FOOD DESERTS, CRIME, AND NEIGHBORHOOD CONTEXT: AN EXAMINATION OF

THE IMPACT OF FOOD INSECURITY ON VIOLENT CRIME IN LITTLE ROCK

By

Sarah Dean

Rick Dierenfeldt
Assistant Professor of Criminal Justice
(Chair)

Gale Iles
Associate Professor of Criminal Justice
(Committee Member)

Jeff T. Walker
Professor of Criminal Justice
The University of Alabama at Birmingham
(Committee Member)

Xinting Wang
Assistant Professor of Criminal Justice
Ball State University
(Committee Member)

Christina Policastro
Associate Professor of Criminal Justice
(Committee Member)

FOOD DESERTS, CRIME, AND NEIGHBORHOOD CONTEXT: AN EXAMINATION OF

THE IMPACT OF FOOD INSECURITY ON VIOLENT CRIME IN LITTLE ROCK

By

Sarah Dean

A Thesis Submitted to the Faculty of the University of
Tennessee at Chattanooga in Partial
Fulfillment of the Requirements of the Degree
of Master of Criminal Justice

The University of Tennessee at Chattanooga
Chattanooga, Tennessee

May 2022

ABSTRACT

This thesis seeks to explore the indirect and direct relationships between food insecurity, concentrated disadvantage, and distribution of violent offenders through the lens of social disorganization. Data gathered by the Little Rock Police Department, American Community Survey, and city business license records are used to test neighborhood-level relationships across Little Rock, Arkansas' 155 Census block groups. Pearson's Correlation is used at the bivariate level and negative binomial regression tests multivariate relationships. The results suggest a null relationship between food insecurity and distribution of violent offenders across Little Rock block groups. However, several findings are consistent with prior research and theory– the most salient of which is the impact of concentrated structural disadvantage on the distribution of violent offenders. This thesis contributes original research to the study of food deserts and crime that may be used as a foundation for future studies.

ACKNOWLEDGEMENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Food plays tangible and abstract roles in a society's overall wellbeing (Amir & Barak-Bianco, 2019; Beaulac et al., 2009). While food regulates life-sustaining nutrients and physical development at the microlevel, its macrolevel symbolism of power, wealth, and security influences a community's perceived value (Amir & Barak-Bianco, 2019; Crank, 2003; Homer-Dixon, 1994). Deprivation of this resource through the development of food deserts has led to conflict, violence, and crime (Crank, 2003; Homer-Dixon, 1994). Extant literature describing the relation between food and human development is abundant; however, its relationship to crime is less researched (Benfer, 2015). Despite this limitation, current studies on the concept of 'food deserts' are promising for criminologists (Beaulac et al., 2009). Individual and household level implications range from maladaptive social behaviors caused by detrimental changes in brain chemistry to family violence and adverse childhood experiences (Acevedo-Garcia et al.) resulting from sustained food scarcity (Benfer, 2015; Helton et al., 2019). These findings suggest that a similar effect may be observed in the aggregate. Specifically, food insecurity could be expected to exhibit influence on neighborhood levels of crime.

Food availability and accessibility in areas of concentrated disadvantage across the U.S. are vastly different from other high-gross domestic income countries such as Canada, New Zealand, Australia, and the United Kingdom (Beaulac et al., 2009). Although other developed countries experience food related inequality in poorer neighborhoods, the prevalence and extent

are minimal compared to the U.S., which consistently experiences food disparities based on class and race (Alkerwi et al., 2015; Beaulac et al., 2009; Heflin, 2017; Krieger et al., 1997). More than 50% of Americans earn less than 13% of the national annual income, and the proportion of black and Latinx families living in poverty more than doubles that of whites (Lynch, 2016; Matthew, 2018). Greater concentrations of food deserts are found in predominantly minority communities with higher proportions of black Americans (Beaulac et al., 2009; Hipp, 2007; Kane, 2011). The U.S. Centers for Disease Control and Prevention (CDC) refers to this phenomenon as "deprivation amplification," because food insecurity aggravates other forms of structural disadvantage (Beaulac et al., 2009, p. 4).

The 20th Century works of sociologists and criminologists Park and Burgess (1924), Shaw and McKay (1972), Kornhauser (1978), Bursik (1988), and Sampson and Groves (1989) sought to explain the relationships between socio-spatial inequality and crime through the theoretical framework of social disorganization. Early researchers focused on explaining crime in the context of inter-neighborhood dynamics; however, more recent intra-neighborhood research focuses on where neighborhood residents are located relative to internal concentrated disadvantage and crime. This thesis extends this framework to the study of interactions between indicators of social disorganization, food insecurity, and the spatial concentration of violent offenders.

CHAPTER 2

LITERATURE REVIEW

Food deserts are defined as neighborhoods experiencing high rates of food insecurity, which is characterized as inconsistent or uncertain access or availability to nutritionally adequate foods because of limited resources or physical remoteness (Andersen, 1990; Beaulac et al., 2009; Pruitt et al., 2016). In contrast, food oasis neighborhoods have abundant access to nutritionally adequate foods (Walker et al., 2011). In urban neighborhoods, food oases may be found in disadvantaged and advantaged alike (Walker et al., 2012); however, deserts occur in areas marked by concentrated disadvantage and social disorganization (Hipp, 2010; Kane, 2011).

Social Disorganization

The overlapping emergence of food deserts and high-crime areas across the U.S. may be explained through the theoretical framework of social disorganization (Park & Burgess, 1924; Sampson et al., 1997; Shaw & McKay, 1972). This framework addresses the social and spatial separation of groups of people, and how those groups interact in the context of a broader society through the implementation of social controls, social cohesion and social capital (Park & Burgess, 1924; Shaw & McKay, 1972). Park and Burgess (1924) observed the organic formation of social groups through internal concentric zones of shared social and demographic characteristics, which they theorized would manifest into physical concentric zones of separation in urban settings. According to Park and Burgess (1924), interactions between urban social groups were buffered

3

via economic competition. Building on this framework, Shaw and McKay (1972) focused on the physical layout of a city and found that Park and Burgess' (1924) zones of social factors and demographics resulted in parallel shifts in the built environment. The culmination of social and spatial separation resulted in isolation of disadvantaged groups, where the less desirable and criminal members of society were forced together and alienated from inter-group commerce (Park & Burgess, 1924; Shaw & McKay, 1972).

The emergence of spatial concentric zones highlighted the disruptive power of the Second Industrial Revolution, where technology, manufacturing and capitalism came to dominate Park and Burgess's (1924) outermost economic circle (Shaw & McKay, 1972). During the first half of the 20th Century, disadvantaged groups were confined to the inner-city, whereas, the most advantaged could afford to commute to and from downtown and so relocated to the suburbs (Shaw & McKay, 1972). Independent of race, ethnicity, and other immutable human characteristics, inter-zone mobility was fully dependent on the economy (Shaw & McKay, 1972). A key feature that also followed this pattern was crime. Shaw and McKay (1972) termed their observations of urban ecological, economic, and crime patterns across these concentric zones 'social disorganization.'

The highest levels of social disorganization were observed in neighborhoods of 'transition,' which were located close to manufacturing areas and characterized by low residential stability, dense populations, lower socioeconomic status (SES), and families of recent immigrants who were searching for any jobs available (Shaw & McKay, 1972). These transitional areas fostered a secure space for crime with little informal or formal control. Law abiding residents, unable to improve their neighborhoods, tolerated them until they were able to relocate. The struggle shared by families moving through transitional zones necessitated stronger, informal bonds to maintain family values and cultural identity, while overcoming cultural attenuation during transition.

4

Industrial Restructuring and Theoretical Development

Shaw and McKay's (1972) inter-neighborhood conceptual model fell out of favor among criminologists who observed that the model failed to explain shifts in urban ecology brought about by the Third Industrial Revolution (Kornhauser, 1978). They failed to explain the existence of social disorganization within communities that did not fit their ecological model. The manufacturing epicenters of the Second Industrial Revolution no longer exist in many metropolitan areas because they have been relocated to the suburbs or production has been outsourced to other countries (Chandler, 1994; Leary, 2005). Subsequently, these spaces are largely devoid of manufacturing-related employment opportunities, and due to a growing trend to reclaim and repurpose metropolitan areas, they now burgeon with low-wage, service-related industries (Chananiah, 2020; Hayashi, 2021; Lee, 2017; Serkin, 2020; Woldoff, 2011; Zuluaga & Forrester, 2020).

Consequently, social disorganization is no longer characterized by urban transitional or concentric zones; it is an intra-neighborhood phenomenon with long-term implications for many disadvantaged urban area residents (Anderson, 1999; Kornhauser, 1978). Criminal and gang populations in neighborhoods experiencing areas of concentrated disadvantage are higher than less disadvantaged areas, which contributes to the subcultural transmission of violent values and norms (Anderson, 1999; Sampson & Groves, 1989). Due to these significant historical shifts in space purpose and function, modern metropolitan residents are faced with the challenge of maintaining family values and raising their children to progress despite their disorganized surroundings (Anderson, 1999; Kirk & Matsuda, 2011).

Social disorganization theory regained popularity at the turn of the 21st-Century through the works of Kornhauser (1978), Bursik and Grasmick (1993), Sampson and colleagues (1997),

and Morenoff and colleagues (2001). Their works reflected urban socio-spatial shifts by focusing on community relationships through the development of private and parochial control. This "community consciousness" (Park & Burgess, 1924, p. 48) or "collective efficacy" (Morenoff et al., 2001; Sampson et al., 1997, p. 919) encompassed informal social control, cohesion and mutual trust within a social group. Bursik and Grasmick (1993) and Sampson and colleagues (1997) observed that the cooperative influence of neighborhoods with high levels of collective efficacy (almost exclusively in the outer, suburban, zones) was especially important in securing resources such as food, education, childcare, desirable employment, and transportation, which in-turn bolstered neighborhood stability and social control. These organized neighborhoods were also characterized by lower crime rates than their disorganized counterparts (Bursik & Grasmick, 1993; Kornhauser, 1978). Modern revisions of this theoretical framework must continue to account for community-level social control and capital, and collective efficacy in order to address the risk of placing culpability on individuals without taking into consideration the role of larger environmental factors (Sampson, 2002).

