

COMMUNITY CONTEXT, SOCIAL NETWORKS,
AND ACES:
IMPACTS ON HEALTH

By

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Abstract: A health crisis has emerged in the United States lowering life expectancy between 2014 and 2017. Specifically, health disparities are a current issue, varying by geography and social inequalities. Since 1998, ten adverse childhood experiences (ACEs) have been identified as having a graded relationship with negative adult health outcomes. The present research seeks to understand the predictors of ACEs that can be addressed to mitigate experiencing an ACE. Furthermore, the present research seeks to understand the role those individual social connections play as a protective factor for negative health outcomes when someone has experienced ACEs.

Results from the first study indicated that community factors were associated with ACEs, as conceptualized through household dysfunction and adverse family experiences, in a national sample of children. Using data from the National Survey of Children's Health, it was found that higher SES, engagement, neighborhood and school safety, and school attendance were associated with lower household dysfunction. Similarly, higher SES, neighborhood and school safety, and school attendance were associated with adverse family experiences. However, differences existed between household dysfunction and adverse family experiences. Neighborhood amenities were not related to household dysfunction while it was positively related to adverse family experiences. Additionally, having an adult mentor was positively related to household dysfunction while having no significant relationship with adverse family experiences.

The second study used data from the UCNets Social Network study. Through this study, it was discovered that select characteristics of social networks served as moderators for various health outcomes. Homophily, or friends with similar personal characteristics to self, served as a protective factor for health outcomes when experiencing household dysfunction. In contrast, emotional closeness, frequency of contact with friends, and social network instability were associated with worse health outcomes.

Findings from the present research support the work of developing self-healing communities that can focus on improving community environments to mitigate the risk of experiencing adverse childhood experiences. It also supports developing strong social networks of people to support one another, potentially bringing those who have experienced ACEs together. Finally, the results support looking into the way we measure ACEs and understanding the difference between groups of ACEs.

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CHAPTER I

INTRODUCTION

The United States has significant health disparities, particularly in race/ethnicity, sex, and income (Zimmerman & Anderson, 2019). The increased interest in improving those health disparities has focused attention on aspects of the life course such as community context (i.e., neighborhood, family, and school), adverse childhood experiences (ACEs), and social networks that positively and negatively affect health outcomes (Anda et al., 2006; Christakis, 2004; Jones et al., 2019). Therefore, research is needed to examine the ways community context, adverse childhood experiences, and social networks contribute to individual health outcomes. This dissertation aims to explore the nuances of these relationships. Specifically, how community contextual factors predict ACEs, how ACEs predict adult health outcomes, and how social connections mediate the relationship between ACEs and adult health outcomes.

This dissertation encompasses two studies that seek to address the community factors that predict adverse childhood experiences and how social relationships can protect individuals from the negative health effects of adverse childhood experiences. Chapter 1 outlines the problem this dissertation seeks to address, theoretical frameworks, and an overview of the two studies. Chapter 2 presents a study on the community factors that predict adverse childhood experiences. Chapter 3 analyzes the protective nature of social networks plays to protect individuals from the long-term negative health outcomes that arise from adverse childhood experiences. Finally, Chapter 4 summarizes the results of the two studies and discusses implications and directions for future research.

Problem Statement

In the United States, an overall health crisis has emerged. Over five decades, the U.S. has increased life expectancy from 69.94 to 78.85 years, peaking in 2014, and subsequently declining from 2014 to 2017 (Barbieri & Wilmoth, 2019; Woolf & Schoomaker, 2019). While the average life expectancy in the U.S. is greater than the global average (72.386), it ranks lower than regions such as the European Union (80.931), Canada (81.949), and Japan (84.1) (World Bank Group, 2020). Despite not having the highest life expectancy, the U.S. spends more on healthcare, as a percentage of gross domestic product (GDP), than any other country in the world. It spends less on social services that provide preventative care than health services among all countries in the Organisation for Economic Co-operation and Development (OECD) countries (Bradley et al., 2017), which makes up 50 industrialized and emerging economies countries. Therefore, it is crucial to understand ways to increase life expectancy without increasing healthcare spending. Increasing life expectancy can be accomplished by focusing on the disparities among the social determinants of health (Marmot et al., 2008).

Health Disparities

In addition to low life expectancy in the United States, significant health disparities also exist. Life expectancy varies by geography (Robert Wood Johnson Foundation, 2020). States such as Mississippi have an average life expectancy of 74.9 years, while those born in California have 81.3 years. This geographical inequality is also present within states and cities. Furthermore, even within specific groups of people, such as women, inequalities can vary dramatically between states, where mortality rates are highest in Nevada and lowest in Hawaii (Fenelon, 2013; Montez et al., 2016). Similarly, race, such as being Black or African-American, plays a role in reducing opportunity, increasing mortality (O'Brien et al., 2020). The differences in health outcomes can be explained by personal characteristics (30%). Still, it also includes the differences explained by contextual factors (32%) such as educational level, social cohesion, and economic conditions (Montez et al., 2016).

The social inequalities that affect health outcomes are multifaceted. Factors such as work and access to healthcare all foster health disparities (Lipscomb et al., 2006). Employment can enhance health outcomes through adequate pay and positive work environments while exposing employees to hazards and increasing workers' stress (Burgard & Lin, 2013). Often, those who face discrimination also lack sufficient access to healthcare, which reduces the control over healthcare decisions and ultimately is harmful to individuals' health (Riley, 2012). Therefore, providing social services and programs that can address work challenges or lack of access to healthcare can improve individuals' health (Lipscomb et al., 2006). Those who face early adversity may be more likely to struggle with these social inequalities, resulting in what is coined *deaths of despair* (Scutchfield & Keck, 2017). This dissertation highlights practices that focus on reducing social inequalities instead of changing health behaviors, particularly for those who have faced early adversity (McCartney et al., 2013).

Adverse Childhood Experiences

In the late 1990s, Felitti et al. (1998) studied over 8,000 adult patients in Kaiser Permanente's San Diego Health Appraisal Clinic to understand whether adverse childhood experiences predict poor health outcomes across the lifespan. Participants were asked about their exposure to adverse experiences during childhood, including their levels of abuse (psychological, physical, and sexual) and household dysfunction (substance abuse, mental illness, domestic violence, and criminal behavior). The results showed a graded relationship between ACE exposure and negative adult health outcomes, including liver disease, skeletal fractures, chronic lung disease, cancer, obesity, STDs, alcoholism, drug abuse, depression, and suicide. Furthermore, the authors found that the cumulative number of ACEs rather than prevalence or the specific ACE category was a significant predictor of health risks.

A more recent study using the CDC Kaiser Data found ACEs to be common throughout the study's population, with 80% of participants experiencing at least one ACE when including spanking as a form of hitting (approximately 54% of the population was spanked) (Merrick et al., 2017).

Additionally, the likelihood of harmful substance use was related to every specific adverse childhood experience. Collectively, these negative health outcomes and behaviors result in early death.

Cost of ACEs from Health Issues

Those who have faced four or more adverse childhood experiences were 80% more likely to experience early death (Anda et al., 2009). This mortality risk can be explained by the mediating relationships of non-communicable diseases such as diabetes or heart disease. ACEs directly increase these diseases and indirectly increase early mortality (Bellis et al., 2015; Felitti et al., 1998). The costs of these chronic diseases in the United States range from \$51 billion for mental health treatment to \$99 billion for respiratory diseases (Bellis et al., 2019). Additionally, indirect costs exist. The loss of educational attainment and workforce productivity due to adverse childhood experiences costs around 3% of a country's GDP (Bellis et al., 2019). The total financial costs of ACEs in the U.S. were estimated to be over \$581 billion in 2018, with costs increasing approximately \$61 billion each year (Bellis et al., 2019; Peterson et al., 2018).

These costs are distributed unequally throughout the United States. Communities with disproportionately high ACE scores tend to experience discrimination, have poor health care, lack access to safe and affordable housing, and have inadequate childcare. However, while there are disparities in communities' ecological factors, ACEs are still common across socioeconomic groups and racial identities, representing the approximately 103 million Americans who have an ACE (Bellis et al., 2019; Danielson & Saxena, 2019). Some ACE indicators of household dysfunction that are used in this dissertation (parental divorce, parental drug use, and parental incarceration) are increasing faster than indicators of abuse and neglect (Finkelhor, 2020).

Conceptual Definitions

Adverse Childhood Experiences refer to “abuse and household dysfunction during childhood (Felitti et al., 1998, p. 246). ACEs conceptualize a series of events from childhood. Research is not consistent in its use of ACEs. Felitti et al. (1998) has established the ten most commonly accepted adverse experiences. These include childhood abuse (physical abuse, emotional abuse, and sexual

abuse), childhood neglect (physical neglect and emotional neglect), and *household dysfunction* (mental illness, incarcerated relative, mother treated violently, substance abuse, and divorce). Specifically, due to data limitations, this dissertation focuses on ACEs associated with household dysfunction.

Throughout the literature, some authors, particularly those who use data from the National Survey of Children's Health (U.S. Census Bureau, 2018), also use the term *adverse family experiences (AFE)*s to indicate negative experiences in the family beyond ACEs. These experiences are ones that the family does not have control over, such as neighborhood violence or the death of a family member (Bethell et al., 2014). Thus, AFEs are included in chapter 2. Additionally, some authors look specifically at *confirmed child abuse cases* (Marco et al., 2020). These terms' relevance will be noted for this dissertation, but this dissertation will use *adverse family experiences* to complement the original ACE categories created by Felitti et al. (1998) when available.

Ecological factors include neighborhood, family, and school characteristics that influence health. These characteristics operate from within the microsystem and exosystem of Bronfenbrenner and Ceci's (1994) bioecological model. Further, these characteristics are loosely derived from the *social determinants of health* framework defined by the World Health Organization as “the conditions in which people are born, grow, live, work, and age” as the fundamental drivers of health (Marmot et al., 2008). Together, these determinants represent the ecological factors that influence health outcomes.

Masten (2014) defines *resilience* as “the capacity of a dynamic system to adapt successfully to disturbances that threaten system function, viability, or development” (p. 10). Specifically, the dynamic system Masten refers to is an individual and the immediate world surrounding that individual. In this dissertation, resilience is conceptualized as an individual having positive health outcomes despite experiencing an adverse childhood experience. Resilience can occur through supportive *social networks*, the collection of relationships around an individual, including structural features such as each specific relationship's type and strength (Umberson & Montez, 2010).

The present research uses *health outcomes* as the primary outcome of interest. While health can be measured in many ways, this research conceptualizes it as self-reported health, including the perception of health and self-reported health issues.

Theoretical Frameworks

Research has shown that childhood experiences affect lifespan development (O'Neil et al., 2020; Shalev et al., 2013). ACEs' lifelong developmental impacts on adult health outcomes are well studied (Anda et al., 2006; Felitti et al., 1998). This framework of ACEs, embraced by the Center for Disease Control (Figure 1), suggests that children's specific adverse experiences increase the likelihood of having later poor health outcomes. Furthermore, bioecological systems theory (Bronfenbrenner, 1986; Bronfenbrenner & Ceci, 1994) provides a template to understand the contextual factors that affect ACEs. In this dissertation, Bronfenbrenner's bioecological theory is applied to the ACE framework by examining how community ecological factors such as neighborhood, family, schools, and ACEs affect health outcomes. The following explains the ACEs framework and the two specific theories of how ACEs affect individuals inform this research: 1) The building community resilience (BCR) model and 2) the intergenerational and cumulative adverse and resilient experiences (ICARE) model (Ellis & Dietz, 2017; Hays-Grudo & Morris, 2020). Finally, an overview of the ecological factors included in this dissertation are discussed.

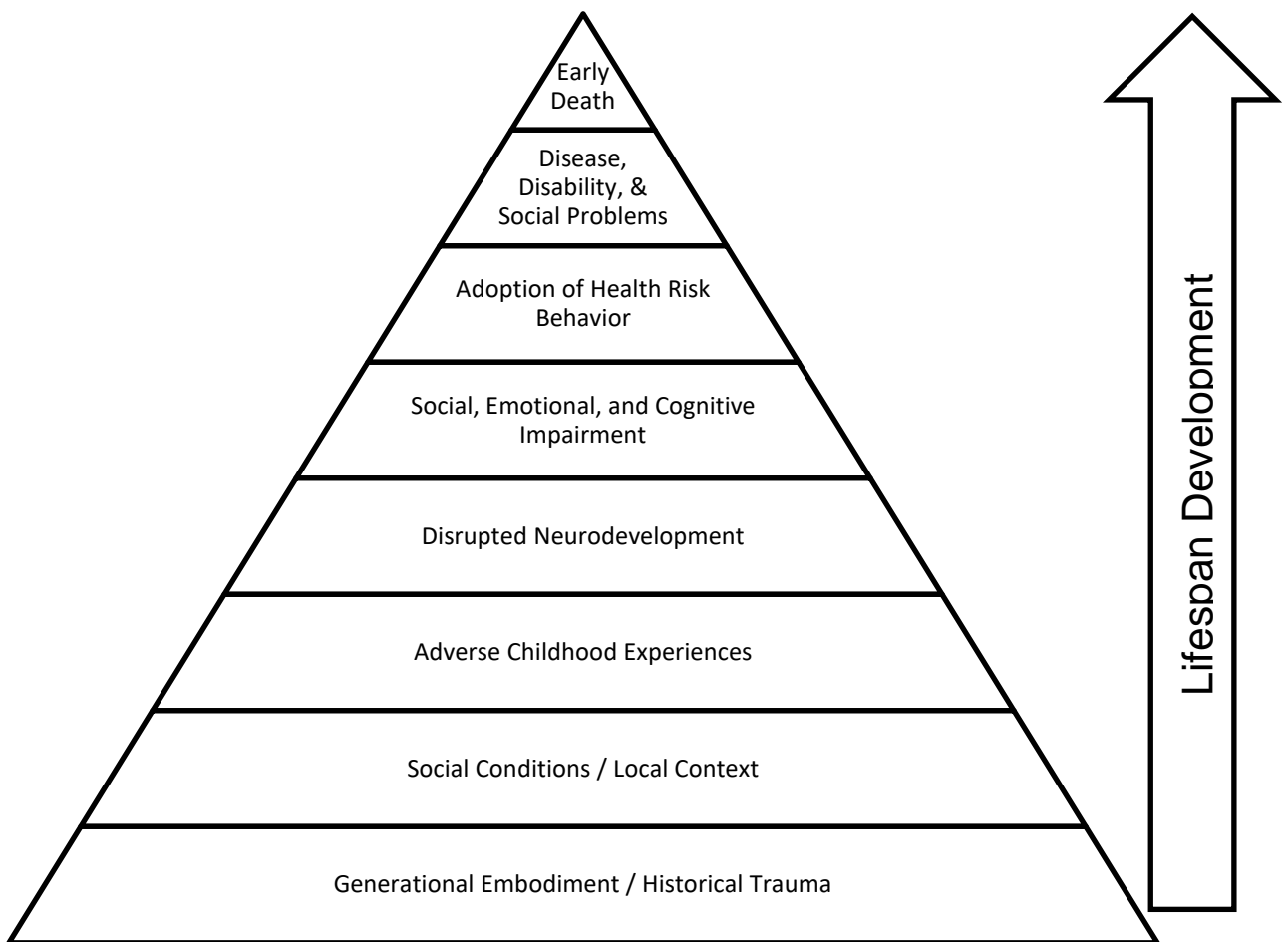
Adverse Childhood Experiences

The original ACE study (Felitti et al., 1998) postulates that an accumulation of adverse experiences in childhood can have negative effects throughout the lifespan, ultimately leading to early death (Centers for Disease Control, 2020). Evidence supports the hypothesis that individuals are born with historical and generational trauma that affects those around them and their epigenetics (Ryan et al., 2016). Nevertheless, as children develop, social conditions support and foster positive development or limit development (Nurius et al., 2016). ACEs result in disrupted neurodevelopment, particularly for children facing unsupportive environments (Sheridan & McLaughlin, 2020). Disrupted neurodevelopment, in turn, leads to impaired social, emotional, and cognitive functioning.

These impairments can result in increased odds of adopting risky health behaviors and, ultimately, morbidities that result in early death (Anda et al., 2009). Furthermore, there are also epigenetic and physiological impacts of ACEs, such as mothers who experienced ACEs passing along detrimental DNA code to their children (Scorza et al., 2020), or the long-term toxic stress of ACEs causing decreased hypothalamic-pituitary-adrenal (HPA) axis function and higher rates of anxiety disorders (Juruena et al., 2020). These studies' results can help understand the causal relationships between ACEs and long-term emotional and physical health.

Figure 1.

Mechanism of ACEs Throughout the Lifespan



Note. Adapted from the CDC ACEs Study (Centers for Disease Control, 2020)

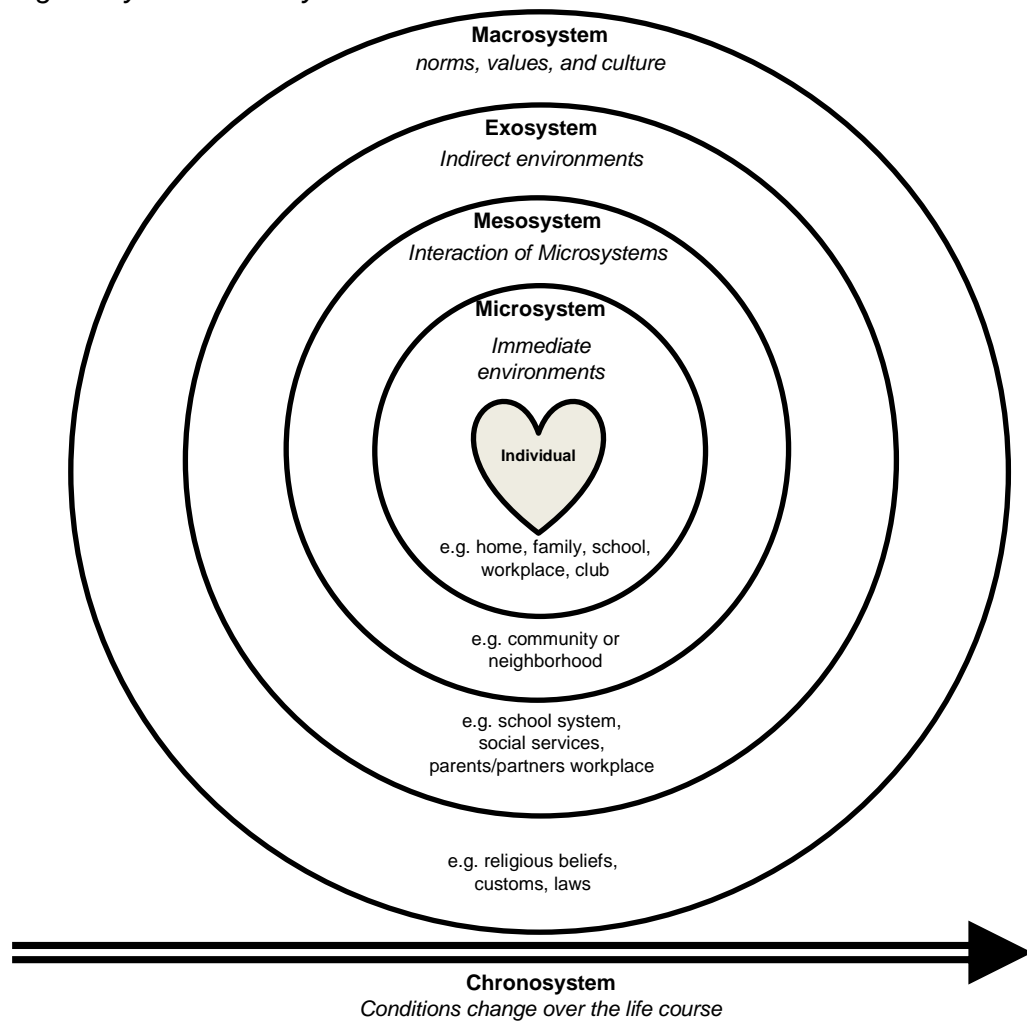
This dissertation focuses on the social conditions and local context that affect adverse childhood experiences and the social impairment due to experiencing adverse childhood experiences. In particular, gender minorities and racial minorities are more likely to experience an adverse childhood experience. It is proposed that this is mainly due to the local context and social conditions that make the environment for these individuals less supportive. Specifically, those with higher ACE scores have lower psychosocial resources. In turn, a lack of these resources may contribute to increased chronic health conditions (Nurius et al., 2016). In other words, a supportive local context with opportunities may decrease the odds of experiencing an adverse childhood experience, and a positive social environment with low discrimination and oppression might protect individuals from negative health outcomes associated with adverse childhood experiences.

Bioecological Systems Theory

The ecological systems theory developed by Bronfenbrenner (1986) and updated to become the bioecological systems theory by Bronfenbrenner and Ceci (1994) guides this dissertation by framing how contextual community factors surround the developing child and biological factors affect their development. While Bronfenbrenner's theory is framed around the developing child, this dissertation recognizes that the individual's developmental needs change with time. The adapted model is shown in Figure 2. The person is affected by the microsystem, including immediate home, school, and workplace environments. These have a direct effect on development, including biological factors such as health. The exosystem, where indirect environments such as social services and school systems exist, also creates an environment that supports an individual's biosocial development. The mesosystem fosters interactions between microsystems and builds on strengths to provide increased support to the individual. The macrosystem's norms, values, and culture shape the ecological systems and, ultimately, the individual's development. This theory also acknowledges that there is change over time where each system plays a differing role in the individual's life.

