommittee on Employment, Manpower, and Poverty's visit to the Mississippi Delta in 1967 and the public broadcast of the CBS television documentary 'Hunger in America' in 1968 (Eisinger, 1996; Eisinger, 1998, p. 12). In response to widespread famine of the early 1970's, the World Food Conference of 1974 was held to examine the global problems of food production and consumption. The governments in attendance proclaimed that "every man, woman, and child has the inalienable right to be free from hunger and malnutrition in order to develop their physical and mental faculties" (United Nations, 1974).

In the time since the World Food Conference, the paradigms that underlie food insecurity research have shifted. Maxwell (1996) identified three key shifts in thinking about food insecurity from 1974 to 1996: 1) The shift from the global and the national to the household and the individual, 2) The shift from a food first perspective to a livelihood perspective, and 3) The shift from objective indicators to subjective perception.

While the World Food Conference viewed food insecurity and hunger as an issue of national food supply and production, Amartya Sen (1981) recognized that a national adequate food supply and widespread hunger could co-exist and initiated a paradigm shift from viewing food insecurity as a supply-based issue to an access-based issue. This shifted the conversations of food insecurity from a macro perspective on the global or national food supply to a micro perspective with a stronger emphasis on the household or individual's access to food (Maxwell, 1996). The current literature still aligns with this value, with recent studies assessing the relationship between food insecurity and various factors such as education levels, physical assets,

financial assets, composition of households, and demographic indicators (Burke et al., 2016; Fitzpatrick & Coleman-Jensen, 2014; Gundersen & Garasky 2012; Ziliak & Gundersen, 2016).

Research conducted during the African famine of 1984/85 prompted the paradigm shift from a food first perspective to a livelihood perspective (Maxwell, 1996). During the famine, it was observed that people would choose to go hungry to protect their future livelihood (de Waal, 1989). This highlights that while food is a primary human need, it is only one of many priorities that people pursue, and that researchers should consider the broader issues of people's livelihood in order to fully understand food insecurity (Maxwell, 1996). The New York Times explored the tradeoff that individuals face through their reporting on senior citizens and food insecurity (Creswell and Simonetti, 2023). In the article, Colleen Heflin, a professor of public administration and international affairs at Syracuse University, explained that:

Food, for many older adults, is a way to bring family to you, and if you cannot afford it, you're either not going to do it or you're going to have less food for yourself later in the week because you value that interaction so highly.

This tradeoff has also been examined within the US's immigrant population. When a recent policy was proposed that could deny green cards to immigrants who were deemed likely to rely on government resources, 78,000 noncitizens opted not to enroll or to withdraw from the USDA's Supplemental Nutrition Assistance Program (Laterman, 2020). The nuances in the choices people make when accessing food is a critical component of modern-day food insecurity discourse.

Food insecurity was previously defined on the basis of objective measurements like target levels of consumption or a minimum percentage of WHO average required daily caloric intake (Siamwalla & Valdes, 1980; Reardon et al., 1989). However, given the variance in nutritional

needs based on age, health, environment, and more, it can be challenging to assess food insecurity with these measures. Additionally, these definitions do not take into account the qualitative components of food insecurity such as lack of options, feelings of deprivation, or the feelings associated with acquiring food in socially unacceptable ways (Radimer et al., 1992). As such, the literature surrounding food insecurity has embraced the notion “that nutritional adequacy is a necessary but not sufficient condition for food insecurity” (Maxwell, 1996, p. 159).

The USDA’s Food Security Supplement of the Census Bureau’s Current Population Survey (CPS-FSS), one of the most commonly used measures of food insecurity, now includes a subjective component that asks participants to rate how much they agree with the statement ‘I worried whether our food would run out before we got money to buy more’. Additionally, various researchers have explored the underlying emotions, psychological impact, and coping mechanisms associated with food insecurity (Conrad et al., 2022; Leung et al., 2020; Leung et al., 2022; Myers, 2020). The current literature has expanded to explore food insecurity not only as an objective phenomenon but also as a subjective human experience.

Hunger is not a new phenomenon. For as long as humans have roamed the earth, they have been plagued by disease, war, and scarcity that have impacted their access to food. However, by approaching food insecurity through a historical lens, researchers are able to understand how food insecurity has evolved over time and view this multifaceted issue in a way that allows for the nuance and sensitivity needed to adequately assess this global health crisis.

Chapter 2

Determinants of Food Insecurity

Researchers have spent decades exploring factors that are related to one's likelihood to experience food insecurity. The 2009 World Summit named four dimensions of food security: availability of food produced locally and internationally imported foods, accessibility of food that is culturally acceptable and accessible through adequate financial resources, utilization and physical ability to eat appropriate amounts of quality food, and the food supply chain must be stable enough to survive shocks to the food chain system through natural disasters or man-made crises like war or economic recessions (FAO, 2008). It is important to note that these factors often interact and overlap with each other, and that their manifestation will vary across regions and over time (Akbari et al., 2022).

For the purpose of this study, factors related to food insecurity will be assessed by level of specificity, with broader systems being assessed first and more individual systems being assessed later. As such, the mechanisms associated with food insecurity will be evaluated within four distinct clusters: 1) Sustainability and environmental factors, 2) Political factors, 3) Cultural factors, and 4) Socioeconomic factors (Akbari et al., 2022). This organization will allow for the reader to understand the broader context that surrounds each system and help exemplify the complex and reciprocal nature of risk factors and food insecurity.

Sustainability and Environmental Factors

While the general trend of food insecurity research has focused more on achieving food security on an individual level, there are still researchers who explore the relationship between

macro-factors, like natural disasters, climate change, or population growth, and food insecurity (Akbari et al., 2022).

Natural catastrophes can pose a threat to existing food systems (Akbari et al., 2022). Water scarcity or widespread drought could negatively impact crop production and lead to food shortages (Chen et al., 2021). Hurricanes have also been shown to have a statistically significant negative impact on agriculture (Dharmaraju et al., 2018). Wildfires have also significantly damaged agricultural areas (Sivakumar, 2005). Extreme weather patterns have been linked to an increase in global food insecurity.

Many researchers have examined the negative effects that climate change has on global food security (De Faria et al., 2016; Godfray 2010; Masipa, 2017; Schmidhuber et al., 2007). It is anticipated that climate change will impact all aspects of food security (physical and economic access, stability of the food supply, and food utilization) (Schmidhuber et al., 2007). Climate change can decrease agricultural productivity, which threatens food security and increases the need for migration (De Faria et al., 2016). Changes in atmospheric conditions have also been identified as a threat to food security (Karthika & Karthikeyan, 2016).

Additionally, since climate change can decrease global food supply, it can indirectly lead to rising prices of food and agriculture, which will only exacerbate the current global hunger crisis (El Bilali et al., 2020). Tilman and colleagues (2011) forecasted a 110% increase in global crop demand from 2005 to 2050. If current trends of food production continue, this demand increase will significantly contribute to greenhouse gas emissions and further the climate crisis. As a result of climate change and population growth, food supply is dwindling and food demand is increasing, causing a true threat to global food access.

Some researchers speculate that the socioeconomic impact of climate change will be more devastating on food security than the biophysical effects (Akbari 2022 ; Parry et al., 2005; Schmidhuber et al., 2007). While climate change affects all dimensions of food security, these changes will disproportionately affect developing countries, as their main agricultural expenditures will be impacted and they will be forced to rely more on imports (Godfray, 2010). Researchers have also highlighted the dual connection between climate change and food security: climate change threatens food security, but the increased food production needed to feed the growing population could contribute to climate change (Schmidhuber et al., 2007; Wheeler et al., 2015).

Political Factors

Food systems are both ecological and social by nature. As such, it is critical to explore the role that the government plays in a nation's rate of food insecurity (Ericksen, 2008). Inequalities in food distribution mechanisms have been linked to widespread hunger, which led researchers to focus more on the political factors that underlie food insecurity (Sen, 1981). Previous research has explored the association between food security and food policy, food sovereignty, governance, self-sufficiency, food production and distribution systems, and global trade (Akbari et al., 2022). Developing countries may lack the purchasing power necessary to accommodate their growing populations and be limited in the dietary diversity available (Kidane & Kejela, 2021; Nabuuma et al., 2021). Improper food distribution and agricultural regulations can also limit the effectiveness of food security initiatives (Anghinoni et al., 2021).

A lower dietary diversity has been found to be associated with a higher rate of food insecurity across cultures (Ruel, 2003). Dietary diversity is defined as 'the number of foods or

food groups consumed over a given reference period'. Developing countries tend to have a lower dietary diversity as diet staples are typically starch-based with few or no animal products and slim availability of fresh fruits or vegetables.

Conflict, lack of institutional capacity, and poor policy design and implementation can negatively impact food production and distribution (Boyd & Wang, 2011). A government may also fail to adequately respond to threats to food security due to poor decision-making, limited coordination, flimsy institutional processes, and resource scarcity (Pereira & Ruysenaar, 2012). Additionally, the complexity and multi-dimensional nature of food security stretches over multiple sectors and policy domains, which makes it challenging to efficiently govern (Duncan & Barling, 2012). This complexity is only exacerbated further by globalization and the further entanglement of the world food systems in which food insecurity exceeds the power of any singular national governance (Lawrence et al., 2024)

As the Federal Reserve is responsible for monetary policy in the US that impacts unemployment and inflation rates, these factors are a direct result of governance that also influence food insecurity (Federal Reserve, 2024). An increase of one percentage point in the unemployment rate has been linked to a 0.5% increase in food insecurity prevalence (Nord et al., 2014). An increase of 1 percentage point in annual inflation rate has been linked to a 0.5% increase in food insecurity prevalence.

Politically motivated decisions within the US have disproportionately impacted food access for marginalized communities. The 1930's practice of redlining or "a discriminatory practice that consists of the systematic denial of services such as mortgages, insurance loans, and other financial services to residents of certain areas, based on their race or ethnicity", resulted in segregated neighborhood communities that are still present today (Wex Definitions Team, 2022;

Shaker et al, 2022). There is an absence of grocery stores in minority-dominant neighborhoods (Raja et al., 2008). Specifically, chain grocery stores are 52% less available in predominantly black neighborhoods and 32% less available in predominantly Hispanic neighborhoods compared to predominantly white neighborhoods (Bodor et al., 2010). Unfortunately, food insecurity in US urban neighborhoods is also linked with limited economic growth, divestment from neighborhoods, substandard housing, and environmental pollution (Shaker et al., 2022).

This phenomenon is exacerbated by corporate consolidation and retailers pulling out of poor urban neighborhoods (Kaye et al., 2024). For example, when the local Safeway in Rockwood, Oregon closed following a merger between Safeway and Albertsons, the local food pantry saw a 12 percent demand increase (Kaye et al., 2024)

Elevated thresholds for government-subsidized food insecurity interventions can also expose more individuals to food insecurity. A proposed change to the USDA's Supplemental Nutrition Assistance Program (SNAP) requirements in which all single, able-bodied adults between the ages of 18 and 49 who don't have children would be required to work 20 hours a week or they would lose their SNAP benefits after three months, had the potential to affect 700,000 Americans (Aguilera, 2019). Currently, nearly 50% of people in the US who are facing hunger are unlikely to qualify for SNAP (Feeding America, 2022). The thresholds that a government sets for food assistance can have a direct impact on food insecurity within the country.

In addition to the consistent impact that governments can have on food insecurity, there are extemporaneous events that can change an individual's access to food. For example, during the COVID-19 health emergency, food insecurity in the US doubled overall and tripled among households with children (Schanzenbach & Pitts, 2020). A documentary by WQED Pittsburgh

tells the story of how an elderly couple found themselves food insecure after a car accident impacted both of their abilities' to work ('WQED Specials: Starved', 2020). The same documentary details the struggles of a single mother diagnosed with breast cancer who had to cut back on her working hours to accommodate her treatment. The decrease in paycheck amount led her family to experience food insecurity ('WQED Specials: Starved', 2020). Individuals in these situations may find themselves experiencing food insecurity as a 'cyclic phenomenon', where there are waves of food adequacy and food insecurity often related to monthly federal food assistance rollouts (Dinour et al., 2007). The interactions between an individual's livelihood and circumstances and government interventions can have a direct impact on their access to food.

Cultural Factors

While research on culture and food access is limited, food and culture are intimately related (Akbari et al., 2022; Alonso et al., 2018). Data from 15 different countries found that all cultures worry about inadequate food quantity and quality, but that some cultures have varying priorities within their food systems. For example, while generally households would worry before reducing food quality and would reduce quality before reducing quantity, households in Bangladesh were more likely to cut the quality and quantity of their food before worrying (Sen, 1981). It is speculated that this anomaly occurred because of the research pool's belief in 'Allah's will' when asked about their perceptions of their future food access, and furthermore, that belief in a supreme power may mitigate some of the negative outcomes associated with food insecurity.

Classification of what is edible versus inedible varies across cultures in a way that impacts both food insecurity and food insecurity interventions (Alonso et al., 2017). For example, a government program in Micronesia failed to increase the population's vitamin A

consumption because it promoted the consumption of leafy vegetables, which Micronesians view as food fit for animal consumption, not human (Englberger, 2004). Culture also influences the ways in which food is produced. Traditional crop selection and pest management interventions are often specific to local environments and increase agro-biological diversity, which helps improve dietary diversity and thus food security (Altieri & Nicholls, 2020; Penafiel et al., 2011). This interaction is exemplified through the Native Americans' 'three sisters' food system, where maize, beans, and squash would be planted together and help facilitate biodiversity (Milburn, 2004).

Culture also shapes social access to food by facilitating either social inclusion or exclusion (Alonso et al., 2017). Stereotypes of certain groups within a culture can lead to structural exclusion and decrease access to food (Mahajan et al., 2021). Indigenous people across multiple countries are often negatively affected by social exclusion (Gundersen & Ziliak, 2018). For example, 95% of indigenous children in Honduras suffer from malnutrition (United Nations, 2009). Indigenous children in Guatemala, El Salvador, and Ecuador experienced growth stunts at almost twice the rate of non-indigenous children in the same country (United Nations, 2009). Social exclusion within cultures can drastically affect food access for marginalized groups.

The way food is distributed within households is also influenced by cultural values (Alonso et al., 2017). Perceived value regarding the types of work and responsibilities within a household may impact the amount of food allocated to each member (Denney et al., 2014). In general, males are often favored over females for available food, and girls and women may be more likely to experience food insecurity as a result of intra-household food distribution (Gittelsohn, 1998; Haddad et al., 1999). Culture also dictates what constitutes a 'proper' meal, and shapes what foods people choose to eat (Roder, 2008). Research with refugees indicates that

unfamiliar cultural eating models can make it challenging for people to navigate a new food environment and prepare unfamiliar foods and thus lead to an increase in food insecurity (Morris, 2022).

On a more micro level, family structures within a culture also have an effect on a person's food insecurity (Alonso et al., 2017). Families play a critical role in enforcing healthy eating habits in children (World Health Organization, 2024). Instilling healthy feeding practices as a child has been associated with food security later in life through the development of healthy food preferences (Johnson et al., 2011).

Culture is constantly evolving in response to a changing environment (Alonso et al., 2017). In times of food shortages, food and non-food classifications or food taboos can change to accommodate the dwindling food supply (Fessler & Navarrete, 2003). As cultures face modernization and economic development, they face the risk of losing their traditional knowledge (Gomez-Baggethun et al., 2013; Reyes-Garcia et al., 2013). However, broad cultural changes such as migration and the spread of Western religion, have not been found to alter cultural standards related to food (Golden & Comaroff, 2015). The nuances and dynamics of culture's impact on food insecurity should be investigated further to understand the true extent that culture has on food access.