The Evolution of Food Deserts in the U.S.

In the U.S., food deserts originated post-World War I, in the 1930's, when population growth surged, suburbanization grew in popularity, transportation infrastructure expanded, and the food industry struggled to meet the increasing demand (Deener, 2017). The financial tensions of capitalism meant retailers localized in areas with the greatest profitability, which did not include black or impoverished urban neighborhoods (Deener, 2017). These issues were exacerbated by the industrial restructuring, disinvestment and disruption of black communities that followed World War II (Eisenhauer, 2001; Zenk et al., 2011; Zenk et al., 2005).

Modern food deserts have surfaced in large part due to repurposing urban neighborhoods for high-income and low-income housing without improving access to public transportation or goods and services (Deener, 2017; Hipp, 2010). Land use ordinances and zoning practices across the U.S. were historically implemented to maintain property value and reduce crime (Serkin, 2020). With the onset of urban sprawl brought about by the Third Industrial Revolution, zoning ordinances shifted focus toward urban planning to separate incompatible land uses such as industrial, commercial, residential and recreational (Serkin, 2020). Within residential zoning, incompatible land use expanded to separate high-, middle- and low-income housing, which has perpetuated the structural disadvantage of poorer populations through physically separating spaces they can afford to live in from the broader community (Serkin, 2020). This practice has contributed to the growing emergence of food deserts and oases, and the disparate distribution of crime between and within neighborhoods (Battin & Crowl, 2017; Brantingham, 2016; Hipp, 2010; Jones & Pridemore, 2018). Given the importance of diet in relation to the development of maladaptive behaviors, and the dynamic between crime, race, and SES, understanding interdependencies between the built environment, food deserts and crime is necessary.

The Importance of the Built Environment

Private vehicle ownership and public transportation infrastructure are crucial determinants of resource accessibility in urban spaces. Access to resources, such as grocery stores, green spaces, good jobs, healthcare, and quality education are restricted for disadvantaged neighborhood residents while remaining key attractions for elite newcomers who are able to afford private transportation to and from these resources (Acevedo-Garcia et al., 2020). The decision low-income, racial minorities make to purchase non-nutritional, energy-dense foods are highly

7

dependent on their proximity or accessibility to stores and supermarkets offering affordable food options (Bader et al., 2010; Ball et al., 2009; Walker et al., 2011). Neighborhoods without local grocery stores or supermarkets require isolated residents to travel to these resources (Acevedo-Garcia et al., 2020; Bader et al., 2010; Deener, 2017). Inexpensive public transportation provides accessibility to supermarkets for disadvantaged residents living close to access points (Sharkey et al., 2010; Soltero et al., 2019); however, this is not the case in areas dependent on individual vehicle ownership (Acevedo-Garcia et al., 2020).

Access to poor-quality foods in areas of concentrated disadvantage typically takes the form of convenience stores, fast-food restaurants, bars, and liquor stores, and lack of grocery stores and casual dining restaurants. This contributes to food insecurity among this population (Freeman, 2015; Hilmers et al., 2012; Hipp, 2010). Supermarkets and grocery stores often relocate to areas with lower crime rates, whereas, convenience stores, bars, and liquor stores are often concentrated in areas with higher crime rates (Hipp, 2010; Johnson & Kane, 2018). Locating these stores in high-crime areas or where traffic safety is an issue further restricts communities' safe access to them (Gotham & Kennedy, 2019; Hipp, 2010). Influencing public transportation infrastructure and neighborhood designs is elemental to mitigating crime hotspots, improving defensibility (Brantingham & Brantingham, 1995; Hillier, 2004; Newman, 1996; Ratcliffe et al., 2011) and increasing resource availability for disadvantaged communities (Hillier, 2004; Long & Baran, 2012; Montoya et al., 2016; Newman, 1996; Penn, 2003).

The physical distance between healthy food sources and residents may be an oversimplification of social-spatial constraints influencing a community's dietary behaviors (Bader et al., 2010; Forsyth et al., 2010). Nutritional food consumption is influenced by social norms and individual-level characteristics, as well as neighborhood location and design features

that limit availability and access (Bader et al., 2010; Hipp, 2010). Furthermore, the mere presence or addition of grocery stores or supermarkets in disadvantaged neighborhoods does not necessarily translate into a change in purchasing behavior (Cummins et al., 2014; Forsyth et al., 2010). That is, addressing social exclusion and isolation is more complex than simply addressing the physical barriers that separate different groups (Ruiz-Tagle, 2013). The built environment is one component of 'socio-spatial' inequality. The social aspects of class and race are equally important (Ruiz-Tagle, 2013).

The Impact of Class and Race

Social groups defined by race and ethnicity are divided into majority and minority categories (Lynch, 2016), which are often linked with SES (Alkerwi et al., 2015) and political influence (Crank, 2003; Homer-Dixon, 1994). As these groups interact in commerce, racial majorities often control resources while minorities struggle to gain access (Lynch, 2016; Park & Burgess, 1924). Over time, those who can afford to move out of disadvantaged neighborhoods create a spectrum with high SES, low-crime areas at one end and high-crime areas of concentrated disadvantage are at the other (Chamberlain & Hipp, 2015). This interaction between resources, class, and race is apparent in the development of modern food deserts (Hilmers et al., 2012) and elevated rates of violence in these disadvantaged minority communities (Lynch, 2016).

In the U.S., the definition of social class is vast; however, SES is widely accepted as a representative measure (Alkerwi et al., 2015; Darmon & Drewnowski, 2008; Krieger et al., 1997). SES has many different attributes, including employment status, annual household income, and educational attainment (Alkerwi et al., 2015). Two key attributes of SES capturing economic freedom are wealth, which is conceptualized as surplus financial resources (Alkerwi et al., 2015;

Krieger et al., 1997) and material hardship, which addresses deprivation of basic needs (Heflin, 2017). These two measures of class are important for understanding which social groups are most likely to experience food insecurity and reside in food desert neighborhoods. Households lacking wealth and experiencing material hardship generally make poorer dietary choices and consume less than recommended levels of nutrient-rich foods (Alkerwi et al., 2015; Basu et al., 2016; Darmon & Drewnowski, 2008; Heflin, 2017). Lower-class, metropolitan residents report consuming energy-dense diets high in processed sugar, grains, and fat, while consuming inadequate micronutrients, and fewer fresh fruits and vegetables (Basu et al., 2016; Walker et al., 2011).

Race is also important for understanding which social groups are at greater risk of experiencing resource scarcity and food insecurity (Heflin, 2017; Ruiz-Tagle, 2013). Black and Latinx populations report higher rates of material hardship, live in disadvantaged neighborhoods at much higher rates than white and Asian/Pacific Islanders, and are more likely to experience sustained durations of food scarcity (Acevedo-Garcia et al., 2020; Basu et al., 2016; Heflin, 2017; Matthew, 2018). However, Latinx populations consume more fruits and vegetables than similarly situated black populations (Kim et al., 2014). This difference is primarily due to first and second generation Mexican-Americans' adherence to traditional cultural norms for family structure, and native cuisine and food preparation (Bekelman et al., 2019; Ramirez et al., 2018). Subsequent generations of this population are more likely to experience dietary acculturation, whereby, consuming processed, energy-dense foods is accepted as part of American culture (Bekelman et al., 2019; Ramirez et al., 2018). American-Indians and Alaska Natives also report high levels of food insecurity (Matthew, 2018), while undocumented citizen status exerts its own unique influence on food buying practices (Amir & Barak-Bianco, 2019). Taken together, these findings

have implications for the connections between diets and maladaptive behaviors, particularly within impoverished minority communities.

Diet and Social Maladaptation

Nutritional intake at every stage in life impacts brain function, cognition, impulse control, and social adaptation to various extents (Lambregts-Rommelse & Hebebrand, 2017; Pina-Camacho et al., 2015; Rucklidge & Mulder, 2016). Early stages of brain development show the most promise for improved function through proper diet (Lambregts-Rommelse & Hebebrand, 2017), including impacts to unborn children caused by pregnant mothers' dietary choices (Gartstein & Skinner, 2018). Pediatric nutritional deficiencies have long-term negative implications for mental health due to the vulnerable state of neuroplasticity (Gartstein & Skinner, 2018) and neurodevelopment (Lambregts-Rommelse & Hebebrand, 2017) in fetuses and infants. This relationship becomes intergenerational and cumulative when children of inadequate pre- and post-natal care propagate under similar circumstances (Pina-Camacho et al., 2015; Walker & Holtfreter, 2016). The deleterious effects of poor dietary practices on mood and behavior are particularly salient given limited access to wholesome foods experienced by families residing in food deserts (American Academy of Pediatrics [AAP], 2015; Vogel et al., 2020).

Studies on the intra- and inter-generational effects of food insecurity suggest a complex spectrum of maladaptive social behaviors resulting from various nutritional inadequacies (AAP, 2015; Brumley et al., 2017; Gartstein & Skinner, 2018; Mersky & Janczewski, 2018; Perez et al., 2018; Schwartz et al., 2019; Wolff & Baglivio, 2017). Perhaps the most notable behavioral disorder diagnosed in children is attention deficit and hyperactivity disorder (ADHD), which has been linked to insufficient prenatal intake of vitamin D (Lambregts-Rommelse & Hebebrand,

2017). Gut-Brain axis microbiota is also a growing area of interest for understanding how adverse childhood experiences (ACEs), early life stressors (Lambregts-Rommelse & Hebebrand, 2017), and diet impact brain development, with the most influential factors being prenatal care and the mental wellbeing of pregnant females (Lambregts-Rommelse & Hebebrand, 2017; Vogel et al., 2020). Families living in food deserts and experiencing food insecurity also experience higher rates of family violence (Helton et al., 2019). After controlling for other sources of hardship or family dysfunction, Helton's team (2019) identified a strong relationship between food insecurity and parent-child aggression. Omega-3 fatty acids have shown promising results for improving parent-child aggression when incorporated into the diets of children struggling to regulate their behaviors and emotions (Portnoy et al., 2017).