Figure 2

Bioecological Systems Theory



Note. Adapted from Bronfenbrenner & Ceci (1994)

This dissertation is guided by each level of the Bioecological Systems Theory (Bronfenbrenner & Ceci, 1994). The adverse childhood experiences that an individual faces takes place in their microsystem. However, this dissertation posits that those experiences are influenced by the community factors present in the mesosystem, such as economic hardship within the community, safe schools, neighborhood quality, and social service support. Furthermore, the exosystem and macrosystem influence the community factors being studied. Over time, the biological effects of adverse childhood experiences, including decreased mental and physical health, can be seen in the

chronosystem. This paper extends the theory by revisiting the microsystem, which plays a role in long-term health since people's social connections are close and personal aspects of their life course.

Building Community Resilience Model

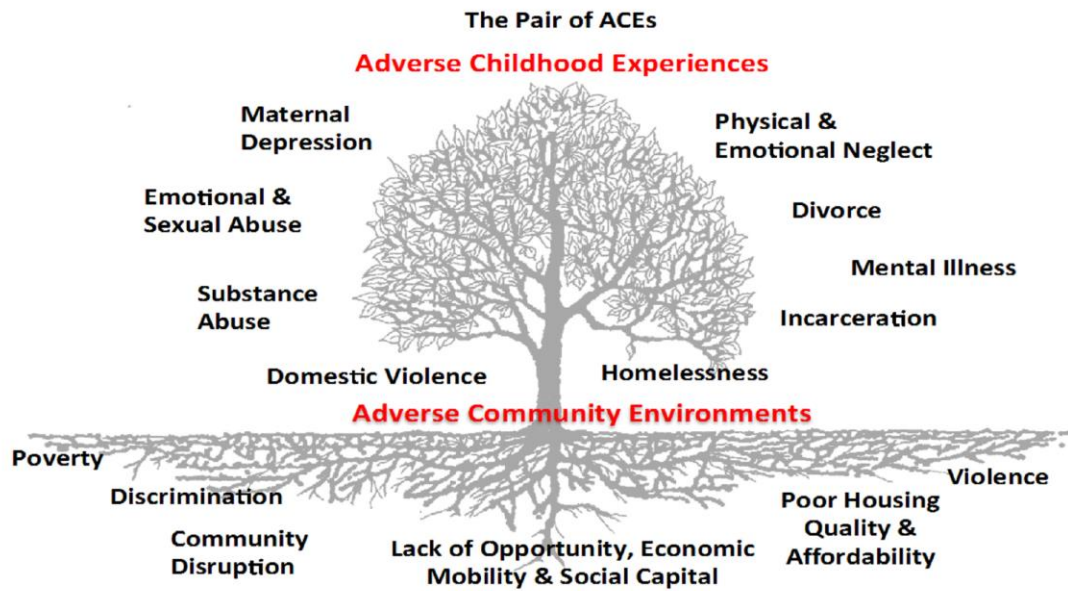
The *Building Community Resilience Model* (Figure 3) further explores the specific social conditions that can be the root causes of ACEs (Ellis & Dietz, 2017). In particular, the BCR Model emphasizes the role of the community in supporting a child. A shared understanding throughout the community can foster engagement and a state of readiness to respond to challenges. While parents may have more control over the household, the community plays a significant factor in influencing childhood experiences. The model also suggests that factors such as poverty, discrimination, economic insecurity, and community violence can create conditions that increase the chances of exposure to ACEs. Similarly, positive community environments can create supportive environments for children. This model guides the hypotheses in Chapter 2.

While the BCR model frames the community environment in terms of adversity, the community environment could also be framed with positive experiences. In other words, how do economic stability, neighborhood peacefulness, and support reduce the likelihood of experiencing adverse childhood experiences? This dissertation seeks to examine the nuance of some of those relationships proposed by the BCR Model.

Overall, the BCR Model (Ellis & Dietz, 2017) is focused on building capacity within communities to address adverse childhood experiences. This capacity includes a shared understanding of adversity, a state of readiness, community engagement, and cross-sector partnerships. The model emphasizes a need to improve individuals' economic opportunities and work to develop resilient communities.

Figure 3

The Building Community Resilience Model



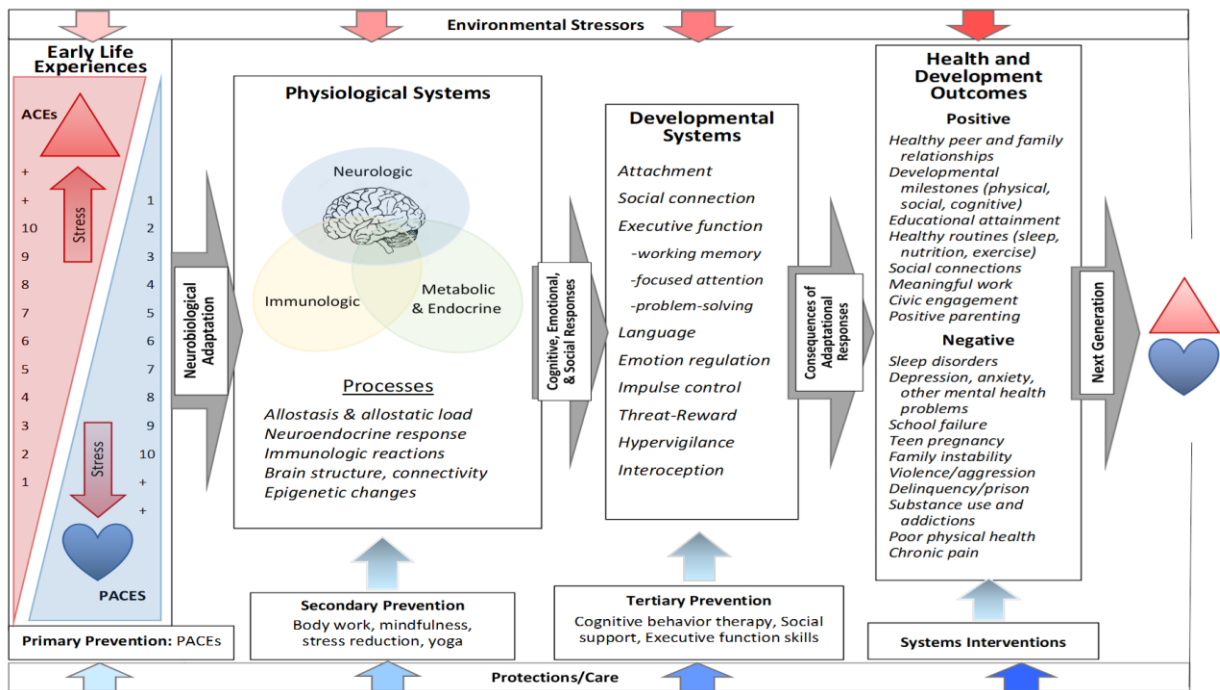
Note. Figure from the Building Community Resilience Model (Ellis & Dietz, 2017)

Intergenerational and Cumulative Adverse and Resilient Experiences

The relationship between ACEs and later-life health outcomes is complex. Bronfenbrenner and Ceci's (1994) bioecological model demonstrates the need to consider factors around the individual and recognize the role of time. Additionally, the BCR model highlights how community factors and family factors interact. The *Intergenerational and Cumulative Adverse and Resilience Experiences (ICARE) Model* (Figure 4) expands upon these two theories. The ICARE model explains how environmental or ecological factors affect a child's physiological development, fostering negative and positive outcomes for individuals and communities (Hays-Grudo & Morris, 2020). ACEs are the result of repeated exposure to chronic ecological stressors. It is understood that ecological stressors significantly affect physiological systems, developmental systems, and health or development outcomes for individuals.

Figure 4

Intergenerational and Cumulative Adverse and Resilient Experiences (ICARE) Model



Note. Figure from Adverse and Protective Childhood Experiences: A Developmental Perspective (Hays-Grudo & Morris, 2020)

Environmental Stressors

Schools, families, and neighborhoods all influence health outcomes in direct and indirect ways. Protective factors such as quality schools and stable families provide a buffering effect, while negative factors such as neighborhood violence and unsafe schools expose children to increased risk. Neighborhood qualities, family stability, and school engagement all create a stable environment for a child. Research has suggested that social supports, neighborhood amenities, low levels of detracting elements, and overall safety supports optimal health for children throughout their lifespan (Cronin & Gran, 2018; Kuang et al., 2017; Putrik et al., 2019; Smith et al., 2015). This body of research questions how these same ecological factors influence ACEs, which predict lower health outcomes.

The ICARE model does not presume how the factors within the health and developmental outcomes relate to one another. This dissertation seeks to understand the nuance between the

developmental outcomes such as family instability, social connections, education, and healthy relationships on health outcomes. Some of these relationships are already being studied and are further explored in Chapter 2 and Chapter 3 (Beier et al., 2000; Fujiwara & Kawachi, 2008; Gilster, 2012; Wolf & Morrissey, 2017). Additionally, those who experience positive or negative developmental outcomes may be more likely to experience an adverse experience of their own.

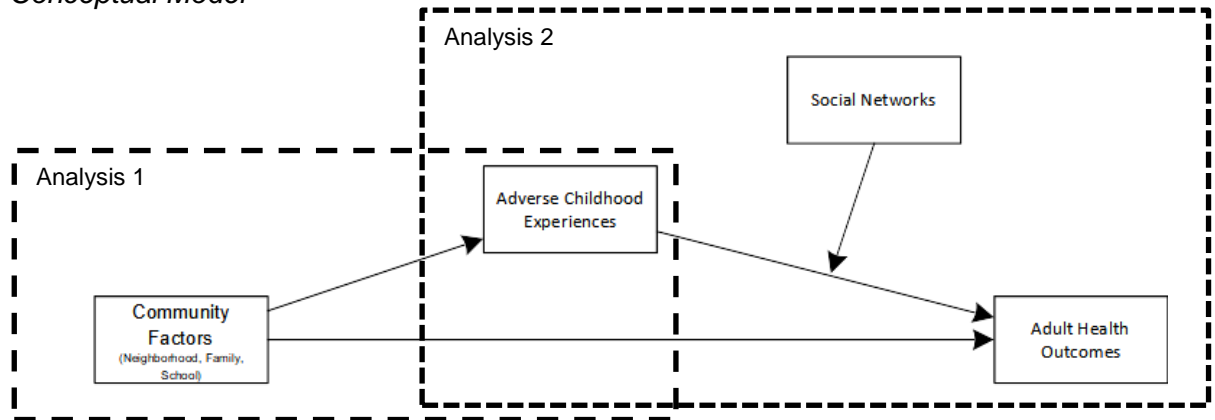
This dissertation's primary focus is the environmental stressors of the ICARE Model (Hays-Grudo & Morris, 2020). Specifically, understanding how environmental stressors affect early life experiences such as adverse childhood experiences is the foundation of Chapter 2. Further, in Chapter 3, the relationship of social connections and health outcomes within the health and development section of the model is explored, including how social connections affect healthy behaviors, substance use, and poor health.

Proposed Conceptual Model

This dissertation conducts two analyses to address how community factors affect health outcomes through adverse childhood experiences and understand the role that social networks play as a protective factor. The conceptual model and specific analyses are shown in Figure 5. The first analysis is presented in Chapter 2, where the relationship between neighborhood, family, and school environments predict the likelihood of experiencing adverse childhood experiences. The second analysis is presented in Chapter 3, where the relationship between adverse childhood experiences and health outcomes is examined, with social networks being a protective factor in that relationship.

Figure 5

Conceptual Model



Note. Adverse Childhood Experiences includes household dysfunction and adverse family experiences

The Current Research Question

This dissertation examines the complex systems that increase the risk of experiencing household dysfunction and which mechanisms protect individuals' health in the face of household dysfunction.

- Chapter 2: How do ecological factors such as safe schools, neighborhood quality, and social activities change the risk of a child experiencing household dysfunction and adverse family experiences?
- Chapter 3: How do relationship quality and stability of individuals moderate the relationship between household dysfunction and health outcomes?

Methodological Approaches

To address this research question, two separate studies were conducted. The first study in Chapter 2 uses the nationally representative National Survey of Children's Health (U.S. Census Bureau, 2018). Using a large national sample provides the robust power required to conduct a structural equation model to understand the nuanced relationships between ecological factors and household dysfunction. The second study in Chapter 3 uses a dataset from the University of

California, Berkley, called UCNets (Fischer, 2020a). This sample of young adults and older adults in the San Francisco Bay Area contains data about adults and their social networks. The ability to examine individuals' social networks to address how relationships affect health outcomes for those who faced household dysfunction as a child is a unique strength of these data.

Chapter 2: Ecological Predictors of Household Dysfunction and Adverse Family Experiences

The focus of the study in Chapter 2 is on understanding the ecological factors such as the neighborhood, school, quality of engagement, and economic situation that affect the likelihood of experiencing household dysfunction and adverse family experiences. This study uses NSCH survey data of parental reports of their children's adverse experiences and parental reports of the ecological conditions in which the child lives. Ultimately this study focuses on children, using a cross-sectional design, to understand if higher levels of household dysfunction are more likely with unfavorable ecological conditions.

The analytic plan for the first study uses a structural equation model with exploratory factor analysis, negative binomial regression, and Poisson regression using Mplus 8 (Muthén & Muthén, 2019). Descriptive statistics were used to understand the average level of ecological support and challenges children faced, and the number of household dysfunction ACEs experienced. Then exploratory factor analysis examined how the ecological factors loaded on latent variables. After making theoretically driven adjustments, a structural equation model was used to predict the number of adverse childhood experiences using a negative binomial regression. Further, comparisons were made between household dysfunction, adverse family experiences, and collective adverse experiences.

Chapter 3: How Social Networks Protect Individuals from the Negative Health Effects of Household Dysfunction

The focus of the study in Chapter 3 is on examining the role that social networks play in mediating the relationship between household dysfunction and adult health outcomes. This study uses a three-wave network survey conducted by the University of California, Berkley (Fischer, 2020a).

This network survey allows examining participants' health over multiple years while also examining their social networks. This dataset has information on each participant's friendship network and the characteristics of each friend. This rich information provides a highly accurate representation of the individual's network.

To accomplish the research goal of the second study, a multivariate regression model was conducted using STATA 16 (StataCorp, 2019). First, descriptive statistics were used to understand the average general health of participants and the average number of adverse experiences. After making adjustments based on the analysis outcome and characteristics of the data, the data was aggregated by individual and time to run the analyses.

Conclusion

The data presented in this dissertation is synthesized in Chapter 4 to explain the full conceptual model. Chapter 2 explores half of the model, specifically the predictive factors of ACEs. Further, chapter 3 explores the other half of the model, the moderating role of social networks for ACEs and health outcomes. Together, these two chapters provide insight into the entire conceptual model understanding the role of ACEs in the complex predictors of health.

CHAPTER II

ECOLOGICAL PREDICTORS OF HOUSEHOLD DYSFUNCTION & ADVERSE FAMILY EXPERIENCES

The increasing interest in adverse childhood experiences (ACEs) has heightened the need for ongoing study into the protective and supportive environments. Much of the research on ACEs has been anchored in the long-term effects of these adverse experiences on outcomes such as health and wellness (Anda et al., 2009; Anda et al., 2006; Crandall et al., 2019; Felitti et al., 2010; Felitti et al., 1998). However, very few studies investigate the environments or contextual factors that put children at risk for adverse experiences. A body of literature that predicts child abuse has started the conversation around the contextual factors influencing ACEs (Coulton et al., 1995; Maguire-Jack & Wang, 2016). This study aims to understand better the contextual factors that predict household dysfunction and adverse family experiences. The following study presents the literature around ACEs and the limited studies that have examined the contextual factors influencing ACEs, followed by the methods and results of a structural equation model using data from the National Survey of Children's Health. A discussion of implications, policy suggestions, and next steps for research is presented.

Literature Review

Since the landmark ACE study by Felitti et al. (1998), the literature on ACEs and later-life health outcomes has grown exponentially. This growth has occurred through studies focused on understanding ACEs at the population level, examining trends in ACE prevalence (Allen et al., 2019). Additionally, literature has expanded when understanding how ACEs relate to health risks

and behaviors and health outcomes, including mental health and life expectancy (Anda et al., 2008; Anda et al., 2007; Anda et al., 2009). More recent research has started to examine specific ACEs to understand how ACEs' types affect health outcomes differently.

A higher prevalence of ACEs in a community decreases the average life span within that community (Mersky et al., 2013). There are increases in poor mental health throughout a community, poor physical health, and increased substance use. The average lifespan decrease is often due to poor mental health, which increases *allostatic load* or increased rates of suicide (Widom et al., 2015). Physiologically, the HPA axis is also affected. The HPA axis consists of three organs: the hypothalamus, pituitary gland, and adrenal glands, which regulate the body's reaction to stress. As a result of the body preparing for a stressful event, the increase in allostatic load changes the hormones of the HPA axis and increases cytokines (McEwen, 2005). While this can be temporarily helpful to navigate a stressful situation, prolonged exposure to toxic stress can also create an undue physiological burden on the body. Given the negative consequences of ACEs, identifying ways to lower ACE prevalence is essential.

Parenting stress, in particular, is affected by the environment surrounding the family (Steele et al., 2016), and a relationship between parental trauma and stress has been established (Ammerman et al., 2013; Pereira et al., 2012). Furthermore, the intergenerational transmission of ACEs has been identified in the literature (Le-Scherban et al., 2018; Scorza et al., 2020). What is less understood is the pathway from community factors to adverse childhood experiences. In light of this knowledge gap, this paper explores household dysfunction and adverse family experiences and how community factors can influence these through internalizing factors and stress spillover.

Prevalence of Adverse Childhood Experiences

The prevalence of ACEs is staggeringly high. The original ACE study estimated that 52.1% of the population had experienced one ACE. More recent studies suggest it could be as high as 80% (Merrick et al., 2018). Child maltreatment, in particular, is estimated to affect 9.2 out of 1,000 children today (U.S. Department of Health & Human Services et al., 2020). However,

some household dysfunction measures have been more prevalent. Specific ACEs have differing prevalence ranging from 3.4% of people experiencing the incarceration of a family member to 25.6% of people experiencing substance abuse (Felitti et al., 1998). Therefore, gaining insight into the rate of household dysfunction is equally important as child abuse and neglect.

Traditionally, many studies have used the raw count of ACEs to predict health outcomes. The cutoff for high or low ACE scores has varied by study. Four ACEs were used as an arbitrary cutoff in the original study (Felitti et al., 1998). However, spanning four birth cohorts in the original studies, Dube et al. (2003) found that three ACEs was the threshold for predicting diabetes, while six to nine ACEs were required to predict coronary heart disease. Indeed, there is some debate about what the best threshold is for considering high and low ACEs (Wade et al., 2017)

There is some evidence that not all ACEs have the same or similar impact on health outcomes. Using a latent class analysis, Schneider et al. (2020) found that different ACEs had differing yet still positively significant effects on depression and anxiety. While any ACE increases the prevalence of premature death, Anda et al. (2009) found that physical neglect, parental substance abuse, and family member incarceration created the highest risks. Similarly, physical abuse and mental illness in the household have predicted more complex health concerns in children, such as obesity throughout the lifespan (Brown et al., 2019; Rehkopf et al., 2016). Household dysfunction has specifically been linked to health outcomes, with domestic violence as the strongest predictor of obesity, depression, and anxiety (Gooding et al., 2015; Schneider et al., 2020). This study focuses on the household dysfunction ACEs (divorce of parents, domestic violence in the household, mental illness in the family, and drug or alcohol problem) as outcomes of community and contextual predictors.

Community Predictors of ACEs

As early as 1995, a body of literature began examining correlates of childhood adversity. Starting in Ohio, two studies emerged examining how impoverished communities and areas with

a child care burden were more likely to have ACEs (Coulton et al., 1995), particularly after controlling for individual-level risk factors such as education level or family income (Coulton et al., 1999). A study in 2001 examining census tracts in Montgomery County, MD, found similar results. After forming latent variables for economic instability (e.g., movement of household) and disadvantage (e.g., poverty), they found that the interaction between instability and disadvantage resulted in higher child maltreatment rates, controlling for family factors (Ernst, 2001).

Most studies have not examined the ACEs conceptualized by Felitti et al. (1998). Instead, researchers have looked at childhood maltreatment using other scales such as the Conflict Tactics Scale (Cascardi et al., 1999), government or DHS reported cases, and direct questions about child abuse or neglect. However, a recent study using the standard ACE inventory, excluding sexual abuse and neglect, found that lower family income and more impoverished neighborhoods predicted the highest ACEs (Walsh et al., 2020). Residential mobility also predicts ACEs, linked to health outcomes, with ACEs serving as a mediator (Dong et al., 2005). Using the same NSCH data as the current study, Melton-Fant (2019) found that Black female children who did not live in a supportive neighborhood where people helped each other out were twice as likely to experience an ACE compared to Black female children living in supportive neighborhoods.

Ecological Health Factors

ACEs are particularly important due to their role in influencing health outcomes across the lifespan (Anda et al., 2006). While this study does not predict health outcomes, it is assumed that ACEs may play a role in health outcomes, and thus the ecological factors mentioned above may influence health outcomes through ACEs. These include neighborhood qualities, family stability, and school engagement, discussed below.