Socioeconomic Factors

Of the risk factors for an increase in food insecurity, the socioeconomic factors have been studied the most extensively. A wide body of research has explored how geography, gender, race, age, income level, nutritional status, family knowledge about food, and household composition are related to food insecurity prevalence (Akbari et al., 2022; Gundersen & Ziliak, 2018).

Food insecurity in the United States is not evenly distributed geographically (Gundersen & Ziliak, 2018). While the national average rate of food insecurity is 13.5%, rates are particularly high in the Mississippi Delta and Appalachia, with roughly 25-30% of the population in these areas experiencing food insecurity (Gundersen & Ziliak, 2018; Feeding America, 2022). Counties along the Texas-Mexico border have some of the highest rates of food insecurity in the country, with certain counties exhibiting a food insecurity rate above 40% (Gundersen & Ziliak, 2018; Feeding American, 2022). However, other parts of the country such as the upper Midwest and the Northeast exhibit a food insecurity rate of roughly 4-14% of the population (Gundersen & Ziliak, 2018; Feeding America, 2022). Additionally, rapid urban growth can significantly raise an area's risk for food insecurity (Szabo, 2016). Principal cities in metropolitan areas have a higher-than-average rate of food insecurity at 16.9%, while rural areas also experience high rates of food insecurity at 15.5%. While the broad implications of geography on food insecurity have been well researched, some scholars believe that further exploration of place-based factors, such as community and neighborhood resources, should be explored to better understand how local food systems impact a community's access (Myers, 2020).

In addition to geographic location, proximity to the nearest grocery store has been explored as a factor relating to food insecurity. The USDA defines a food desert as an area where at least one third of residents live one mile or more from the nearest grocery stores (USDA, 2025). However, low-income households often choose their preferred retailers based on prices rather than proximity (Wainer et al., 2023). One study found that distance to the nearest supermarket was not associated with food insecurity (Wilde et al., 2018). While proximity to a grocery store can be a helpful tool to quantify physical food access, its important to acknowledge that this metric does not include the other factors that one considers when trying to access food.

Gender has been another demographic variable that could be linked to food insecurity (Akbari et al., 2022). One meta-analysis found that in studies where women were the respondents, there was a 40% increase in household food insecurity compared to the male respondents (Jung et al., 2017). The same study found that families with a female head of household were 75% more likely to be food insecure than male-headed households. In developed countries, women are 4.7% more likely than men to experience food insecurity (Broussard, 2019). In developing countries, women are 2% more likely than men to experience food insecurity (Broussard, 2019). This gap is attributed to differences in income, educational attainment, and social networks. To my knowledge, there have been no empirical investigations that have evaluated the rates of food insecurity within transgender and gender non-conforming individuals (Russomanno & Tree, 2020). However, an estimated 27% of LGBTQ+ individuals within the United States experienced food insecurity in the year prior to being surveyed (Wilson & Conron, 2020).

Multiple researchers have examined the relationship between race and food insecurity (Akbari et al., 2022). One study found that in the US, Blacks and Latinos are disproportionately affected by food insecurity (Myers & Painter, 2017). Food insecurity among Black or Latino individuals is higher than white individuals in more than 9 out of 10 counties with comparable data (Feeding America, 2024). Feeding America's 2024 Mind the Meal Gap Report explained this disparity in part by stating:

Food insecurity is a symptom of historical and structural oppression, not individual weakness. It does not exist in a vacuum: people who face challenges accessing enough food also face challenges affording adequate housing, healthcare, transportation, and other basic needs. Food insecurity is a complex issue that will not be solved with a one-

size-fits-all solution. Rather, effective solutions to food insecurity should be informed by a deep understanding of individuals and families experiencing food insecurity and where they live.

While age is not considered a determinant of food insecurity, it is still critical to consider the ways in which access to food varies across one's lifespan. Approximately 1 in 5 children in the US experience food insecurity, with one county in the country reporting that 48% of children in their county were food insecure (Feeding America, 2024). Additional studies have found that college students are also at risk for food insecurity. While the exact rate of food insecurity across college students varies from 10%-75%, a scoping review of 51 study samples concluded that roughly 31% of college students experience food insecurity across a 12-month period and roughly 47% across a 9-month period (Nikolaus et al., 2020). One study found that Americans aged 65 years or older are 39% less likely to experience food insecurity than their younger counterparts. However, some experts have expressed concern about how rising food costs can negatively impact senior citizens' access to food (Creswell & Simonetti, 2023).

Generally speaking, financial insecurity is the key factor that influences access to food. Multiple studies have found that a lower household income is consistently associated with an increased likelihood of food insecurity (Coates, 2013; Cook et al., 2012; Gundersen & Ziliak, 2018). However, current income is only a small portion of the financial factors that predict food insecurity. Recently, researchers have highlighted the importance of tangible and intangible assets when evaluating food insecurity (Gundersen & Ziliak, 2018). Lower financial management skills and lower education levels correlate with higher rates of food insecurity (Gundersen & Garasky, 2012). Individuals with fewer physical assets, like leasing a car instead

of renting, and fewer financial assets, like limited savings or lack of access to credit, are more likely to experience food insecurity (Fitzpatrick & Coleman-Jensen, 2014).

An increase of 1 percentage point in the annual relative price of food was associated with a 0.6% increase in food insecurity prevalence (Nord et al., 2014). Limited financial resources combined with rising food prices can negatively impact household access to food. Households and individuals that spend a greater financial or physical expenditure on food are more likely to experience food insecurity (Maxwell et al., 2013; Smith et al., 2006). A household's knowledge about nutrition and motivation to seek out healthy foods plays a minimal yet statistically significant role in determining their food security (Worsley et al., 2015).

Household composition and interactions within a household can impact access to food (Gundersen & Ziliak, 2018). Single parent households, households with a non-custodial father who does not regularly visit, or households with grandchildren present are more likely to experience food insecurity (Gundersen & Ziliak, 2018; Nepomnyasschy et al., 2014; Ziliak & Gundersen, 2016). Food insecurity rates are higher in households with a disabled parent or child (Burke et al., 2016; Sonik et al., 2016). Households where a member is currently or has previously been incarcerated also experience an increased risk of food insecurity (Cox & Wallace, 2016). Households with an adult smoker (Cutler-Triggs et al., 2008) or households with a Native American (Gundersen, 2008) are also more likely to be food insecure. Additionally, households experiencing financial or physical shocks such as high risk of homelessness or chaotic households, are also more likely to experience food insecurity (Gundersen, 2008; Fiese et al., 2016). However, household composition can also serve as a protective factor against food insecurity in some instances. Having working teenagers within the house and receiving child

support can reduce a household's likelihood of experiencing food insecurity (Hamersma & Kim, 2016; Garasky & Stewart, 2007).

Chapter Closing

The environmental, political, cultural, and socioeconomic factors that influence food insecurity are often intertwined and interact with each other to create one's larger food environment. Peng and colleagues (2018) addressed this complexity by stating:

Food security and food insecurity are dynamic, reciprocal and time dependent and the resultant status depends on the interaction between the stresses of food insecurity and the coping strategies to deal with them.

An individual or household's food insecurity level is determined through environmental, political, cultural, and socioeconomic factors that interact with each other and evolve based on changes within an environment or household. Given that these dynamics change over time, it is necessary to also consider the broader temporal space of one's life when evaluating their level of food insecurity.

People have a tendency to gravitate towards individualistic explanations of poverty or misfortunes (Calnitsky, 2018). They fall victim to the fundamental attribution error, or the attribution of blame to an individual rather than the broader situation or system (Ross et al., 1977). Separately, Lerner's just-world hypothesis encapsulates the cognitive bias in which people assume that others 'get what they deserve' and that one's livelihood is the consequences of either their own actions or a universal force that restores moral balance (Lerner & Simmons, 1966). These mechanisms underlie the stigma that individuals experiencing food insecurity face. It is truly critical to keep in mind that food insecurity is not a result of individual failings, but rather structural failures that have far-reaching implications.

Chapter 3

Impacts of Food Insecurity Across the Lifespan

Since food and nutrition are essential components for an active and healthy life, the effects of food insecurity permeate every aspect of one's health. However, since nutrition is also a large influencer in human development, the ways in which food insecurity manifests varies across the lifespan. Food insecurity can have negative impacts on a person's physical and mental wellbeing throughout their life. It is important to note that the relationship between food insecurity and health can be bidirectional: food insecurity can increase the risk of poor health, but poor health can also increase financial strain and food insecurity (Shankar et al., 2017).

There is limited research exploring the impact of food insecurity on infants and toddlers (Shankar et al., 2017). There is a wealth of knowledge that explores the impacts of food insecurity in children, adolescent, and adult populations. There have been few studies that have assessed the impact of food insecurity on senior citizens. Synthesizing the results of this research area provides a clear justification for why food insecurity is one of the most pressing public health crises of modern times.

Infants and Toddlers (Age 0-3 Years)

Infants who experience food insecurity are at risk for negative physical and mental effects. Infants born of food insecure mothers are at an elevated risk for birth defects, anemia, lower nutrition intakes, cognitive problems, aggression and anxiety (Gundersen & Ziliak, 2014). Zaslow and colleagues (2009) found that greater levels of food insecurity at 9 months were associated with higher rates of an insecure attachment style with a caregiver and lower levels of mental proficiency at 24 months. A separate study found that toddlers aged 4 to 36 months who

experienced food insecurity were 3 times more likely to be at risk for developmental disorders, even when underweight children and children who experienced very low levels of food insecurity were removed from data analysis (Rose-Jacobs et al., 2008). A more recent study also found that household food insecurity was associated with a heightened risk of developmental delays in children under 24 months (Oliviera et al., 2021). Toddlers living in households that were temporarily experiencing food insecurity were found to experience small but immediate negative effects of their development. Specifically, these toddlers scored roughly 1.5 points lower on cognitive assessments than their food-secure counterparts (Hernandez & Jacknowitz, 2009). Additionally, one study found that food insecurity is correlated with increased stress in the parent-child relationship (Belans et al., 2024). This stress is strongly correlated with delays in early childhood development.

Children (Age 4-11 Years)

In preschool years, food insecurity has been associated with higher levels of both internalizing behaviors and externalizing behaviors (Slack & Yoo, 2005). Studies have also found that preschool children who experience food insecurity are more likely to present symptoms of poor mental health, less self control, and less developed interpersonal skills (Kimbrow & Denney, 2015; Weinreb et al., 2002). Higher levels of food insecurity is correlated with increased behavioral problems in children (Whitaker et al., 2006).

In school age children, food insecurity can have an adverse effect on a child's behavioral, academic, and emotional performance (Shankar et al., 2017). Food insecurity has been found to be associated with reduced learning and productivity (Ke & Ford-Jones, 2015). Children who experienced food insecurity are twice as likely to exhibit hyperactivity/inattention symptoms than food-secure children (Belsky et al., 2010). However, there is some controversy surrounding

the validity of the relationship between food insecurity and hyperactivity/attention symptoms (Ke et al., 2015). Food insecurity in children is also associated with decreased academic performance and higher absenteeism rates (Melchior et al., 2012). Food-insecure children also exhibit higher rates of borderline emotional problems, fewer adaptive strategies in their interpersonal relationships, and less self-control (Whitaker et al., 2006; Melchior et al., 2012).

In addition to the behavioral and academic impact, food insecurity also affects a child's physical and mental well being (Gundersen & Ziliak, 2015). Children who experience food insecurity are at an elevated risk of being in poor general health or being hospitalized (Cook et al., 2006; Gundersen & Kreider, 2009). Children in food-insecure households are 2-3 times more likely to have anemia, twice as likely to be in fair or poor health, and 1.4-2.6 times more likely to have asthma than their food-secure counterparts (Eicher-Miller & Zhao, 2018; Cook et al., 2013; Kirkpatrick et al., 2015). Children who experience food insecurity are also more likely to have poor oral health (Muirhead et al., 2009). Food-insecure children also exhibit higher levels of cognitive issues, anxiety, and aggression (Howard, 2011; Gundersen & Kreider, 2009). They are also at a heightened risk for depression and suicidal ideation (Melchior et al., 2012; McIntyre et al., 2013).

Some researchers have aimed to explore the psychological distress that underlies childhood food insecurity through a qualitative approach (Leung et al., 2020). They discovered that most children were aware of the limited food supply in their household. Some children were also aware of their immediate family's reliance on resources from their extended family and their family's use of food assistance programs to provide food.

This research uncovered that children who experience psychological distress from food insecurity often feel worried about their limited food supply, anger and frustration about not

having enough food, sadness about not having enough food, worry about their parents' well-being, embarrassment from their family's food situation, and experience a strain on the family's dynamics because of their food insecurity (Leung et al., 2020).

One child expressed their embarrassment about their family's food insecurity by sharing a story from school:

I told my other friends that I had no money, no food, so that made me embarrassed by laughing at me... it made me feel sad and mad... [My teacher] had to announce that I had no money and food, so that's when they stopped laughing at me. They knew [my teacher] was serious... I just had to walk away.

Another child expressed that they use their imagination to cope with their family's food insecurity:

[My imaginary friend] is the one who gives me the imaginary food, because he works at a place where you could get any food you want. I just imagine I have food. I imagine I have food, then eat the imaginary food.

Food insecurity has a negative yet multifaceted impact on the behavioral, academic, physical, and psychological outcomes of children (Leung, 2020).

Adolescents and Young Adults (Age 12-25)

Individuals who experience food insecurity also exhibit many of the challenges associated with food insecurity in childhood but also face the unique challenge of learning to navigate the food environment independently of their household.

In studies focusing on adolescents, food insecurity has been associated with heightened risk for anxiety, depression, dysthymia, and attempted suicide (Alaimo et al., 2001).

Additionally, adolescents experiencing food insecurity are more likely to be suspended from

school and show difficulties getting along with their peers (McLaughlin et al., 2012). Adolescents who are food insecure are also at elevated risk for developing a substance use disorder. Food insecurity was also found to be significantly associated with poorer subjective well-being in individuals aged 15 or older (Frongillo et al., 2014). Young adults who experience food insecurity also have a greater likelihood of experiencing depression, anxiety, or panic disorder (Nagata et al., 2019). It was also discovered that higher rates of food insecurity were correlated with more trouble falling asleep and staying asleep. Individuals who experience food insecurity in childhood have reported higher levels of distress in adulthood (Fertig et al., 2019).

Other studies have focused more on the physical impacts of food insecurity on young adults. Darling and colleagues (2017) found that young adults who had experienced food insecurity had higher average body mass indexes, waist-to height ratios, and disordered eating patterns than those who had not experienced food insecurity. Additionally, food insecure young adults were more likely to have poor health status, diabetes, hypertension, obesity, and obstructive airway disease than those with no history of food insecurity (Nagata et al., 2019).

The existing literature has also recognized the emergence of food insecurity and its impact on the psychological wellbeing of postsecondary students (Myers, 2020). Students who reported food insecurity in college also have reported greater levels of depressive symptoms (Darling et al., 2017). A separate study found a similar association in their sample cross-sectionally, but not longitudinally (Bruening et al., 2018). Additionally, a study exploring the relationship between food insecurity and substance use in US college students found that food insecurity was associated with higher rates of substance use (Han & Park, 2023).