The relationship between poor diet and maladaptive social behaviors continues throughout the aging process. Consistent with micro-level observations, disadvantaged neighborhoods with over-availability of foods low in nutritional value experience higher rates of childhood obesity-related bullying that leads to increased anger, depression, and violence (AAP, 2015; Issner et al., 2017; Lampard et al., 2014; Walters, 2020). Further, teens consuming diets high in processed sugars consistently exhibit behavioral maladaptations that result in hyperactivity, agitation, antisocial tendencies, poor performance in school, aggression and violence (AAP, 2015; Basu et al., 2013; Holubcikova et al., 2015; Hostmark, 2010; Solnick & Hemenway, 2012, 2014). Adolescents under the age of 17 are at the greatest risk for expressing antisocial and maladaptive behaviors; but as this population ages, their coping mechanisms shift to substance abuse and other addictive behaviors (Samek et al., 2017). If these trends hold true for food deserts, higher rates of substance use disorders should be present in the adult populations residing in these areas. Importantly, these findings of age-related maladaptive and coping behaviors overlap with the

12

enduring age-crime curvilinear association where the most crime-prone years range from 17 to 24 years (Brame & Piquero, 2013; Hirschi & Gottfredson, 1983).

Prison studies have yielded findings comparable to community-based research efforts. Prison inmates display antisocial behaviors and report mood instability when their diets lack adequate quantities of micronutrients (Chamberlain et al., 2017; Cook et al., 2015; Gesch et al., 2002; Rosenboom et al., 2018; Rucklidge & Mulder, 2016; Shively, 2018). The food deserts created by the corrections component of the criminal justice system is problematic in light of extant evidence that nutritional therapy and robust diets of fresh produce and fish facilitate recovery, mood stability, and reduce compulsive behaviors (Gesch et al., 2002; Rucklidge & Mulder, 2016). In an effort to address these issues, researchers are beginning to focus on nutrition therapy for those with behavioral and personality disorders (Rucklidge & Mulder, 2016). These extant studies into the impacts of diet on maladaptive behaviors suggest a relationship between crime frequency and food insecurity may be observed at the neighborhood level.

Current Study

Social disorganization explains extant neighborhood level research findings on the relationship between food insecurity, class, race, diet, and crime. Food deserts observed within socially disorganized neighborhoods characterized by attenuated collective efficacy, low SES, racial heterogeneity, residential instability and meager access to nutritional food may co-occur with localized elevated crime. The current study contributes to the growing body of criminological research into food deserts by measuring the relationship between food insecurity and violent crime independent of other neighborhood characteristics in the city of Little Rock, Arkansas.

CHAPTER 3

METHODOLOGY

The primary interest of the current study is understanding the relationship between neighborhood-levels of food insecurity, concentrated disadvantage, and violent offending. Arrest data for violent offenders gathered from the Little Rock Police Department for 2014 are examined in conjunction with grocery store and supermarket location data for the city of Little Rock. Consistent with previous neighborhood-level studies (e.g., Thomas et al., 2021), social and economic characteristics are taken from data gathered by the U.S. Census Bureau's American Community Survey (ACS) at the block group level. The geocoded, cross-sectional analysis is conducted on data gathered from Little Rock, Arkansas between January 1, 2014, and December 31, 2014. An application for exemption was submitted to the Institutional Review Board (IRB) for The University of Tennessee at Chattanooga. The IRB determined, based on federal regulations that govern the protection of human rights, that this study is exempt from further review (IRB# 21-157).

Research Questions and Hypotheses

The works of Park and Burgess (1924), Shaw and McKay (1972), Kornhauser (1978), Bursik (1988), and Sampson and Groves (1989) provide a framework for examining the effects of socio-spatial inequality and crime through the lens of social disorganization. Food insecurity may moderate this relationship at the neighborhood level. In light of this, a review of the literature

14

indicates a relationship between diet composition and maladaptive behaviors, where sustained insufficient nutrient intake leads to deleterious changes in brain structure and function (Lambregts-Rommelse & Hebebrand, 2017; Pina-Camacho et al., 2015; Rucklidge & Mulder, 2016). Food deprivation is found at higher rates in neighborhoods experiencing concentrated disadvantage than in moderately disadvantaged or advantaged areas (Alkerwi et al., 2015; Basu et al., 2016; Darmon & Drewnowski, 2008; Heflin, 2017). Additionally, violent crime rates are elevated in areas of concentrated disadvantage (Chamberlain & Hipp, 2015; Lynch, 2016). However, the relationship between food insecurity, concentrated disadvantage, and crime has yet been established. These gaps in the literature prompted the following research questions and hypotheses:

Research Question 1: What is the direct relationship between food insecurity and the distribution of violent offenders?

Hypothesis 1: There is a direct, positive relationship between food insecurity and distribution of violent offenders in the city of Little Rock, Arkansas.

Research Question 2: What is the indirect relationship between food insecurity, concentrated disadvantage, and violent offenders?

Hypothesis 2: In the city of Little Rock, Arkansas, the influence of concentrated disadvantage on the distribution of violent offenders will be conditioned by the levels of food insecurity.

Sample

The current study maintains a focus on Little Rock, Arkansas. As the capital and largest city in Arkansas, Little Rock maintains a population of approximately 200,000 residents. It is also consistently ranked as one of the most violent cities in the United States. In 2018, for example,

Little Rock experienced 2,882 violent crimes, including 40 murders, 218 rapes, 371 robberies, and 2,253 aggravated assaults (Criminal Justice Information Services Division, 2018). For the purposes of this study, neighborhoods are defined as small geographic locations whose residents share unique access to material and social resources, as well as interdependent social networks (Bursik, 1988; Sampson & Groves, 1989). Neighborhoods are operationalized as the 155 Census block groups located within Little Rock. The final sample consists of 154[1] block groups for which data are complete and available in the ACS. Although block groups are approximations for neighborhoods, prior works have illustrated that they are suitable proxies given that they are more internally homogenous than tracts and cities (e.g., Hipp, 2007; Thomas et al., 2021).

Dependent Variable

      The dependent variable in this study is counts of violent offenders. For the purposes of this study, a violent offender is conceptualized as a person arrested for an interpersonal act involving the risk of or infliction of physical harm to another person in violation of the law. Counts are operationalized using the physical home addresses of suspects arrested for the crimes of murder, nonnegligent manslaughter, aggravated assault, or robbery, as documented by the Little Rock Police Department between January 1, 2014, and December 31, 2014. This definition is consistent with the Bureau of Justice Statistics' (BJS) definition of violent crime, with the notable exceptions of rape and sexual assault (Morgan & Truman, 2020). These offenses are not included because of underreporting issues (National Research Council, 2014). Home address data for arrestees are

---

[1] The U.S. Census Bureau designates 155 block groups for the city of Little Rock. One is dropped from the analysis due to missing and incomplete data; therefore, 154 block groups are included in this thesis.

geocoded and aggregated to the block group level as a count of violent offenders within each block group. Offender count is coded at the ratio level of measurement because the values are mutually exclusive, exhaustive, can be logically rank-ordered, equal intervals exist between values, and zero is a meaningful value (Walker & Madden, 2005).

Independent Variables

Consistent with previous studies, food insecurity is conceptualized as inconsistent or limited access to or availability of nutritionally adequate foods (e.g., fruits, vegetables, and healthy proteins) (Andersen, 1990; Beaulac et al., 2009; Pruitt et al., 2016). For the purposes of this study, food insecurity is operationalized as counts of supermarkets and grocery stores in block groups located in the city of Little Rock, Arkansas during the year 2014. Similar to the dependent variable, street addresses for these businesses are procured from active business licenses for 2014[2], geocoded, and aggregated to the block group level. This represents the ratio level of measurement because the values are mutually exclusive, exhaustive, can be logically rank-ordered, equal intervals exist between values, and zero is a meaningful value.

For the purposes of this study concentrated disadvantage is conceptualized as the intersection of overlapping forms of neighborhood disadvantage (Hipp, 2010; Merolla et al., 2011; Osgood & Chambers, 2003). Consistent with prior works, including those examining blocks groups in Little Rock (e.g., Thomas et al., 2021), concentrated disadvantage is operationalized as an index measure constructed as the average of standardized values for the percent of families

---

[2] Ground truthing was used by the chair of this thesis in 2014 as a means of confirming that each of these businesses sold fresh fruits and vegetables, as well as healthy proteins. This process involved measuring shelf space, number of items, descriptions of item quality, and price.

living below the federally established poverty line, percentage of the population aged 16 and over who are unemployed, percentage of families headed by a single female with children, percentage of the population who are Black, and percentage of residents aged 25 and over who have not graduated from high school. These attribute percentages and the resulting index are coded at the interval level of measurement because the values are mutually exclusive, exhaustive, can be logically rank-ordered, and equal intervals exist between values. All measures are drawn from the 2013-2017 ACS 5-year summary file at the block group level. Factor analysis using an oblique rotation indicates these measures converge on a single dimension with an Eigenvalue of 3.044 and factor loadings in excess of .65 (α = .837), affirming their retention as a summary measure of disadvantage.

This thesis also implements several control variables. Each of these measures are drawn from the 2013-2017 ACS 5-year summary file. Racial heterogeneity is a core concept of social disorganization (Osgood & Chambers, 2003; Sampson & Groves, 1989; Shaw & McKay, 1972). For the purposes of this study, racial heterogeneity is conceptualized as neighborhood level residential integration of populations from diverse national or cultural traditions, as well as distinctive physical characteristics. Using the 2013-2017 ACS 5-year summary file, racial heterogeneity is operationalized as one minus the sum of squared proportions of all racial groups within a block group (see Sampson & Groves, 1989; Thomas et al., 2021). Using this measure, higher values are indicative of greater racial diversity within the block group. Racial heterogeneity is operationalized at the ratio level of measurement because the values are mutually exclusive, exhaustive, can be logically rank-ordered, equal intervals exist between values, and zero is a meaningful value.