Neighborhood

Neighborhoods create an environment that allows children to thrive. In a study using the National Survey of Children's Health (NSCH), parents reported significantly better health for their children when they said they lived in a safe neighborhood with supportive environments,

such as social supports, amenities, and a low amount of detracting elements (Cronin & Gran, 2018). Conversely, not living in a supportive community predicted decreased odds of having a routine place to receive medical care and to have had a dental visit in the past year (Kuang et al., 2017). Similarly, outside of the United States, studies have found that neighborhood safety, aesthetics, and walkability predicted positive health outcomes in Britain (Smith et al., 2015). Safety can be measured as perceived safety or through crime statistics. Neighborhood safety attitudes, rather than actual crime rate, have predicted general health (Putrik et al., 2019).

It has been established, using NSCH data, that neighborhood amenities and detractions predict health outcomes for children. Cronin and Gran (2018) found that neighborhood amenities such as recreation centers, libraries, sidewalks, and playgrounds were positively related to parental reports of children's health, while families living in neighborhoods with detractions such as litter, garbage, and vandalism were negatively related to reports. However, no studies have looked at these variables and their relationship to ACEs to the author's knowledge. One example of how communities could indirectly affect health is that Kuang et al. (2017) found that communities with noticeable blight predicted lower odds of having a medical visit, dental visit, and a medical home.

There are also nonphysical parts of a neighborhood, such as organized activities, volunteer opportunities, and community mentorship. These activities are correlated with health outcomes. Siblings that participated in the community through religious activities, sports, social groups, or other group meetings were more likely to have higher perceived physical health and lower depressive symptoms (Fujiwara & Kawachi, 2008). These results do not completely characterize the nuances of what takes place. For example, volunteering did not predict health outcomes in this study. The authors suggest this might be because those with pre-existing health outcomes might volunteer with organizations related to their health outcomes. Aligned with this postulate, adolescents connected to adult mentors, being positive and supportive, were less likely to engage in high-risk behaviors such as carrying a weapon, drug use, smoking, and sex with

multiple partners (Beier et al., 2000). Further research is needed to understand the role of certain activities on individual outcomes (Gilster, 2012).

Family

The family environment is another predictor of health outcomes. The family's economic stability is deeply linked to mental and physical health outcomes (Brooks-Gunn & Duncan, 1997). Indirectly, it has been established that higher poverty levels predict decreased odds of having a recent medical visit, a recent dental visit, and a medical home (Kuang et al., 2017). Further, parental engagements affect children's health outcomes, with greater parent involvement in schools predicting lower rates of obesity (Dudovitz et al., 2016). Education, combined with wealth, can significantly predict health scores (Kollia et al., 2018). Children of parents with lower education levels were less likely to have had a recent medical visit, a recent dental visit, or a medical home (Kuang et al., 2017).

Interestingly, these relationships are complex and suggest some mediation that is not always studied. For example, food insecurity predicts health outcomes to suggest ACEs could mediate the relationship. Wolf and Morrissey (2017) found that food insecurity, economic instability, and children's health are all related to low-income families. However, food insecurity affected children in families where parents had a college degree the most. Lower-income families might receive food assistance that middle-class families do not receive as quickly. Therefore, understanding the relationship between economic conditions, parental support, and health should be further explored. This relationship is shown by having current health insurance and adequate insurance predicted higher odds of good health and acting on children's health concerns (Cronin & Kelley, 2018).

School

School quality is related to health outcomes. Dudovitz et al. (2016) found that high school quality was significantly and positively associated with self-rated health, being diagnosed with depression, and being obese. It has been shown that this relationship strengthens over time,

with stronger links in adulthood than in childhood (Johnson, 2010). In this dissertation, school engagement and absenteeism are of importance. In a study from the National Study of Adolescent to Adult Health, higher parental involvement at school was associated with decreased obesity, while absenteeism predicted lower reported health outcomes and higher depression (Dudovitz et al., 2016). How might this relationship be mirrored with school qualities predicting ACEs?

This present study examines both neighborhood and individual contextual factors that predict ACEs. Neighborhood factors such as unemployment rate, percent of female-headed households, and percent with high school diplomas explained 10% of the variance in individual ACE scores of a juvenile delinquent youth sample (Baglivio et al., 2017). However, 45% of the variance within each neighborhood is explained by individual contextual factors such as gender, family support, and parental employment. In light of this, the current study examines both community factors such as safe neighborhoods and individual contextual factors such as parent's education level and family economic stability.

Internalizing Community Factors

One theory for why neighborhoods could influence ACEs is an indirect pathway to childhood adversity through internalizing neighborhood characteristics (Haas et al., 2018). This theory postulates that people's engagement with one another is different in communities with low neighborhood quality. Through neighborhood trust and social cohesion, social capital has been connected to lower physical abuse (Freisthler & Maguire-Jack, 2015; Fujiwara et al., 2016). Furthermore, child maltreatment rates are lower in neighborhoods with high social cohesion levels and low levels of social and physical disorder (Molnar, Goerge, et al., 2016). Poverty predicts child abuse and child neglect (McLeigh et al., 2018). However, the relationship to child abuse is partially mediated through social cohesion, and the relationship to child neglect is minimally mediated through social cohesion. Poverty also predicts child neglect, but the relationship is very minimally mediated through social cohesion. The relationship between poverty and household dysfunction has not been studied.

It is suggested that while a lack of neighborhood social cohesion does not cause childhood neglect, social cohesion is related to social support and lower parenting stress, which predicts lower levels of childhood neglect (Maguire-Jack & Wang, 2016). Neighborhood social cohesion predicts lower childhood neglect, but social cohesion is not clearly related to complex trauma like parental substance abuse (Maguire-Jack & Showalter, 2016). Additionally, mentoring relationships were more prevalent with children who faced ACEs (Weber Ku et al., 2020). However, the experiences were shorter and less frequent. Quality mentoring relationships might help share social support in a community, which could reduce ACEs. Furthermore, household dysfunction ACEs were not specifically studied. Therefore, more research is needed to fully understand the impact of these multiple factors on adverse childhood experiences.

Stress Spillover

The second theory for why neighborhood factors may influence ACEs is that socioeconomic challenges may stress families. While the information available suggests that neighborhood characteristics influence ACEs, they may only partially explain childhood adversity. While being poor significantly predicted childhood neglect, parental domestic violence, and psychological aggression on the child, such as verbal abuse, living in an impoverished neighborhood did not have the same predictive values (Maguire-Jack & Font, 2017b). Similarly, another study found that perceiving the neighborhood as impoverished predicted physical child abuse and child neglect, but only for impoverished families. In other words, families living in disadvantaged neighborhoods did not show a significant likelihood of facing childhood adversity if the family was not in poverty (Maguire-Jack & Font, 2017a). This study extends this theory and includes stressful family situations such as family-level poverty and low income as factors that may increase the likelihood of adverse childhood experiences.

Similarly, accessible and affordable childcare is also a significant stressor for families. One study found that neighborhoods with higher early childcare density, affordable early childcare, and childcare attendance predicted lower rates of child maltreatment referrals (Klein,

2011). Affordability could be a factor in accessing child care services (Klein, 2011). While circumstances such as unmarried mothers and receiving SNAP benefits resulted in higher rates of child abuse and neglect in Tennessee counties, the percentage of families receiving TANF was related to lower rates of child abuse and neglect, suggesting that with direct income support, family stress may not spill over into abuse and neglect (Morris et al., 2019). However, much like the other studies focused on child abuse and neglect, research has not focused on household dysfunction ACEs.

Measurement

A measurement issue in previous papers is that many of the studies use child abuse and neglect reporting from family & child services at the state level to determine rates of childhood adversity (Maguire-Jack & Font, 2017a, 2017b; Maguire-Jack & Showalter, 2016; Maguire-Jack & Wang, 2016; Molnar & Beardslee, 2014; Molnar, Beatriz, et al., 2016; Molnar, Goerge, et al., 2016). Using child abuse and neglect does not reflect the household dysfunction ACEs. Additionally, it is widely believed that substantiated cases dramatically underestimated the rate of child abuse and neglect (Daley et al., 2016). Because of rates being higher in some neighborhoods, families are more likely to be investigated by child protective services, resulting in unsubstantiated cases being higher in those areas (Marco et al., 2020). Therefore, accurate measurement is needed to get at these relationships.

Finally, a limited number of studies have used the NSCH to examine which factors predict ACEs and other adversities. Children engaged in school through participation in classes and were excited to complete homework were 80% less likely to have an adverse family experience, a term used to describe broader adverse experiences that include some ACEs (Kasehagen et al., 2018). The authors did not find any other studies that used the school as a predictor. Conversely, compared to children with no adverse family experiences, children with two or more were more likely to repeat a grade in school and had lower school engagement (Bethell et al., 2014). More research is needed to determine if a school affects ACEs.

Summary

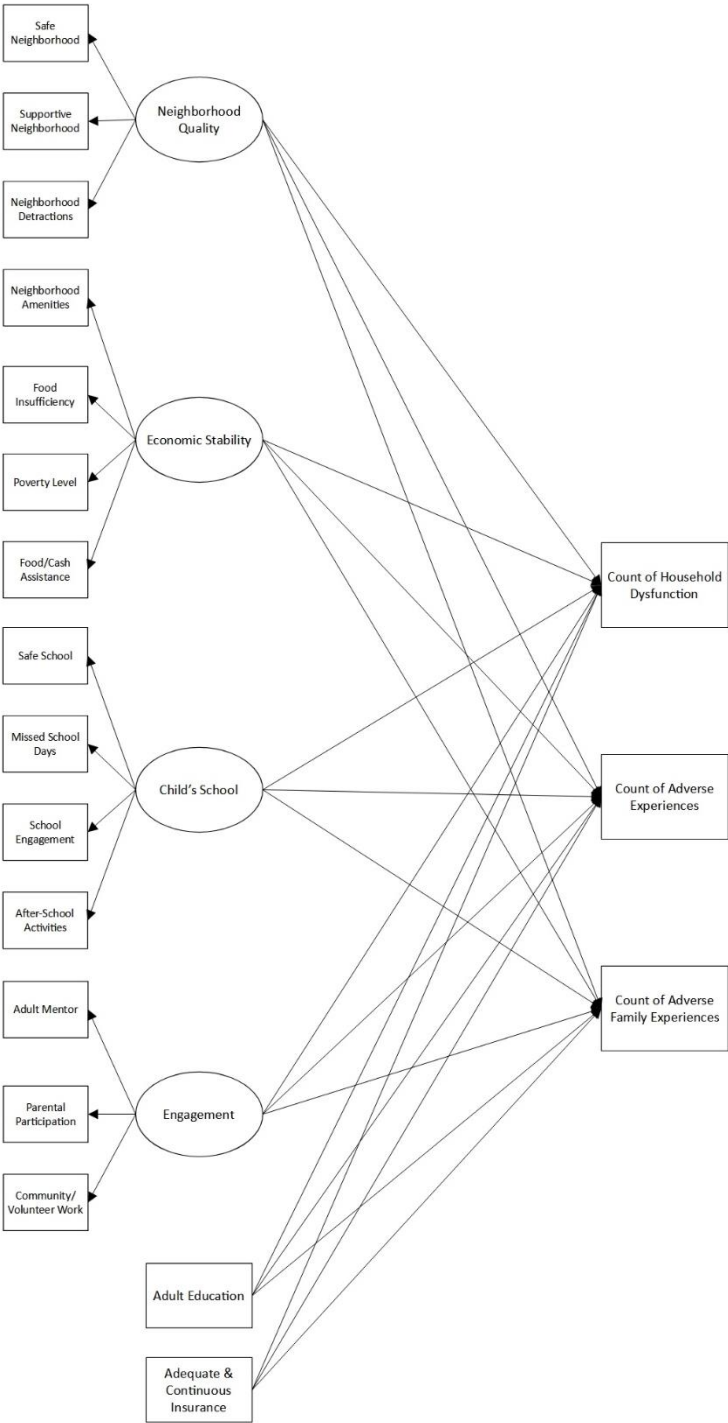
Adverse Childhood Experiences are prevalent (Felitti et al., 1998; Merrick et al., 2018) and decrease average lifespan through poor health outcomes (Mersky et al., 2013; Widom et al., 2015). Household dysfunction in the form of parents' divorce, domestic violence in the household, mental illness in the family, and drug or alcohol problems is a major adverse childhood experience (Felitti et al., 1998). Little information is available about what predicts adverse childhood experiences (Baglivio et al., 2017). Limited research has suggested that neighborhood quality becomes an internalizing factor for families or creates stress spill-over into families (Haas et al., 2018; Maguire-Jack & Font, 2017b). Understanding what factors increase the prevalence of ACEs can have major policy implications for improving communities in ways that reduce ACEs.

Hypothesis

Poor neighborhood quality, lower economic stability, low-quality schools, and low student engagement are positively related to household dysfunction and adverse family experiences.

Figure 6

Study 1: Conceptual Model



Method

This study seeks to understand the ecological factors that predict household dysfunction and adverse family experiences. Data for this study were drawn from the National Survey of Children's Health (U.S. Census Bureau, 2019b), which conducts an annual survey that collects information about children across the United States, including adverse experiences, attitudes about school, neighborhood, and family, and economic conditions among others. Before doing this analysis, an Institutional Review Board (IRB) application was submitted. The IRB determined the study used secondary data, did not involve human subjects, and did not need any additional IRB approval: IRB-20-557, see Appendix A. A structural equation model was used to conduct this analysis using Mplus 8.4 (Muthén & Muthén, 2019).

Sample and Procedure

Data are from the National Survey of Children's Health (U.S. Census Bureau, 2019b), which has been administered since 2001. Since 2016, the NSCH has comprised a combined instrument from the Survey of Health and the Survey of Special Needs. The goal of the NSCH is to understand the physical and emotional health of American children under 18 years of age. The aim is to sample national and state-level populations successfully.

To gather the random sample used for the NSCH, the US Census Bureau used stratified sampling (Child and Adolescent Health Measurement Initiative, 2019). A random address selection was conducted of households. Households in the first stratum were identified as having children. Of the total sampled addresses, 60% were flagged as households with children (U.S. Census Bureau, 2019b). The second stratum included households with a high probability of having children but was not flagged. In total, 40% of the sample were not flagged as having children but had a higher probability (U.S. Census Bureau, 2019b). In order to determine if a household was likely to have children, administrative data were used.

The survey and screening process took place online and by mail, with mailed instructions sent to every randomly selected address to access the survey online. Half of the sample was

invited by USPS certified mail, and half were invited by USPS First Class Mail (U.S. Census Bureau, 2019b). Two reminder letters and postcards followed the initial request with a paper screening questionnaire also included in reminder letters.

The sample purposefully oversampled within each stratum for children 0-5 years of age and children with special health care needs. When a household had two or more children, there was a higher probability of having a child with special needs or a child under five years old being selected compared to other children. The resulting CSHCN oversample was 80%, while the oversample for 0-5 years was 60% (U.S. Census Bureau, 2019b).

The final sample in 2018 resulted in 176,052 screened households, with 71,335 children reported from the screeners from 38,140 households having children. A total of 30,530 child-level questionnaires were completed. The sample size ranged from 520 to 769 questionnaires in each state, with state response rates ranging from a low of 35.7% in Louisiana to 59.8% in Vermont.

The survey instruments included a screener and a child topic survey. Every household received a screener asking about the household and children living in the household. Eligible households then received a child topic survey. Three different surveys were used: 0-5 years, 6-11 years, and 12-17 years. The surveys had tailored questions based on age, such as asking about attachment behaviors with 0-5 years, curiosity and elementary school questions in 6-11 years, and independent behavior in 12-17 years (U.S. Census Bureau, 2018). A total of 90% of the participants received a small denomination dollar bill (a two-dollar bill or a five-dollar bill) with their survey as an incentive to complete the survey (U.S. Census Bureau, 2019b).

Missing data were handled by the U.S. Census Bureau and are also handled within this analysis's design. The NSCH conducted multiple imputations for missing data using several demographic variables (U.S. Census Bureau, 2019a). Child sex, race, and Hispanic origin were imputed using hot-deck methods, where "each missing value is replaced with an observed response from a 'similar' unit" (Andridge & Little, 2010, p. 1), while education and household size were imputed using sequential regression imputation methods. Finally, total family income

was imputed for use in the family poverty level ratio using sequential regression imputation methods. The remaining missing data in the sample on outcome variables were examined, and data were assumed to be *missing at random*. Thus, Full Information Maximum Likelihood (FIML) using Mplus (Muthén & Muthén, 2017) was used to handle missing data during the analysis.

Following a complex survey design, the NSCH data has instructions to be weighted. However, the weighting is designed for complete sample research questions. This specific research question uses a subsample of children 6 years to 18 years. Therefore, no weighting could be used when running these analyses (U.S. Census Bureau, 2019b).

Description of the Sample

The sample of children is explored in Table 1. The sample was slightly higher male (N = 11,517) than female (N = 10,437). Further, a majority of the sample was White. The sample was less than 1% American Indian and Native Hawaiian or Pacific Islander. Finally, the average age of the child was 12.119 years old.

Table 1

Descriptive Data of Study 1 Sample

Characteristic	N	Percent	M	S.D.
Race/Ethnicity				
Hispanic	2,596	11.92		
White	15,231	69.93		
Black	1,470	6.75		
Asian	1,044	4.79		
American Indian or Alaska Native	144	0.66		
Native Hawaiian and other Pacific Islander	53	0.24		
Multiracial	1,243	5.71		
Sex				
Male	11,517	52.46		
Female	10,437	47.54		
Age of Child			12.119	3.451

Note. N = 21,945 (subsample of entire Sample, N = 30,530).

Measures

The following measures will be used in this analysis. For the complete survey questions, see Appendix B.

Childhood Adversity

Parents were asked about events that happened in the child's life, answering yes or no to specific experiences. Each response was coded 1 or 0 for present or not present.

Household Dysfunction. To answer if there was household dysfunction, parents answered yes or no to the following experiences: parent or guardian divorced, parent or guardian served time in jail, saw or heard parents or adults slap, hit, kick, punch one another in the home, lived with anyone who was mentally ill, suicidal, or severely depressed, and lived with anyone who had a problem with alcohol or drugs. The measure is a count from 0-5 of yes responses to these items. These questions include five of the common CDC ACE questions about household dysfunction.

Adverse Family Experiences. AFE are additional questions that the NSCH uses as a proxy for adverse childhood experiences. The additional events that were asked about include: parent or guardian died, was a victim of violence or witnessed violence in his or her neighborhood, treated or judged unfairly because of his or her race or ethnic group. The measure is a count from 0-4 of yes responses to these items.

Adverse Experiences. The measure of adverse experiences measures the sum of the household dysfunctions and the adverse family experiences to represent both standard household dysfunction and the additional family adversity. Scores range from 0 – 7.

Socioeconomic Status

Adult Education. Adult education is measured by asking the parent, "what is the highest grade or level of school you have completed?" Respondents were also asked about the highest education of other caregivers. The highest choice among all caregivers is used as the variable for adult education. The NSCH cleaned this data to have the following responses: (0) Less than high

school, (1) High school or GED, (2) Some college or technical school, (4) College degree or higher.

Poverty Level. The child's poverty level is calculated by using the reported family income, which was asked, “think about your total combined family income in the last calendar year for all members of the family. What is that amount before taxes?” with a list of examples of income. Bins were created of the data for: (0) less than 100% of the federal poverty level (FPL), (1 – 3) groups for every 100% over the FPL, and (3) up to 400% of the FPL.

Food Security. Respondents were asked, “which of these statements best describes your household’s ability to afford the food you need during the past 12 months” The NSCH Methodologists cleaned the data, and the variable was recoded to have the following responses: (0) Often we could not afford enough to eat, (1) Sometimes we could not afford enough to eat, (2) We could always afford enough to eat but not always the kinds of food we should, (3) We could always afford to eat good nutritious meals.

Support

Insurance. Insurance is measured using an NSCH indicator for continuous and adequate insurance, calculated from multiple questions. Questions included having insurance, gaps in coverage, and the ability for insurance to meet medical needs. The NSCH methodologists cleaned and recoded this data to have the following responses: (1) Yes – continuous and adequate insurance, and (0) No – non-continuous or inadequate insurance.

Cash Assistance. Parents were asked, “at any time during the past 12, even for one month, did anyone in your family receive: Cash assistance from a government welfare program, Food Stamps or Supplemental Nutrition Assistance Program (SNAP) benefits, free or reduced-cost breakfasts or lunches at school, and benefits from the Women, Infants, and Children (WIC) Program?” The count of the forms of assistance used from 0 to 4 is included.

School

School Engagement. The level of engagement a child has with their school work is measured by an indicator of two questions asking about the child's engagement with their homework and engagement in the classroom. The NSCH cleaned and recoded the data to have the following responses, which were reverse coded for analysis: (0) Sometimes or never to both or any item, (1) always or usually to one item or usually to both, and (2) Always to both items.

School Attendance. Respondents were asked, "During the past 12 months, about how many days did this child miss school because of illness or injury," ranging from 11 or more to no missed school days. The final responses were coded: (1) 11 or more days (2) 7-10 days (3) 4-6 days (4) 1-3 days (5) No missed days.

School Safety. Parents were asked if their child attends a safe school. Final responses included: (0) definitely disagree, (1) somewhat disagree, (2) somewhat agree, and (3) definitely agree.

Engagement

Extracurricular Involvement. Respondents were asked, "During the past 12 months, did this child participate in..." with checkboxes for the following options: a sports team or did he or she take sports lessons after school or on the weekends? Any clubs or organizations after school or on weekends? Any other organized activities or lessons, such as music, dance, language, or other arts? The NSCH cleaned and recoded the options, with the final responses being: (0) does not participate in extracurriculars and (1) participates in one or more extracurriculars.