Students experiencing food insecurity are more likely to report their current health as fair, poor, or very poor, and reported lower energy levels than their food-secure counterparts (Paynes-

Sturges et al., 2018). They also have reported depressive symptoms that interrupt their ability to complete academic work. Higher levels of food insecurity were associated with lower GPAs in past research (Paynes-Sturges et al., 2018; Silva et al., 2017). Food insecurity can make it challenging for students to succeed academically and reach their full economic potential (Paynes-Sturges et al., 2018; Meza et al., 2018). Since higher education can be a powerful tool for upward economic mobility, food insecurity undermining student success can have a lasting negative impact on a student's future career and economic prospects (Weaver et al., 2020).

Like children experiencing food insecurity, the psychological distress of lack of access to food can cause psychological distress in college students (Meza et al., 2018). However, the ways in which this stress manifests are different from that of younger children. In a qualitative study exploring the psychosocial effects of food insecurity in college students, participants expressed a fear of disappointing their families due to their food situation, jealousy and/or resentment toward their food secure peers in more stable financial situations, challenges developing meaningful social connections, sadness toward their food insecurity, stress about their food insecurity that interferes with their daily life, feeling hopeless about their food situation and undeserving of help, and frustration toward their academic institution for not providing more resources to support student success (Meza et al., 2018). One student expressed their stress by stating:

When you're so stressed about food all the time, that takes a lot of mental power. You need room for creativity; you need room to do certain things. But, if all that's in your head is cluttered, everything becomes blurry. You're not focusing on the bigger picture. You're only focused on what's happening next.

Another student articulated the impact of their food insecurity on their social life by stating:

Food is a very social thing. That's how people connect. When you go out to a restaurant, that's how you maintain your friendships and stay connected with people. To not be able to do that, I felt very left out and it was depressing.

While many institutions offer resources for students experiencing food insecurity, some students expressed hesitation to use those resources. One student explained this hesitation by saying:

I always felt I didn't deserve the help...I felt like I was taking resources away from other people who needed it more than I did. In the summer, I got really hungry because I lost my job. There was one week where I just sat in my room and ate nothing but peanut butter.

While young adults experience physical and psychological symptoms similar to those of children who experience food insecurity, the developmental milestones associated with adolescence impact the manifestation of these stressors. Food insecurity experienced in students can have a lasting impact on their academic and economic success.

Adults (Age 26-50)

Food insecurity in adults is correlated with decreased nutrient intakes, increased rates of mental health problems and depression, diabetes, hypertension, high cholesterol, worse outcomes on health exams, and poor sleep outcomes (Gundersen & Ziliak, 2018). In a sample of adults aged 24-32, food insecurity was positively associated with self-reports of chronic diseases and obesity (Nagata et al., 2019). Additionally, a global analysis of food insecurity revealed that food insecurity and mental status have a dose-response relationship: as food insecurity developed from mild to moderate to severe, reported mental status worsened (Jones, 2017). A separate

global study found that food insecurity was positively associated with poor subjective wellbeing (Frongillo et al., 2017). This relationship was more pronounced in developed countries than developing countries. Additionally, a study conducted within the United States found that individuals who experienced food insecurity also experienced significantly higher rates of frequent mental distress (Liu et al., 2014).

Adults experiencing food insecurity are also at heightened risk for substance use disorders. One study found that individuals experiencing food insecurity were three times more likely to smoke cigarettes, one and a half times more likely to heavily use alcohol, and five times more likely to use both cigarettes and alcohol (Bergmans et al., 2019). A separate study found that food insecurity was correlated with greater odds of using marijuana, methamphetamines, cocaine, opioids, sedatives, and stimulants (Nagata et al., 2021).

Researchers have also noted that the negative mental symptoms associated with food insecurity are particularly salient among parents or caregivers (Lent et al., 2009; Leung et al., 2022; Melchior et al., 2009). Additionally, parenthood may exacerbate existing food insecurity. Some mothers may attempt to shield their children from food insecurity through “maternal deprivation”, where they reduce or sacrifice their own food intake to ensure their children have enough to eat (Dinour et al., 2009). Adults with children who experienced very low food insecurity were almost nine times more likely to experience serious psychological distress than their counterparts with no children (Joseph et al., 2022). A qualitative exploration of the psychological distress of food insecurity in parents and caregivers found that this population experiences shame and guilt for not being able to provide for their family, stress from the logistic and financial balancing act of feeding their family, frustration and lack of choice associated with the high price of healthy foods, stigma and shame of using community resources, and sadness

about their family's cyclic and chronic food insecurity (Leung et al., 2022). One participant expressed their stress regarding balancing the logistics and finances of feeding their family by stating "It's like spinning 10 plates, and you can't drop one". Another described their guilt by stating "It's just hard to feel that you can't give your kids everything they need." Another participant described the pressure that she felt under within her family:

I feel like I am the spoke that holds everything together, in terms of working and doing all the food shopping and doing all the budgeting, paying all the bills. It's up to me. It's really stressful because nobody can share the burden.

As individuals transition from adolescence to adulthood, the burden associated with securing food access becomes more independent than in childhood or college. This burden is particularly stressful for adults with children who are responsible for feeding not only themselves, but their families.

Seniors (Age 50+)

Food-insecure seniors report lower nutrient intakes than their food secure counterparts (Ziliak et al., 2018). Food insecure seniors were more likely to self-report poor health and chronic health conditions (Bengle et al., 2010). Additionally, older adults who experience chronic illnesses and food insecurity are sometimes forced to make a choice between food and medication. Some studies have found that food insecurity in older adults is correlated with cost-related medication non-adherence, which may further exacerbate the negative effects of food insecurity on seniors' health (Sattler et al., 2013; Schroeder et al., 2019). There has also been an association between food insecurity and decreased cognitive function in adults aged 60-85 (Frith & Loprinzi, 2018). Additionally, a sample of adults aged 60 years or older found that food

insecurity is associated with frailty, or vulnerability to stressors and adverse incomes (Perez-Zepeda et al., 2016).

Dr. Preeti Malani, a professor of medicine at the University of Michigan and a member of the National Poll on Healthy Aging research team, expressed concern for the ways that food insecurity can pose a threat to seniors' health. She stated that, "This is a group that has diabetes and cancer risk. For them, food is part of their health and right now, money has become a big barrier to eating healthy for a lot of people." (Creswell & Simonetti, 2023). In addition to the threat to seniors' physical health, they also experience psychological distress associated with food insecurity. One study found that seniors who experienced food insecurity were almost five times as likely to report depressive symptoms than their food-secure counterparts (Dean et al., 2011). While the effects of food insecurity in seniors is less studied than other age groups, the existing research demonstrates that less access to food negatively impacts both the physical and mental health of seniors.

Chapter Closing

While the physical health effects vary depending on an individual's age, food insecurity is associated with psychological distress throughout the entire lifespan. The bidirectional relationship of food insecurity and health is complex and multifaceted, but fundamentally food insecurity threatens both physical health and psychological safety (Anderson & Roumasset, 1996).

When considering the underlying factors and impact of food insecurity, it is vital to understand the unconscious bias that individuals hold towards others. Waytz and Epley (2013) coined this bias 'the lesser minds problem'. They argue that while individuals have the capacity

to think about others' experiences, the mind and cognitive processes attributed to others may be lacking in complexity, depth, and intensity. They expand upon this theory on page 50 by stating:

Because the minds of others are inherently invisible compared to one's own, inferences about other minds must rely on indirect information such as inferential theories, stereotypes, egocentric analogies, expressed behavior, and others' verbal reports of their mental states. These indirect methods create a systematic bias, we believe, to perceive others' mental capacity as lesser than one's one –as less intense, less causally impactful, and less objective than one's own. Because a mind is typically the defining feature of personhood for intellectuals and ordinary perceivers alike, the lesser minds problem represents a subtle form of dehumanization.

Addressing food insecurity requires an intimate knowledge of its role within a person's life, but no matter how many papers are read, studied or written, knowledge alone will never be able to fully encapsulate the complex personhood of those experiencing food insecurity. This awareness of this gap in our collective understanding can help drive curiosity to better understand the lived complexities and nuances of those experiencing food insecurity.

Chapter 4

Food Insecurity Interventions and Their Effectiveness

Given the pervasiveness and magnitude of the effects of food insecurity, the US Department of Agriculture as well as state and local agencies have established an array of food assistance programs to combat food insecurity (Gundersen & Ziliak, 2018). Some of these programs' effectiveness have been well documented, while others have received less research attention. Generally, nationwide programs have been more thoroughly studied than more local programs.

Nationwide Food Assistance Programs

The Supplemental Nutrition Assistance Program (SNAP) is the largest food assistance program in the US (Gundersen, 2019). SNAP provides individuals experiencing food insecurity with money that is loaded onto a payment which can only be used for eligible food expenses (USDA, 2024). In order to be eligible for SNAP benefits, a household's gross monthly income must be at or below 130% of the poverty line. For a family of three, this equates to roughly \$2152 a month or \$33,576 a year. Additionally, the net household income must be at or below the poverty line. Finally, household assets must be valued at \$3,000 or less in most cases. Households with members aged 60 or older or members with a disability are permitted to have up to \$4,500 dollars in assets. There are additional requirements for eligibility for adults without dependents (USDA, 2024).

While the above requirements exclude roughly 50% of individuals experiencing food insecurity, SNAP is generally considered the most effective intervention for reducing food insecurity in the US (Feeding America, 2024; Gundersen, 2019). Many researchers have found that participating in SNAP is related to a significant decline in both prevalence and severity of

food insecurity (Bartfield & Wang, 2006; Johnson & Markowitz, 2018; Mabli & Ohls, 2016). One study found that participation in SNAP reduced food insecurity cross-sectionally by 4% and longitudinally by 11.1% (Malbi & Ohls, 2016). A separate study found that after controlling for confounding variables, SNAP participants were between 5-20% less likely to be food insecure than non-participants (Gundersen et al., 2017). SNAP's success can be attributed to the extensive resources dedicated to the program allowing for nationwide reach, its status as an entitlement program, meaning it is a mandatory expenditure in the US federal budget and is not subject to as many legislative mechanisms that could reduce its funding, and its availability to individuals of all ages (Gundersen, 2019).

While SNAP has been proven effective in reducing food insecurity for tens of millions of Americans, SNAP benefits alone may not be sufficient to eradicate food insecurity due to high food prices and varying needs across households (Gundersen et al., 2019; Loopstra, 2018). To eliminate this disparity, referred to in the literature as the SNAP meal gap, researchers have suggested increasing the national expenditure of SNAP by \$23 billion based on meal cost projections across the country, but also acknowledge that this proposal isn't explicitly feasible given legislative challenges and regulatory efforts to reduce the program size (Gundersen et al., 2019). Others have suggested that SNAP should index the benefits rates to local prices, which is already a practice in Alaska, Hawaii, Guam, and the US Virgin Islands (Gregory & Coleman-Jensen, 2013; Gundersen et al., 2019). However, this practice is inhibited by the fiscal burden and human capital that would be needed to implement this change (Gundersen et al., 2019).

Additionally, while SNAP is proven effective in reducing food insecurity in participants, many eligible citizens do not participate (Gundersen & Ziliak, 2018). This nonparticipation is a result of three main factors: the transaction cost of enrollment, the potential benefits of

enrollment, and the stigma associated with federal welfare programs. To enroll in SNAP, participants must travel to a SNAP office, which may pose transportation challenges as well as trouble potentially finding childcare. These challenges are ongoing as well, as households must recertify their eligibility annually (Ponza et al., 1999). Additionally, the application process can be complex and time consuming (Gundersen & Ziliak, 2018). One study found that individuals most in need of SNAP, as defined through education and income levels, found it the most difficult to navigate the SNAP application process (Currie & Gahvari, 2008). Households weigh these transaction costs against the potential benefits of SNAP. For some households, the benefits do not exceed the costs. For one or two person households, SNAP benefits can be as low as \$16 per month (Gundersen & Ziliak, 2018). As such, when controlling for confounding variables, individuals whose incomes are closer to the SNAP eligibility line are less likely to participate in the program. Finally, individuals may be deterred from using SNAP due to their own distaste with using SNAP, fear of others' disapproval when redeeming SNAP, and a potential negative reaction from caseworkers (Stuber & Kronebusch, 2004; Reutter et al., 2009; Wu & Eamon, 2010).

The National School Lunch Program (NSLP) is a federally assisted program that offers free and reduced school meals to eligible students in public and nonprofit private schools as well as residential childcare facilities (USDA, 2024). In 2010, a piece of legislation called the community eligibility provision made it less burdensome for schools to offer universal free meals by stating that 40% of a school or district's students qualify for certain federal assistance programs, are homeless, migrants, or in foster care, it can serve free meals to everyone (Shain, 2024). This program has expanded rapidly following the COVID-19 pandemic, in which the federal government subsidized free meals for all students and ended in 2022. Since then, eight

states have passed their own universal free meal legislation and dozens more have similar legislation in the works. The number of students eligible for free meals is now ten-fold what it was in 2010, with over 21 million children now attending schools that offer universal free meals.

The true effect of these programs is difficult to assess due to sample selection hurdles (Gundersen & Ziliak, 2018). However, one study found that the NSLP reduced food insecurity rates in households with children in school by 2.3 to 9% (Gundersen et al., 2012). Other studies have found that food insecurity rates among households with children increased in the summer, which may be associated with lack of access to the NSLP (Bhattacharya & Currie, 2001; Nord & Romig, 2006).

While empirical studies exploring the NSLP's effectiveness are limited, firsthand accounts have helped give insight into the NSLP's impact. One mother at an elementary school that does not participate in community eligibility shared that she spends roughly \$250 a month on breakfast and lunch for her five children (Shain, 2024). The elimination of their monthly \$250 food expenditure could lighten the financial load of the family, which gives indirect evidence of the micro-impact that the NSLP and its partner program, the School Breakfast Program (SBP) could have on a single family.

Additionally, schools that do participate in community eligibility have noticed differences in their students. A teacher at an elementary school in Butte, Montana, shared with the New York Times that she saw an increase in her students' motivation to learn following their school's rollout of universal free lunch (Shain, 2024). A mother of a student at the same elementary school discussed how she believed the universal free lunch program eliminated some of the stigma that was present with cafeteria-provided lunches when she was in elementary

school. While these findings are not yet empirically supported, they may give insight into the subtle changes of the food landscape within schools.

While there has been an increase in NSLP eligible students over the past five years, one third of eligible students do not participate (Shain, 2024). This has been attributed to the stigma associated with a school-provided meal as a mark of poverty and need (Shain, 2024; Gundersen & Ziliak, 2018). However, this stigma may be lessened through state-subsidized universal free lunch programs (Shain, 2024). Students may also not wish to eat the meal that is served due to taste preference or perceived health value. Additionally, parents may opt for their children not to participate in free and reduced-price meals by failing to complete the necessary paperwork because they have varying income, face language barriers, or are embarrassed about their financial state (Shain, 2024). The need for this paperwork is reduced under the community eligibility provision and universal free lunch programs.

Food Banks

A food bank, or sometimes referred to as a food pantry, is a place where individuals can receive food staples free of charge (Loopstra, 2018). There are variations in food bank operations across the country, but they generally rely on donated food from the community or surplus food from the food industry. They also generally rely on community volunteers, although some may have paid employees as well. Finally, food banks are extra-governmental, meaning they are not government run but may receive grant funding. Food banks have fewer restrictions for use than federally funded food assistance programs. As such, for some individuals in the US, food banks are the primary source of food (Martin et al., 2016; Robaina & Martin, 2013).