The works of Osgood and Chambers (2003), Sampson and Groves (1989), and Shaw and McKay (1972) have established residential stability as a hallmark of social *organization*. Accordingly, residential stability is conceptualized as intra-neighborhood consistency in residence, typified by home ownership. This concept is operationalized as the percentage of homes within block groups that are owner-occupied. Coded values are mutually exclusive, exhaustive, can be logically rank-ordered, equal intervals exist between values, and zero is a meaningful value, thus, residential stability is a ratio level of measurement.

Age structure is conceptualized as the period during which residents reach their peak offending years and is operationalized as the percentage of the population between the ages of 15 and 24 years. Hirschi and Gottfredson (1983), and Moffitt (1993) found that age structure is linked to criminal activity; adolescents and young adults are more crime-prone than other age cohorts. This concept is coded at the ratio level of measurement because the values are mutually exclusive, exhaustive, can be logically rank-ordered, equal intervals exist between values, and zero is a meaningful value.

Finally, variable counts per block group may be misleading because the population varies across block groups. To avoid this bias in the data, the block group population is used to modify each count into a rate of occurrence per capita. A block group with a count of 10 violent offenders per 1,000 residents is considerably different than a block groups with 2 violent offenders per 1,000 residents. Therefore, the block group population is treated as an 'exposure' variable in the analyses that followed (see below).

Analytic Approach

Consistent with the works of Osgood (2000) and Osgood and Chambers (2000), the use of count data necessitates a Poisson-based estimator to examine variation in the concentration of violent offenders across block groups included in the sample. A standard Poisson model is appropriate when there is equidispersion between the mean and variance of the dependent variable. This rarely occurs when using crime data. Instead, it is more common that outcome measures exhibit overdispersion, a characteristic that occurs when the variance of the dependent variable exceeds its mean. Preliminary analysis of the dependent variable violent offenders indicates that its variance (9.07) exceeds its mean (2.76). This finding prompts the use of a negative binomial estimator, which allows for introduction of an error term, and is designed to address issues of overdispersion (Long & Freese, 2006). As previously noted, the block group population is treated as an exposure variable, while robust standard errors are used to preemptively address potential concerns related to non-independence in block group level data.

CHAPTER 4

RESULTS

Data gathered from the Little Rock Police Department, American Community Survey, and active city business licenses for the year 2014 are analyzed at the univariate, bivariate, and multivariate level. Negative binomial regression models are used to test the relationships between food insecurity and the concentration of violent offenders in the city of Little Rock, AR at the Census block group level.

Univariate Analysis

All variables are geocoded and aggregated to the Census block group level. Descriptive statistics explain the minimum and maximum values present in the data, along with mean values and standard deviations. Results of univariate analysis are shown in Table 4.1. The counts of violent offenders across the 154 Census block groups ranges from 0 to 13, meaning a low of 0 and high of 13 residents were arrested for a violent offense in the block groups during the observation period. The mean value is 2.760 violent offenders and the standard deviation across the data is 3.012, indicating overdispersion in the data since the standard deviation value is greater than the mean value. The number of grocery stores across the same Census block groups ranges from 0 to 2 grocery stores per block group. The mean value is 0.182 with a standard deviation of 0.435, which indicates some degree in variability.

The concentrated disadvantage index constructed from five related attributes ranges from -1.180 to 1.800, where a decrease in value indicates lower levels of concentrated disadvantage and increasing values correspond with higher levels of concentrated disadvantage. The mean value is 0.00 and the standard deviation is 0.778. Descriptive statistics for each of the five attributes included in the concentrated disadvantage index are included in Table 4.1. The percent of families living below the federally established poverty line ranges from 0.00% to 64.380% with a mean value of 15.004% and a standard deviation of 15.004%. The percent of unemployed residents who are at least 16 years of age ranges from 0.000% to 23.400% with a mean value of 3.703% and a standard deviation of 4.232%. The percent of single-female with children households ranges from 0.000% to 45.640% with a mean value of 16.676% and a standard deviation of 11.004%. The percent of Black or African American residents ranges from 0.000% to 100.000% with a mean value of 45.016% and a standard deviation of 31.755%. Finally, the percent of residents at least 25 years of age who did not graduate from high school ranges from 0.000% to 43.810% with a mean value of 10.331% and a standard deviation of 9.586%.

Table 4.1   Univariate Statistics

Variables	Mean	Min	Max	Std. Dev.
Violent Offender	2.760	.000	13.000	3.012
Grocery Store	.182	.000	2.000	.435
Concentrated Disadvantage Index	.000	-1.180	1.800	.778
Families Below Poverty Level (%)	15.004	.000	64.380	15.004
Unemployed 16YR and Over (%)	3.703	.000	23.400	4.232
Single-Female w/ Children Household (%)	16.676	.000	45.640	11.004
Black/African American (%)	45.016	.000	100.000	31.755
25YR and Over w/o High School Graduation (%)	10.331	.000	43.810	9.586
Owner-Occupied (%)	57.573	1.350	100.000	24.163
Racial Heterogeneity	.368	.000	.750	.178
Black/African American	.450	.000	1.000	.318
White/Caucasian	.482	.000	1.000	.305
Asian	.025	.000	.340	.055
American Indian/Alaska Native	.003	.000	.200	.017
Native Hawaiian/Pacific Islander	.000	.000	.000	.000
Population 15-24YR (%)	13.170	.000	63.460	8.253

The percent of owner-occupied dwellings ranges from 1.350% to 100.00% per Census block group. The mean value is 57.573% and the standard deviation is 24.163%. Racial heterogeneity ranges from 0.000 to 0.750 with a mean value of 0.368 and a standard deviation of 0.178. A value of zero indicates an absence of racial heterogeneity and a value of one indicates a completely heterogeneous neighborhood. The 2013-2017 ACS 5-year summary file includes five racial groups from which respondents were asked to identify; descriptive statistics for these racial groups are included. Black or African American ranges from 0.000 to 1.000 with a mean value of 0.450 and a standard deviation of 0.318. White or Caucasian ranges from 0.000 to 1.000 with a mean value of 0.482 and a standard deviation of 0.305. Asian ranges from 0.000 to 0.340 with a mean value of 0.025 and a standard deviation of 0.055. American Indian or Alaska Native ranges

from 0.000 to 0.200 with a mean value of 0.003 and a standard deviation of 0.017. Lastly, the minimum, maximum, mean, and standard deviation for Native Hawaiian or Pacific Islander is 0. Finally, the percent of the population between the ages 15 and 24 ranges from 0.000% to 63.460% with a mean value of 13.337% and a standard deviation of 8.486%.

Bivariate Analysis

Continuous variables are analyzed to determine the strength and directionality of linear bivariate correlations using Pearson's Correlation. A complete list of correlation results is located in Table 4.2, including correlations that fail to rise to the level of statistical significance. Bivariate statistics are measured at the Census block group level across Little Rock, AR ($N = 154$). Hypothesis 1 expressed the expectation of finding a statistically significant, strong, positive relationship between the distribution of grocery stores and the distribution of violent offenders. Counter to this hypothesis, the relationship between these measures fails to achieve statistical significance.

The distribution of grocery stores shares a statistically significant, weak, and negative relationship with the percent of owner-occupied residences ($r = -.168$, $p =. 037$), which indicates that as the percent of owner-occupied homes increases, the concentration of grocery stores decreases. This finding is consistent with the historical shift of owner occupancy to the suburbs, away from urban, industrial and retail settings, that was produced by expanding transportation infrastructure and automobile ownership (Bursik & Grasmick, 1993; Deener, 2017; Sampson et al., 1997). Concentrated disadvantage shares a statistically significant, strong, and positive relationship with the distribution of violent offenders ($r = .617$, $p \leq .001$) indicating that as neighborhood concentrated disadvantage increases, so too does the number of violent offender

residents. This is consistent with social disorganization theory and extant literature findings of a positive relationship between violent crimes rates and concentrated disadvantage (Chamberlain & Hipp, 2015; Lynch, 2016).

The statistically significant relationship between concentrated disadvantage and owner occupancy is moderate and negative ($r = -.274$, $p = .001$). These findings are consistent with the works of Bursik and Grasmick (1993), and Sampson and colleagues (1997), who found that as neighborhood concentrated disadvantage increases, the percent of owner-occupied residences decreases. Owner-occupancy also shares a statistically significant, moderate, negative relationship with the distribution of violent offenders ($r = -.340$, $p \leq .001$), as well as with racial heterogeneity ($r = -.316$, $p \leq .001$). Thus, as the percent of owner-occupied residences increases in a neighborhood, the concentration of violent offenders and racial heterogeneity decreases. These findings are consistent with social disorganization theory, which postulates that neighborhood racial homogeneity, residential stability and community investment mitigate crime (Kornhauser, 1978; Morenoff et al., 2001; Park & Burgess, 1924; Shaw & McKay, 1972).

Table 4.2   Pearson's Correlation Analysis Across Little Rock Census Block Groups ($N = 154$)

Variable A × Variable B	Correlation Coefficient
Grocery Store × Violent Offender	.084
Grocery Store × Concentrated Disadvantage Index	-.023
Grocery Store × Owner-Occupied (%)	-.168*
Grocery Store × Racial Heterogeneity	.133
Grocery Store × Population 15-24YR (%)	-.050
Concentrated Disadvantage Index × Violent Offender	.617***
Concentrated Disadvantage Index × Owner-Occupied (%)	-.274***
Concentrated Disadvantage Index × Racial Heterogeneity	.063
Concentrated Disadvantage Index × Population 15-24YR (%)	.267***
Owner-Occupied (%) × Violent Offender	-.340***
Owner-Occupied (%) × Racial Heterogeneity	-.316***
Owner-Occupied (%) × Population 15-24YR (%)	-.160*
Racial Heterogeneity × Violent Offender	.025
Racial Heterogeneity × Population 15-24YR (%)	.046
Population 15-24YR (%) × Violent Offender	.173*

Correlation (2-tailed) is significant at the $*p \leq .05$; $**p \leq .01$; $***p \leq .001$

Concentrated disadvantage and the percent of neighborhood residents between the ages of 15 and 24 years share a statistically significant, moderate, positive relationship ($r = .267, p \leq .001$). This indicates that an increase in the percent of neighborhood residents between the ages of 15 to 24 years is accompanied by an increase in the levels of concentrated disadvantage. The percent of residents between the ages of 15 and 24 years shares a statistically significant, weak, negative relationship with owner-occupancy ($r = -.160, p = .048$). This denotes that as the percent of residents between the ages of 15 and 24 years increases, the percent of owner-occupied residences decreases. There also exists a statistically significant, weak, and positive relationship between the percent of residents aged 15 to 24 years and the distribution of violent offenders ($r = .173, p = .032$). Thus, as the percent of residents between the ages of 15 and 24 years increases, so does the concentration of violent offenders. Each of these age-related relationships is consistent with the

works of Hirschi and Gottfredson (1983), and Moffitt (1993) who found that criminal activity

increases throughout teenage years and tapers off in the early- to mid-twenties before declining in

later years. The remaining bivariate relationships fail to achieve statistical significance.