Volunteering. Volunteering was asked with the previous extracurricular question with an option being "any type of community service or volunteer work at school, place of worship, or in the community." Final responses include (0) No and (1) Yes

Parental Engagement. Parents were asked, "During the past 12 months, how often did you attend events or activities that this child participated in?" Final responses were coded: (0) Never, (1) Rarely, (2) Sometimes, (3) Usually, and (4) Always.

Adult Mentor. This was measured by asking respondents, “Other than you or other adults in your home, is there at least one other adult in this child’s school, neighborhood, or community who knows this child well and who he or she can rely on for advice or guidance?” Final responses include (0) No and (1) Yes.

Neighborhood

Safe Neighborhood. Parents were asked, “To what extent do you agree with these statements about your neighborhood or community?” with this measure using the statement, “this child is safe in our neighborhood.” Response options included: (0) definitely agree, (1) somewhat agree, (2) somewhat disagree, and (3) definitely disagree.

Supportive Neighborhood. With the previous question used in a safe neighborhood, parents were asked to what extent they agreed with the statements: people in the neighborhood help each other out, we watch out for each other’s children in this neighborhood, when we encounter difficulties, we know where to go for help in our community. Final responses from the NSCH created indicator include: (0) Does not live in a supportive neighborhood or (1) Lives in a supportive neighborhood.

Neighborhood Amenities. Parents were asked in your neighborhood, is/are there... sidewalks or walking paths, a park or playground, a recreation center, a community center, or boys’ and girls’ club, and a library or bookmobile. Each amenity is used individually in the analysis: (1) Yes and (0) No.

Neighborhood Detractions. Parents were asked in your neighborhood, is/are there... litter or garbage on the street or sidewalk, poorly kept or rundown housing, and vandalism such as broken windows or graffiti. Each amenity is used individually in the analysis: (1) Yes and (0) No.

Descriptive Statistics

On average, the number of adverse experiences each child faced was low ($M = 0.772$, $SD = 1.267$). In particular, the number of children who have experienced at least one adverse experience was relatively lower than the original ACE study ($N = 8,355$), with 40.13% of the

sample experiencing at least one adverse experience compared to 52.1% originally (Felitti et al., 1998). That being said, the measures are not directly comparable. Further, household dysfunction was more common in this sample, with 36.24% of children experiencing one or more ($N = 7,620$) than adverse family experiences, with 11.30% of children experiencing one or more ($N = 2,395$). Descriptive statistics of adverse experiences are shown in Table 2.

Table 2

Adverse Experiences of Participants

Characteristic	N	Percent	M	S.D.
Number of Adverse Family Experiences			0.129	0.385
Presence of Adverse Family Experiences	2,395	11.30%		
Number of Household Dysfunctions			0.644	1.080
Presence of Household Dysfunctions	7,620	36.34%		
Number of Adverse Experiences			0.772	1.267
Presence of Adverse Experiences	8,355	40.13%		

Note. Adverse Experiences is inclusive of both Adverse Family Experiences and Household Dysfunction

Adverse Experiences by Gender and Race

Further, in Table 3, adverse experiences are examined by gender, and in Table 4, adverse experiences are examined by race. Adverse experiences were equally prevalent in males and females, with males experiencing slightly more adverse experiences than females. However, within racial categories, the prevalence was more pronounced. Asian children experienced the lowest rate of adverse experiences (23.88%), while Multiracial children experienced the highest rate of adverse experiences (50.68%). Regarding adverse family experiences, White children had the lowest prevalence of AFEs (7.89%), and Black children had the highest prevalence (26.89%). This prevalence differs from household dysfunction, where Asian children had dramatically lower scores (16.1%) than the highest group, American Indian or Alaska Native (49.25%).

Table 3*Number and Presence of Adverse Experiences by Gender*

Specific Adverse Experience	Male		Female	
	M	S.D.	M	S.D.
Adverse Family Experiences	0.13	0.39	0.13	0.38
Household Dysfunction	0.65	1.09	0.64	1.07
Adverse Experiences	0.78	1.28	0.76	1.26
	N	%	N	%
Presence of Adverse Family Experiences	1,302	11.72	1,093	10.84
Presence of Household Dysfunction	4,000	36.36	3,620	36.34
Presence of Adverse Experiences	1,302	11.72	1,093	10.84

Note. Male: $N = 11,517$. Female: $N = 10,437$

Table 4*Presence of Adverse Experiences by Racial Group*

Presence of Experience	Hispanic	White	Black	Asian	American Indian or Alaska Native	Native Hawaiian or other Pacific Islander	Multiracial	Total
Adverse Family Experience								
Yes	404 16.34%	1,170 7.89%	366 26.89%	124 12.58%	34 24.82%	8 16.33%	255 21.16%	2,361 11.23%
No	2,068 83.66%	13,653 92.11%	995 73.11%	862 87.42%	103 75.18%	41 83.67%	950 78.84%	18,672 88.77%
Household Dysfunction								
Yes	973 39.75%	5,208 35.48%	608 45.1%	155 16.1%	66 49.25%	22 45.83%	529 44.53%	7,561 36.34%
No	1,475 60.25%	9,471 64.52%	740 54.9%	808 83.9%	68 50.75%	26 54.17%	659 55.47%	13,247 63.66%
Adverse Experience								
Yes	1,099 45.34%	5,528 37.88%	742 55.71%	229 23.88%	67 50.38%	24 50%	597 50.68%	8,286 40.09
No	1,325 54.66%	9,064 62.12%	590 44.29%	730 76.12%	66 49.62%	24 50%	581 49.32%	12,380 59.91

Table 5*Descriptive Statistics for Main Predictor Variables*

	Frequency	Percent
Level of Adult Education		
Less than High School	651	2.97%
High School or GED	3,096	14.10%
Some College or Technical School	5,376	24.49.00%
College Degree or Higher	12,831	58.44%
Poverty Level		
0-99% FPL	2,635	12.00%
100-199% FPL	3,595	16.38%
200-399% FPL	6,642	30.25%
400% FPL or greater	9,082	41.37%
Adequate Insurance		
Uninsured	1,060	4.85%
Current insurance is not adequate	6,324	28.95%
Current insurance is adequate	14,462	66.20%
Continuous Insurance		
Currently uninsured or had periods with no insurance	1,370	6.29%
Currently insured throughout the past year	20,398	93.71%
Engaged in School		
Sometimes or never to both engagement items	3,335	15.31%
Always or usually to one item or usually to both engagement items	8,074	37.06%
Always to both engagement items	10,378	47.63%
Safe in School		
Definitely Agree	15,159	70.84%
Somewhat Agree	5,651	26.41%
Somewhat Disagree	44	2.07%
Definitely Disagree	144	0.67%
Attendance in School		
Not Enrolled	90	0.41%
11 or more days absent	955	4.58%
7-10 days absent	1,512	6.96%
4-6 days absent	3,675	16.91%
1-3 days absent	9,904	45.57%
No missed days	5,557	25.57%

Table 5 Continued

	Frequency	Percent
Participates in Extracurriculars		
Does not participate in extracurricular activities	3,253	14.96%
Participates in one or more extracurricular activity	18,491	85.04%
Parental Engagement		
Never	373	1.72%
Rarely	330	1.52%
Sometimes	1,200	5.53%
Usually	5,868	27.04%
Always	12,929	64.19%
Volunteering		
No	10,494	7.09%
Yes	10,978	92.91%
Adult Mentor		
No	1,516	7.09%
Yes	19,853	92.91%
Adequate Food		
Often we could not afford enough to eat	114	0.53%
Sometimes we could not afford enough to eat	715	3.31%
We could always afford enough to eat, but not always the kinds of food we should	5,135	23.79%
We could always afford to eat good nutritious food	15,618	72.37%
Received Cash Assistance		
Received no cash assistance	15,952	73.75%
Received 1 type of cash assistance	3,445	15.93%
Received 2 types of cash assistance	1,718	7.94%
Received 3 types of cash assistance	445	2.06%
Received 4 types of cash assistance	70	0.32%
Safe Neighborhood		
Definitely Disagree	172	0.80%
Somewhat Disagree	484	2.25%
Somewhat Agree	5,572	25.91%
Definitely Agree	15,274	71.04%
Neighborhood Amenities		
No amenities	2,918	13.67%
1 amenity	2,493	11.68%
2 amenities	3,598	16.86%

Table 5 Continued

	Frequency	Percent
3 amenities	4,735	22.18%
4 amenities	7,600	35.61%
Neighborhood Detractions		
No detracting elements	17,027	79.36%
1 detracting element	2,905	13.54%
2 detracting elements	948	4.42%
3 detracting elements	575	2.68%
Supportive Neighborhood		
Does not live in a supportive neighborhood	8,153	38.16%
Lives in a supportive neighborhood	13,215	61.84%

Table 6*Polychoric Correlations of Study 1 Variables*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1. Adult Education	1.00																								
2. Poverty Level	0.56	1.00																							
3. Adeq. & Cont. Insurance	-0.01	-0.01	1.00																						
4. School Engagement	0.14	0.13	0.06	1.00																					
5. School Safety	0.12	0.12	0.17	0.23	1.00																				
6. School Attendance	0.00	0.02	0.12	0.19	0.16	1.00																			
7. Extracurr Involvement	0.41	0.36	0.00	0.31	0.13	0.11	1.00																		
8. Parental Engagement	0.14	0.13	0.02	0.22	0.16	0.05	0.33	1.00																	
9. Volunteer Engagement	0.28	0.19	-0.02	0.21	0.07	0.08	0.47	0.17	1.00																
10. Adult Mentor	0.19	0.21	0.08	0.10	0.24	-0.01	0.26	0.22	0.28	1.00															
11. Food Security	0.42	0.53	0.14	0.23	0.29	0.16	0.28	0.15	0.18	0.20	1.00														
12. Cash Assistance	-0.54	-0.71	0.12	-0.17	-0.13	-0.04	-0.35	-0.18	-0.24	-0.21	-0.54	1.00													
13. Neighborhood Safety	0.18	0.23	0.12	0.17	0.56	0.09	0.15	0.14	0.13	0.25	0.37	-0.26	1.00												
14. Neighborhood Support	0.18	0.22	0.13	0.20	0.49	0.09	0.20	0.21	0.19	0.36	0.38	-0.24	0.70	1.00											
15. Neighborhood Sidewalks	0.11	0.07	0.06	0.04	0.06	0.04	0.09	-0.03	0.02	-0.02	0.11	-0.08	-0.02	0.06	1.00										
16. Neighborhood Parks	0.12	0.09	0.06	0.03	0.08	0.03	0.10	-0.01	0.05	0.06	0.12	-0.08	0.03	0.09	0.75	1.00									
17. Neighborhood Com. Cntrs.	0.10	0.08	0.05	0.05	0.06	0.05	0.09	-0.01	0.06	0.05	0.12	-0.08	0.04	0.11	0.59	0.72	1.00								
18. Neighborhood Libraries	0.10	0.06	0.05	0.04	0.07	0.03	0.09	0.02	0.08	0.07	0.10	-0.07	0.03	0.12	0.57	0.72	0.76	1.00							
19. Neighborhood Litter	-0.19	-0.21	0.01	-0.06	-0.17	-0.01	-0.11	-0.12	-0.06	-0.12	-0.23	0.27	-0.38	-0.29	0.36	0.35	0.34	0.36	1.00						
20. Neighborhood Blight	-0.19	-0.21	0.00	-0.09	-0.20	-0.05	-0.12	-0.10	-0.07	-0.10	-0.30	0.27	-0.44	-0.33	0.26	0.32	0.29	0.34	0.75	1.00					
21. Neighborhood Vandalism	-0.20	-0.21	0.01	-0.09	-0.26	-0.03	-0.14	-0.10	-0.08	-0.14	-0.29	0.28	-0.51	-0.32	0.47	0.47	0.47	0.49	0.82	0.89	1.00				
22. Number of AE	-0.26	-0.30	-0.01	-0.27	-0.20	-0.13	-0.21	-0.15	-0.15	-0.09	-0.36	0.41	-0.21	-0.23	-0.03	-0.05	-0.05	-0.05	0.16	0.19	0.21	1.00			
23. Number of AFE	-0.20	-0.22	-0.04	-0.23	-0.26	-0.09	-0.12	-0.13	-0.05	-0.12	-0.26	0.31	-0.25	-0.21	0.00	-0.01	0.00	-0.01	0.19	0.20	0.27	0.81	1.00		
24. Number of HD	-0.26	-0.30	0.00	-0.26	-0.17	-0.13	-0.22	-0.14	-0.16	-0.07	-0.36	0.40	-0.18	-0.22	-0.04	-0.05	-0.06	-0.06	0.14	0.17	0.18	0.99	0.50	1.00	

Note. Tetrachoric correlation is used for two binary variables; polychoric correlation is used for categorical variables; Pearson correlation is used for two continuous variables Significance is uncalculated

Analysis

Of the data collected for the 2018 NSCH, a subsample of children 6-17 years of age was selected. This subsample is used in previous studies (Elmore & Crouch, 2020; Elmore et al., 2020; Melton-Fant, 2019) to get children who engage in school and the community. Structural equation modeling was used to evaluate the model in Figure 6. This analysis was done using Mplus v. 8.4 (Muthén & Muthén, 2019).

The proposed conceptual model is shown in Figure 6. Three steps were used in examining this model. First, exploratory factor analysis was conducted to determine the natural loadings of community factors on latent variables. It was proposed that five latent variables should emerge: neighborhood quality, economic stability, insurance, child's school experience, engagement, and personal health. Adjustments were made to the proposed latent variables based on the results of the EFA. Second, confirmatory factor analysis was conducted on the adjusted theoretical model to determine adequate model fit. Third, a structural equation model was used to examine the predictive nature of the community context variables on the number of adverse experiences, household dysfunction, and adverse family experiences a child has experienced. Due to the outcome variables being measured in counts, a negative binomial regression was used for adverse experiences and household dysfunction, while a Poisson regression was used for adverse family experiences. Poisson regression is used for a count outcome, such as the number of adverse experiences. However, when the variance dispersion is greater than the mean, a negative binomial regression can be used (Loeys et al., 2012). Due to these analyses using a Montecarlo Integration for handling missing data, CFI and TLI could not be calculated to determine the global fit of the model. Specific relationships were examined for local fit, using a significance of $p < .05$.

Data Limitations

The NSCH data consist of a large, representative national sample with increased power to conduct complex statistical analyses. However, secondary data also has the challenge of being fitted to meet the research question. The NSCH data has been chosen as an appropriate choice for this particular research question. The scope of this project is children's health outcomes, which are self-reported by parent perception. It is out of the scope of this study to examine children's health outcomes while they are experiencing ACEs. The National Survey of Children's Health does not measure abuse or neglect, and thus only household dysfunction will be used as a proxy for ACEs. Finally, the scope of this study is cross-sectional, which limits the assumptions of causation. Specifically, reported ACEs could be happening currently or previously before the present community factors are examined.

Results

Generation of Latent Variables

The community context variables were formed into reflexive latent variables. Latent variables are inferred variables that are not observed but can affect observed variables. They consolidate analyses to more comprehensible constructs (Kline, 2016). In order to generate these latent variables, exploratory factor analysis was conducted. An oblique goemin rotation was selected due to the assumption of correlation between the proposed latent variables. A five-factor solution presented the simplest structure. Table 7 shows the loadings. The five factors identified include socioeconomic status, engagement, neighborhood amenities, neighborhood detractions, and safety/support. However, the EFA resulted in latent variables that were different from the proposed model. Upon further examination, it was decided that the five-factor solution aligned with the theoretical framework and would be used in the structural equation model.

Table 7*Oblique Geomin Rotated Loadings of Community Context Variables*

Variable	Factor				
	1 SES	2 Engage	3 Amenities	4 Detractions	5 Safety
Adult Education	0.591*	0.155*	0.076*	-0.012	-0.039*
Poverty	0.89*	-0.06*	-0.013*	0.044*	0.015*
Food Security	0.507*	0.052*	0.037*	-0.047*	0.254*
Food/Cash Assistance	-0.769*	-0.03*	0.027*	0.05*	-0.017*
School Engagement	-0.068*	0.419*	-0.001	-0.017	0.17*
Extracurricular Activities	0.118*	0.752*	0.023*	-0.025*	-0.053*
Parental Engagement	-0.02*	0.374*	-0.054*	0.015	0.146*
Volunteer Engagement	0.056*	0.507*	-0.008	0.025	0.036*
Presence of Sidewalks	-0.005	0.014	0.752*	-0.101*	-0.115*
Presence of Parks	0.003	-0.001	0.91*	-0.053*	-0.061*
Presence of Community Centers	0.014	-0.014	0.802*	0.117*	0.096*
Presence of Libraries	0.006	0.004	0.797*	0.175*	0.125*
Presence of Litter	-0.085*	0.011	0.087*	0.665*	-0.04*
Presence of Blighted Homes	0.01	-0.007	-0.107*	0.88*	0.003
Presence of Vandaldism	-0.003	-0.018	0.024*	0.892*	-0.063*
Safe Neighborhood	-0.074*	0.067*	0.027*	0.006*	0.647*
Supportive Neighborhood	0.019*	0.039*	0.047*	-0.045*	0.749*
Safe School	-0.074*	0.067*	0.027*	0.006	0.647*

Note. School Attendance, Adult Mentor, and Insurance not included. Bold loadings show simple structure. * $p < 0.05$

The exploratory factor analysis was adapted in two ways. Before running the EFA, it was decided to exclude insurance due to the singular nature of having insurance coverage. The NSCH provides a variable for continuous and adequate insurance over the past year that was chosen. Further, when conducting the EFA, school attendance and having an adult mentor did not sufficiently load on any factor. Therefore, it was decided to use those variables as observed variables in the final model.

The generated latent variables were examined using confirmatory factor analysis to ensure they were suitable for the final models. The CFA deemed the latent variables suitable (CFI = 0.966; TLI = 0.958; SRMR = 0.043; RMSEA = 0.038). Therefore, the final models proceeded with the five latent variables and three observed variables representing the community context.

Adverse Experiences

A structural equation model was used to examine how community context predicts the count of adverse experiences, using a negative binomial regression. Figure 7 shows the structural equation model with standardized coefficients. Socioeconomic status, engagement, safety/support, school attendance, and adult mentor all predicted lower adverse experience counts. Specifically, the strongest relationship is among socioeconomic status, where a one-unit change in SES, the logs of expected adverse experiences is expected to change by -0.302. Meanwhile, the weakest relationship was between neighborhood amenities and adverse experiences. Interestingly, this relationship was positive, suggesting that increased neighborhood amenities predict greater log odds of having an adverse experience. Further, there was no significant relationship between neighborhood detractions and adverse experiences, nor was there a significant relationship between having adequate insurance and adverse experiences.

Household Dysfunction

The analysis results looking at household dysfunction were similar to the results for the model for adverse experiences. The results and standardized coefficients are shown in Figure 8. As with adverse experiences, socioeconomic status, engagement, and school attendance had a significant negative relationship with a child experiencing household dysfunction. However, having an adult mentor was significantly, positively associated with household dysfunction, while neighborhood amenities and neighborhood detractions had no significant relationship with household dysfunction.

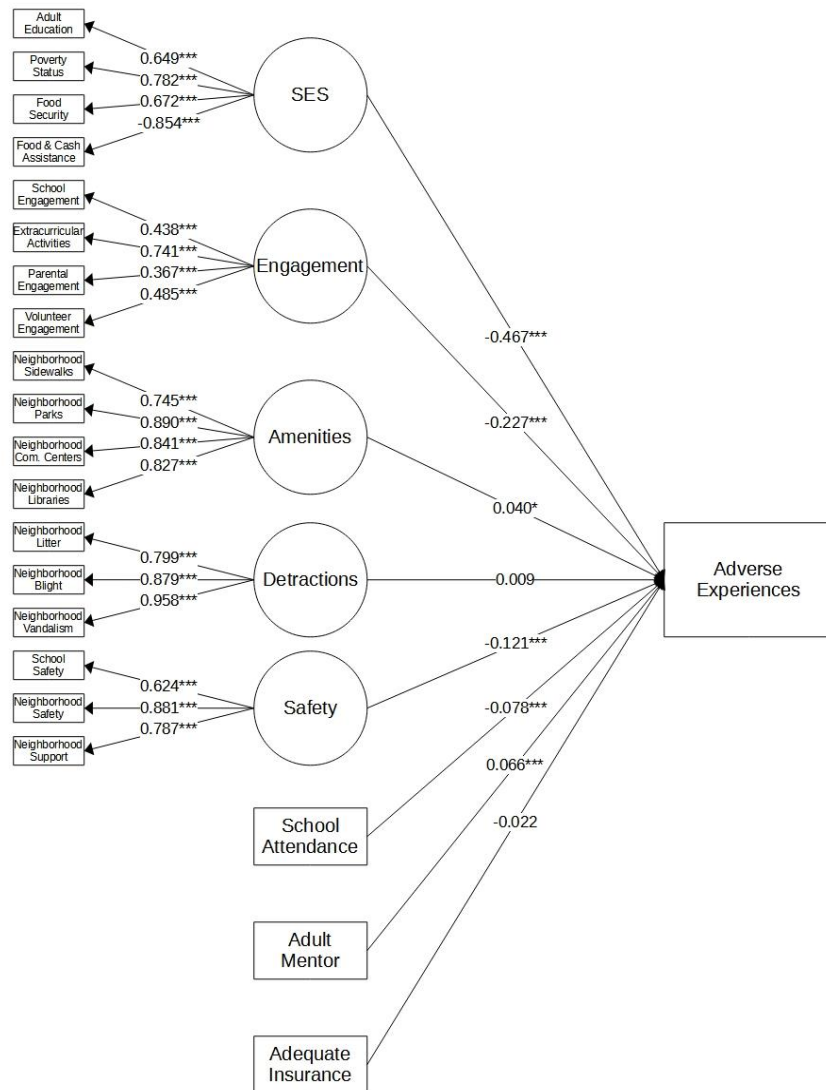
Adverse Family Experiences

The National Survey of Children's Health (U.S. Census Bureau, 2018) includes three variables not traditionally used to measure adverse childhood experiences. Community context had a similar, albeit different, relationship to AFE than total adverse experiences or household dysfunction. Socioeconomic status, safety, and school attendance all predicted significantly lower log odds of AFE. However, while engagement and an adult mentor were significantly associated

with total adverse experiences, they were not significantly related to AFE. Neighborhood amenities had a small, significantly positive, relationship to AFEs. Similar to previous models, neighborhood detractions and insurance both had no significant relationship with AFEs.