There is limited research assessing the effectiveness of food banks. While food banks have been a vital way for individuals to increase their food access, recent studies have found that

food banks are largely unable to eliminate food insecurity (Hamelin et al., 2002; Loopstra, 2018). One study found that even with regular food bank use, there was still a 70% prevalence of severe food insecurity in their sample (Tarasuk et al., 1999).

Qualitative studies exploring the underlying mechanisms of food bank operations provide some insight into their limitations. An in-depth qualitative analysis of food bank utilization in Toronto found that since food banks are highly reliant on donations, the level of assistance they were able to provide varied greatly and was contingent on available supply rather than users' needs (Tarasuk et al., 2020). The strain placed on food banks' food supply is exacerbated by a recent shift in demographic use. While food banks were previously viewed as an intervention for those in short term crises, they are being increasingly utilized by those experiencing long term food insecurity (McKay et al., 2020; Neter et al., 2014).

Food banks also have limited hours of operation, which may exclude some participants from being able to utilize food banks. Further studies across Canada revealed that food banks not only did not have an adequate quantity of food, but that the food they did have was expired, highly processed, or given at quantities that would only last for a few days (Jacobs et al., 2023; Bocskei & Ostry, 2010; Tarasuk et al., 2014). This lack of quality foods and a lack of variety in the foods available suggest that the food provided by food banks is not nutritionally adequate for individuals to lead a healthy and active life (Simmet et al., 2017). Specifically, it was found that food provided in food banks generally reported insufficient amounts of fruit, vegetables, and milk products, as well as insufficient amounts of calcium, vitamin A, and vitamin C. One study also posits that food bank staff are not trained enough in nutrition to be able to help further understanding of nutrition and health in their clients, which is hindering their effectiveness (Bazerghi et al., 2016).

Additionally, individuals who could utilize food bank assistance sometimes opt not to due to documented feelings of stigma (Lambie-Mumford, 2017; Garthwaite, 2017). Due to this stigma, food banks are generally viewed as a last-resort intervention where individuals would rather go without food than use them (Loopstra & Tarasuk, 2012). Based on these overall findings, research suggests that the impact of food banks is limited in their ability to meet individual needs and have done little to reduce the overall population level of food insecurity. However, multiple researchers have also highlighted that despite these limitations, food banks offer an important supplement to people's otherwise low or non-existent food supply (Hamelin et al., 2002; Baskin et al., 2008).

Community Based Interventions

Some community organizations have sought to offer no cost or low-cost food to supplement the supply of food banks (Loopstra, 2018). These interventions' availability and effectiveness vary greatly depending on the community. Some community based interventions focus on skill building, such as debt counselling, cooking classes, or participation in a community kitchen where participants prepare large quantities of food together and then take home the prepared meal. These community based programs lack adequate empirical pre- and post-test evaluations. Some researchers have also expressed concern about using community based programs as an intervention for food insecurity because of their focus on skill-building and behavioral changes, which are not empirically supported determinants of food insecurity (Tarasuk, 2001; Hamelin et al., 2010; Johnston & Baker, 2005). There have been creative local non-profit endeavors that have aimed to increase access to food but have yet to be assessed empirically. For example, Transfarnation, a New York City based non-profit, aims to decrease food insecurity by arranging for corporate cafeterias and restaurants to donate uneaten food to

soup kitchens (Laterman, 2020). The local endeavors relevant to this study will be discussed as part of the City of Erie and 16501 Zip Code Profile in Chapter Six.

Chapter 5

Gaps in Literature and Current Study

While there has been extensive research exploring the underlying factors, effects, and interventions associated with food insecurity, multiple researchers have highlighted areas where the current literature could be expanded to enhance the knowledge base surrounding food insecurity.

Firstly, there is a lack of experimental designs which makes it challenging to assess causational factors relating to food insecurity (Gundersen & Ziliak, 2018; Myers, 2020; Leung, 2022; Akbari, 2022). Specifically, there is a deficit of evidence exploring the causal relationship between food insecurity and health outcomes (Gundersen & Ziliak, 2018; Leung, 2022). Researchers have also acknowledged the need for more longitudinal studies to better understand the long-term consequences associated with food insecurity (Carter et al., 2013; Gundersen & Ziliak, 2018; Loopstra, 2018).

While many demographic variables have been considered in relation to food insecurity, there is still the need to determine whether food insecurity should be assessed at the household level or the individual level as well as the need to delve deeper into certain demographic variables (Akbari et al., 2022; Gundersen & Ziliak, 2018). Specifically, researchers are interested in how food insecurity is distributed within a household. They have also highlighted the need to further evaluate how labor force participation, food cultural models, and disability status impact food security status. There is also interest in exploring why food insecurity rates fall along a declining age gradient and why older populations generally experience lower rates of food insecurity (Gundersen & Ziliak, 2018).

Researchers have also acknowledged that food insecurity on the local level is generally understudied (Carter et al., 2013). Specifically, there is a gap in understanding how local food systems, cultures, and lifestyles impact access to food (Akbari et al., 2022). It is also critical to explore further how local food systems can affect food diversity and to assess the role that governance plays in developing sustainable food systems. Researchers have also highlighted the need to explore how local factors may influence the existing relationship between food insecurity and negative health outcomes (Myers, 2020). This information is vital to be able to assess how local food distribution systems could more effectively reach underserved areas (Gundersen & Ziliak, 2018).

Additionally, there has been a growing interest in assessing how changes within local populations can impact food access (Feeding America, 2024). Researchers have suggested assessing how biological, social, economic, or environmental changes can affect local food systems (Akbari et al., 2022). They have also suggested evaluating how broader shocks like climate change, biodiversity loss, and disease can impact food security. It has also been posited that further research should explore how innovations in food production can impact food security.

Finally, multiple researchers have assessed the need to empirically evaluate community-based interventions to food insecurity (Akbari et al., 2022; Gundersen & Ziliak, 2018; Loopstra, 2018). There is a lack of evidence evaluating the true effectiveness of food banks and community based programs, despite these arenas being some people's primary method of food access (Gundersen & Ziliak, 2018; Loopstra, 2018). The existing research is also lacking depth in its understanding of what factors make local interventions effective. In a broader sense, researchers have highlighted the need to identify community centered strategies for achieving food security

(Akbari et al., 2022). On a more individual level, scholars have expressed a desire to understand the coping mechanisms of low-income food secure families to identify how these coping strategies impact food security status (Gundersen & Ziliak, 2018). There is also a gap in understanding the effective mechanisms for improving food security while accounting for the socio-ecological differences between local communities (Akbari et al., 2022). It is also critical to assess what empowers individuals to use community food programs in order to better understand how to increase their reach and effectiveness.

The current study aims to address some of the gaps in the literature by providing an in-depth, quantitative and qualitative account of the psychological experiences of food insecurity and its effects within the 16501 zip code, which resides in Erie, Pennsylvania. Specifically, it aims to address the following research questions:

- 1) What are the psychological impacts of food insecurity within the 16501 zip code?
- 2) What coping strategies and community resources do people utilize to access food and what is their perceived effectiveness?
- 3) How have the social, economic, and physical changes to the 16501 zip code changed food access in the area?

These questions were assessed through the use of a mixed method survey. By exploring these research questions, I hope to increase the depth of knowledge available regarding local experiences of food insecurity, the psychological mechanisms that underlie utilization of community resources, and how changes to a local food system impact food insecurity.

Chapter 6

The City of Erie and the 16501 Zip Code Community Profile

In order to understand the intricacies of food insecurity within the 16501 zip code, it is critical to understand the broader context in which these circumstances exist. To achieve this, I collected and organized secondary data to create a community profile of Erie, PA with special consideration to the 16501 zip code. Cross-sectional data was generally drawn from the 2020 U.S Census while longitudinal data was largely extracted from the 2019-2023 American Community Survey 5-Year Narrative Profile. This community profile will give an overview of the City of Erie before delving into the 16501 zip code's specific location and the population's demographics, income and housing, education and employment, revitalization related changes, existing food insecurity rates, and available food insecurity interventions to provide a quantitative knowledge base to support the findings of this study.

The City of Erie Overview

Figure 1

Map of Pennsylvania with Erie Noted (Visit Erie, 2025)



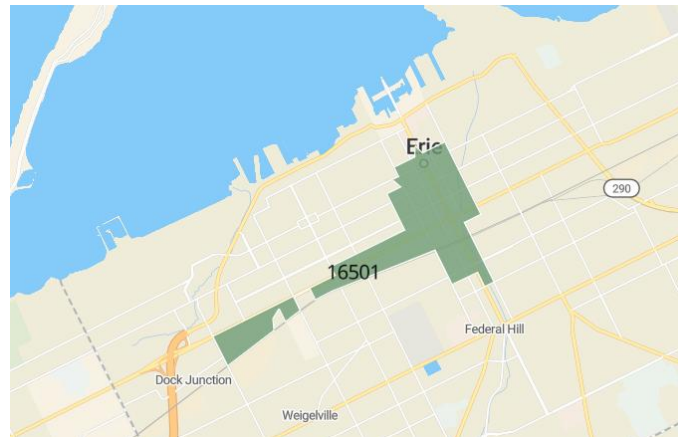
Erie, Pennsylvania is a mid-sized city in the northeast corner of the state on the south shore of Lake Erie with a total area of 19.3 square miles and a current population of roughly 94,000 people (U.S. Census Bureau, 2023). It is the fifth most populated city in the state. The city's name is derived from the indigenous people who originally occupied the land (City of Erie, 2013). In the first half of the 20th century, Erie attracted waves of European immigrants due to its booming manufacturing industry. However, in the 1950s and 1960s, Erie's large manufacturing firms experienced industrial decline (Federal Reserve Bank, 2022). From 1954 to 2002, the total number of manufacturing jobs in Erie decreased an estimated 31-43% (Wertz, 2016).

Like many rust-belt towns, Erie has experienced the corrosive effects of population loss, economic decline, and urban decay often associated with deindustrialization (Wertz, 2016). In recent years, however, there has been a concentrated effort to revitalize the city. In 2016, the Erie

Downtown Improvement District and the Erie Redevelopment Authority sponsored the Erie Downtown Master Plan, a framework for future development in the area. This plan outlined six main goals for development: to recognize and promote four distinct areas in downtown Erie to support social synergy, to improve the physical environment, to pursue further economic development opportunities, to increase market-rate housing, to improve transportation and connectivity, and to launch a promotional campaign for downtown Erie's businesses and programs (*Downtown Erie*, 2016). At the heart of many of these revitalization efforts is the 16501 zip code.

The 16501 Zip Code Location

Figure 2
Map of the 16501 Zip Code (Google Maps, 2025)



The 16501-zip code is centrally located in downtown Erie and occupies approximately 0.72 square miles (Simple Maps, 2022). It has been considered the poorest zip code in the state and one of the poorest in the nation based on census data from the 2012-2016 American

Community Survey (Vendetti, 2018). Yet, the zip code is a hub for commercial activity and is home to a bustling university, a Fortune 500 company, a hospital, and dozens of local businesses. There has been a longstanding polarization between the professional workers and local population within the zip code, specifically along racial and economic lines (Burdick, 2019). The 16501-zip code's geography, history, population, and its role in Erie's broader revitalization efforts make it a prime location for a deeper look at how these various factors intersect with food insecurity.

16501 Zip Code Population

The 16501-zip code is home to 2,241 people and 1,245 households (U.S. Census Bureau, 2020; U.S. Census Bureau, 2023). The average household size is 2.16 people, with a margin of error of ± 0.26 for a 90% confidence interval. The median age of this population is 55.4 years old (± 4.8), which is older than the average median age in Pennsylvania of 41.1 years (± 0.1) (U.S. Census Bureau, 2023). Approximately 28.6% (± 6.8) of the population is 65 years or older, which is higher than the state average of 20% (± 0.1). Only 0.9% (± 1.5) of the population is under 18 years of age. Approximately 16.24% of the population is between the ages of 15-24, which may be due to the proximity of a university that directly borders the 16501-zip code (U.S. Census, 2023).

The 16501-zip code is home to an aging population, which is often accompanied by higher disability rates (United Nations, 2024). Approximately 38.4% (± 9.7) of the 16501 population has a disability, which is more than double the state average of 14.7% (± 0.2). Roughly 5.4% (± 3.5) of the population has difficulty hearing, 12.2% (± 5.3) has vision

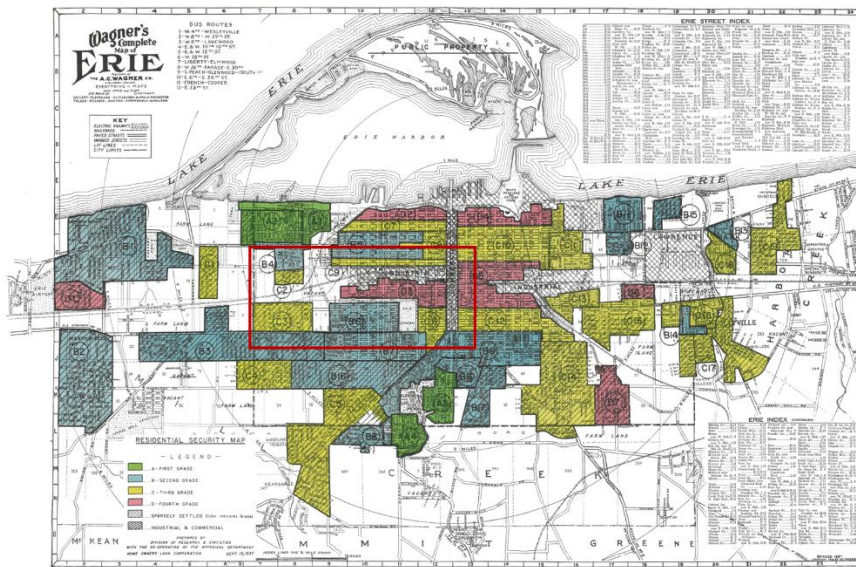
difficulty, and 19.9% (± 8.7) has cognitive difficulty (U.S. Census Bureau, 2023). Additionally, 23.5% (± 8.7) of the population have difficulty walking, 8.3% (± 4.4) have self-care difficulties, and 14.9% (± 6.3) struggle with living independently. The struggles associated with these disabilities are exacerbated in the 15.5% (± 8.6) of the population without health care coverage.

Of the 2,241 people that reside in the 16501 zip code, 1,441 are Caucasian, 509 are African American, 186 are Hispanic or Latino, 157 are two or more races, 34 are Asian, 9 are American Indian or Alaska Native, 4 are Native Hawaiian or other Pacific Islander, and 87 indicated that they identified as a race not listed (U.S. Census Bureau, 2020). Additionally, 11.8% (± 6.9) of the population was born outside of the United States, and 56.2% of the foreign-born population are not U.S. citizens (U.S. Census Bureau, 2023).