Negative Binomial Regression

Results of negative binomial regression are displayed in Table 4.3. Model 1 is the base

model that includes the direct effects of all independent variables. Hypothesis 1 predicts a direct,

positive relationship between food insecurity and distribution of violent offenders in the city of

Little Rock, AR. Contrary to this expectation, food insecurity, operationalized as the number of

groceries stores in a Census block group, shares a null relationship with the number of violent

offenders residing in each block group ($b = -.117$, $p = .491$). Thus, Hypothesis 1 is rejected.

This model also tests the direct effects of the four additional independent variables on the

number of violent offenders living in the Census block groups. Consistent with the works of Shaw

and McKay (1972), Sampson and Groves (1989), and Osgood and Chambers (2003), concentrated

disadvantage shares a statistically significant, strong, and positive relationship with the number of

violent offenders ($b = 1.041$, $p \leq .000$). Each standard deviation increase in the concentrated

disadvantage index is associated with a 124.8% increase in the number of violent offenders. Also

consistent with these previous works, the percent of owner-occupied residences shares a

statistically significant and negative relationship with the number of violent offenders ($b = -.011$,

$p \leq .01$). Each standard deviation increase in community investment, measured here as the percent

of owner-occupied homes, is related to a 23.7% decrease in the number of violent offenders.

Contrary to prior works (Osgood & Chambers, 2003; Sampson & Groves, 1989; Shaw & McKay,

1972), however, neither racial heterogeneity nor community age structure achieves a statistically

significant relationship with the dependent variable.

Table 4.3   Negative Binomial Regression Models

Variable	Model 1	Model 2
Grocery Store	-.117 (.170)	-.059 (.210)
Concentrated Disadvantage Index	1.041 (.121)***	1.045 (.122)***
Owner-Occupied (%)	-.011 (.004)**	-.011 (.004)**
Racial Heterogeneity	-.481 (.465)	-.461 (.471)
Population 15-24YR (%)	.015 (.016)	.015 (.017)
Concentrated Disadvantage Index × Grocery Store Distribution	---	-.175 (.261)
Constant	-5.695 (.395)***	-5.720 (.400)**

Unstandardized coefficients with robust errors in parentheses. $*p \leq .05$; $**p \leq .01$; $***p \leq .001$

Model 2 tests the extent to which the impact of concentrated disadvantage on the number

of violent offenders is conditioned by food insecurity. This is achieved through incorporation of a

cross-product interaction term that multiplies the concentrated disadvantage index by the mean-

centered measure of food insecurity. The interaction is non-significant ($b = -.175$, $p = .504$),

meaning food insecurity, as it is operationalized in this thesis, does not appear to condition the

relation between concentrated disadvantage and number of violent offenders living in a Census

block group. This finding prompts rejection of Hypothesis 2. The thesis now turns to discussion

of the findings and limitations of this study, as well as recommendations for future research.

CHAPTER 5

DISCUSSION AND CONCLUSION

This thesis seeks to contribute to the growing body of research on neighborhood-level distributions of crime, race, class and food insecurity through the theoretical framework of social disorganization. This was primarily achieved through analyzing the direct impact of food insecurity on the distribution of violent offenders in Little Rock, AR. The data were evaluated to determine if the impact of concentrated disadvantage on violent offender distribution is conditioned by food insecurity—a timely and important contribution to the understanding of food insecurity and food deserts in the U.S. and other high-GDP countries. Food insecurity and high-GDP are seemingly incongruous concepts, yet the disparate race-class landscape across many U.S. cities points to their coexistence. Although this thesis does not identify any significant relationships between crime and food insecurity, several findings merit further discussion.

Extant research suggests a strong, positive relationship between food insecurity, diet and maladaptive behavior through every stage of life (AAP, 2015; Basu et al., 2013; Holubcikova et al., 2015; Hostmark, 2010; Lambregts-Rommelse & Hebebrand, 2017; Solnick & Hemenway, 2012, 2014). Populations at-risk for food insecurity include racial and ethnic minorities, and disadvantaged, impoverished communities (Acevedo-Garcia et al., 2020; Alkerwi et al., 2015; Basu et al., 2016; Darmon & Drewnowski, 2008; Heflin, 2017; Hilmers et al., 2012). These at-risk community characteristics overlap with extant crime literature, and therefore emphasize the strong, positive relationships between crime, concentrated disadvantage, and racial heterogeneity (Battin

& Crowl, 2017; Brantingham, 2016; Hipp, 2010; Jones & Pridemore, 2018; Lynch, 2016). Social disorganization theory explains these observed socio-spatial relationships through neighborhood-level informal and formal social controls, collective efficacy, social cohesion and social capital (Bursik & Grasmick, 1993; Kornhauser, 1978; Morenoff et al., 2001; Sampson & Groves, 1989; Sampson et al., 1997; Shaw & McKay, 1972). This thesis contributes original research to the body of literature through exploring direct and indirect relationships between food insecurity, concentrated disadvantage and crime.

Several of the bivariate and multivariate results contained in the Little Rock data are consistent with previous findings and social disorganization tenets. First, the concentration of grocery stores across the 154 Census block groups decreases as owner occupancy increases. This relationship points to the influence of class and vehicle ownership, where neighborhoods characterized by community investment and greater economic resources are also able to afford personal transportation to and from grocery stores or shopping centers (Bursik & Grasmick, 1993; Deener, 2017; Sampson et al., 1997). Contrary to expectations, this is the only statistically significant relationship grocery store distribution shares across the variables included in this thesis. The effects of class on community investment are also observed between owner-occupancy and concentrated disadvantage. An increase in neighborhood concentrated disadvantage is correlated with a decrease in owner-occupied residences. Community investment and residential stability are hallmarks of social *organization* and speak to a community's ability to secure resources and advocate for social change (Bursik & Grasmick, 1993; Sampson et al., 1997; Shaw & McKay, 1972). In Little Rock, an increase in the racial heterogeneity of a neighborhood is correlated with a decrease in home ownership–a finding consistent with neighborhood-level research. The lack of capital investment, in the form of mortgage lending, in these neighborhoods is, in part, due to a

lack of public social control (Bursik & Grasmick, 1993). Enduring overlapping forms of disadvantage may result from the sequence of fewer owner-occupied homes to more rental units to lower rental prices to successively poorer and poorer residents. The totality of these findings indicates that racially heterogeneous Little Rock neighborhoods with high levels of concentrated disadvantage also experience a decrease in community investment through home ownership.

Second, the relationships between crime, measured here as the concentration of violent offenders, and class, community investment, and age are consistent with extant research findings and social disorganization theory. Increasing concentrations of violent offenders are correlated with increases in concentrated disadvantage and decreases in owner-occupied residences. Consistent with theory—there are larger concentrations of violent offenders nested within Little Rock neighborhoods marked by overlapping indicators of structural disadvantage and residential turnover; areas where networks of informal social control would be expected to be weakened.

Consistent with the age-crime curve described in prior works, as the percent of residents within the at-risk age group of 15 to 24 years increases, so does the concentration of violent offenders (Brame & Piquero, 2013; Hirschi & Gottfredson, 1983). Importantly, although age structure shares a statistically significant relationship with violent offender distribution at the bivariate level, this relationship is reduced to statistical non-significance when controlling for all other variables. Taken together, these findings indicate that neighborhoods in Little Rock with higher concentrations of violent offenders are also characterized by concentrated disadvantage, low community investment, and elevated proportions of residents within the crime-prone age range.

Similarly, at the bivariate level, neighborhoods with greater proportions of residents within the crime-prone age range of 15 to 24 years are characterized by concentrated disadvantage, racial

heterogeneity, and decreased community investment. Previous works have identified these neighborhood-level characteristics as correlates of crime (Gotham & Kennedy, 2019; Hipp, 2010). Hipp (2010) and Gotham and Kennedy (2019) found a reduction in the likelihood that reputable business owners will reside within neighborhoods they predict are crime-prone due to the presence of these factors. Contrary to these prior works, however, there is no relationship between grocery store distribution and racial heterogeneity, concentrated disadvantage, or population age structure among the Little Rock data.

This study includes racial heterogeneity, which contrary to expectations does not demonstrate statistically significant relationships with grocery store distribution, concentrated disadvantage, violent offender distribution or percent of the population between 15 to 24 years. Although this may indicate the absence of a relationship, extant research findings suggest that this may be due to the insufficiency of racial heterogeneity as a measure of social disorganization (Collins et al., 2017; Hipp & Kim, 2022; Konkel et al., 2021; Kubrin & Weitzer, 2003; Kurbin et al., 2021).

Contrary to the expectations of this thesis, concentrations of violent offenders and grocery stores share a null direct relationship. Further, the extent to which food insecurity conditions the impact of concentrated disadvantage on violent offender distributions is statistically non-significant. This suggests that there may not be a direct relationship between the distribution of violent offenders and grocery stores. These findings should, however, be interpreted with a degree of caution due the various limitations of this study.