Figure 7

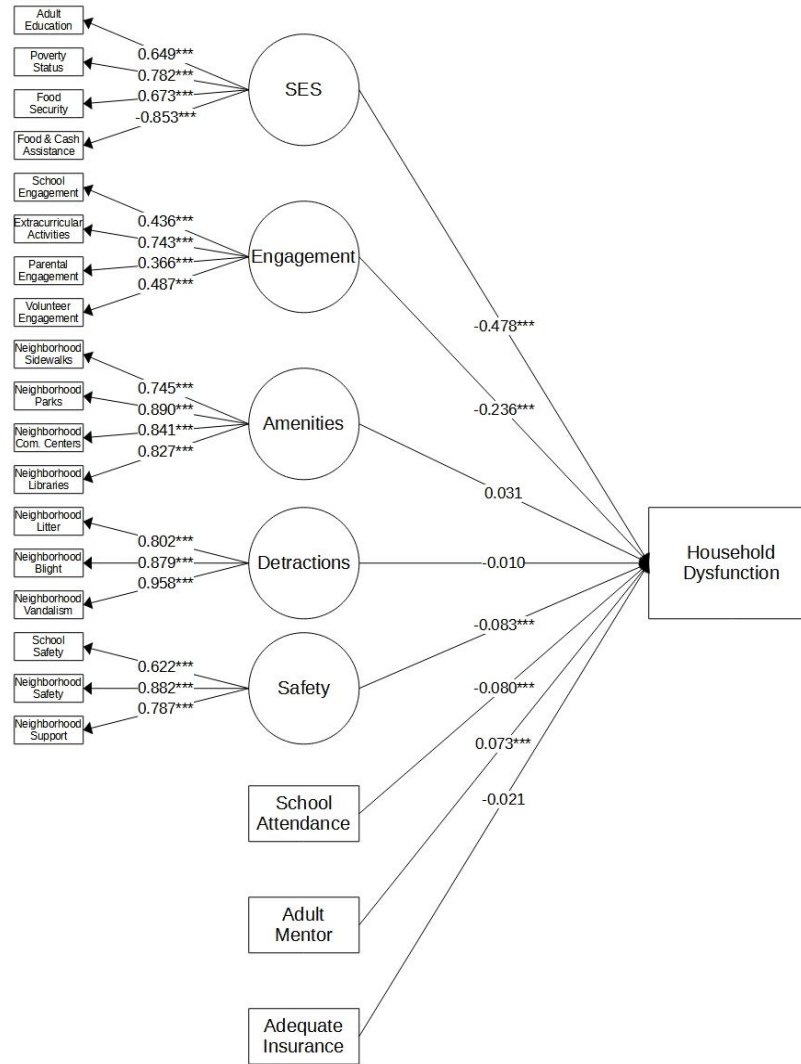
Results for Adverse Experiences



Note. Standardized coefficients are shown. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 8

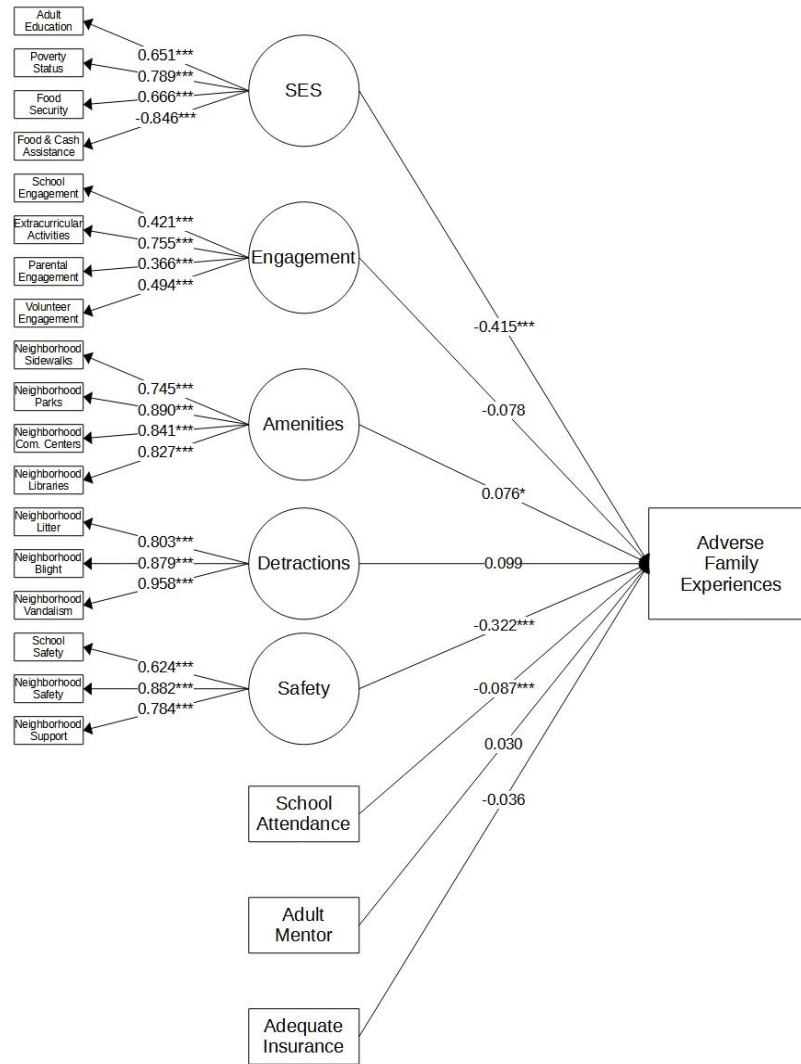
Results for Household Dysfunction



Note. Standardized coefficients are shown. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 9

Results for Adverse Family Experiences



Note. Standardized coefficients are shown. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Discussion

This study provides a unique perspective into the contextual factors that may predict types of adverse childhood experiences. Three different outcomes were examined: adverse experiences, household dysfunction, and adverse family experiences. The results suggest that

community context does matter regarding adverse experiences. However, these results also highlight the challenges in using contextual factors in causal relationships due to the various ways to measure the communities around individuals. The results also had surprising findings with some contextual factors not being significant and finding limited differences between household dysfunction and adverse family experiences.

Community Context Matters

The first model, summarized in Figure 7, tested how contextual factors may predict adverse experiences. The adverse experience scale was a count of all the adverse experiences included in this study. As shown in Figure 7, many of the contextual factors are significantly related to adverse experiences. These significant relationships include engagement, safety, school attendance, socioeconomic status, and adult mentors.

Increased engagement of children and parents predicted a lower likelihood of experience adverse experiences. In line with the ICARE model (Hays-Grudo & Morris, 2020), engagement is a healthy and supportive way to create safe places for children to thrive. Given that Dudovitz et al. (2016) found that parental involvement can decrease the likelihood of health conditions such as obesity, future studies could examine if adverse childhood experiences might mediate that relationship. Similarly, safe neighborhoods, safe schools, and school attendance predicted a decreased likelihood of adverse experiences.

These findings also suggest that higher socioeconomic status predicts a lower count of adverse experiences. As previously mentioned, socioeconomic status has not been used to predict household dysfunction, contributing to this study. Maguire-Jack and Font (2017a) noted that families in poverty had increased child abuse and neglect rates. This relationship was only found for impoverished families, and it was not found for families who lived in neighborhoods with high poverty. Therefore, the findings of this study support the poverty theory that a stress spillover may contribute to household dysfunction.

In addition to socioeconomic status, this study examined neighborhood qualities' role in predicting adverse experiences. The relationship between neighborhood detractors and adverse experiences was largely insignificant. This finding upholds findings from Maguire-Jack and Font (2017a), suggesting that an impoverished neighborhood does not affect the likelihood of experiencing adverse experiences in childhood. Further, neighborhood amenities are positively related to adverse experiences and adverse family experiences, but not household dysfunction. The differences are explored later, but it is important to note that the significant relationships are positively related. This result may be because families experiencing household dysfunction might be more inclined to seek out neighborhoods with amenities to supplement unsupportive elements of the family unit. Since Cronin and Gran (2018) found that neighborhoods with amenities have better health outcomes than those without amenities, future studies might test how neighborhood amenities moderate relationships due to parents seeking out support.

Insurance

There was no significant relationship between continuous and adequate insurance and adverse experiences, household dysfunction, or adverse family experiences. Given that studies have suggested that health insurance has a substantial connection to health outcomes (Freeman et al., 2008; Rand Health, 2006), this finding is noteworthy. For instance, this result could suggest that adverse experiences are not part of the relationship between insurance and health outcomes. Future research should examine what role adverse experiences, if any, mediate the relationship between established predictors of health outcomes and the health outcomes themselves.

Additionally, while it was expected that insurance might be a stressor, it is important to note that the household dysfunction measure does not include childhood abuse and neglect. If lack of insurance was a stressful experience for parents, the chances of abuse and neglect might change differently than household dysfunction. This result should not extend beyond household dysfunction and adverse family experiences.

Adult Mentor

Having an adult mentor significantly predicted the likelihood of being exposed to an adverse experience and household dysfunction. While this finding may be contradictory, it has a plausible explanation due to the cross-sectional nature of this data. Children in dysfunctional households may rely more on adult mentors. For example, a child whose parents are divorced might have an adult in their life that can provide emotional stability when the family has challenges; Or a child with an incarcerated parent might be assigned an adult mentor to fill the gap of an absent parent (Hagler et al., 2019). Having an adult mentor is not the equivalent of having social cohesion. However, it would contribute to cohesion. Maguire-Jack and Showalter (2016) did not find clear results about social cohesion predicting substance use, which is part of household dysfunction. The findings in this study suggest that the relationship is not established for household dysfunction and needs further exploration

Differences Between Household Dysfunction and Adverse Family Experiences

There are some notable differences among adverse experiences, household dysfunction, and adverse family experiences. The first difference concerns neighborhood amenities. As mentioned previously, neighborhood detractions were insignificant for all measured outcomes. Nevertheless, neighborhood amenities were significant for adverse experiences and adverse family experiences, but not household dysfunction. Since adverse family experiences include neighborhood qualities such as violence and racism, it is plausible to connect amenities to adverse family experiences. Thus, more research regarding neighborhood qualities is needed to understand the potential relationship to adverse experiences.

The other variable, engagement, was not significantly related to adverse family experiences but was significantly associated with household dysfunction. Parent and child engagement had a significant, negative relationship with household dysfunction. This relationship suggests that children who are more engaged and have more engaged parents are less likely to experience household dysfunction. Since this relationship had not been studied with household

dysfunction, the relationship is of importance. Specifically, because the results align with the research that with higher social cohesion, there is lower abuse (Molnar, Goerge, et al., 2016). Finally, there was no significant relationship between parental engagement and adverse family experiences. This finding suggests that adverse family experiences outside of the purview of the family are not affected by the engagement of family members. However, it further suggests a difference between household dysfunction, which is part of the landmark ACEs study (Felitti et al., 1998), and adverse family experiences added in the NSCH (Bethell et al., 2014; U.S. Census Bureau, 2018).

Conclusion

This study sought to understand how neighborhood quality, economic stability, schools, and student engagement are related to adverse childhood experiences. In particular, this study hypothesized that poor neighborhood quality, lower economic stability, low-quality schools, and low student engagement are positively related to household dysfunction and adverse family experiences. This study addresses a gap in the literature where the factors that predict adverse childhood experiences are not thoroughly explored (Baglivio et al., 2017). It further helps explore the idea of stress spillover into families (Haas et al., 2018; Maguire-Jack & Font, 2017b). Through the three models conducted, the hypothesis of this study was partially upheld.

It was found that schools, engagement, safety, and socioeconomic status were significantly related to adverse experiences. However, it was initially theorized that economic stability, which included insurance, would predict adverse experiences. Economic stability was partially found to be related to adverse experiences. While SES comprising adult education, poverty status, food security, and food/cash assistance were related to adverse experiences, adequate health insurance was not significantly related. Having adequate and continuous insurance did not load on the socioeconomic status factor and was used separately from the other SES variables. It may be that people from various SES backgrounds all struggle equally with having continuous and adequate insurance, albeit in different ways. However, while insurance

may predict the health outcomes of individuals in other studies (Allred et al., 2007; Bethell et al., 2011), this relationship is not likely to occur through childhood adversity and is likely more direct.

Finally, neighborhood qualities outside of neighborhood safety were not able to be definitively connected to adverse experiences. Particularly surprising, neighborhood detractors of litter, blight, and vandalism had no relationship to adverse experiences. This result contradicts the *broken windows theory* coined by Wilson and Kelling (1982), suggesting that violence may come from neighborhoods with visual elements of distress. However, while neighborhood violence, domestic violence, and incarceration are all adverse experiences closely related to violence, other experiences studied here are still trauma but less violent.

Study Limitations

The cross-sectional nature of the data limits the study. When examining adverse childhood experiences, the evidence suggests that childhood experiences affect lifelong health (Anda et al., 2006; Felitti et al., 1998). Therefore, causal relationships can be temporally established. The National Survey of Children's Health surveys children through their respective parents, which only captures a single timepoint in an individual's life. Furthermore, the measure of adverse experiences is retrospective through the child's life, but the other measures are current, meaning an adverse experience could have preceded a contextual factor. Therefore, causal relationships should not be inferred from this study.

The National Survey of Children's Health (U.S. Census Bureau, 2018) is a robust national sample of children throughout the United States, which is beneficial for this analysis. However, using secondary data limits the questions that can be asked of participants. The NSCH measure of adverse childhood experiences is not entirely aligned with the landmark study (Felitti et al., 1998; U.S. Census Bureau, 2019b). Only household dysfunction ACEs are used in the NSCH survey. Additionally, the NSCH has included other ACEs that are not traditionally used to study the effects of ACEs on long-term health outcomes. This variation of variables limits

generalizability to other ACE studies. Finally, using a subsample that does not have provided weights means these results are not necessarily reflective of the population of the United States, and should be generalized with caution.

Future research should be careful about what ACEs are being used

When researching adverse childhood experiences, there needs to be a clear definition of what constitutes childhood adversity. The results suggest variations in how children experience these ACEs when breaking down the outcomes of the household dysfunction adversities and the NSCH added adverse family experiences. Taylor-Robinson et al. (2018) argue that sometimes adverse childhood experiences are broadened to include adverse socioeconomic conditions, which should not be conflated. This study also suggests that we should not conflate the ACEs that are part of the original ACE study by Felitti et al. (1998) and additional measures that may negatively affect a child but are not part of the original ACEs.

Future research should examine the role of ACE groups (household dysfunction, abuse, and neglect) when further exploring relationships. In the initial study, Felitti et al. (1998) suggest a graded relationship between ACEs and health outcomes. They suggest not studying each ACE but seeing the collective dose-response of adversity. However, seeing that there are variations of adverse childhood experiences surveyed, understanding how each group of ACEs plays in health outcomes would be beneficial.

Finally, this study seeks to be specific when using an ACE measure. Household dysfunction should not be expanded to include child abuse and neglect. Similarly, studies that have used child abuse and neglect should not be expanded to include household dysfunction (Maguire-Jack & Font, 2017a, 2017b; Maguire-Jack & Showalter, 2016; Maguire-Jack & Wang, 2016; Molnar & Beardslee, 2014; Molnar, Beatriz, et al., 2016; Molnar, Goerge, et al., 2016). This study tested the theories presented in previous articles on a new set of outcomes.

Implications

States across the country have begun to model comprehensive ACE policy using the State of Washington as a model for addressing and reducing childhood adversity (Kagi & Regala, 2012). In particular, states have focused on trauma-informed care, treating people in a way that is aware and inclusive of their past trauma (Missouri Department of Mental Health, 2014). However, it is also essential to develop policies that create unfavorable conditions for childhood adversity. Recognizing the intersection of income and adverse childhood experiences is one way policymakers can be more intentional in lowering adverse childhood experiences (Strompolis et al., 2019).

Arguably, addressing household dysfunction is different from addressing childhood neglect and trauma. Household dysfunction does not happen to the child; instead, it happens around the child. In turn, there is less direct intervention to remove a child from a situation with household dysfunction and more indirect interventions to address the situations creating the adverse household experience. Given that household dysfunction is increasing more quickly than abuse and neglect (Finkelhor, 2020), creating policies that can address household dysfunction is essential. This study suggests that policies that support family economic stability through safety-net programs would significantly decrease the chance of household dysfunction. Further, providing safe environments for children to participate in extracurricular activities would also reduce the likelihood of experiencing household dysfunction.

CHAPTER III

HOW SOCIAL NETWORKS PROTECT INDIVIDUALS FROM THE NEGATIVE HEALTH EFFECTS OF HOUSEHOLD DYSFUNCTION

Adverse childhood experiences (ACEs) affect over half of the U.S. population, with household dysfunction being common (Felitti et al., 1998; Merrick et al., 2018). Recent research has had an increasing interest in understanding how to mitigate ACEs' long-term negative health effects (McBride & Williams, 2013; Merrick et al., 2017; Moore & N. Ramirez, 2015). Therefore, focusing on protective factors across the lifespan is needed to address poor health outcomes caused by ACEs. This study seeks to address how one particular factor, social networks, can protect adults from the harmful effects of adverse childhood experiences.

Social networks, relationships, and friendships have benefits for an individual's health. It is understood that social networks positively affect mental health outcomes (Lahuerta et al., 2004). However, the relationship between a person's social networks and general health outcomes is more nuanced. Some studies suggest that negative health behaviors may spread through networks. Others suggest that people who have more social connections are more likely to report positive perceptions of their health (Bergland et al., 2015; Christakis, 2004; Christakis & Fowler, 2007, 2008). Furthermore, adults who have experienced childhood adversity are less likely to form healthy and strong adult relationships (McLafferty et al., 2018; McLafferty et al., 2019; Schneider et al., 2020). It is thus believed that social networks mediate the relationship between ACEs and health outcomes, but how might positive social networks moderate the relationship

between ACEs and health outcomes, protecting individuals from the long-term negative health outcomes associated with ACEs?

This study seeks to understand the role of social networks as a protective factor between adverse childhood experiences and negative adult health outcomes. The study highlights the long-term effects ACEs have on health outcomes and the role social networks play in mediating the effect of ACEs on health outcomes. It explores these relationships using a multilevel structural equation model with social network data, which is rarely used in studying this phenomenon. The study concludes with implications for providing support for those who have faced adverse childhood experiences, specifically household dysfunction.

Literature Review

Since 1998, studies have examined adverse childhood experiences' impact on lifelong health outcomes (Anda et al., 2008; Anda et al., 2007; Anda et al., 2006; Felitti et al., 1998). Additionally, social networks have been studied as a factor influencing health outcomes, particularly in adulthood (van der Horst & Coffe, 2012). These two areas of study raise the question of how social networks might be beneficial for those who have faced household dysfunction in childhood. This study aims to understand how people's social networks can protect against the negative effects of ACEs.

ACEs Affect Lifelong Health

ACEs are linked to many health risks. Several studies, including those using the Behavioral Risk Factor Surveillance System (BRFSS), have found indirect relations between ACEs and health outcomes (Merrick et al., 2018). For example, the odds of experiencing a heart attack increase dramatically with exposure to four or more ACEs (Chanlongbutra et al., 2018). Having a family member incarcerated is a significant predictor of myocardial infarction (White et al., 2016). Similarly, the odds of being diagnosed with diabetes and asthma are significantly greater when individuals report experiencing three or more ACEs (Chanlongbutra et al., 2018). It has been hypothesized that ACEs affect social, emotional, and cognitive functioning, which

increases high-risk behaviors causing disease that results in early death (Felitti et al., 2010; Felitti et al., 1998). However, this theory does not hypothesize the external role of social networks in facilitating positive social experiences, thus serving as a protective factor.

Furthermore, negative health behavior changes only partially explain morbidity (Campbell et al., 2016). For example, health behaviors successfully explain how obesity is impacted by ACEs, with individuals with high ACE scores also reporting lower physical activity (Felitti et al., 1998). Similarly, people with six or more ACEs are three times more likely to be diagnosed with lung cancer than those with less than six ACEs. Smoking has been shown to mediate the relationship between ACEs and lung cancer. Specifically, experiencing four or more ACEs results in significantly greater odds of smoking cigarettes. Nevertheless, an early study of ACEs found that increased ACE scores significantly predicted COPD risk but only modestly decreased when controlling for smoking. (Anda et al., 2008; Brown et al., 2010; Meadows et al., 2019). The poor emotional coping skills in people with high ACE scores could explain some adverse health outcomes (Springer, 2009).