The median household income in the 16501-zip code is \$14,579 ($\pm 2,362$), which is less than a fifth of the state median household income of \$73,824 (± 511). Roughly 61% (± 12.3) of the 16501 population lives at or below the poverty line, which is approximately five times higher than the statewide poverty rate of 12% (± 0.3) (U.S. Census Bureau, 2023). Additionally, the employment rate is only 26.8% (± 9.5) compared to the statewide rate of 60% (± 0.3). However, considering that the zip code's population is typically older, this may be since individuals have retired. Roughly 23% (± 9.1) of the population has attained a bachelor's degree or higher, compared to the statewide attainment rate of 35.3% (± 0.3). Only 3.2% (± 4.6) of the population own their homes and all the houses within the zip code are valued within the \$50,000-\$99,999 (U.S. Census Bureau, 2023). As such, most of the population rents a one-bedroom housing unit. The median gross rent is \$411 per month.

Figure 3

Map of Erie's Redlined Districts with 16501 Zip Code Approximated in Red Rectangle (Burdick, 2019)



The current socio-economic state of the 16501-zip code can be attributed in part to systemic racism in the form of redlining (Shaker et al., 2022). Following the collapse of the housing market in the Great Depression, President Franklin D. Roosevelt made 30-year mortgages the new standard, which helped make home ownership possible for more consumers (Burdick, 2019). The Federal Housing Administration (FHA) and private firms' residential security maps to “graphically reflect the trend in desirability in neighborhoods from a residential viewpoint” (Burdick, 2019). The accompanying reports for each neighborhood included the “type” of people who live there, specifically the percentage of immigrants or African American residents, who were referred to in the reports as “undesirables”. If a neighborhood had many of these groups, it would be referred to as an “infiltration” (Burdick, 2019). Each neighborhood was

designated a security grade and color that described the quality of the neighborhood. Areas with higher immigrant and minority populations were typically rated lower. Neighborhoods with a security grade A, indicated in green on the map above, were considered the most desirable. Neighborhoods given a security grade B, indicated in blue on the map above, were considered desirable. Neighborhoods given a security grade C, indicated in yellow on the map above, were in a state of decline. Neighborhoods given a security grade of D, indicated in red on the map above, were considered hazardous. Neighborhoods with a security rating of C or D were consistently denied loans in favor of more affluent or white neighborhoods (Burdick, 2019). This system also deterred real estate developers and urban planners from these neighborhoods, which is key in how redlining impacted the development of key resources in certain neighborhoods (Shaker et al., 2022). The 16501-zip code is outlined above and consists primarily of C or D rated neighborhoods.

The Revitalization of the 16501 Zip Code

Efforts to revitalize downtown Erie have been present since 1955 when the Redevelopment Authority of the City of Erie (RACE), a quasi-governmental agency that aims to renew, rebuilt and revitalize Erie through urban renewal, housing rehabilitation and blight mitigation, was established (RACE, 2024). In 1965, RACE spearheaded a downtown urban renewal project that aimed to improve Erie's tax base by incentivizing businesses to stay in Erie. The outcome of this project included the development of Erie City Hall, a university library and science center, and a 600-car parking garage, all of which reside within the 16501-zip code. In 1972, RACE launched a neighborhood development program that relocated 81 families and

rehabilitated 51 housing units across 18 city blocks, some of which resided in the 16501-zip code.

From 1980 to 1993, RACE received a \$7.3 million federally funded grant that aimed to create new job opportunities through supporting new businesses and expansion of current businesses within downtown Erie. This project expanded the Erie Insurance Exchange, a Fortune 500 company located within the 16501-zip code. It funded the development of a four story, 200,000 square feet office complex and a two-level parking garage. It also led to 138 families and individuals being relocated. This grant was also able to fund multiple smaller businesses to move into the area including an art museum, a day care center, an art gallery, and legal offices. This contribution laid the foundation for the current developments taking place in the 16501-zip code.

In 2004, The Erie Downtown Partnership (EDP) was founded with the goal of improving the quality of life and creating a richer downtown experience for businesses, residents, and guests through advocacy, marketing, and placemaking, or designing and maintaining public spaces with special consideration to the community's existing assets (Erie Downtown Partnership, 2025). They offer resources for visitors to Erie, funding for downtown businesses to improve their property exteriors, and have developed design guidelines to help property owners maintain the historic buildings of Erie. They also host multiple events throughout the year in downtown Erie and have installed multiple public art projects to beautify the area. The Erie Downtown Partnership (EDP) serves as a hub for any person looking to learn more about or invest in downtown Erie.

The Erie Downtown Development Corporation (EDDC) is a nonprofit, 501(c)3 organization that was established in 2017 by local business leaders to further revitalize downtown Erie through real estate development (EDDC, 2025). The EDDC was backed by over \$27 million raised by local investors (Martin, 2023). As of 2023, the group had invested more than \$110 million in downtown Erie and generated \$2.5 million in property taxes. They have spearheaded the development of the Flagship City Public Market, which will soon include the first and only food market to the 16501-zip code (Martin, 2024). They have also developed the Flagship City Food Hall, a casual food court with a wide variety of local restaurants (EDDC, 2025). Since their founding, EDDC has developed 100,000 square feet of new commercial space, helped launch 25 new businesses, and developed 108 new residential spaces. As part of this broader investment in real estate, Erie Insurance, the Pennsylvania Housing and Finance Agency, Beacon Communities, and the City of Erie invested \$27.4 million to restore Richford Arms, a 100-unit affordable housing apartment complex located within the 16501-zip code (Flowers, 2023).

The City of Erie was also recently approved to participate in the City Revitalization and Improvement Zone (CRIZ) program (Pennsylvania Department of Community and Economic Development, 2024). This program is designed to help cities that have faced economic challenges to revitalize their downtown by attracting new businesses and creating jobs. Specifically, the CRIZ will designate 130 acres of CRIZ zones across the city and for the next 30 years, certain state and local taxes generated within those zones will be available to invest into economic development projects in those areas (Martin, 2024). The CRIZ is anticipated to generate up to \$15 million annually for development projects.

There has been both a history of investment in the local community and recent efforts to revitalize downtown Erie that have changed the landscape of the poorest zip code in the state, but many of these groups have not made efforts that pertain to food access within the area. Despite this, it is necessary to understand the broader ecological changes to the 16501-zip code to assess how these changes subsequently affect food access.

Food Insecurity Within the 16501 Zip Code

The 16501-zip code was long considered a food desert, or an area where at least one third of residents live one mile or more from the nearest grocery store (Erie County Department of Health, 2025; USDA, 2024). However, the upcoming opening of a local market in the Flagship City Public Market has been speculated to eliminate this status (Martin, 2024). However, since proximity to a grocery store is only one of many factors that influence food insecurity, many residents of the 16501-zip code may still be at risk for food insecurity even after this grocery store opens.

There is little quantitative data exploring the prevalence of food insecurity within the 16501-zip code specifically, which aligns with prior literature's desire to expand evaluations of food insecurity on a local level. However, there is data available exploring food insecurity at the county level. In 2022, 13.9% of Erie County residents experienced food insecurity and 31% of residents were eligible for SNAP (Feeding America, 2024). The annual food budget shortfall, or the total amount of additional dollars needed for these individuals to purchase enough food, was \$29,061,000.

To estimate the prevalence of food insecurity within the 16501-zip code, it may be beneficial to review the demographics of the zip code and their relation to various risk factors associated with food insecurity. The chart below explores how various empirically supported correlations align with population demographics within the 16501-zip code.

Table 1:

Table Exploring the Relationship between Empirically Supported Risk Factors for Food Insecurity and Demographics of the 16501 Zip Code

Relationship within the Literature	Population Demographic in the 16501 Zip Code
Lower income is correlated with increased food insecurity (Gundersen & Ziliak, 2018).	The average income is \$14,579, a fifth of PA's average income (U.S. Census Bureau, 2023)
Having fewer financial assets is correlated with increased likelihood of food insecurity (Fitzpatrick & Coleman-Jensen, 2014).	Roughly 96.8% of residents rent their housing and only 23% has a bachelor's degree or higher (U.S. Census Bureau, 2023).
In the U.S., African Americans and Latinos are more likely to experience food insecurity (Myers & Painters, 2017)	Roughly 31% of the population is African American or Latino (U.S. Census Bureau, 2020).
Rapid urban growth is correlated with an increase in food insecurity (Szabo, 2016).	There has been an increase in the number of businesses and available housing units within the area (EDDC, 2024; EDP, 2024).
Roughly 47% of college students nationwide experience food insecurity across a 9-month period (Nikolaus et al., 2020)	Roughly 16.2% of the population is within the ages of 15-24 and a portion of these individuals may be enrolled at a

	university that is within a quarter of a mile of the 16501- zip code (US Census Bureau, 2020).
Food insecurity rates are higher within a household where a member is disabled (Burke et al., 2016)	Roughly 38.4% of the population has a disability (U.S. Census Bureau, 2023).
Previously redlined areas are more likely to be at risk for food insecurity (Shaker et al., 2022).	In the 1940's, areas of the 16501-zip code were given the security grades of C or D indicating they were in a state of decline or hazardous (Burdick, 2019).
The USDA defines a food desert as an area where at least one third of residents live one mile or more from the nearest grocery stores (USDA, 2025). However, low-income households often choose their preferred retailers based on prices rather than proximity (Wainer et al., 2023). One study found that distance to the nearest supermarket was not associated with food insecurity (Wilde et al., 2018).	EDDC has recently brought a new local market to the 16501-zip code, set to open in August 2025, marking the first market to open in the area and eliminating the food desert (EDDC, 2025).
Individuals aged 65 and older are 39% less likely to experience food insecurity (Gundersen & Ziliak, 2018).	Roughly 24.5% of the population is aged 65 or older (U.S. Census Bureau, 2020).
Culture plays an important role in determining what constitutes as food and what the socially acceptable forms of attaining food are (Alonso et al., 2017)	Roughly 11.8% of the population is foreign-born and roughly 64.3% of the population is non-white (U.S. Census Bureau, 2020; U.S. Census Bureau, 2023)

Food Insecurity Interventions Within the 16501 Zip Code

Another indicator that food insecurity is prevalent within the 16501-zip code may be the number of local food insecurity interventions that are based within the area. In addition to the local food insecurity interventions, individuals within the 16501-zip code may also be eligible for national food assistance programs.

The Erie City Mission was founded in 1911 and aims to meet the physical, emotional, and spiritual needs of individuals within the City of Erie (Erie City Mission, 2025). While they offer a variety of rehabilitation and emergency services, they also serve free public breakfast and lunch daily to hundreds of Erie residents. They also partner with several local restaurants in a food recovery program that reduces food waste while feeding individuals. The Erie City Mission's Public Meal service operates every day of the year except Thanksgiving and Christmas Day.

Emmaus Ministries, a ministry of the Benedictine Sisters of Erie, has been providing food supplements to Erie residents since 1974 (Emmaus Ministries, 2024). They offer a warm dinner, Mondays through Fridays from 4:00-5:30 PM. They also have a food pantry that is open on Monday and Tuesday mornings from 9:00-11:00 AM. The Sister Gus' Kids Cafe, an extension of Emmaus Ministries, offers an after-school meal and activities for 6–18-year-old students from 2:30-5:30 on school days. Additionally, Emmaus Ministries launched and maintains Emmaus Grove, a neighborhood garden that grows over 2,000 pounds of fresh produce that is distributed within the food pantry during the summer months.

Erie Sunday Suppers is an ecumenical ministry that was founded in 2014 (Erie Sunday Suppers, 2017). The founding members realized that the existing community programs were all

closed on Sunday evenings and sought to provide a free meal to Erie's vulnerable populations during this time. They serve 130-200 men, women, and children each Sunday and note that the number of guests increase during the summer and during later Sundays of the month, which may be related to limited availability of school-based food interventions and dwindling SNAP benefits at the end of the month.

The Second Harvest Food Bank of Northwest Pennsylvania is the largest nonprofit food distributor in Northwest, PA (Second Harvest Food Bank of Northwestern PA, 2025). They distribute millions of pounds of groceries to nonprofit agencies across 11 Pennsylvania counties. While they are located within the 16501-zip code, they generally do not distribute food directly to the public, but rather serve as a facilitator for food pantries to receive resources. They accept food donations that are past the expiration date, which may help reduce food waste and increase donations, but prior studies exploring the effectiveness of food pantries have highlighted the individuals experiencing food insecurity may not desire expired food (Loopstra, 2018).

The Erie Downtown Partnership (EDP) has also aimed to address food insecurity within downtown Erie (Sorenson, 2024). Through collaboration with various community partners, the EDP was able to organize pay-what-you-can markets in the 16501-zip code throughout the summer months of 2024. A pay-what-you-can market functions by collecting excess produce from market stands across Erie and offering it at a farmers' market downtown. When an individual visits the market, they can opt to donate or are able to take the produce for little to no cost. Additionally, the farmers running the food stand can offer suggestions of how much produce is needed for a certain number of people and how to use certain produce, which can help reduce the knowledge gap associated with food insecurity.

The Lake Erie Food Rescue is not based within the 16501-zip code but serves as an interesting example of an innovative community effort to decrease food insecurity. The Lake Erie Food Rescue was founded in 2021 and serves as a liaison between organizations with excess food and organizations that serve food to those in need (Bruce, 2022). Volunteers pick up food from senior living centers, universities, and other corporations within Erie and deliver it to Shelter Community Services, an agency located within the 16502-zip code that provides resources for adults experiencing homelessness and poverty (Bruce, 2022; Community Shelter Services, 2025).

Chapter Closing

The 16501-zip code is a microcosm of the corrosive nature of post-industrialism, but the area has been experiencing cultural revitalization due to various stakeholder groups. While there is little known about the quantitative scope of food insecurity within the 16501-zip code, the population exhibits demographic traits that would suggest food insecurity is prevalent within the area. Throughout Erie's current revitalization developments, the role that food access has played when determining development efforts appears minimal given the lack of data and research devoted to the issue. There are multiple community-based groups aiming to increase access to food for this population, but their effectiveness has not been empirically assessed. This research hopes to support the development of further food insecurity assessment and interventions within the 16501-zip code.

Chapter 7

Methodology

Participants

Participants of this study were recruited from the 16501-zip code through fliers at apartment buildings, food pantries, soup kitchens, social service agencies, email solicitations, and snowball sampling. The study was described as “a research study that examines how hunger affects people’s wellbeing and how food access has changed in downtown Erie over the past five years.” The principal investigator also advertised in person at two local soup kitchens and at a local daytime homeless shelter. Individuals interested in participating were asked to scan a QR code on the flier using their mobile device that would direct them to a short Qualtrics survey to screen their eligibility. During in-person solicitation, I also offered participants the option to take the survey on an iPad. Participants were eligible if they were above the age of 18, resided within the 16501 zip code, and reported at least one affirmative response to the 6-item USDA Household Food Security Survey Module (FSSM) (USDA ERS, 2024).

Materials

To determine a participant’s level of food insecurity, the 6-item USDA Short Form of the Food Security Survey Module (FSSM) was used (USDA ERS, 2024). This is an abbreviated version of the 18-item USDA Household Food Security Survey Module. The shortened version was selected to minimize respondent burden. Although less precise than the 18-item questionnaire, this measure has still been found to be reliable in assessing food insecurity and

assessed food insecurity accurately in 97.7% of households (Blumberg et al., 1999). In this survey, participants read a statement such as “The food that (I/we_ bought just didn’t last, and (I/we) didn’t have money to get more” and were prompted to respond if the statement was often true, sometimes true, never true, or if they were unsure/unwilling to answer. The responses were coded and scored according to the USDA’s guidelines to determine affirmative responses. Any participant who responded affirmatively to one of the questions was eligible to participate in this study.