Limitations

Within the literature, food insecurity has been operationalized in a variety of ways—each of which produces is own benefits and drawbacks. In this study, food insecurity is operationalized as the number of supermarkets and grocery stores in Census block groups located in the city of Little Rock, which is consistent with the approach adopted by Bader and colleagues (2010). This simplistic approach, though accounting for the physical representation of nutritional food options within a neighborhood, ignores the complex impacts of several notable variables on food insecurity and threatens omitted variable bias. Participation in supplemental nutrition assistance programs (SNAP), food stamps and community food pantries influence the degree to which neighborhoods experience poverty induced food insecurity (Helton et al., 2019; Walker et al., 2012; Walker et al., 2011). Receiving nutritional supplements allows low-income households to avoid the trade-offs associated with allocating limited financial resources to food as opposed to other necessary expenses including housing, utilities and transportation. Additionally, for neighborhoods where grocery stores are scarce, including a variable that measures access to private and public transportation would demonstrate how food options are restricted for those with poor access. Bader and colleagues (2010) found that vehicle ownership, and expansive and accessible public transportation are associated with food deserts and oases. Sharkey's research team (2010) found that private vehicle ownership is an important measure in sprawling urban areas where public transportation infrastructure is lacking. To this end, including a proximity or distance measure that captures how far residents have to travel to a grocery store or shopping center would further illuminate the importance of transportation (Sharkey et al., 2010). A network proximity measure, as opposed to a straight-line measure, approximates the distance between individual residences and nearby food options by virtue of the transportation infrastructure that provides access. Hilmers

and colleagues (2012) found that a network proximity measure accounting for ease of access to healthy and unhealthy food options helps to explain why some residents still choose convenient, unhealthy options. A measure of individual purchase rates and revenue may shed additional light on the buying practices of residents (Forsyth et al., 2010). As Cummins, Flint, and Matthews (2014) point out, an increase in healthy food options does not necessarily influence buying habits or diet. Future research should address the physical distance residents are required to travel to reach a grocery store, as well as the availability of most likely means of travel (e.g., walking, driving, public transit).

A second concern, this study analyzes crime data in Little Rock via the counts of violent offenders living across the city's 155 Census block groups. Offender addresses are gathered from city police records and are based on *self-report* data that were not verified by the department. In this study, the key drawback of self-reported addresses is the validity threat presented by potentially false or inaccurate data respondents reported to the Little Rock Police Department (Frey, 2018).

The cross-sectional approach used in this thesis, as opposed to longitudinal, precludes causal inferences and limits the ability to measure the long-term impacts living in a food desert has on crime. Future research should address this through developing a longitudinal approach or through including a variable that measures address history and timeline. The available datasets do not measure how long a respondent resided at their current address.

Another potential limitation is that violent crimes alone were included in this thesis' analysis. This limitation presents an issue of generalizability to other forms of offending. Specifically, property crimes, drug offenses, and non-violent personal crimes were not explored

and the findings cannot be generalized to concentrations of individuals arrested for these offenses. This should be addressed in future works.

Finally, additional emphasis should be placed on exploring the unique effects of racial homogeneity—particularly communities of color (Collins et al., 2017; Hipp & Kim, 2022; Konkel et al., 2021; Kurbin et al., 2021). The concentrated disadvantage index used in this thesis includes a measure for the percent of Black or African American residents. Consideration should be given to dropping it from the index because race is a meta-concept and often over-estimates the contribution of the measure of disadvantage (Peterson & Krivo, 2005; Rodriguez & Cordero-Guzman, 1992; Schieman, 2005). Moreover, this approach would allow for consideration of the unique effects of class and race.

Conclusion

Despite these limitations, this thesis represents an important contribution to the literature concerning the relationship between food deserts and crime by providing a foundation for future study. Although prior works have explored the impact of food consumption habits on maladaptive behaviors (Helton et al., 2019; Lambregts-Rommelse & Hebebrand, 2017; Portnoy et al., 2017; Vogel et al., 2020), no studies could be identified that examined the extent to which this relationship might manifest at the aggregate level. Such an omission is concerning given the relationships between food insecurity, diet, and a range of deleterious outcomes.

Energy-dense, nutrient-poor diets have been linked with various negative health and behavioral outcomes across all ages. Childhood obesity and diabetes reduce quality of life and increase the risk of comorbid diseases throughout the aging process (Alkerwi et al., 2015; Eisenhauer, 2001; Issner et al., 2017). Weight-related teasing and bullying experienced by this

population further contributes to maladaptive psychosocial coping (Lampard et al., 2014). Poor academic performance and truancy in juveniles is linked to early onset of cognitive, mental, and emotional disorders brought on by poor dietary practices (AAP, American Academy of Pediatrics, 2015; 2013; Holubcikova et al., 2015; Hostmark, 2010; Lambregts-Rommelse & Hebebrand, 2017; Solnick & Hemenway, 2012, 2014). Finally, antisocial tendencies and low impulse control are also associated juvenile delinquency and substance abuse (Samek et al., 2017; Wolff & Baglivio, 2017).

In contrast, access to foods with high nutritional content have been associated with improved health and behavioral outcomes. Nutrition is not only prophylactic (Gartstein & Skinner, 2018; Lambregts-Rommelse & Hebebrand, 2017), its therapeutic effects are instrumental in recidivism reduction, recovery facilitation, and mood stabilization in populations with behavioral and personality disorders (Gesch et al., 2002; Rucklidge & Mulder, 2016). Increasing micronutrient intake in prison populations has been shown to reduce negative emotionality and violence (Chamberlain et al., 2017; Cook et al., 2015; Gesch et al., 2002; Rosenboom et al., 2018; Rucklidge & Mulder, 2016; Shively, 2018).

In view of these issues, food access and dietary habits should remain focal points of interest among researchers and policy makers alike. It is the hope of the author that this thesis will serve as a springboard of sorts for future studies that might further clarify the nature of the relationship between food insecurity and crime, particularly at a neighborhood level. In turn, such research may contribute to the cultivation of policies that promote a more healthy and just society.

REFERENCES

Acevedo-Garcia, D., Noelke, C., McArdle, N., Sofer, N., Huntington, N., Hardy, E., Huber, R., Baek, M., & Reece, J. (2020). *The geography of child opportunity: Why neighborhoods matter for equity*. Brandeis: The Heller School for Social Policy and Management. http://new.diversitydatakids.org/sites/default/files/file/ddk_the-geography-of-child-opportunity_2020v2.pd

Alkerwi, A., Crichton, G. E., & Hebert, J. R. (2015). Consumption of ready-made meals increased risk of obesity: Findings from the observation of cardiovascular risk factors in Luxembourg. *British Journal of Nutrition*, *113*, 270-277.

American Academy of Pediatrics. (2015). Promoting food security for all children. *Pediatrics*, *136*(5), e1431-e1438.

Amir, T., & Barak-Bianco, A. (2019). Food as a biopower means of control: The use of food in asylum regimes. *American Journal of Law & Medicine*, *45*, 57-79.

Andersen, S. A. (1990). Core indicators of nutritional state for difficult to sample populations. *The Journal of Nutrition*, *120*, 1557S-1600S.

Anderson, E. (1999). *Code of the street: Decency, violence, and the moral life of the inner city*. W. W. Norton & Company.

Bader, M., Purciel, M., Yousefzadeh, P., & Neckerman, K. M. (2010). Disparities in neighborhood food environments: Implications of measurement strategies. *Economic Geography*, *86*(4), 409-430.

Ball, K., Timperio, A., & Crawford, D. (2009). Neighborhood socioeconomic inequalities in food access and affordability. *Health & Place*, *15*, 578-585.

Basu, S., McKee, M., Galea, G., & Stuckler, D. (2013). Relationship of soft drink consumption to global overweight, obesity, and diabetes: A cross-national analysis of 75 countries. *American Journal of Public Health*, *103*, 2071-2077.

Basu, S., Wimer, C., & Seligman, H. (2016). Moderation of the relation of county-level cost of living to nutrition by the supplemental nutrition assistance program. *American Journal of Public Health*, *106*(11), 2064-2070.

Battin, R. J., & Crowl, J. N. (2017). Urban sprawl, population density, and crime: An examination of contemporary migration trends and crime in suburban and rural neighborhoods. *Crime Prevention & Community Safety*, *19*, 136-150.

Beaulac, J., Kristjansson, E., & Cummins, S. (2009). A systematic review of food deserts, 1966-2007. *Preventing Chronic Disease*, *6*(3), 1-10.

Bekelman, T. A., Johnson, S. L., & Taylor, C. A. (2019). Differences in diet quality and snack intakes amoung non-Hispanic white and Mexican American adolecents from different acculturation groups. *Journal of Racial & Ethnic Health Disparities*, *7*, 1090-1099.

Benfer, E. A. (2015). Health Justice: A framework (and call to action) for the elimination of health inequity and social injustice. *American University Law Review*, *65*(2), 275-351.

Brame, R., & Piquero, A. R. (2013). Selective attrition and the age-crime relationship. *Journal of Quantitative Criminology*, *19*(2), 107-127.

Brantingham, J. P. (2016). Crime diversity. *Criminology*, *54*, 553-586.

Brantingham, P. L., & Brantingham, J. P. (1995). Criminality of place: Crime generators and crime attractors. *European Journal on Criminal Policy and Research*, *3*(3), 5-26.

Brumley, L. D., Jaffee, S. R., & Brumley, B. P. (2017). Pathways from childhood adversity to problem behaviors in young adulthood: The mediating role of adolescents' future expectations. *Journal of Youth & Adolescence*, *46*, 1-14.

Bursik, R. J. (1988). Social disorganization and theories of crime and delinquency: Problems and prospects. *Criminology*, *26*(4), 519-552.

Bursik, R. J., & Grasmick, H. G. (1993). *Neighborhoods and crime: The dimensions of effective community control*. Lexington Books.

Chamberlain, A. W., & Hipp, J. R. (2015). It's all relative: Concentrated disadvantage within and across neighborhoods and communities, and the consequences for neighborhood crime. *Journal of Criminal Justice*, *43*, 431-443.

Chamberlain, S. R., Redden, S. A., & Grant, J. E. (2017). Calorie intake and gambling: Is fat and sugar consumption 'impulsive'? *Journal of Gambling Studies*, *33*, 783-793.