ACEs are also linked to a multitude of mental health outcomes. There is a direct link from the adverse experiences to mental health impairment, and there is an indirect link through additional adult adversities (Jones et al., 2018). Even when controlling for SES, a strong predictor of mental health status, this relationship is maintained (Houtepen et al., 2020). In one study, every ACE except having an incarcerated family member was associated with depression (Merrick et al., 2017). Meanwhile, sexual and psychological abuse has been associated with women's anxiety disorders (Harkness & Wildes, 2002). As noted previously, these results are important because poor mental health outcomes can cause decreased life expectancy through increased allostatic load and increased likelihood of suicide (Widom et al., 2015).

Those who report three or more ACEs, on average, have a decrease of 9.5 quality-adjusted life expectancy years, a 17% decrease in overall life (Jia & Lubetkin, 2020). Notably, while ACEs' effects are seen across the lifespan, in young adults, having four or more ACEs

doubled the risk of developing an early-onset chronic disease (Sonu et al., 2019). A relationship between ACEs and premature mortality in the family has been observed across all age groups. People are 1.8 times more likely to die prematurely when they experience four or more ACEs (Anda et al., 2009). ACEs predict premature death through previously mentioned related health outcomes such as heart disease, COPD, and cancer. However, the risk of death from ACEs was only partially explained through these health outcomes, suggesting other ways in which ACEs cause premature death (Brown et al., 2009). For example, suicide is a cause of premature death not usually associated with a physical health outcome associated with ACEs; Higher ACE scores result in an increased likelihood of suicide attempts (Felitti et al., 1998; Merrick et al., 2017). One study estimates that suicide odds increased 50% with each additional ACE (Dube et al., 2003).

Social Networks and Health

Social networks are a valuable resource for health resilience. Friendships positively and negatively influence human behavior (Umberson & Montez, 2010). Studies have found that health risk behaviors such as smoking could spread through a network (Christakis & Fowler, 2007, 2008), where friendships can influence behaviors that increase obesity or provide emotional support and promote mental health (Umberson & Montez, 2010). However, a robust social network, sufficient in size and quality, is associated with positive health outcomes for older adults due to friends and family's resources. Social networks do not always mediate the relationship. Indeed, Mitchell and LaGory (2002) found no mediating effect of social capital between economic stressors and mental health. It may be plausible to believe that social networks moderate the relationship between challenges and health outcomes instead.

Friendship and social connections influence subjective well-being (van der Horst & Coffe, 2012). This influence has been observed when individuals meet friends face-to-face rather than through virtual means, although the study is nearly a decade old, and technology has changed. Therefore, understanding how modern virtual relationships can influence well-being is vital to understand. Regardless, friendships bring benefits to the individual (van der Horst &

Coffe, 2012). For example, following heart failure, participants with the weakest structural social and interpersonal support lived a year less than their counterparts (Kaiser et al., 2020). This benefit could be because positive interactions can reduce allostatic load (Umberson & Montez, 2010), resulting in better health. In particular, the quality of the network is essential. Older adults who lived alone but had a solid social network, measured by the Lubben Social Network Scale, exhibited lower levels of depression than those who did not live alone but did not have a solid social network (Sakurai et al., 2019). This study seeks to understand how closeness, measured by physical and emotional closeness, and stability, measured by the presence of a social tie in multiple stages of the study, within a social network can promote positive health outcomes in those who experience high ACEs.

While social networks can benefit individual health outcomes, there is also a negative effect of social networks (Villalonga-Olives & Kawachi, 2017). Portes (1998) referred to this as the “dark side” of social capital. For example, Ziersch (2004) found that while civil society groups have a generally positive effect on health in a community, participation by individuals could be damaging to their health. Participants noted that sometimes they overexerted themselves as members, had a conflict with other people within the group that caused mental distress, and were more likely to witness troubling social problems that cultivated distress. Similarly, adverse health outcomes such as obesity have been known to be spread through social networks, with a person having a 57% greater chance of being obese if they had a friend who became obese (Christakis & Fowler, 2007). In particular, these health behaviors and health outcomes spread in relationships of similar or homophilous individuals, such as the same sex or within the same family.

Bonding Social Capital

Social capital is embedded in community-based research, as popularized by Bourdieu (1986), Coleman (1988), and Putnam (2000). Researchers study this concept at individual and community levels. It includes collective factors that provide the power and ability to access

resources (Bourdieu, 2011; Putnam, 2017). In the social capital literature, the terms *bridging* and *bonding* are often used to describe types of capital (Kawachi et al., 2013). Bonding social capital is the concept of people of similar backgrounds coming together, such as a neighborhood or a family. In contrast, bridging social capital is groups across difference interacting with one another.

Kawachi et al. (2008) explain that homophily can be a proxy for bonding social capital. Relationships with homophily would represent bonding capital while bridging capital would be defined by relationships with heterophily. However, homophily has not been used as a variable of social capital for health outcomes in the context of bridging or bonding (Poortinga, 2012). Instead, bonding capital has been measured through neighborhood cohesion, trust, and belonging, while bridging capital has been measured through social cohesion, mutual respect, and political engagement. Further, Poortinga (2012) notes that bridging and bonding social capital indicators are relatively unrelated, indicating the ability to understand their health effects better using homophily as a variable.

It is suggested that bridging social capital may be beneficial to individual health outcomes. Inter-group social cohesion along with political efficacy and trust representing bridging social capital positively predicted personal health, even when controlling for socioeconomic conditions (Poortinga, 2012). The idea that social capital improves health outcomes exists at the community level. However, it has not been seen as extensively at the individual level (Kawachi et al., 2008), which needs further study. For example, Beaudoin (2009) found that bridging may only affect high SES individuals, where it was significantly related to well-educated white individuals' health outcomes. Bonding, in contrast, is more nuanced.

Bonding social capital is related to individual health outcomes. This type of social capital can benefit marginalized communities where bridging could connect community members to communities exhibiting racism and prejudice (Shan et al., 2014). Bonding has also been shown to benefit parents in wealthy neighborhoods, with knowing more neighbors being related to lower

anxiety and depression. However, in poor neighborhoods, the opposite was true, where knowing more neighbors increased the likelihood of anxiety and depression (Caughy et al., 2003). Similarly, Mitchell and LaGory (2002) found that bonding social capital predicted higher mental distress in impoverished communities. Webster et al. (2021) also found that as bonding connections decrease and bridging connections increase, individuals report better health. These findings might suggest that bonding capital can be protective for marginalized groups by creating networks of care suggested by Shan et al. (2014) but harmful for low-resourced groups as suggested by Caughy et al. (2003). Indeed, Mitchell and LaGory (2002) also suggest that civic participation of these under-resourced groups came at a cost to their health. Finally, having close ties to similar individuals can limit information and spread similar health habits throughout the network (Christakis, 2004; Kawachi et al., 2008)

ACEs and Social Networks

Research on ACEs and social networks is limited. In the ACEs research, social networks have been studied as a mediator, without studying the protective effects developed networks can play on lifelong health outcomes for those experiencing ACEs. Some research suggests that ACEs shape how we interact with others through how we create social networks. For example, emotional and physical abuse predicts how we establish our family networks, with increased abuse predicting less closeness to families (Savla et al., 2013). While the study did not examine household dysfunction as a predictor of closeness, there could be a similar relationship between dysfunction and closeness. In general, increases in childhood adversity have predicted decreased quality of social networks (McLafferty et al., 2018). Similarly, military veterans who experience trauma are less likely to have supportive social networks, and missionaries are more likely to seek out a more extensive network for emotional support in their work (McLafferty et al., 2019; Wilkins et al., 2017).

Summary/Gaps in Literature

Thus far, research has focused on understanding how adverse childhood experiences affect health outcomes through various capacities. Felitti et al. (1998) established this relationship, and, since then, BRFSS studies have confirmed these relationships for both physical and mental health outcomes (Merrick et al., 2018; Merrick et al., 2017). This relationship has been partially explained by social network quality (McLafferty et al., 2018; Savla et al., 2013). Furthermore, the literature has established that social networks are a positive resource for health resilience (Umberson & Montez, 2010; van der Horst & Coffe, 2012). In total, these studies provide evidence of a relationship between ACEs and health outcomes that social networks can mediate.

Three unanswered questions remain in the literature. First, how does household dysfunction as a specific adverse childhood experience interact with social networks for health outcomes? Second, it is unclear if social networks have a protective relationship for health outcomes for those who face childhood trauma. Schneider et al. (2020) argue that treating ACEs needs to include helping adults develop networks that promote resilience. Third, the qualities of social networks and their role in health outcomes are not well established. While social network size and diversity were found to affect general health, the explained variance in one study was less than 1% for general health and around 1% for mental health. (Liu et al., 2017). This study will seek to address these gaps in the literature

Hypothesis

Closeness, frequency, social network stability, and homophily will moderate the relationship between household dysfunction and individual health outcomes (self-reported health, mental health, and physical health in the forms of health conditions, BMI, and difficulties due to health). Specifically, closer networks, more frequent contacts, more stable networks, and heterophily will protect individuals from the adverse health outcomes of household dysfunctions.

Method

This study seeks to understand social networks' role in moderating the relationship between household dysfunction and health outcomes. The University of California Social Networks Study (UCNETS) was used to conduct this analysis (Fischer, 2020a). Household dysfunction, comprising divorce, domestic violence, verbal abuse, and drug or alcohol abuse, was used as the specific ACEs being studied. Qualities of the social network, including homophily, stability, closeness, and quality, were examined. This analysis was completed using full information maximum likelihood (FIML) for a multivariate multiple regression, allowing the estimation of missing data to be included in the model for a more accurate understanding of the data.

Before starting this analysis, an Institutional Review Board (IRB) application was submitted. Due to this data being secondary, it was determined that the study did not involve human subjects. Thus it did not need any additional IRB approval: IRB-20-557. See Appendix A for more information.

Sample and Procedure

Data are from the University of California Social Networks Study (Fischer, 2020a). The UCNETS study consists of three waves of data from 2015, 2017, and 2018. The purpose of the original study is to examine how social changes affect health outcomes, particularly individuals experiencing life transitions. Two cohorts make up this survey, comprising of a younger cohort and an older cohort.

The UCNETS population of interest is adults who may experience a transition. Two cohorts of individuals were identified: 21-30-year-olds and 50-70-year-olds. Six counties in the Bay Area of California (Alameda, Contra Costa, Marin, San Francisco, San Mateo, and Santa Clara) were included. The geographical limits were decided based on the costs of conducting complex social network surveys (Fischer, 2020c). While the sample was not drawn from the

broader United States, “analyses carried out thus far have yielded results consistent with those published on other adult samples” (Fischer, 2020c, p. 2).

To obtain the sample, Fischer (2020c) used stratified sampling. Three strata were identified. The first stratum includes individuals living in the cities of San Francisco, Oakland, and San Jose. The first stratum represented 34% of households. The second stratum included individuals living in inner suburban areas within 25 miles of the city center. The second stratum represented 45% of households. The third stratum included individuals living in outer suburban areas, greater than 25 miles from city centers. The third stratum represented 22% of households. In the first sampling stage, 120 census tracts were identified and divided proportionally between the strata based on the tract's percentage of households. Thirty samples were allocated to each tract.

To enroll participants, the researchers used mail and phone to reach households. An online survey was administered to individuals who qualified for the study. A random selection of participants was selected to be interviewed instead of using the online survey. Due to difficulty reaching a younger sample, Facebook recruitment was used through advertisements. A total of 420,000 exposures occurred on Facebook, with 2,120 clicking on the ad, 786 starting the screener, and 290 completing the screener survey (Fischer, 2020c). Participants were paid \$25 for completing the survey in Wave 1, \$35 for completing the survey in Wave 2, and \$50 for completing the survey in Wave 3. The final sample comprises 962 individuals who completed all three surveys (Fischer, 2020c) with 1156 individuals who completed a survey. The sample of individuals who completed all three surveys consists of 387 from the younger cohort and 575 from the older cohort. The attrition rate is 17% from Wave 1 to Wave 3.

Missing data in the sample could be due to attrition or lack of response. Previous analyses with this dataset used casewise deletion throughout the waves with samples that remained similar to the original sample (Child et al., 2021; Child & Lawton, 2019). However, FIML using the

SEM framework in SATA 17, assisted by providing variance estimates for each variable to handle attrition.

Measures

The measures included in this study are provided by respondents, known in social network analysis terminology as egos. Additionally, egos also identified relationships such as family and friends, known as alters, and responded to their alters' characteristics. A copy of the survey questions used is included in Appendix C.

Ego Measures

General Health is measured with a five-level Likert-scale question asking, "Would you say your health is excellent, very good, fair, or poor?" with responses of (1) Excellent, (2) Very Good, (3) Good, (4) Fair, and (5) Poor. It is notated in the analysis as poor health, with higher values indicating worse general health.

Mental Health is measured using the Kessler-10 scale. Questions ask about the frequency in the past thirty days feeling nervous, hopeless, hopeful, restless or fidgety, irritable, depressed, worthless, effort to accomplish tasks, and bothered by memories (Kessler et al., 2002; Kessler et al., 2003). Additionally, the thought of suicide was included in the mental health measure. These variables are scaled into one measure with a Cronbach's Alpha = 0.9005.

Health Conditions was the number of health conditions a respondent provided at each wave. They were asked, "tell me if any of these apply to you," with the following options: (1) high blood pressure or hypertension, (2) diabetes or high blood sugar, (3) a heart attack, coronary heart disease, angina, congestive heart failure, or another heart problem, (4) asthma or another breathing issue, (5) arthritis or rheumatism, and (6) depression or another psychological problem. Scores ranged from 0 - 6.

Difficulties due to Health were measured as the number of difficulties identified at each wave. Participants were asked, "please tell me whether you have any difficulty doing each of the activities listed here." Difficulties included were (1) walking several blocks, (2) dressing,

including putting on shoes and socks, (3) bathing or showering, (4) hearing what people are saying, and (5) seeing or reading. A score between 0 and 5 was created.

Body Mass Index was calculated using the height reported at wave one and the weight at each wave to create a BMI for each time point. The formula used for BMI is

$$BMI = \frac{weight(lb)}{height(in)^2} \times 703.$$

Household Dysfunction is measured by a count variable of the number of household dysfunction measures the ego reported experiencing as a child. Participants were asked these questions at different waves. They were asked about divorce, “Did your parents ever get divorced or split up?” Domestic violence, “When you were growing up, was anyone in your household violent?” Verbal Abuse “When you were growing up, did any adult in your home swear at you, or insult you, or put you down?” and Drug or alcohol abuse, “When you were growing up, was there anyone in your household who had problems with drugs or alcohol?”

Alter Measures

Relationship Stability measures the consistency of alters named by the ego. The ego can list several names of people that are important to them. They were asked about people they confide in, seek out advice, provide practical help, and ask for help. Each named alter had relationship stability calculated. Six types of stability are possible. *Stable relationships* are alters named at all three waves. *Early departures* are named only at wave one, while *late departures* are named at waves one and two. *Early enterers* are alters named at waves two and three, while *late enterers* are only named at wave three. *Inconsistent* are present at waves one and three but not wave two or present at wave two. See Table 8 for more information

Table 8*Stability Measures*

Stability Type	Wave 1	Wave 2	Wave 3
Stable	Present	Present	Present
Early Departure	Present	Absent	Absent
Early Arrival	Absent	Present	Present
Late Departure	Present	Present	Absent
Late Arrival	Absent	Absent	Present
Unstable 1	Present	Absent	Present
Unstable 2	Absent	Present	Absent

Closeness measures the perceived emotional closeness of the alter to the ego.

Respondents were asked of their list of alters named, “which of these people on this list do you feel especially close to?” with the ability to check up to all named alters. Each alter was coded (1) for feeling especially close to and (0) do not feel especially close to.

Frequency of contact is a summative measure of how often the ego interacts with the alter on the telephone, in person, and through text or email. Each ego was asked, “about how often do you talk to [name] by phone?”, “how often do you see [name] in person these days?”, and “about how often do you communicate with [name] by text, e-mail, or other ways online these days?” Each response had the options of (1) at least once a day, (2) at least once a week, (3) at least once a month, (4) several times during the year, (5) once a year or less, and (6) never. Answers were reverse coded and summed to provide an overall frequency of contact measure ranging from 0 to 15.

Homophily measures the ego's similarity to the altar in categories such as gender, ethnic background, age, religious affiliation, and political beliefs. Full homophily would be someone of the same gender, ethnic background, age, religious affiliation, and political belief. Egos were

asked which of these people on this list (with a list of their named alters) are... with questions for similarity of each characteristic.

Scaling of Measures

The measures were averaged by alter and time, explained later in the analysis section. For each ego, the average of alter variables was calculated to generate a single alter variable. For example, Homophily is a variable representing the *average* homophily among all of the ego's alters. Furthermore, variables were also averaged by time, where homophily also represents the average of the averages over time. Ego-centric variables such as health outcomes are only averaged over time. Characteristics of the ego, including demographic characteristics and household dysfunction, were not averaged and represent time-invariant variables.

Descriptive Statistics

The average number of adverse childhood experiences people faced was low ($M = 1.64$, $SD = 1.276$). However, 76.65% of the sample reported one or more household dysfunction, higher than the percentage of individuals reporting one or more ACEs in the original ACE study of 52.1% (Felitti et al., 1998). Descriptive statistics can be seen in Table 9. Overall, the sample was racially diverse, representing multiple racial groups. The sample was asked about their racial background with Asian, Black, Indigenous, White, and Other. A sizable number of people included Latinx (1.99%) as a racial category and it was included in the racial makeup by the study authors (Fischer, 2020b). However, the respondents were also independently asked if they were of Hispanic, Latino, or Spanish origin, which 10.49% said they were. Since this study included Latinx as a racial category, it is included in addition to Hispanic, Latino, or Spanish as an ethnic category separate from race. There was a significant difference of people who responded differently to Latinx and Hispanic, Latino, or Spanish ($\chi^2 = 154.4024$, $p = 0.00$). Of those identifying racially at Latinx, 90.91% also identified ethnically as Hispanic, Latino, or Spanish. Meanwhile, 16.53% of the individuals identifying ethnically as Hispanic, Latino, or Spanish indicated Latinx as a racial category.

Table 9*Descriptive Data of Study 2 Sample*

Characteristic	N	Percent	M	S.D.
Race				
Asian	195	16.87%		
Black	81	7.01%		
Indigenous	25	2.16%		
Latinx	23	1.99%		
Other	92	7.96%		
White	825	71.37%		
Hispanic, Latino, or Spanish Origin	121	10.49%		
Sex				
Male	764	66.09%		
Female	392	33.91%		
Education				
No High School	8	0.69%		
High School / GED	55	4.76%		
Some College	243	21.02%		
College / Bachelor's Degree	483	41.78%		
Graduate Degree	330	28.55%		
Age			46.15	18.05
Household Dysfunctions ^a			1.64	1.276

Note. $N = 1,156$. ^aReflects the number of Household Dysfunctions that people responded yes to

There was a wide range of responses regarding the social network characteristics and health outcomes. Variables were scaled to represent the percentage of alters for each ego that possessed a characteristic. The final variables are summed as noted previously. Overall, homophily was high, ranging from no homophily (0) to complete homophily (600) ($M = 52.91$, $SD = 115.58$). The emotional closeness of the ego to the alter was also high ranging from no emotional closeness with alters (0) to high emotional closeness with alters (100) ($M = 92.98$, $SD = 20.31$). The frequency of contact was lower with a range of 4.4 to 16.33 ($M = 9.21$, $SD = 1.633$), but scores could be as low as 0 and high as 18. Friendship stability could range from 0 to 100, with stable friendships averaging 21.65% of people's networks.

Table 10*Descriptive Statistics for Major Study Variables*

Variable	N	M	S.D.
Homophily ^a	846	521.91	115.58
Emotional Closeness ^b	1155	92.98	20.31
Frequency of Contact ^c	1152	9.21	1.633
Friendship Stability			
Stable ^b	1156	21.65	16.65
Late Departure ^b	1156	7.37	9.68
Late Arrival ^b	1156	14.41	12.03
Early Departure ^b	1156	30.93	28.71
Early Arrival ^b	1156	8.46	8.62
Inconsistent ^b	1156	3.62	5.87
Poor Health ^d	1156	2.37	0.93
Health Conditions ^d	1156	140.20	77.54
Mental Health ^d	1156	37.71	6.01
Difficulties Due to Health ^d	1156	38.25	73.63
Body Mass Index ^d	1150	25.95	5.82

Note. $N = 1,156$. ^aMean reflects the percent of homophily variables that were responded to as yes, averaged among all alters and over time. ^bMean reflects the average percentage of people who were emotionally close over time. ^cMean reflects the average frequency score among alters over time. ^dMean reflects the average score over time.