I developed a mixed-method survey based on prior quantitative and qualitative studies exploring the psychological effects of food insecurity (Leung et al., 2020; Leung et al., 2022). The survey was specifically designed to answer the research questions, so the content revolves around the psychological impact of the participant’s food insecurity, their strategies for attaining food, and if/how these strategies have shifted in response to changes within the 16501-zip code. The survey began with collecting more information about the participants’ scope of food insecurity, like how many meals they had eaten the day before and if they were responsible for feeding other members of their family.

To address the first research question, the survey listed six mental outcomes that had been previously identified in the literature as biproducts of food insecurity (sadness, hopelessness, stress, frustration, embarrassment, difficulty falling asleep, difficulty regulating emotions) and asked participants to rate how often they experienced this emotion on a four-point Likert scale. The scale included the options “I’ve never experienced this when I didn’t eat enough”, “I’ve experienced this emotion once or twice when I didn’t eat enough”, “I experience this every time I don’t eat enough”, and “This feeling is constant when I think about food”.

Participants were then asked to describe any other emotions they felt when they did not have enough to eat and to tell a story about a time they did not have enough to eat and explain how it made them feel. They were also asked an open-ended question that inquired about the participants' coping strategies when they do not have enough to eat.

To address the second research question, participants were asked how often they have used a specific national or local intervention (SNAP, food banks, soup kitchens, EDP's Pay-What-You-Can-Stand). If they had used it before, they were asked to share how satisfied they were with the service on a five-point Likert scale ranging from "Not at all Satisfied" to "Extremely Satisfied". There was also an open-ended question listed after each satisfaction scale that asked participants to share a bit more information about their experiences with these interventions. There was also a question that asked participants to share a bit more about other ways in which they try to obtain food and how satisfied they are with them. Participants were then asked if they had any suggestions for improving food access or interventions in downtown Erie.

To address the third research question, participants were asked about two large changes in recent years. They were first asked how often they visited the Flagship City Food Hall and what made them choose to visit or not visit the Flagship City Food Hall. They were then asked how, if at all, the demolition of a McDonald's in the 16501 zip-code impacted their access to food. They were then asked to list any other changes they have noticed to downtown Erie over the past five years and how, if at all, these changes have impacted their day-to-day lives. The final question of the survey asked participants what they would like others to know about struggling to find food.

Procedure

Individuals interested in participating in this study first completed the 6-item USDA Short Form Security Survey Module (FSSM) (USDA ERS, 2024). Individuals who responded affirmatively to at least one question on the FSSM were directed to the mixed method survey in Qualtrics that they could complete on any compatible device. Participants were instructed to respond to these prompts in as much detail as they felt comfortable including but were also permitted to skip any questions with which they were uncomfortable. At the end of the survey, participants were shown a list of local websites and resources for combatting food insecurity and encouraged to utilize these resources. Participants were then redirected to a separate survey without IP tracking to provide information for compensation of their \$10 Amazon gift card. The median completion time of the survey was 9.1 minutes.

The quantitative results from the survey were analyzed using IBM Statistical Package for Social Sciences (SPSS) and Microsoft Excel. I calculated measures of central tendency (mean and median) and variability (standard deviation) to summarize the data. Since this research is exploratory in nature and does not test specific hypotheses, no comparative statistical tests (t-tests, ANOVAs) were used in the data analysis (Sullivan & Artino, 2013). To supplement the quantitative findings, thorough reflexive thematic analysis was utilized.

I analyzed the qualitative results from the open-ended survey questions using Microsoft Excel to conduct reflexive thematic analysis and then my thesis supervisor checked this analysis for accuracy. Thematic analysis was chosen for this research because the flexibility it offers is synergistic with the broad research questions pose (Braun & Clark, 2006). While this flexibility can lead to an absence of guidelines that dilute the reliability and validity of qualitative analysis,

I was careful to follow best practices for reflexive thematic analysis to mitigate this risk. This included following the framework outlined in the following paragraph, explicitly considering and discussing the number of decisions made throughout the analysis, and using the 15-point checklist of criteria for good thematic analysis outlined in Braun & Clark (2006).

A key component of reflexive thematic analysis is that it acknowledges that the researcher's position on the given research are inextricably linked to their subsequent research contributions (Braun and Clark, 2006). A researcher's subjectivity is a critical component of their process and would be impossible to remove, reduce or avoid. In fact, Braun and Clark argue that a researcher's subjectivity should be embraced and critically considered within the research process. They coin this examination as reflexivity. Reflexivity involves drawing upon prior experiences, pre-existing knowledge, and social position and evaluating how these factors influence and contribute to both the research process and qualitative insights (Braun & Clark, 2021). Subjectivity in qualitative research often relies on variations across the four domains of thematic analysis: orientation to the data, focus of meaning, the qualitative framework used, and the theoretical framework used. Reflexive thematic analysis encourages researchers to be transparent about their positioning across these areas. Hence, throughout my procedure, I highlight the ways in which these four domains interacted with how I interpreted the data.

I followed the phases of reflexive thematic analysis outlined by Braun & Clark (2006). First, I familiarized myself with the data set by reading over each response. In the instance of this project, given its small sample size and the length of responses, familiarizing myself with the data was a relatively short process of about a few hours of reading and rereading approximately

120 open-ended responses to various survey questions, evaluating them both within and between participants, to understand the scope of responses.

I then coded the data by extracting key words, phrases, or ideas from responses that were relevant to the research questions. Coding is the exploratory process in which a researcher reviews the data in relation to the research questions and writes codes, or brief descriptions of the data, next to them (Braun & Clark, 2006). Coding is critical to rigorously and insightfully noting variations across the data set, which is necessary to generating meaningful themes (Braun & Clark, 2021). For this project, I utilized a more inductive approach to coding in which I reviewed the data to identify the patterns within the data, rather than a more deductive approach in which the researcher applies a specific theoretical lens or framework to extract meaning from the data set (Braun & Clark, 2021). Since this project was incredibly exploratory by nature, the inductive approach gave the research a crucial flexibility that allowed for meaningful results.

I utilized a largely relativist and constructivist approach to my data analysis, in which the research sought to examine the realities and sense-making displayed within the data set, rather than determine an objective reality or truth (Braun & Clark, 2021). There is no one objective reality of food insecurity, the reality of food insecurity is derived from the ways in which an individual views their personal circumstances and how the people around them interact with their situation. Additionally, my qualitative framework was primarily experiential; the research questions were designed to better understand the lived experiences of food insecurity so experiential analysis aligned well with the research questions, although some critical analysis was used particularly to assess the third research question since its focus on Erie's revitalization

efforts shifted away from understanding experiences and more towards evaluating an existing, albeit developing, system (Braun & Clark, 2021).

After the initial code book was developed, I searched for themes across the codes (Braun & Clark, 2021). A theme can be defined as “a coherent and meaningful pattern in the data relevant to the research question” (Braun & Clark, 2021, p. 121). Themes do not need to encapsulate every data point, but they should have a central organizing component and be distinctive from the other themes (Braun & Clark, 2021). The focus of meaning for theme development varied across the data set based on the responses. Some responses were very explicit in their meaning. In these instances, the themes derived from the responses were also very explicit. For example, multiple participants noted physical symptoms that overlapped with their mental experiences of food insecurity, so this was noted as a theme in a straightforward manner. Other themes were the result of abstraction of the data. For example, the themes for the third research question were derived from the data set, but also reliant on my broader understanding of how Erie’s revitalization was being portrayed within local media. Given the external factors that influence food insecurity within the 16501 zip code, it was critical to assess the responses of this survey within the context of broader cultural trends.

The themes were then reviewed to ensure that they aligned with both the full corpus and the coded extracts (Braun & Clark, 2006). I then wrote a detailed analysis of each theme and named each theme based on its core message. This information was then integrated with the quantitative findings to develop answers to the research questions.

Chapter 8

Research Question One Results

Demographic Data

I collected data from 30 people. The average age of participants was 43.2 years old ($SD = 13.16$). Of this sample pool, 17 people were Caucasian, five were African American, three were Hispanic, one individual listed that they were two or more races, two individuals identified with races that were not listed and one participant preferred not to answer. There were 18 people who identified as male and 12 people who identified as female. Every participant was classified to have food insecurity based on the USDA's Six-Item Food Security Survey Module (FSSM). Participants scored an average of 4.0 out of six on the FSSM, indicating a score of low food security. Low food insecurity is defined as food insecurity characterized primarily by reductions in dietary quality and variety (USDA ERS, 2024). To contextualize this score further, when asked which meals they had consumed the day before, 23 people (65.7%) did not eat breakfast, 22 people (62.9%) did not eat lunch and 16 people (45.7%) did not eat dinner.

Research question one (RQ1) examined the psychological impacts of food insecurity within the 16501 zip-code. Participants most reported feeling embarrassment about their food situation, with seven participants expressing that they never feel embarrassed, four participants expressing that they sometimes feel embarrassed, eight participants expressing that they often feel embarrassed and eight participants expressing that they always feel embarrassed when thinking about their food insecurity ($M = 2.4$, $SD = 1.33$). The second most frequent emotion associated with food insecurity was sadness, with seven participants expressing that they never

feel sad, seven participants expressing that they sometimes feel sad, twelve participants expressing that they often feel sad and, four participants expressing that they always feel sad when they think about their food insecurity ($M = 2.4$, $SD = 0.99$). Participants then listed difficulty falling asleep as the next most prominent symptom, with six participants reporting that they never have trouble falling asleep, seven participants reporting that they sometimes struggle to sleep, eight participants reporting that they often have trouble sleeping, and six participants reporting that they always have trouble sleeping when they think about their food situation ($M = 2.3$, $SD = 1.23$).

Participants expressed feeling frustration as well, with five participants expressing that they never feel frustrated, nine participants stating that they sometimes feel frustrated, ten participants reporting that they often feel frustrated, and four participants reporting that they always feel frustrated when they think about their food insecurity ($M = 2.3$, $SD = 1.13$). Participants expressed hopelessness, with six participants saying they never felt hopeless, ten participants reporting that they sometimes felt hopeless, six participants reporting that they often felt hopeless, and six participants reporting that they always felt hopeless when thinking about their food insecurity ($M = 2.2$, $SD = 1.21$). Participants also expressed that they felt stress, with five participants reporting that they never felt stressed, nine participants reporting that they sometimes felt stressed, twelve participants reporting that they often felt stressed, and two participants reporting that they always felt stressed when thinking about their food insecurity ($M = 2.2$, $SD = 1.04$). The least reported psychological impact was difficulty regulating emotions, with eight respondents stating that they never experienced emotional regulation difficulties, six respondents stating that they sometimes experience emotional regulation difficulties, ten

respondents stating that they often felt emotional regulation difficulties, and three respondents expressing that they always struggled to regulated their emotions when thinking about their food insecurity ($M = 2.1$, $SD = 1.15$).

Table 2

Table Depicting the Percentage of how Often Participants Experience Emotions Previously Correlated with Food Insecurity

						Hard to	Hard to
	Sad	Hopeless	Stressed	Frustrated	Embarrassed	Fall Asleep	Regulate Emotions
Never (1)	23%	21%	18%	18%	25%	21%	29%
Sometimes (2)	23%	36%	32%	32%	14%	25%	21%
Often (3)	40%	21%	43%	36%	29%	29%	36%
Always (4)	13%	21%	7%	14%	29%	21%	11%

In addition to the quantitative data showcasing the display and frequency of specific emotions, I identified three themes surrounding the psychological impacts of food insecurity from the qualitative data. These included the interactivity of physical and mental manifestations of hunger, the internalization of food insecurity stigma and community research usage, and a less prevalent occurrence of optimism and persistence in the face of food insecurity.

RQ1 Theme 1: The Interactivity of Physical and Mental Manifestations of Hunger

The data reflected the inextricable relationship between a person's mental state and physical state. Hunger is both a physical and mental phenomenon, and as such, people's lived experiences with food insecurity will impact both their physical and emotional wellbeing.

Many participants listed that they were angry, demoralized and exasperated by their food insecurity. Others shared that their food insecurity made them feel anxious or depressed. One participant noted that their hunger often made them irritable, and they have less patience. Other people expressed an overall emotional exhaustion with their broader circumstances. For these participants, their food insecurity was interconnected with other struggles in their life including recent loss of housing or homelessness, prior incarceration, unemployment, lack of funds, and/or addiction. Participants also expressed feelings of anger, despair, and stress and shared that these extenuating circumstances exacerbated their already negative experiences of food insecurity.

Some participants explicitly discussed how the negative psychological impacts of food insecurity drive negative physical impacts. One participant noted that their food insecurity decreased their energy levels and made it challenging for them to work. Another participant discussed how their food insecurity made it hard for them to maintain their body heat and that this increased their levels of stress and discomfort. Two participants also shared that they experience gastrointestinal issues and subsequently discomfort because of their food insecurity. Another participant shared that they worried about their health and their children's health.

Within these examples, the physical and mental manifestations of hunger intersect. The psychological burden of being food insecure drove people to feel angry, exhausted, and anxious. In some cases, the health outcomes associated with food insecurity further exacerbate the

negative mental symptoms. While this may seem like an obvious connection, it is critical to explore and address to accurately portray both the data set and the lived experiences of people experiencing food insecurity.

RQ1 Theme 2: Internalization of Food Insecurity Stigma and Community Resource Usage

There has been a long documented social stigma around using community resources to combat food insecurity (Purdam et al., 2016, Loopstra, 2018; Meza et al., 2018). This stigma may be derived from the underlying assumptions that community resource users are unable to manage their budgets or that people who use food banks are undeserving of public welfare due to other external factors (unemployment, drug use, etc.) (Purdam et al., 2016). Participants expressed both awareness and internalization of this stigma.

One participant discussed the embarrassment they felt when experiencing food insecurity because they were employed, which indicates that they do not believe that as a working person they fit the standard demographic of food insecurity. Another participant noted that their shame and embarrassment toward their current situation was so great that they simply could not ask for help with food and instead opted to go hungry. In this instance, the participant could not overcome their internalized stigma of community resources from their current food insecurity status and thus chose to avoid community resources.

In most cases, participants internalized this stigma by sharing that their food insecurity harmed their self-image. Participants internalized their current food situation as a reflection of their capabilities and self-worth rather than a situational or external occurrence. Participants expressed feeling at fault for their food situation. They also expressed feelings of worthlessness

and inferiority due to their food insecurity. One participant stated that their food insecurity led them to suffer from low self-esteem.

Throughout the data, participant responses indicated an awareness of the stigma of food insecurity. To alleviate the conflict between this stigma and their current situation, people either primarily avoided community resources, made distinctions between themselves and food insecurity stereotypes or adjusted their self-concept to accommodate feelings of inferiority and worthlessness.

RQ1 Theme 3: Positivity and Stoicism in the Face of Food Insecurity

A small subgroup of participants (roughly five people) expressed some level of positivity toward their current food insecurity. One person shared that their food insecurity motivated them. Another participant shared that their food insecurity made them more ambitious. Additionally, in the final question of the survey, people were asked what else they wished people knew about struggling to find food. Seven participants opted to answer this question. Of the seven, three people shared words of encouragement and that there are resources available to help. Two of the participants shared tips for others experiencing food insecurity (to start a garden and that it's legal to forage in state parks). There were four participants who expressed a more neutral outlook on their food insecurity. The participants essentially said that they do what they must do to get by and that when they find themselves hungry, they actively look for their next meal.