Chananiah, P. (2020). The churning of skid row: A genealogy of development, gentrification, and displacement. *The American Journal of Economics and Sociology*, *79*(2). https://link.gale.com/apps/doc/A635032848/ITBC?u=tel_a_utc&sid=bookmark-ITBC&xid=8adc5ae1

Chandler, A. D., Jr. (1994). The competitive performance of U.S. industrial enterprises since the Second World War. *Business History Review*, *68*(1).

https://link.gale.com/apps/doc/A16391766/ITBC?u=tel_a_utc&sid=bookmark-ITBC&xid=45f451a8

Collins, C. R., Neal, Z. P., & Neal, J. W. (2017). Transforming social cohesion into informal social control: Deconstructing collective efficacy and the moderating role of neighborhood racial homogeneity. *Journal of Urban Affairs*, *39*(3), 307-322.

Cook, E. A., Lee, Y. M., White, B. D., & Gropper, S. S. (2015). The diet of inmates: An analysis of a 28-day cycle menu used in a large county jail in the state of Georgia. *Journal of Correctional Health Care*, *21*(4), 390-399.

Crank, J. P. (2003). Crime and justice in the context of resource scarcity. *Crime, Law & Social Change*, *39*, 39-67.

Criminal Justice Information Services Division. (2018). *Arkansas: Offenses known to law enforcement* [Data set]. https://ucr.fbi.gov/crime-in-the-u.s/2018/crime-in-the-u.s.-2018/tables/table-8/table-8-state-cuts/arkansas.xls

Cummins, S., Flint, E., & Matthews, A. S. (2014). New neighborhood grocery store increased awareness of food access but did not alter dietary habits or obesity. *Health Affairs*, *33*(2), 283-291.

Darmon, N., & Drewnowski, A. (2008). Does social class predict diet quality? *American Journal of Clinical Nutrition*, *87*, 1107–1117.

Deener, A. (2017). The origins of the food desert: Urban inequality as infrastructural exclusion. *Social Forces*, *95*(3), 1285-1309.

Eisenhauer, E. (2001). In poor health: Supermarket redlining and urban nutrition. *GeoJournal*, *53*, 125-133.

Forsyth, A., Lytle, L., & Van Riper, D. (2010). Finding food: Issues and challenges in using geographic information systems to measure food access. *Journal of Transport and Land Use*, *3*(1), 43-65.

Freeman, A. (2015). Transparency for food consumers: Nutrition labeling and food oppression. *American Journal of Law & Medicine*, *41*, 315-330.

Frey, B. B. (2018). *The SAGE encyclopedia of educational research, measurement, and evaluation* (Vol. 1-4). SAGE Publications, Inc.

Gartstein, M. A., & Skinner, M. K. (2018). Prenatal influences on temperament development: The role of environmental epigenetics. *Development & Psychopathology*, *30*, 1269-1303.

Gesch, C. B., Hammond, S. M., Hampson, S. E., Eves, A., & Crowder, M. J. (2002). Influence of supplementary vitamins, minerals and essential fatty acids on the antisocial behaviour of

young adult prisoners: Randomized placebo-controlled trial. *The British Journal of Psychiatry*, *181*, 22-28.

Gotham, K. F., & Kennedy, D. B. (2019). Analyzing crime foreseeability: Premises security litigation and the case of convenience stores and gas stations. *Security Journal*, *34*, 207-230.

Hayashi, A. T. (2021). Dynamic property taxes and racial gentrification. *Notre Dame Law Review*, *96*(4). https://link.gale.com/apps/doc/A661250345/ITBC?u=tel_a_utc&sid=bookmark-ITBC&xid=36c00d39

Heflin, C. M. (2017). The role of social positioning in observed patterns of material hardship: New evidence from the 2008 survey of income and program participation. *Social Problems*, *64*, 513-531.

Helton, J. J., Jackson, D. B., Boutwell, B. B., & Vaughn, M. G. (2019). Household food insecurity and parent-to-child aggression. *Child Maltreatment*, *24*(2), 213-221.

Hillier, B. (2004). Can streets be made safe? *Urban Design International*, *9*(1), 31–45.

Hilmers, A., Hilmers, D. C., & Dave, J. (2012). Neighborhood disparities in access to healthy foods and their effects on environmental justice. *American Journal of Public Health*, *102*(9), 1644-1654.

Hipp, J. R. (2007). Income inequality, race, and place: Does the distribution of race and class within neighborhoods affect crime rates? *Criminology*, *45*, 665–697.

Hipp, J. R. (2010). A dynamic view of neighborhoods: The reciprocal relationship between crime and neighborhood structural characteristics. *Social Problems*, *57*(2), 205-230.

Hipp, J. R., & Kim, J. H. (2022). Persistent racial diversity in neighborhoods: What explains it and what are the long-term consequences. *Urban Geography*, 1-28. https://doi.org/10.1080/02723638.2021.2014658

Hirschi, T., & Gottfredson, M. (1983). Age and the explanation of crime. *American Journal of Sociology*, *89*(3), 552-584.

Holubcikova, J., Kolarcik, P., Geckova, A. M., Reijneveld, S. A., & van Dijk, J. P. (2015). The mediating effect of daily nervousness and irritability on the relationship between soft drink consumption and aggressive behaviour among adolescents. *International Journal of Public Health*, *60*, 699-706.

Homer-Dixon, T. F. (1994). Environmental Scarcities and Violent Conflict: Evidence from Cases. *International Security*, *19*(1), 5-40.

Hostmark, A. T. (2010). The Oslo health study: Soft drink intake is associated with the metabolic syndrome. *Applied Physiology, Nutrition, and Metabolism*, *35*, 635-642.

Issner, J. H., Mucka, L. E., & Barnett, D. (2017). Increasing positive health behaviors in adolescents with nutritional goals and exercise. *Journal of Child & Family Studies*, *26*, 548-558.

Johnson, L. T., & Kane, R. J. (2018). Deserts of disadvantage: The diffuse effects of structural disadvantage on violence in urban communities. *Crime & Delinquency*, *64*(2), 143-165.

Jones, R. W., & Pridemore, W. A. (2018). Toward an integrated multilevel theory of crime at place: Routine activities, social disorganization, and the law of crime concentration. *Journal of Quantitative Criminology*, *35*, 543-572.

Kane, R. J. (2011). The ecology of unhealthy places: Violence, birthweight, and the importance of territoriality in structurally disadvantaged communities. *Social Science & Medicine*, *73*, 1585-1592.

Kim, S. A., Moore, L. V., Galuska, D., Wright, A. P., Harris, D., Grummer-Strawn, L. M., Merlo, C. L., Nihiser, A. J., & Rhodes, D. G. (2014). Vital signs: Fruit and vegetable intake among children – United States, 2003-2010. *Morbidity & Mortality Weekly Report*, *63*(31), 671-676.

Kirk, D. S., & Matsuda, M. (2011). Legal cynicism, collective efficacy, and the ecology of arrest. *Criminology*, *49*(2), 443-472.

Konkel, R. H., Hafemeister, A. J., & Daigle, L. E. (2021). The effects of risky places, motivated offenders, and social disorganization on sexual victimization: A microgeographic- and neighborhood-level examination. *Journal of Interpersonal Violence*, *36*, 8409-8434.

Kornhauser, R. (1978). *Social sources of delinquency: An appraisal of analytic models*. University of Chicago Press.

Krieger, N., Williams, D. R., & Moss, N. E. (1997). Measuring social class in US public health research: Concepts, methodologies, and guidelines. *Annual Review of Public Health*, *18*, 341–378.

Kubrin, C., & Weitzer, R. (2003). New directions in social disorganization theory. *Journal of Research in Crime and Delinquency*, *40*(4), 374–402.

Kurbin, C. E., Branic, N., & Hipp, J. R. (2021). (Re)conceptualizing neighborhood ecology in social disorganization theory: From a variable centered approach to a neighborhood-centered approach. *Crime & Delinquency*, 1-25. https://doi.org/10.1177/00111287211041527

Lambregts-Rommelse, N., & Hebebrand, J. (2017). Editorial focused issue 'The role of nutrition in child and adolescent onset mental disorders'. *European Child & Adolescence Psychiatry*, *26*, 1007-1010.

Lampard, A. M., MacLehose, R. F., Eisenberg, M. E., Neumark-Sztainer, D., & Davison, K. K. (2014). Weight-related teasing in the school environment: Associations with psychosocial health and weight control practices among adolescent boys and girls. *Journal of Youth & Adolescence*, *43*, 1770-1780.

Leary, E. (2005). Crisis in the U.S. labor movement: the roads not taken. *Monthly Review*, *57*(2). link.gale.com/apps/doc/A144016105/ITBC?u=tel_a_utc&sid=bookmark-ITBC&xid=efd14928

Lee, S. (2017). The food we eat and the people who feed us. *Washington University Law Review*, *94*(5). https://link.gale.com/apps/doc/A529947933/ITBC?u=tel_a_utc&sid=bookmark-ITBC&xid=9eb06374

Long, J. S., & Freese, J. (2006). *Regression models for categorical dependent variables using stata* (2nd ed.). Stata Press.

Long, Y., & Baran, P. K. (2012). Does intelligibility affect place legibility? Understanding the relationship between objective and subjective evaluations of the urban environment. *Environment & Behavior*, *44*(5), 616–640.

Lynch, M. J. (2016). The ecological distribution of community advantage and disadvantage: Power structures, political economy, communities, and green-state crime and justice. *Critical Criminology*, *24*, 247-262.

Matthew, D. B. (2018). "Lessons from the other America:" Turning a public health lens on fighting racism and poverty. *The University of Memphis Law Review*, *49*, 229-262.

Merolla, D. M., Hunt, M. O., & Serpe, R. T. (2011). Concentrated disadvantage and beliefs about the causes of poverty: A multi-level analysis. *Sociological Perspectives*, *54*(2), 205-227.

Mersky, J. P., & Janczewski, C. E. (2018). Racial and ethnic differences in the prevalence of adverse childhood experiences: Findings from a low-income sample of U.S. women. *Child Abuse & Neglect*, *76*, 480-487.

Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, *100*(4), 674-701.

Montoya, L., Junger, M., & Ongena, Y. (2016). The relation between residential property and its surroundings and day- and night-time residential burglary. *Environment & Behavior*, *48*(4), 515–549.