Table 11
Polychoric Correlation of Study 2 Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
1. Poor Health	1.00																													
2. Mental Health	-0.40	1.00																												
3. Health Conditions	0.40	-0.13	1.00																											
4. Body Mass Index	0.31	0.00	0.35	1.00																										
5. Difficulties Due to Health	0.47	-0.18	0.47	0.33	1.00																									
6. Number of HDs	0.15	-0.18	0.07	0.06	0.10	1.00																								
7. Homophily	-0.03	0.07	-0.13	0.02	-0.04	0.29	1.00																							
8. Frequency of Contact	0.13	-0.06	0.08	0.02	0.14	-0.02	0.03	1.00																						
9. Emotional Closeness	-0.02	0.10	-0.04	0.04	-0.02	0.21	0.85	0.02	1.00																					
10. Late Departure Friends	0.05	-0.03	0.04	-0.01	0.05	-0.02	0.24	-0.03	0.21	1.00																				
11. Late Arrival Friends	-0.02	0.02	-0.05	-0.02	0.00	0.12	0.52	0.09	0.40	-0.07	1.00																			
12. Early Departure Friends	0.02	-0.12	0.03	-0.08	0.00	-0.21	-0.88	-0.05	-0.78	-0.24	-0.51	1.00																		
13. Early Arrival Friends	-0.02	0.10	-0.06	0.01	-0.02	0.12	0.42	0.01	0.33	-0.10	0.14	-0.42	1.00																	
14. Inconsistent Friends	-0.01	0.05	-0.04	0.04	-0.01	0.00	0.26	0.03	0.21	-0.07	0.02	-0.25	-0.02	1.00																
15. Stable Friends	-0.07	0.17	-0.03	0.09	-0.05	0.09	0.55	-0.04	0.44	-0.13	0.09	-0.60	0.13	0.16	1.00															
16. Male	0.00	-0.06	0.03	-0.06	0.05	0.09	0.12	-0.14	0.06	0.02	-0.02	-0.06	-0.01	0.05	0.09	1.00														
17. Age	0.09	0.36	0.31	0.21	0.25	0.00	0.01	0.14	0.10	0.00	-0.02	-0.13	0.02	0.10	0.20	-0.07	1.00													
18. Race: Asian	0.11	-0.19	-0.12	-0.25	-0.16	-0.15	-0.01	0.01	-0.03	-0.01	0.02	0.06	-0.03	-0.07	-0.09	0.03	-0.34	1.00												
19. Race: Black	0.15	0.00	0.13	0.17	0.15	0.10	-0.11	-0.15	-0.07	0.01	-0.10	0.09	0.03	-0.07	-0.17	0.14	0.08	-0.28	1.00											
20. Race: Hispanic (Ethnicity)	0.01	0.15	0.07	0.02	0.02	-0.20	0.00	0.12	0.03	0.02	0.00	-0.03	0.00	-0.05	0.06	-0.09	0.31	0.25	0.05	1.00										
21. Race: Indegenous	0.07	-0.16	0.19	0.01	0.05	0.13	-0.17	0.05	-0.12	0.08	-0.10	0.16	-0.23	-0.11	-0.32	0.17	-0.15	0.16	0.57	-0.40	1.00									
22. Race: Latinx	-0.05	-0.06	0.14	-0.08	0.07	0.20	-0.11	0.00	-0.07	-0.18	-0.02	0.10	0.01	-0.36	-0.16	0.09	-0.02	0.01	0.15	-0.84	0.41	1.00								
23. Race: Other	-0.02	-0.05	-0.02	0.07	-0.07	0.16	0.02	-0.14	0.04	-0.04	0.03	0.00	0.01	-0.02	0.01	0.05	-0.14	-0.24	0.02	-0.43	0.31	0.20	1.00							
24. Race: White	-0.13	0.13	0.09	0.06	0.03	0.01	0.03	0.11	0.06	0.02	-0.01	-0.08	0.00	0.08	0.13	-0.03	0.24	-0.86	-0.71	0.19	-0.09	-0.47	-0.72	1.00						
25. EDU: No High School	0.09	-0.14	0.16	0.14	0.15	0.31	0.00	-0.30	0.07	0.12	-0.13	-0.14	-0.16	-0.14	0.05	-0.26	0.08	.	0.30	-0.21	.	.	0.09	-0.09	1.00					
26. EDU: High School	0.17	-0.11	0.07	0.06	0.16	0.08	-0.18	-0.10	-0.14	-0.05	-0.16	0.14	-0.17	0.04	-0.06	-0.01	-0.04	-0.08	0.21	-0.18	.	-0.02	0.09	-0.15	.	1.00				
27. EDU: Some College	0.18	-0.09	0.13	0.14	0.15	0.17	-0.05	-0.02	-0.07	-0.02	-0.04	0.05	-0.03	0.00	0.01	0.00	0.07	-0.24	0.18	-0.17	0.23	0.31	0.18	-0.03	.	.	1.00			
28. EDU: College	-0.05	-0.08	-0.14	-0.07	-0.10	-0.06	0.11	-0.02	0.06	0.03	0.04	-0.01	0.04	0.00	-0.07	0.04	-0.26	0.14	-0.12	0.05	-0.06	-0.18	-0.14	-0.01	-0.94	.	-0.99	1.00		
29. EDU: Graduate School	-0.17	0.21	-0.03	-0.11	-0.12	-0.13	0.03	0.09	0.06	0.00	0.04	-0.10	0.03	0.03	0.10	-0.04	0.21	0.07	-0.19	0.16	-0.17	-0.15	-0.09	0.09	-0.94	.	-0.98	-0.99	1.00	

Note. Tetrachoric correlation is used for two binary variables; polychoric correlation is used for categorical variables; Pearson correlation used for pairs of continuous variables. Significance is uncalculated

Analysis

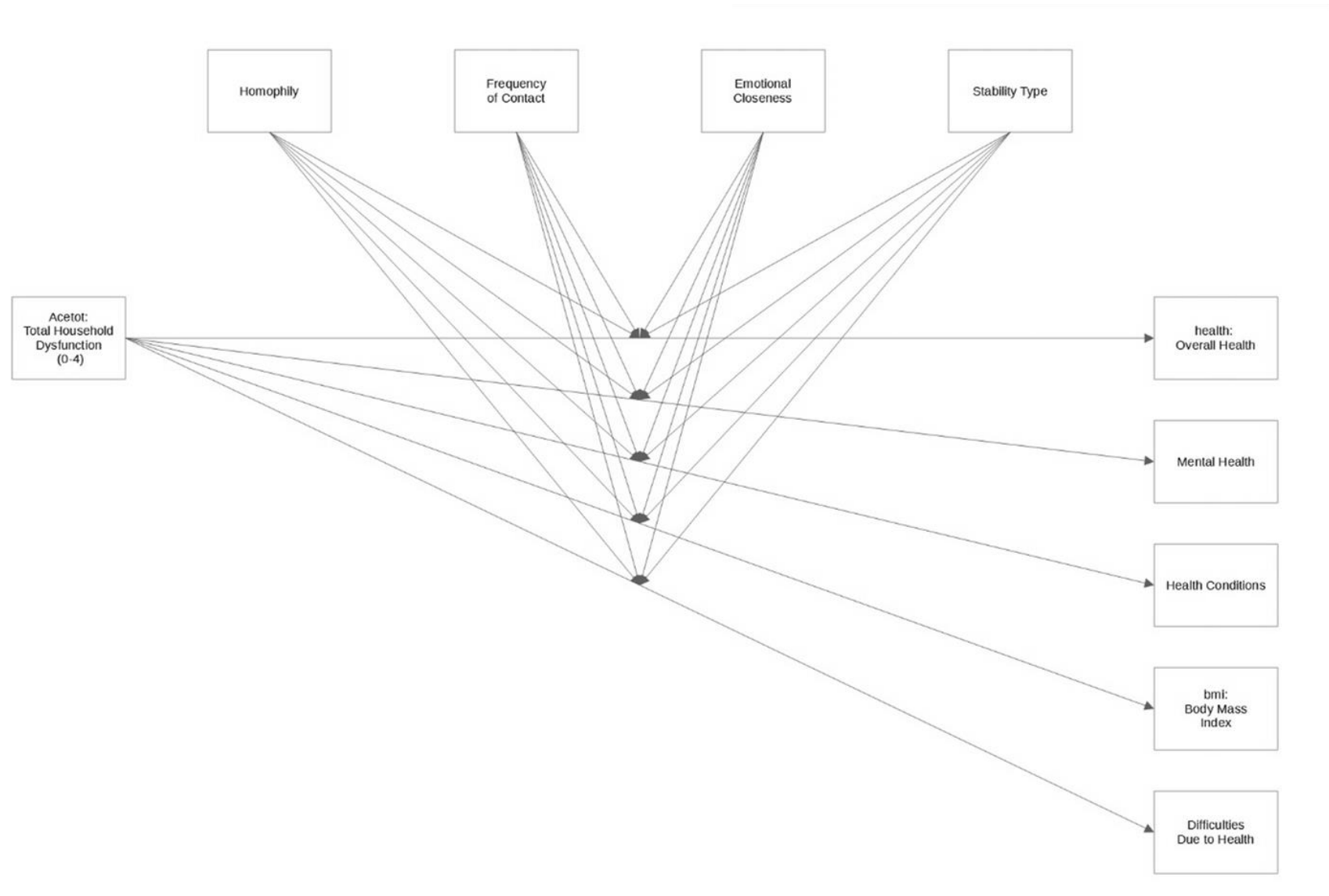
The UCNet sample from the three waves was used for this analysis. The data are naturally set up in a multilevel framework with ego measures representing level 3, alter measures representing level 2, and time-specific questions in level 1. However, the variable of interest is located at the ego level. Using a level 3 variable as an outcome required the model to be condensed into a one-level model because maximum likelihood approaches cannot predict a level 3 variable. Initially, a structural equation model was going to be conducted using Mplus v8.4 (Muthén & Muthén, 2019). However, the data did not support the creation of latent variables due to a flattened loglikelihood, so a multiple regression framework was used with scaled variables instead.

The means of each time-varying variable were calculated to produce an average of each variable over three waves. After calculating time means, the data was further simplified to average all alter measures over each ego, resulting in a one-level ego-driven dataset. The count of ACEs was totaled for each ego. Additionally, variables such as homophily, closeness, and stability type, which started as categorical, represented the percentage of times a yes value was included. Therefore, these variables were scaled from a proportion to a percentage to offer more variance for analysis. Scale measures were created by generating sums of the variables included in the measure. This flattening of time and alters removes the levels within the model, allowing what would be level 2 variables to be used as the outcomes of interest. However, this also significantly limits the nuance able to be examined within time and alters.

Missing data were handled in two ways at the variable creation stage. The variable was coded as missing if a participant did not respond to an alter-level variable at any time. However, for adverse childhood experiences, if a participant did not respond to a specific ACE, it was coded as “not present” because only 8.74% of participants failed to answer three of the four questions. The 4.76% of the participants who did not answer any ACE questions were coded as missing for total ACEs. Following guidance from Myrtveit et al. (2001), it was decided to use a Maximum Likelihood multiple regression with a missing data approach. This choice was because the number of partial respondents was greater than 10%. Using FIML resulted in a complete constructed set of observations of 1,156 responses.

Figure 10

Study 2: Conceptual Model



When using a Maximum Likelihood approach, multiple outcomes allowed for a multivariate regression to be used when examining the relationships of personal characteristics to health outcomes. The specific relationships were analyzed for local fit with a significance of $p < .05$. This analysis accounted for the other health outcomes, allowing for the results to demonstrate the effect of ACEs and friendship networks on a specific outcome, holding personal characteristics and other health outcomes constant. The conceptual model is shown in Figure 10.

Data Limitations

A large social network dataset allows the researcher to have specific data about an individual's social network to answer questions. The UCNets data has been chosen for this research question because it examines health outcomes, measures social networks, and asks about household dysfunction. The scope of the project limits health outcomes to self-reported measures. This analysis's scope is limited to only understanding self-reported health and does not include diagnosed health data. While self-reported health can be inaccurate, there is an increasing level of validity in using self-reported health measures (Schnittker & Bacak, 2014). Additionally, the ACEs being studied are limited to household dysfunction and do not study childhood neglect or physical and sexual abuse.

This analysis is limited by how networks are measured. Using an ego-network design, a large sample can be collected with robust network data. However, this also limits analysis to an egocentric focus, lacking the ability to see health trends throughout a complete community network. Additionally, egos were asked to respond for their alters, which reduces the response's validity based on ego perceptions of the relationship. Yet, having a larger sample that is representative of more individuals is a benefit to using these data.

Finally, the analysis would benefit from a multilevel approach, which is not possible with the outcome of interest. As a result, the analysis is cross-sectional and cannot parse out health's role over time. Further, the data is aggregated among the ego, resulting in a variable representing the average type of alter rather than the specific contribution of different social connections.

Results

Five models were run, each using poor health, mental health, health conditions, body mass index, and difficulties due to health as multivariate regression outcomes using full information maximum likelihood estimation (FIML). The first model examined demographics that predict the health outcomes, including race, gender, education, and age. The second model examined household dysfunction alone. The third model used the social network characteristics of homophily, frequency, emotional closeness, and friendship stability to predict the health outcomes. The fourth model included all study variables, and the fifth model added the interaction terms of household dysfunction and social network characteristics for moderation.

General Health

Overall, the models demonstrated significant predictions of general health (poor health) among participants, with the final model explaining 12% of the variance in poor health ($R^2 = 0.120$). These results can be seen in Table 12. Personal characteristics explained just over 5% of the variance in poor health ($R^2 = 0.058$). In particular, with each year older, participants were predicted to report poorer health ($b = 0.006, p = 0.000$). Asian respondents were more likely than their white counterparts to report poor health ($b = 0.313, p = 0.000$) as were Black respondents ($b = 0.262, p = 0.015$). Having a bachelors degree ($b = -0.240, p = 0.020$) and a graduate degree ($b = -0.420, p = 0.000$) predicted better general health in comparison to those with a high school degree. Household dysfunction explained 1.9% of the variance in poor health ($b = 0.106, p = 0.000$). Meanwhile, social network characteristics explained 3% of the variance in poor health. Specifically homophily ($b = -0.002, p = 0.006$) and frequency of contact ($b = 0.073, p = 0.000$) significantly predicting better and worse health outcomes, respectively.

In the final model, accounting for all study variables and interactions, there were notable significant relationships. Household dysfunction significantly predicted an increase in poor health ($b = 0.192, p = 0.000$) as did frequency of contact ($b = 0.080, p = 0.000$) while homophily predicted a decrease in poor health ($b = -0.003, p = 0.000$). The standardized results suggest that homophily has a stronger effect than household dysfunction.

Table 12
Regression Analysis for Outcome: Poor Health

	<i>b</i>	<i>SE</i>	<i>p</i>	<i>95% CI</i>	β	<i>R</i> ²
Model 1						0.058
Age	0.006	0.002	0.000	[.003 , .009]	0.120	
R: Asian	0.313	0.074	0.000	[.168 , .458]	0.127	
R: Black	0.262	0.107	0.015	[.052 , .473]	0.072	
E: Hispanic	-0.076	0.098	0.438	[-.268 , .116]	-0.025	
R: Indigenous	0.013	0.189	0.947	[-.359 , .384]	0.002	
R: Latinx	-0.277	0.206	0.178	[-.68 , .126]	-0.042	
R: Other	-0.051	0.101	0.615	[-.248 , .147]	-0.015	
EDU: No HS	-0.009	0.332	0.978	[-.66 , .642]	-0.001	
EDU: Some College	0.027	0.110	0.806	[-.189 , .243]	0.012	
EDU: Bachelors	-0.240	0.103	0.020	[-.443 , -.038]	-0.128	
EDU: Grad. Degree	-0.420	0.107	0.000	[-.629 , -.212]	-0.205	
Male	0.004	0.056	0.944	[-.106 , .114]	0.002	
Model 2						0.019
Household Dysfunction	0.106	0.023	0.000	[.061 , .152]	0.136	
Model 3						0.030
Homophily	-0.002	0.001	0.006	[-.003 , -.001]	-0.207	
Emotional Closeness	0.003	0.002	0.164	[-.001 , .008]	0.076	
Frequency of Contact	0.073	0.017	0.000	[.04 , .106]	0.128	
Early Arrival Friends	0.000	0.004	0.916	[-.007 , .008]	0.004	
Early Departure Friends	-0.002	0.002	0.302	[-.007 , .002]	-0.073	
Late Arrival Friends	0.000	0.003	0.955	[-.005 , .006]	0.002	
Late Departure friends	0.005	0.003	0.097	[-.001 , .011]	0.055	
Inconsistent Friends	0.000	0.005	0.997	[-.01 , .01]	0.000	
Model 4						0.108
Household Dysfunction	0.119	0.024	0.000	[.072 , .165]	0.153	
Homophily	-0.002	0.001	0.003	[-.003 , -.001]	-0.232	
Emotional Closeness	0.003	0.002	0.160	[-.001 , .008]	0.075	
Frequency of Contact	0.079	0.017	0.000	[.047 , .112]	0.138	
Early Arrival Friends	0.000	0.004	0.978	[-.007 , .007]	0.001	
Early Departure Friends	-0.002	0.002	0.348	[-.007 , .002]	-0.066	
Late Arrival Friends	0.001	0.003	0.800	[-.005 , .006]	0.009	
Late Departure Friends	0.006	0.003	0.038	[0.000 , .012]	0.066	
Inconsistent Friends	0.000	0.005	0.927	[-.009 , .01]	0.003	
Age	0.005	0.002	0.004	[.001 , .008]	0.091	
R: Asian	0.351	0.073	0.000	[.208 , .493]	0.142	
R: Black	0.298	0.106	0.005	[.091 , .505]	0.082	
E: Hispanic	-0.060	0.096	0.533	[-.249 , .129]	-0.020	
R: Indigenous	-0.166	0.188	0.377	[-.533 , .202]	-0.026	
R: Latinx	-0.323	0.202	0.110	[-.719 , .073]	-0.049	
R: Other	-0.039	0.099	0.690	[-.233 , .154]	-0.012	
EDU: No HS	-0.033	0.327	0.920	[-.674 , .608]	-0.003	
EDU: Some College	0.055	0.109	0.613	[-.158 , .268]	0.024	
EDU: Bachelors	-0.188	0.103	0.068	[-.389 , .014]	-0.100	
EDU: Grad. Degree	-0.373	0.105	0.000	[-.579 , -.166]	-0.182	
Male	0.025	0.055	0.657	[-.084 , .133]	0.013	
Model 5						0.120
Household Dysfunction	0.192	0.035	0.000	[.123 , .26]	0.247	
Homophily	-0.003	0.001	0.000	[-.005 , -.001]	-0.365	
Emotional Closeness	0.008	0.004	0.053	[.000 , .016]	0.173	
Frequency of Contact	0.080	0.017	0.000	[.048 , .113]	0.140	
Early Arrival Friends	0.000	0.004	0.946	[-.007 , .007]	-0.002	
Early Departure Friends	-0.001	0.002	0.610	[-.006 , .003]	-0.036	
Late Arrival Friends	0.001	0.003	0.841	[-.005 , .006]	0.007	
Late Departure Friends	0.006	0.003	0.056	[.000 , .012]	0.062	
Inconsistent Friends	-0.001	0.005	0.905	[-.01 , .009]	-0.004	
HDs * Homophily	-0.003	0.001	0.002	[-.006 , -.001]	-0.363	
HDs * Closeness	0.008	0.005	0.119	[-.002 , .018]	0.145	
HDs * Frequency	-0.016	0.014	0.276	[-.044 , .012]	-0.032	
HDs * Early Arrival	0.002	0.003	0.469	[-.004 , .008]	0.024	
HDs * Early Departure	-0.003	0.002	0.154	[-.007 , .001]	-0.081	
HDs * Late Arrival	0.005	0.002	0.036	[.000 , .009]	0.071	
HDs * Late Departure	0.000	0.003	0.886	[-.005 , .006]	0.005	
HDs * Inconsistent	0.000	0.004	0.944	[-.009 , .008]	-0.002	
Age	0.005	0.002	0.002	[.002 , .008]	0.096	
R: Asian	0.329	0.073	0.000	[.186 , .472]	0.133	
R: Black	0.276	0.106	0.009	[.069 , .483]	0.076	
E: Hispanic	-0.019	0.097	0.842	[-.209 , .17]	-0.006	
R: Indigenous	-0.096	0.188	0.609	[-.464 , .272]	-0.015	
R: Latinx	-0.361	0.202	0.074	[-.757 , .035]	-0.054	
R: Other	-0.035	0.098	0.720	[-.228 , .158]	-0.010	
EDU: No HS	-0.103	0.328	0.752	[-.746 , .539]	-0.009	
EDU: Some College	0.030	0.109	0.781	[-.183 , .243]	0.013	
EDU: Bachelors	-0.200	0.103	0.051	[-.402 , .001]	-0.107	
EDU: Grad. Degree	-0.384	0.106	0.000	[-.591 , -.177]	-0.187	
Male	0.043	0.056	0.442	[-.066 , .152]	0.022	
Intercept/Const.	2.303	0.488	0.000	[1.36 , 3.245]	2.489	

There were two significant interactions in the final model shown in Figure 11 and Figure 12. The first interaction was between homophily and household dysfunction ($b = 0.003, p = 0.002$). Participants with all four household dysfunctions were slightly more likely to experience poor health when having no homophilous friends in their network. However, if an individual had all homophilous friends, they reported significantly less poor health. In contrast, the interaction between having late arrival friends and household dysfunction was the opposite, where late arrival friends served as a risk factor, with participants reporting greater poor health. Interestingly, there was no main effect of having late arrival friends with poor health.