While these two groups may not initially seem related, I think they both demonstrate an acceptance of a person's current circumstances. This is important to note because it highlights the diversity of the food insecurity experience across the sample. While food insecurity is

associated with negative mental health outcomes for some, it is simply a part of life for others. This is also supported by quantitative findings. For each of the negative emotions listed, 5-8 participants stated that they never experience this emotion when they are experiencing food insecurity. While food insecurity is characterized by negative mental outcomes for some participants, it is important to note that this is not a universal phenomenon.

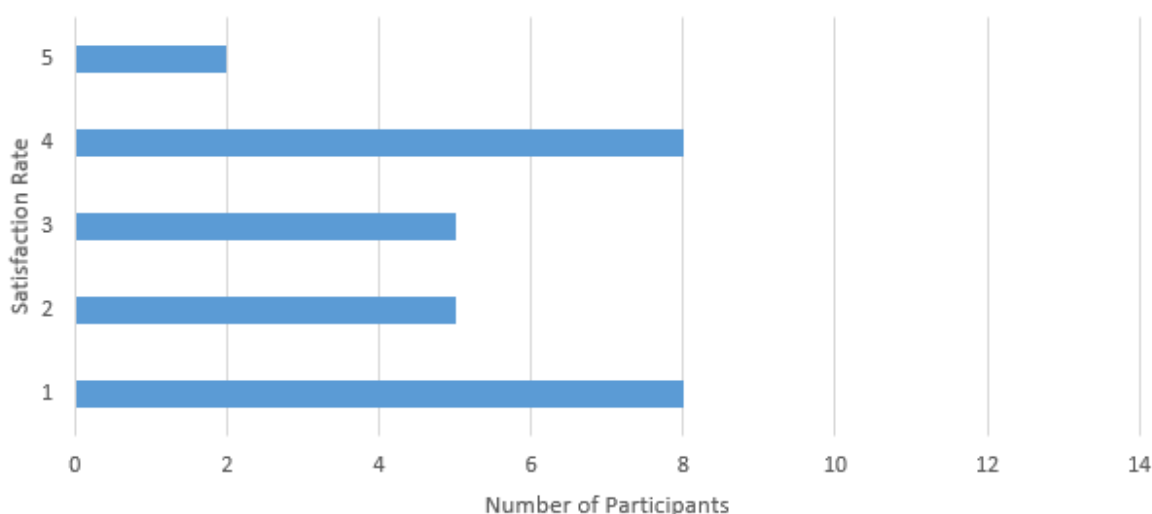
Chapter 9

Research Question Two Results

RQ2 inquired about the coping strategies and community resources people use to access food and the perceived effectiveness of these resources.

Figure 4

Graph Showing the Distribution of Satisfaction Rates of SNAP amongst Survey Participants who Have Used SNAP

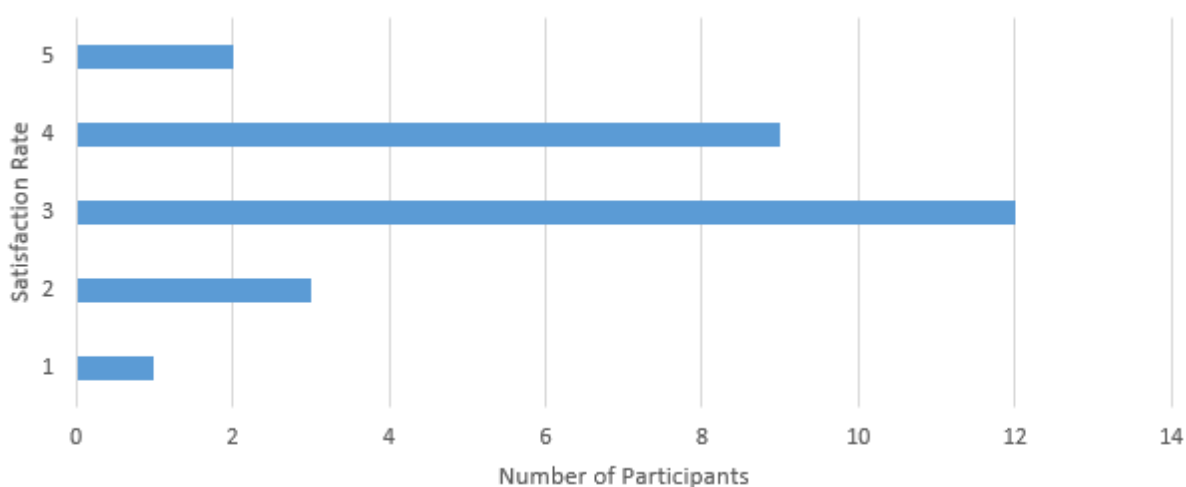


Of the participants, 27 people (90%) had used the Supplemental Nutritional Assistance Program (SNAP) and two people had tried to use SNAP but were ineligible. Of the people who used SNAP, the average satisfaction rate out of five was 2.62 (SD = 1.36). Interestingly, eight participants (22.6%) stated that they were not at all satisfied with SNAP while an additional eight participants (22.6%) stated that they were extremely satisfied with SNAP. Multiple participants (15 respondents) cited quantity deficiencies of their benefits as the core reason for their

dissatisfaction. One person mentioned that they receive \$23 a month to support themselves and their child. Another person mentioned that there were delays with their benefits being disbursed in March 2025, which impacted their ability to feed themselves and their family. However, four participants expressed satisfaction with SNAP's utility and convenience as part of their open-ended responses. While most people who participated in this study use SNAP, over half of the respondents have noted that SNAP benefits alone are not nearly enough to support their pursuit of a balanced diet.

Figure 5

Graph Showing the Distribution of Satisfaction Rates of Food Banks amongst Survey Participants that have Visited a Food Bank

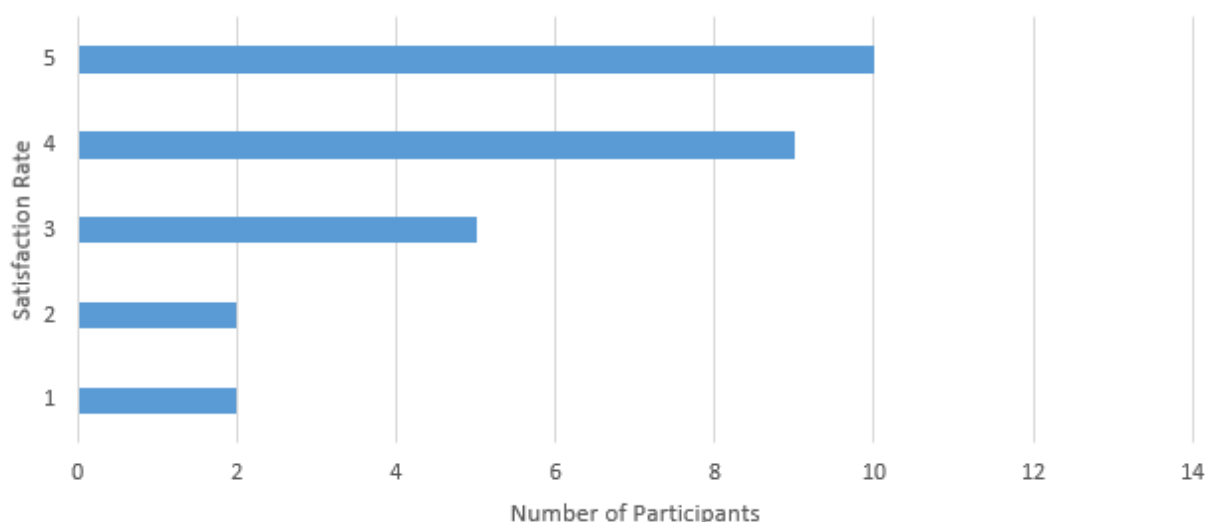


Of the participants, 26 people (86.6%) had used a food bank to obtain food. Of these participants, the average satisfaction rate was 3.3 out of five ($SD = 1.22$). One third of respondents felt neutral about the services they received at a food bank. Four respondents noted that they had received expired food from food banks, with one participant sharing that they had gotten food poisoning from some food bank items and another participant making the distinction

that the food was not only expired but spoiled and completely inedible. Two participants noted that the food banks did not seem to have enough food, and that the food was low quality. One participant felt that staff or volunteers at the food banks were sometimes judgmental to the patrons. Three individuals noted that their experiences with food banks were professional and efficient, and seven others expressed satisfaction with the food bank's quantity and quality.

Figure 6

Graph Showing the Distribution of Satisfaction Rates of Soup Kitchens and Charitable Free Meals amongst Survey Participants that have Used These Services



Of the participants, 28 people (93.3%) had visited a soup kitchen or received a free meal through a charitable organization. The average satisfaction rate amongst participants was 3.8 out of 5 (SD = 1.22). Participants expressed gratitude for these resources and the community they provide. Multiple participants noted the kindness, generosity, and utility of the staff and volunteers at these organizations. One individual noted that many community food programs in

Erie also provide essential supplies to individuals in need. Two participants noted a gap in soup kitchen coverage in Erie. I am speculating that they are referring to Saturday night and Sunday morning, as I do not believe any soup kitchens operate during these hours. One participant also noted that they enjoy the soup kitchens except for occasional fights or other environmental disruptions. One participant also noted concerns about overcrowding in these facilities.

From the qualitative data, I identified three themes surrounding the coping strategies and resource utilization of people experiencing food insecurity: 1) Coping with food insecurity is a continuum, 2) Quantity, quality, and resource satisfaction, and 3) The ‘community’ in community resources matters.

RQ2 Theme 1: Coping is a Continuum

Alongside the formal resource utilization methods outlined above, some participants shared additional methods of coping with their food insecurity. In line with RQ1 Theme 2, a few people shared that they try to remain positive to help cope with their food insecurity. Others say that when they are hungry, they simply go without food. Some people shared that they would watch TV or take naps to distract themselves from their hunger. Many participants shared that they often try to hydrate as an alternative to eating because it can alleviate some of the feelings associated with hunger. Some reached out to family, friends, or passersby and asked for food. Other participants shared that they would forage for food along Presque Isle Bay or search for food in dumpsters. One participant shared that sometimes they would get so hungry that they would eat their nasal discharge. Some participants also alluded to thinking about accessing food in illegal ways or shared that they had accessed food in an illegal way (armed robbery,

shoplifting). One participant noted that their crime was a direct result of the pervasive hunger that they felt.

In the same way that the effects of food insecurity vary amongst the sample, the strategies for coping with food insecurity differed too. While a vast majority of participants had utilized formal community resources, there was a larger variability across the informal methods that people used. These informal methods specifically vary in the level of action one is willing to take to obtain food and ranges from denial, avoidance, and distraction, to reaching out to others for help, to obtaining food in illegal ways. The extent to which a person copes by attempting to access food varies widely across the sample. While some individuals choose to avoid or distract themselves from their current situation, others acknowledge their reality through asking for help or aiming to obtain food through alternative channels.

RQ2 Theme 2: Quantity, Quality, and Resource Satisfaction

Across each intervention that was assessed, multiple participants noted concerns of quantity and quality. For SNAP, these concerns primarily revolved around the benefit amount not being sufficient to obtain enough food. However, some participants also noted that they found SNAP to be useful and helpful. There were additional concerns about quantity at both food banks and soup kitchens. Some participants stated that food banks and soup kitchens have been a way of life for them and that there is an adequate supply while others expressed discontent with the operating hours and quantity of food available through these channels.

There was also a lack of consensus regarding quality of the food for local interventions. Some participants expressed satisfaction about the quality of food bank and soup kitchen food,

while multiple others expressed receiving expired food or getting sick from spoiled food from food banks or that the food at soup kitchens was low quality. From this information, individuals have had different experiences with community resources. This is further supported by the fact that the food supply at both food banks and soup kitchens often rely on donations, which would explain the variance in both food quantity and quality.

While the responses exploring food quantity and quality vary, it is interesting that comments regarding food quantity and quality were present in roughly 18.5% of written responses. The prominence of this theme indicates that quality and quantity are critical components to a user's experience at a local intervention. This theme is further supported by the quantitative data; SNAP received the lowest average satisfaction rating and received 13 negative comments about quantity and quality. Food banks received the second highest satisfaction rating and received six negative comments concerning food quantity and quality. Finally, soup kitchens had the highest satisfaction score and only received three negative comments about their quality and quantity. Both the qualitative and quantitative data suggest that the quantity and quality of food offered at the community is related to the user's satisfaction level.

RQ2 Theme 3: The 'Community' in Community Resource Matters

It is also interesting that the level of user satisfaction within each intervention is correlated with the level of individual contact each intervention offers. SNAP is a relatively independent service, and people did not comment on whether they enjoyed the autonomy SNAP provides. However, when talking about food banks, people discussed how pleasant, seamless, and quaint the experience was. People had varied experiences with the staff; some people said

they were helpful, others felt judged. When talking about soup kitchens, people expressed gratitude not only for the place but for the people. They described the people as kind and generous. Some participants specifically addressed staff and volunteers at Emmaus Soup Kitchen and the Erie City Mission in their responses, which indicates an affinity for these individuals.

Approximately one third of respondents expressed some sentiment about the personal aspect of these services. Others included comments not directly related to staff but spoke more broadly about the welcoming atmosphere. One of the participants who listed that they were not at all satisfied with soup kitchens cited environmental concerns as an issue. Like how quality and quantity are key in defining the success of these services, the context and community in which the services are offered play a significant role in shaping user experience.

Chapter 10

Research Question Three Results

RQ3 explored if and how the social, economic, and physical changes to the 16501 zip-code have changed food access in the area.

While the survey did inquire about Erie Downtown Partnership's Pay-What-You-Can-Stand, 16 participants responded that they had not visited, and 13 respondents stated that they had not heard of the Pay-What-You-Can-Stand. No survey participants had visited the Pay-What-You-Can-Stand.

When asked about the Flagship City Food Hall, over half (65.5%) of participants stated that they had never visited. Additionally, only one participant stated that they visit often (once a month), and no participants stated that they visited weekly. When asked what factors influenced their decision to visit or not visit the Flagship City Food Hall, multiple participants cited high prices as a deterrent from their visit, although one participant did say that it was a good place to get a cheap snack. Additionally, a few participants stated that they were unaware that the food hall even existed.

When asked about if and how the demolition of a McDonald's in the 16501 zip-code impacted their access to food, seven participants expressed that this had no impact on their food access and one participant expressed that they thought closing the restaurant was a good thing. Seven additional participants expressed that the closing of this restaurant did impact their food access. One participant shared that this McDonald's was their only source of cheap food, so they were particularly disappointed by the closing. Someone else shared that they had eaten at the restaurant a lot growing up and that they missed the nostalgia it provided. Another participant

expressed frustration with the lack of communication regarding the change. One participant mentioned that they now must walk 30 minutes round trip to the next closest McDonald's.

When asked about broader changes to downtown Erie over the past five years, participants were divided. Some people were neutral or had not noticed any large changes. Others acknowledged and approved of the changes; stating that downtown was getting more modern and starting to look good. One participant noted that the price of restaurant food in the area had increased and another noted that there was a growing lack of public restrooms.

I identified two key themes related to how Erie's revitalization efforts have impacted food access in the area: 1) The cost of Erie's revitalization is more than monetary and 2) Revitalization is not remediation.