Morenoff, J. D., Sampson, R. J., & Roudenbush, S. W. (2001). Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence. *Criminology*, *39*(3), 517-559.

Morgan, R. E., & Truman, J. L. (2020). *Criminal Victimization, 2019*. Bureau of Justice Statistics. https://bjs.ojp.gov/library/publications/criminal-victimization-2019

National Research Council. (2014). *Estimating the Incidence of Rape and Sexual Assault*. The National Academies Press. https://doi.org/10.17226/18605

Newman, O. (1996). *Creating defensible spaces*. DIANE Publishing.

Osgood, D. W. (2000). Poisson-based regression analysis of aggregate crime rates. *Journal of Quantitative Criminology*, *16*, 21-43.

Osgood, D. W., & Chambers, J. M. (2000). Social disorganization outside the metropolis: An analysis of rural youth violence. *Criminology*, *38*(1), 81-115.

Osgood, D. W., & Chambers, J. M. (2003). Community correlates of rural youth violence. *Juvenile Justice Bulletin*, 1-12. https://www.ojp.gov/pdffiles1/ojjdp/193591.pdf

Park, R. E., & Burgess, E. W. (1924). *Introduction to the Science of Sociology* (2 ed.). University of Chicago Press.

Penn, A. (2003). Space syntax and spatial cognition. *Environment & Behavior*, *35*(1), 30-65.

Perez, N. M., Jennings, W. G., & Baglivio, M. T. (2018). A path to serious violent, chronic delinquency: The harmful aftermath of adverse childhood experiences. *Crime & Delinquency*, *64*, 3-25.

Peterson, R. D., & Krivo, L. J. (2005). Macrostructural analysis of race, ethnicity, and violent crime: Recent lessons and new directions for research. *Annual Review of Sociology*, *31*, 331-356.

Pina-Camacho, L., Jensen, S. K., Gaysina, D., & Barker, E. D. (2015). Maternal depression symptoms, unhealthy diet and child emotional-behavioural dysregulation. *Psychological Medicine*, *45*, 1851-1860.

Portnoy, J., Raine, A., Lui, J., & Hibbeln, J. R. (2017). Reductions of intimate partner violence resulting from supplementing children with omega-3 fatty acids: A randomized, double-blind, placebo-controlled, stratified, parallel-group trial. *Aggressive Behavior*, *44*, 491-500.

Pruitt, S. L., Leonard, T., Xuan, L., Amory, R., Higashi, R. T., Nguyen, O. K., Pezzia, C., & Swales, S. (2016). Who Is food insecure? Implications for targeted recruitment and outreach, national health and nutrition examination survey, 2005–2010. *Preventing Chronic Disease*, *13*(10). https://doi.org/10.5888/pcd13.160103

Ramirez, A. S., Golash-Boza, T., Unger, J. B., & Baezconde-Garbanati, L. (2018). Questioning the dietary acculturation paradox: A mixed-methods study of the relationship between food and ethnic identity in a group of Mexican-American women. *Journal of the Academy of Nutrition & Dietetics*, *118*(3), 431-439.

Ratcliffe, J. H., Taniguchi, T., Groff, E. R., & Wood, J. D. (2011). The Philadelphia foot patrol experiment: A randomized controlled trial of police patrol effectiveness in violent crime hotspots. *Criminology*, *49*(3), 795-831.

Rodriguez, C. E., & Cordero-Guzman, H. (1992). Placing race in context. *Ethnic & Racial Studies*, *15*(4), 523-542.

Rosenboom, L. M., Shlafer, R. J., Stang, J. L., & Harnack, L. J. (2018). Evaluation of nutritional quality of commissary foods offered in American women's prisons. *Journal of Correctional Healthcare*, *24*, 264-275.

Rucklidge, J. J., & Mulder, R. T. (2016). Could nutrition help behaviours associated with personality disorders? A narrative review. *Personality & Mental Health*, *10*, 3-11.

Ruiz-Tagle, J. (2013). A theory of socio-spatial integration: Problems, policies and concepts from a US perspective. *International Journal of Urban and Regional Research*, *37*(2), 388-408.

Samek, D. R., Hicks, B. M., Keyes, M. A., & Iacono, W. G. (2017). Antisocial peer affiliation and externalizing disorders: Evidence for gene x environment x development interactions. *Development & Psychopathology*, *29*, 155-172.

Sampson, R. J. (2002). Transcending tradition: New directions in community research, Chicago style. *Criminology*, *40*, 213-230.

Sampson, R. J., & Groves, W. B. (1989). Community structure and crime: Testing social-disorganization theory. *American Journal of Sociology*, *94*(4), 774-802.

Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhood and violent crime: A multilevel study of collective efficacy. *Science*, *277*(5328), 918-924.

Schieman, S. (2005). Residential stability and the social impact of neighborhood disadvantage: A study of gender- and race-contingent effects. *Social Forces*, *83*(3), 1031-1064.

Schwartz, J. A., Wright, E. M., & Valgardson, B. A. (2019). Adverse childhood experiences and deleterious outcomes in adulthood: A consideration of the simultaneous role of genetic and environmental influences in two independent samples from the United States. *Child Abuse & Neglect*, *88*, 420-431.

Serkin, C. (2020). A case for zoning. *Notre Dame Law Review*, *96*(2), 749-798.

Sharkey, J. R., Horel, S., & Dean, W. R. (2010). Neighborhood deprivation, vehicle ownership, and potential spatial access to a variety of fruits and vegetables in a large rural area in Texas. *International Journal of Health Geographics*, *9*, 1-27.

Shaw, C. R., & McKay, H. D. (1972). *Juvenile delinquency and urban areas*. University of Chicago Press.

Shively, R. (2018). The importance of staff training in mental health. *Journal of Community Corrections*, *27*(3), 11-29.

Solnick, S. J., & Hemenway, D. (2012). The 'twinkie defense': The relationship between carbonated non-diet soft drinks and violence perpetration among Boston high school students. *Injury Prevention*, *18*, 259-263.

Solnick, S. J., & Hemenway, D. (2014). Soft drinks, aggression and suicidal behaviour in US high school students. *International Journal of Injury Control and Safety Promotion*, *21*(3), 266-273.

Soltero, E. G., Ledoux, T. A., O'Connor, D. P., Moore, Q. L., Berger Cardoso, J., & Lee, R. E. (2019). Cross-country comparison of school neighborhood food environments in Houston, Texas and Guadalajara, Mexico. *The Journal of Primary Prevention*, *40*, 591-606.

Thomas, S. A., Harris, C. T., & Drawve, G. (2021). Exploring the influence of elements of the social and physical environment on neighborhood gun crime. *American Journal of Criminal Justice*, 1-29. https://doi.org/10.1007/s12103-020-09599-1

Vogel, S. C., Brito, N. H., & Callaghan, B. L. (2020). Early life stress and the development of the infant gut microbiota: Implications form mental health and neurocognitive development. *Current Psychiatry Reports*, *22*, 61-69.

Walker, D., & Holtfreter, K. (2016). Adolescent motherhood, depression, and delinquency. *Journal of Child & Family Studies*, *25*, 939-948.

Walker, J. T., & Madden, S. (2005). *Statistics in criminology and criminal justice: Analysis and interpretation* (5th ed.). Jones & Bartlett Learning.

Walker, R. E., Block, J., & Kawachi, I. (2012). Do residents of food deserts express different food buying preferences compared to residents in food oases? A mixed-methods analysis. *International Journal of Behavioral Nutrition and Physical Activity*, *9*(41), 1-13.

Walker, R. E., Fryer, C. S., Butler, J., Keane, C. R., Kriska, A., & Burke, J. G. (2011). Factors influencing food buying practices in residents of a low-income food desert and a low-income food oasis. *Journal of Mixed Methods Research*, *5*(3), 247-267.

Walters, G. D. (2020). Unraveling the bidirectional relationship between bullying victimization and perpetration: A test of mechanisms from opportunity and general strain theories. *Youth Violence & Juvenile Justice*, *18*, 395-411.

Woldoff, R. A. (2011). *White flight/black flight: The dynamics of racial change in an American neighborhood*. Cornell University Press.

Wolff, K. T., & Baglivio, M. T. (2017). Adverse childhood experiences, negative emotionality, and pathways to juvenile recidivism. *Crime & Delinquency*, *36*(12), 1495-1521.

Zenk, S. N., Odoms-Young, A., Dallas, C., Hardy, E., Watkins, A., Hoskins-Wroten, J., & Holland, L. (2011). You have to hunt for the fruits, the vegetables: Environmental barriers and adaptive strategies to acquire food in a low-income African-American neighborhood. *Health Education & Behavior*, *38*(3), 282-292.

Zenk, S. N., Schulz, A. J., Israel, B. A., James, S. A., Bao, S., & Wilson, M. L. (2005). Neighborhood racial composition, neighborhood poverty, and the spatial accessibility of supermarkets in metropolitan Detroit. *American Journal of Public Health*, *95*(4), 660-667.

Zuluaga, D., & Forrester, A. C. (2020). The Impact of the Community Reinvestment Act on neighborhood gentrification. *Quarterly Journal of Finance and Accounting*, *58*(3). https://link.gale.com/apps/doc/A647210008/ITBC?u=tel_a_utc&sid=bookmark-ITBC&xid=1ee88f33

VITA

Sarah Kathryn Dean grew up in greater Columbus, Ohio with her parents, brother, and two sisters. Throughout her undergraduate education, she worked as a peer tutor and spent weeknights working as a tutor and mentor for inner-city high school students. She graduated from The Ohio State University prior to joining her husband, Chad Dean, in Cleveland, Tennessee. Sarah accepted an opportunity to work for Mars Wrigley Confectionery (Mars), a global, privately held company, where she invested nearly a decade of her professional career in various positions within engineering teams. During her time with Mars, she developed a passion for conflict resolution, problem solving, negotiating, and advocacy between people and teams within her sphere of influence. Stemming from this work, Sarah chose to pursue a Master's of Science in Criminal Justice (MSCJ) from the University of Tennessee at Chattanooga and is pursuing a career in criminal justice.