RQ3 Theme 1: The Costs and Benefits of Erie's Revitalization are More than Monetary

Recall back to the closing of chapter three when the lesser minds problem, or the idea that we tend to attribute less complexity to others' lives and decisions than our own, was discussed. When thinking generally about changes to Erie, it is easy to fall prey to the lesser minds bias and assume that residents are upset about the rising prices and environmental changes. While this is true for some participants, others appreciate and enjoy the changes. What I challenge the reader to consider with this theme is the non-monetary costs associated with changes to Erie and the food environment. While it may seem like a minor inconvenience to walk 30 minutes to a fast-food restaurant instead of five to ten minutes, this factor weighs into one's decision making and food acquisition process and may decrease the likelihood that this individual seeks out food. When a participant says that they miss the McDonald's because of the

nostalgia it provided, they're speaking to a broader phenomenon of how downtown Erie holds comfort and memories for people, and that changing the physical landscape impacts these memories. While this was not represented in the current sample, I speculate that this is likely to work both ways: as Erie changes, countless people will form new memories and find new comfort in the new spaces and environments. Revitalization is a broad, future-oriented process. The physical changes to Erie are conspicuous, while the minutiae of their impact are in ways abstract, emotional, and impossible to quantify.

RQ3 Theme 2: Revitalization is not Remediation

Development efforts in Erie have brought innovative and exciting business prospects to the area which have the potential to increase food access for the study population, including the Erie Downtown Partnership's Pay-What-You-Can-Stand and the addition of a convenience store with grocery options to the Flagship City Public Market to open in spring of 2025 (Sorenson, 2024; Burns, 2025).

Spokesmen for the EDP and the EDDC as well as local reporters have been noting that these developments will eliminate the existence of a food desert in downtown Erie. An urban food desert is defined by the USDA as an area where at least 33 percent of the population live more than one mile from the nearest supermarket, supercenter, or large grocery store (USDA, 2025). The headline for Go Erie's article about the Pay-What-You-Can-Stands reads "Food desert solution? Erie groups launch pay-what-you-can market concept downtown" (Sorenson, 2024) while an article about the convenience store's opening states "[The] store will be

eliminating a food desert that Whiting [CEO of the EDDC] said has been an issue for a while.” (Burns, 2025).

There is no question that these resources will increase food access. The Pay-What-You-Can-Stands capitalizes on Erie’s beautiful summers to provide a sense of community grounded by fresh fruits and produce. The convenience store can make the Flagship City Public Market more accessible and affordable for low-income residents. However, the language and narrative used when addressing these elements of the revitalization seem to be positioning them as solutions to Erie’s food insecurity. By the very definition of a food desert, they are not eliminating the food desert in downtown Erie because the grocery stand is not a supermarket or large grocery store.

Furthermore, while there is an overlap between a food desert and food insecurity, the discussions regarding food in downtown Erie seem to use these terms interchangeably. Farmers markets and convenience stores will eliminate some of the physical barriers to food access, but the social and economic barriers that are characteristic of food insecurity still exist (USDA, 2025). Low-income households often choose their preferred retailers based on prices rather than proximity, so while these changes may improve their physical access to food, physical access may not be the top priority for the 16501 zip code when seeking food (Wainer et al., 2023). Food insecurity is complicated. The narrative of Erie’s revitalization thus far has oversimplified these nuances by viewing food access one-dimensionally by considering proximity as sole the metric of success. While the developments in downtown Erie are truly a meaningful step in the journey to reducing food insecurity, the preliminary results from this study indicate that the revitalization efforts listed have not had a demonstrable effect on the participant pool’s access to food.

Chapter 11

Discussion

A plethora of prior qualitative and quantitative research has explored the psychological impacts of food insecurity as well as the effectiveness of interventions that reduce food insecurity. Researchers have acknowledged that food insecurity on the local level is generally understudied (Carter et al., 2014). Specifically, there is a gap in understanding how local food systems, cultures, and lifestyles impact access to food (Akbari et al., 2022). Scholars have also expressed a desire to understand the coping mechanisms of low-income food secure individuals to identify how these coping strategies impact food security status (Gundersen & Ziliak, 2018). This study is novel in its specific scope of evaluating food insecurity at the zip code level and its mixed-method approach to local food insecurity. Additionally, this project is unique in its attempt to include intervention effectiveness and environmental changes as variables that impact food insecurity at the zip code level.

RQ1 explored the psychological impacts of food insecurity within the 16501 zip-code. The results for RQ1 suggest that participants of this study felt embarrassment, sadness, difficulty falling asleep, frustration, hopelessness, and stress when they were experiencing food insecurity. Participants' quantitative responses indicated that the psychological impact of their food insecurity overlapped and intersected with the physical impacts of hunger. People also expressed that the shame of their food situation negatively impacted their self-concept. However, there was also a level of positivity and stoicism expressed amongst the participants. These results are aligned with the current literature, as many quantitative studies have found a correlation between food insecurity and increased health risks (Gundersen & Ziliak, 2018; Jones, 2017; Bengtson et al.,

2010; Perez-Zepeda et al., 2016). Prior qualitative research has found that food insecurity is related to shame of not being able to provide for oneself, the stigma of using community resources, and feeling undeserving of help (Meza et al., 2018; Leung et al., 2020; Leung et al., 2022). However, to my knowledge, this study is novel in its identification of stoicism and positivity throughout participant responses.

RQ2 posited about the effectiveness of local interventions and other strategies that people use to cope with food insecurity. The results indicated that an overwhelming majority of participants utilized formal national and local resources, but that the informal coping methods varied in the level of action a person was willing to take to find food. Quantity, quality, and community were among the most discussed factors regarding satisfaction or dissatisfaction with an intervention. The variability in quantity and quality of offerings at food banks and soup kitchens has been well supported within the literature (Hamelin et al., 2002; Jacobs et al., 2023; Bocskei & Ostry, 2010; Tarasuk et al., 2014). The concern shared by participants that the quantity of SNAP benefits they receive are not sufficient to eradicate their food insecurity has previously been documented by Gundersen and colleagues (2019) and Loopstra (2018).

The satisfaction ratings of national versus local interventions within the current study contradicts the existing literature. SNAP is generally considered the most effective intervention for reducing food insecurity, but participants within this study ranked it the lowest out of the interventions assessed (Feeding America, 2024; Gundersen, 2019). Additionally, while there is contention in the current literature about the role that community and skill building should play in addressing food insecurity, the results of this study indicate that community may play an

important role in resource utilization for food insecurity interventions (Tarasuk, 2001; Hamelin et al., 2010).

RQ3 inquired about if and how physical, economic, and social changes to Erie were impacting food access. Rapid urban growth and gentrification have been quantitatively evaluated and linked to an increase in food insecurity (Szabo, 2016; Cheung, 2024). To my knowledge, this study was the first of its kind to explore how physical changes related to revitalization efforts have impacted the local population through their own voices. While the results of RQ3 were largely inconclusive with some residents offering support for the changes and others expressing frustration or sadness, they did offer valuable insight into the lack of evidence for how changes downtown are impacting local populations. The lack of evidence surrounding community-based intervention effectiveness is pervasive throughout the literature and was further documented in this research (Tarasuk, 2001; Johnston & Baker, 2005). The narrative surrounding how Erie's changes have impacted food access up until this project has spoken with confidence that these developments are having a large impact on increasing food access. However, within the sample population, the resources highlighted by various stakeholder groups as being solutions to food deserts have not been utilized by the people who live within this food desert. Since these changes are recent (the Flagship City Food Hall and Public Market opened in 2021 and the Pay-What-You-Can markets launched in summer of 2024), they have the potential to eventually become significant drivers in reducing food insecurity.

This study had several limitations. Firstly, the recruitment methods and low response rate may have impacted the generalizability of the results. While I hung posters around the 16501 zip-code, most participants seemed to opt for the survey during in-person recruitment at a local

daytime homeless shelter and two soup kitchens. Individuals who attend these places clearly utilize community resources, so the results relating to RQ2 may have been slanted in favor of these resources as a result. Additionally, the sample size is incredibly limited. While 30 people are considered a large enough sample to reach saturation for qualitative findings, approximately 300 participants would be needed to achieve a representative sample of the 16501 zip-code population with a 95% confidence level and a 5% margin of error (Saunders et al., 201; Qualtrics, 2023). Finally, while not explicitly a limitation, reflexive thematic analysis relies strongly on the researchers' interpretations. While myself and my thesis advisor did reach consensus and had a level of interrater reliability, this reliability could be further improved by expanding the size of the research team.

Despite its flaws, this project supplemented the existing food insecurity research base and provided a foundation for further research of Erie's food systems and their interconnectivity with Erie's broader ecosystems. The building of this knowledge base could have meaningful implications within policymaking and urban planning but also help increase understanding and empathy at the individual level across Erie's population. The breadth of this project also allows for ample future expansion. Future studies should consider pursuing a quantification of food insecurity within the 16501 zip-code, as there is still not a public repository that collects food insecurity data at the zip code level. Studies could also employ the use of semi-structured interviews to delve deeper into the observed themes and phenomena of this study or seek to identify new themes.

Over 44 million Americans are currently experiencing food insecurity (Feeding America, 2022). Food insecurity is not simply the act of being hungry; it's an exceedingly complicated

issue with tangible, detrimental impacts on everyday people. Truly unraveling this phenomenon requires careful consideration of both the macro environment and the lived experiences and voices of those experiencing food insecurity. This study aimed to balance these two factors to address food insecurity in a small Pennsylvanian town and provided value with the foundation and nuance it provided.

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EDUCATION

Penn State Erie, The Behrend College

Expected Graduation: May 2025

Bachelor of Science in Marketing; Bachelor of Science in Psychology

Schreyer Scholar, Behrend Honors Certificate

Study Abroad

Spring 2023

Institute for American Universities- Aix-en-Provence, France

RESEARCH EXPERIENCE

DUBLIN CITY UNIVERSITY

Dublin, Ireland

Research Assistant

May 2024-August 2024

- Analyzed historical data using AI to explore how the language choices used in immigration debates in France and the US reflect national opinions of immigration.
- Presented this research at the 2024 Possibility Studies' Network Annual Conference at the University of Cambridge.
- Co-authored a paper that explored how college students use TikTok to share their attitudes toward AI, which has been submitted for publication in the American Educational Research Association (AERA) Open Access Journal.

ERIE INSURANCE

Erie, PA

Research Intern, Next Level Innovation

May 2023 – August 2023

- Worked within a cross-functional team to plan and conduct research exploring markets adjacent to the insurance industry to make strategic recommendations on how to effectively enter these markets.
- Contributed to the creation of detailed market reports and presented these findings to senior leadership and internal stakeholders to support strategic decision making.
- Collaborated with mentors and colleagues to expand personal knowledge of qualitative and quantitative methods and best practices within market research.

PENN STATE ERIE, THE BEHREND COLLEGE Erie, PA

Undergraduate Researcher

Ethical Leadership's Effects on Bottom-Line Mentality & Unethical Behavior September 2023-May 2024

- Synthesized existing data to be used for data analysis to explore how ethical leadership impacts employees who have a bottom-line mentality place an extremely strong emphasis on financial gain, which is correlated with engagement in unethical behaviors.
- Analyzing data to address hypotheses regarding the relationship between ethical leadership, bottom-line mentality, and unethical behavior.
- Presented this research at the Society for Industrial Organizational Psychology's 2024 Annual Conference.

Distressing Media & Anxiety Levels Through Short Form Media

September 2023-May 2024

- Collaborated with two fellow students to design and conduct an experiment that aimed to build on existing media effect research to see if these effects are still present within short-form media.
- Presented findings at two regional conferences in April 2024.

Exploring the Effectiveness of Group Mentor Programs on At-Risk Youth September 2023-May 2024

- Analyzed pre- and post-survey data to evaluate whether Penn State Behrend's Mentor Project is effective in increasing protective factors and decreasing risk factors within elementary school students from three local schools.
- Presented findings at two regional conferences in April 2024.

Integration of CBT within Batterer Intervention Methods**September 2023-January 2024**

- Reviewed existing literature regarding the Duluth Model, a community framework for responding to domestic violence, to support a community partnership project in which the Duluth Model and Cognitive Behavioral Therapy were used to prevent domestic violence reoccurrence within a local population.
- Documented scales and measures to assist with future publication.

Exploring App-Based Interventions to Mental Illness**September 2022 – January 2023**

- Reviewed existing literature and relevant data to inform the creation of an evidence-based mental health app for low-income communities.
- Translated cognitive-behavioral research into educational content pieces to make complex research comprehensible for application users.

ORGANIZATIONAL EXPERIENCE

PENN STATE ERIE, THE BEHREND COLLEGE Erie, PA**Development Intern, Office of Development and Alumni Relations****August 2023-Present**

- Contribute to the planning and execution of donor and alumni events to ensure smooth logistics and enjoyable participant experiences.
- Create meaningful content for the department's social media and monitor and maintain social media engagement.
- Assist with organizing alumni visits to campus to ensure a meaningful and engaging return to Penn State Behrend.

Student Assistant, Office of Humanities and Social Sciences**October 2021 – January 2023**

- Assisted in event planning and logistics for current and prospective students to execute events that appeal to the student demographic.
- Maintained office organization and efficiency by managing files and records as well as organizing and maintaining inventory levels of office supplies and promotional materials.
- Provided administrative support to the office by managing daily tasks, handling incoming calls, and directing visitors.

LEADERSHIP AND CAMPUS INVOLVEMENT

PENN STATE ERIE, THE BEHREND COLLEGE Erie, PA**Residents' Assistant****December 2021-May 2023**

- Provide guidance, support, and mentorship to a diverse community of 60 students by outreaching to students on a weekly basis.
- Organizing educational and social programs to create meaningful experiences for residents.
- Act as a liaison between residents and university administration by conveying policies and feedback.

Behrend Schreyer Council, President**December 2023-Present**

- Lead a team of high-achieving peers in the development of academic resources to navigate the honors program at Penn State Behrend, with a special emphasis on accessing resource and execution of academic, career-building, and social events for students to strengthen the honors community.
- Mentored incoming students by introducing them to the organization, directing them to additional resources, and troubleshooting any transitional challenges.

Black School of Business Ambassador**January 2022 - Present**

- Assist in organizing and executing various school events, including open houses and orientation sessions to ensure student participation and smooth logistics.
- Effectively communicate opportunities offered through the university to prospective students and parents by listening to the students' interests and connecting them to related campus resources.

Lion Ambassador and Lion Scout**September 2021-August 2023**

- Introduced prospective students and parents to Penn State by conducting informative and engaging campus tours.
- Participated in community service efforts to make an impact on the broader community.

ADDITIONAL WORK EXPERIENCE**WEGMANS FOOD MARKETS****Erie, PA****Pharmacy Technician****December 2019 - May 2023**

- Accurately and efficiently processed prescription orders, verifying patient information, medication dosage, and insurance coverage to ensure patient safety and compliance with legal requirements.
- Assisted in the execution of COVID-19 vaccine clinics by organizing appointments and processing patient paperwork.

AWARDS AND HONORS**John and Jane Herbert Undergraduate Research Award****May 2024****Outstanding Psychology Student Award****May 2024****Sigma Xi Undergraduate Research Conference- 1st Place in Psychology Oral Session****April 2024****Sigma Xi Undergraduate Research Conference- 1st Place in Humanities Poster Session****April 2024****Perreault Fellowship****November 2023****Benjamin A. Gilman International Scholarship****December 2022****Penn State Behrend Leadership Scholars Award****Sept. 2021, Sept. 2022, Sept. 2024****Jim Conner Memorial Scholarship****May 2021**