Figure 11

Interaction of Household Dysfunction and Homophily for Poor Health

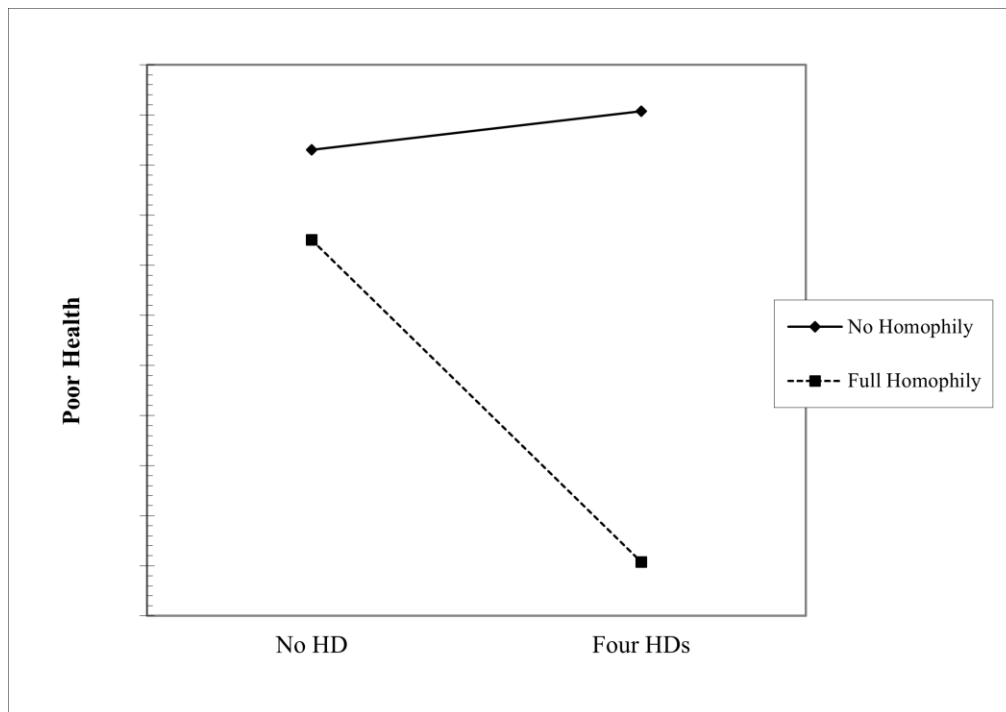
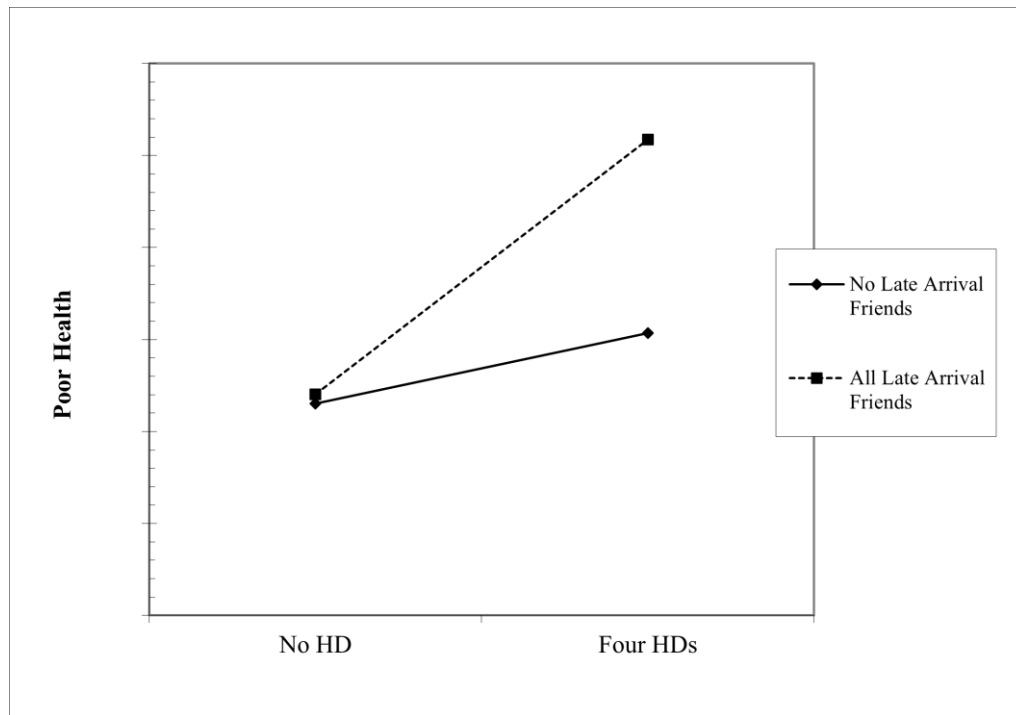


Figure 12

Interaction of Household Dysfunction and Late Arrival Friends for Poor Health



Mental Health

The variables of interest predicted mental health outcomes differently than for poor health. The final model explained 22.4% of the variance in mental health. The results are shown in Table 13. Personal characteristics explained 15.6% of the variance in mental health, with age being positively associated with better mental health ($b = 0.113, p = 0.000$), Asian respondents reporting poorer mental health than their white counterparts ($b = -1.007, p = 0.018$), and those with a graduate degree reporting better mental health than those with high school degrees ($b = 2.004, p = 0.000$). The most considerable effect can be seen from age.

Household dysfunction and social network characteristics each explained 2.9% of the variance in mental health, respectively. Household dysfunction is significantly and negatively associated with mental health ($b = -0.860, p = 0.000$). The frequency of contact with friends was also significantly and negatively associated with mental health ($b = -0.241, p = 0.027$) as is early departure friends ($b = -0.040, p = 0.006$)

and late departure friends ($b = -0.050, p = 0.015$). However, only frequency of contact remained significant when controlling for household dysfunction and personal characteristics.

In the final model, household dysfunction, homophily, and frequency of contact significantly predicted mental health outcomes. Household dysfunction was significantly and negatively associated with mental health ($b = -1.410, p = 0.000$), homophily significantly and positively associated with mental health ($b = 0.014, p = 0.000$), and frequency of contact significantly and negatively associated with mental health ($b = 0.504, p = 0.000$). The effect of household dysfunction was the strongest ($\beta = -0.280$) followed by homophily ($\beta = 0.248$) and frequency of contact ($\beta = -0.135$).

There was a significant interaction between household dysfunction and homophily for mental health ($b = 0.015, p = 0.000$). This interaction is shown in Figure 13. Respondents with no homophilous relationships had a slight decrease in self-reported mental health scores. However, respondents with all homophilous relationships had a large increase in mental health scores, suggesting homophily is a strong protective factor for mental health as it is for general health.

Figure 13

Interaction of Household Dysfunction and Homophily for Mental Health

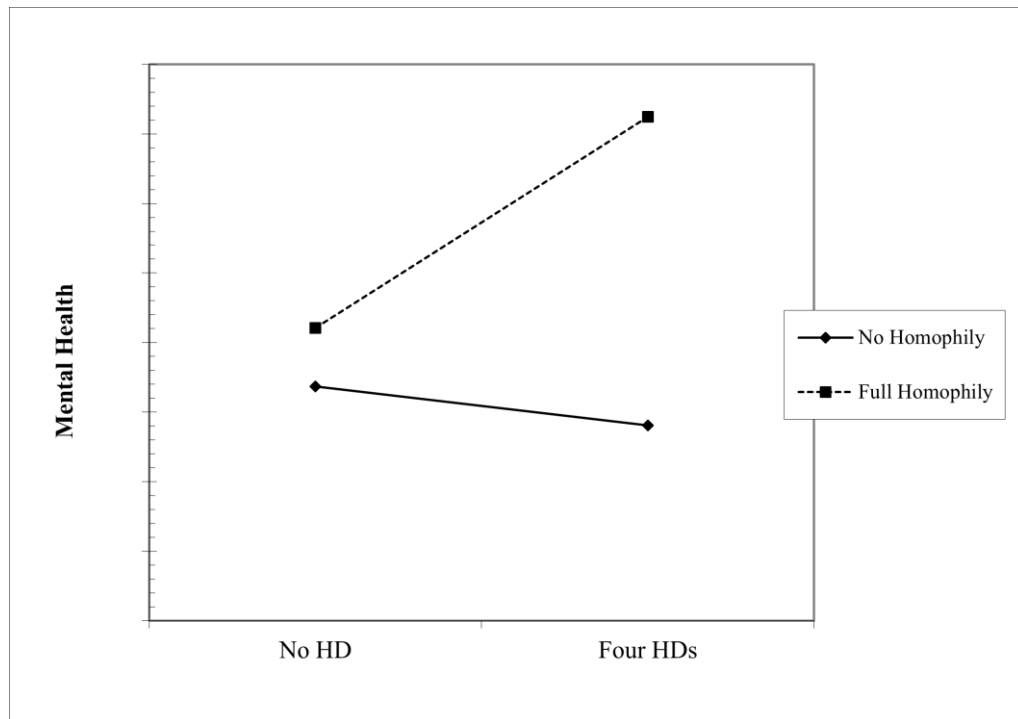


Table 13
Regression Analysis for Outcome: Mental Health

	<i>b</i>	<i>se</i>	<i>p</i>	95% <i>CI</i>	β	<i>R</i> ²
Model 1						0.156
Age	0.113	0.010	0.000	[.094 , .132]	0.340	
R: Asian	-1.077	0.456	0.018	[-1.97 , -.183]	-0.067	
R: Black	0.108	0.661	0.871	[-1.188 , 1.403]	0.005	
E: Hispanic	0.411	0.601	0.495	[-.768 , 1.589]	0.021	
R: Indigenous	-1.632	1.166	0.162	[-3.916 , .653]	-0.039	
R: Latinx	0.117	1.265	0.926	[-2.363 , 2.597]	0.003	
R: Other	0.341	0.619	0.582	[-.872 , 1.554]	0.015	
EDU: No HS	-2.674	2.043	0.191	[-6.678 , 1.33]	-0.037	
EDU: Some College	0.082	0.678	0.904	[-1.246 , 1.41]	0.006	
EDU: Bachelors	1.203	0.636	0.059	[-.044 , 2.449]	0.099	
EDU: Grad. Degree	2.004	0.656	0.002	[.718 , 3.289]	0.151	
Male	-0.293	0.345	0.395	[-.97 , .383]	-0.023	
Model 2						0.029
Household Dysfunction	-0.860	0.154	0.000	[-1.162 , -.558]	-0.169	
Model 3						0.029
Homophily	-0.003	0.004	0.529	[-.01 , .005]	-0.044	
Emotional Closeness	0.006	0.016	0.703	[-.025 , .037]	0.020	
Frequency of Contact	-0.241	0.109	0.027	[-.455 , -.028]	-0.065	
Early Arrival Friends	0.020	0.024	0.399	[-.027 , .067]	0.029	
Early Departure Friends	-0.040	0.014	0.006	[-.068 , -.011]	-0.189	
Late Arrival Friends	-0.035	0.018	0.051	[-.071 , 0.000]	-0.070	
Late Departure Friends	-0.050	0.020	0.015	[-.09 , -.01]	-0.080	
Inconsistent Friends	0.006	0.032	0.858	[-.058 , .069]	0.006	
Model 4						0.215
Household Dysfunction	-0.960	0.145	0.000	[-1.245 , -.676]	-0.191	
Homophily	0.008	0.004	0.052	[.000 , .015]	0.132	
Emotional Closeness	-0.009	0.015	0.523	[-.038 , .019]	-0.032	
Frequency of Contact	-0.498	0.101	0.000	[-.696 , -.3]	-0.134	
Early Arrival Friends	0.037	0.022	0.088	[-.006 , .079]	0.053	
Early Departure Friends	-0.006	0.013	0.673	[-.032 , .021]	-0.027	
Late Arrival Friends	-0.007	0.016	0.656	[-.039 , .025]	-0.015	
Late Departure Friends	-0.036	0.019	0.053	[-.072 , .001]	-0.058	
Inconsistent Friends	-0.012	0.029	0.672	[-.07 , .045]	-0.012	
Age	0.119	0.010	0.000	[.1 , .138]	0.357	
R: Asian	-1.329	0.443	0.003	[-2.198 , -.46]	-0.083	
R: Black	-0.083	0.642	0.897	[-1.342 , 1.176]	-0.004	
E: Hispanic	0.290	0.585	0.621	[-.857 , 1.437]	0.015	
R: Indigenous	-0.434	1.142	0.704	[-2.672 , 1.803]	-0.011	
R: Latinx	0.445	1.231	0.717	[-1.967 , 2.858]	0.010	
R: Other	0.279	0.601	0.642	[-.898 , 1.456]	0.013	
EDU: No HS	-2.568	1.994	0.198	[-6.476 , 1.339]	-0.035	
EDU: Some College	-0.092	0.661	0.889	[-1.387 , 1.203]	-0.006	
EDU: Bachelors	0.738	0.624	0.237	[-.485 , 1.96]	0.061	
EDU: Grad. Degree	1.520	0.641	0.018	[.262 , 2.777]	0.114	
Male	-0.394	0.338	0.243	[-1.056 , .268]	-0.031	
Model 5						0.224
Household Dysfunction	-1.410	0.211	0.000	[-1.822 , -.997]	-0.280	
Homophily	0.014	0.005	0.006	[.004 , .024]	0.248	
Emotional Closeness	-0.029	0.024	0.239	[-.076 , .019]	-0.097	
Frequency of Contact	-0.504	0.101	0.000	[-.702 , -.306]	-0.135	
Early Arrival Friends	0.034	0.022	0.116	[-.008 , .077]	0.049	
Early Departure Friends	-0.015	0.014	0.279	[-.041 , .012]	-0.070	
Late Arrival Friends	-0.008	0.017	0.642	[-.04 , .025]	-0.015	
Late Departure Friends	-0.035	0.019	0.066	[-.072 , .002]	-0.056	
Inconsistent Friends	-0.004	0.029	0.900	[-.061 , .054]	-0.004	
HDs * Homophily	0.015	0.006	0.016	[.003 , .027]	0.239	
HDs * Closeness	-0.036	0.030	0.224	[-.095 , .022]	-0.102	
HDs * Frequency	0.016	0.088	0.857	[-.157 , .189]	0.005	
HDs * Early Arrival	0.018	0.018	0.342	[-.019 , .054]	0.029	
HDs * Early Departure	0.000	0.012	0.976	[-.024 , .024]	-0.002	
HDs * Late Arrival	-0.016	0.014	0.255	[-.043 , .012]	-0.036	
HDs * Late Departure	0.004	0.018	0.834	[-.031 , .039]	0.006	
HDs * Inconsistent	0.004	0.026	0.863	[-.046 , .055]	0.005	
Age	0.115	0.010	0.000	[.096 , .134]	0.345	
R: Asian	-1.267	0.445	0.004	[-2.14 , -.395]	-0.079	
R: Black	0.076	0.644	0.907	[-1.186 , 1.337]	0.003	
E: Hispanic	0.142	0.588	0.810	[-1.011 , 1.294]	0.007	
R: Indigenous	-0.614	1.143	0.591	[-2.855 , 1.626]	-0.015	
R: Latinx	0.681	1.231	0.580	[-1.731 , 3.094]	0.016	
R: Other	0.235	0.599	0.695	[-.94 , 1.41]	0.011	
EDU: No HS	-2.323	2.000	0.245	[-6.243 , 1.597]	-0.032	
EDU: Some College	-0.037	0.660	0.956	[-1.331 , 1.258]	-0.002	
EDU: Bachelors	0.743	0.626	0.235	[-.484 , 1.97]	0.061	
EDU: Grad. Degree	1.483	0.643	0.021	[.223 , 2.744]	0.111	
Male	-0.482	0.339	0.156	[-1.147 , .184]	-0.038	
Intercept/Const.	33.708	2.856	0.000	[28.111 , 39.305]	5.608	

Health Conditions

Several variables in the models significantly predicted the mean of the sum of health conditions over the three waves. The final model explained 20% of the variance in health conditions ($R^2 = 0.201$). As with general health and mental health, age was a significant predictor of health conditions ($b = 1.332, p = 0.000$). Additionally identifying as Indigenous ($b = 61.314, p = 0.000$) or Latinx ($b = 35.307, p = 0.033$) was also positively associated with increased health conditions compared to identifying as White. Participants were asked to identify their race, which is where Latinx participants were identified. However, participants who responded yes to being from a Hispanic, Spanish, or Latino origin did not have significantly different health outcomes than those who responded to not being Hispanic, Spanish, or Latino. Finally, having a graduate degree predicted significantly lower health conditions than those with high school degrees ($b = -18.565, p = 0.030$).

Household dysfunction alone predicted less than 1% of the explained variance in health conditions ($R^2 = 0.005$), while social network characteristics alone predicted 8% of the variance in health conditions ($R^2 = 0.079$). Specifically, household dysfunction was positively associated with health conditions ($b = 4.487, p = 0.021$). Homophily was negatively related to health conditions ($b = -0.384, p = 0.000$) while emotional closeness ($b = 0.577, p = 0.005$) and frequency of contact ($b = 4.087, p = 0.003$) were positively related to health conditions. Within friendship stability types, having early departure friends predicted decreased health conditions ($b = -0.979, p = 0.000$). These relationships were retained when controlling for all variables in the model. However, emotional closeness became significant when controlling for all predictors ($b = 0.408, p = 0.038$).

Regression Analysis for Outcome: Health Conditions

	<i>b</i>	<i>se</i>	<i>p</i>	95% <i>CI</i>	β	<i>R</i> ²
Model 1						0.134
Age	1.332	0.127	0.000	[1.082 , 1.582]	0.310	
R: Asian	1.908	5.958	0.749	[-9.769 , 13.585]	0.009	
R: Black	10.121	8.635	0.241	[-6.804 , 27.045]	0.033	
E: Hispanic	3.143	7.989	0.694	[-12.514 , 18.801]	0.012	
R: Indigenous	61.314	15.226	0.000	[31.471 , 91.157]	0.115	
R: Latinx	35.307	16.565	0.033	[2.839 , 67.774]	0.064	
R: Other	-2.639	8.086	0.744	[-18.487 , 13.21]	-0.009	
EDU: No HS	52.650	26.687	0.049	[-.345 , 104.956]	0.056	
EDU: Some College	-0.510	8.850	0.954	[-17.857 , 16.836]	-0.003	
EDU: Bachelors	-14.824	8.308	0.074	[-31.108 , 1.46]	-0.094	
EDU: Grad. Degree	-18.565	8.565	0.030	[-35.352 , -1.778]	-0.108	
Male	5.331	4.507	0.237	[-3.502 , 14.164]	0.033	
Model 2						0.005
Household Dysfunction	4.487	1.940	0.021	[.685 , 8.289]	0.069	
Model 3						0.079
Homophily	-0.384	0.056	0.000	[-.494 , -.274]	-0.522	
Emotional Closeness	0.577	0.205	0.005	[.176 , .979]	0.151	
Frequency of Contact	4.087	1.387	0.003	[1.368 , 6.805]	0.085	
Early Arrival Friends	-0.500	0.304	0.100	[-1.096 , .097]	-0.056	
Early Departure Friends	-0.979	0.188	0.000	[-1.347 , -.61]	-0.363	
Late Arrival Friends	-0.392	0.231	0.090	[-.844 , .061]	-0.061	
Late Departure friends	0.045	0.260	0.864	[-.465 , .554]	0.006	
Inconsistent Friends	-0.763	0.413	0.064	[-1.572 , .045]	-0.058	
Model 4						0.184
Household Dysfunction	5.404	1.898	0.004	[1.684 , 9.124]	0.083	
Homophily	-0.299	0.057	0.000	[-.41 , -.187]	-0.405	
Emotional Closeness	0.408	0.197	0.038	[.022 , .794]	0.107	
Frequency of Contact	2.954	1.336	0.027	[.336 , 5.571]	0.061	
Early Arrival Friends	-0.317	0.287	0.270	[-.879 , .246]	-0.035	
Early Departure Friends	-0.596	0.185	0.001	[-.959 , -.234]	-0.221	
Late Arrival Friends	-0.109	0.218	0.618	[-.536 , .319]	-0.017	
Late Departure Friends	0.264	0.246	0.283	[-.218 , .745]	0.033	
Inconsistent Friends	-0.724	0.389	0.063	[-1.487 , .039]	-0.055	
Age	1.226	0.130	0.000	[.971 , 1.481]	0.285	
R: Asian	4.630	5.858	0.429	[-6.852 , 16.112]	0.022	
R: Black	12.388	8.515	0.146	[-4.301 , 29.076]	0.041	
E: Hispanic	2.631	7.798	0.736	[-12.653 , 17.914]	0.010	
R: Indigenous	43.820	15.077	0.004	[14.269 , 73.37]	0.082	
R: Latinx	29.043	16.261	0.074	[-2.827 , 60.913]	0.052	
R: Other	-2.224	7.935	0.779	[-17.776 , 13.327]	-0.008	
EDU: No HS	45.804	26.303	0.082	[-5.75 , 97.357]	0.049	
EDU: Some College	5.819	8.759	0.506	[-11.348 , 22.986]	0.031	
EDU: Bachelors	-7.161	8.264	0.386	[-23.358 , 9.036]	-0.046	
EDU: Grad. Degree	-12.717	8.497	0.134	[-29.37 , 3.937]	-0.074	
Male	7.120	4.468	0.111	[-1.638 , 15.878]	0.043	
Model 5						0.201
Household Dysfunction	13.401	2.793	0.000	[7.927 , 18.875]	0.206	
Homophily	-0.462	0.073	0.000	[-.604 , -.319]	-0.623	
Emotional Closeness	1.075	0.326	0.001	[.436 , 1.714]	0.282	
Frequency of Contact	3.126	1.329	0.019	[.521 , 5.731]	0.065	
Early Arrival Friends	-0.318	0.287	0.268	[-.88 , .244]	-0.035	
Early Departure Friends	-0.457	0.187	0.014	[-.823 , -.091]	-0.169	
Late Arrival Friends	-0.113	0.219	0.607	[-.542 , .316]	-0.017	
Late Departure Friends	0.162	0.250	0.516	[-.327 , .652]	0.020	
Inconsistent Friends	-0.856	0.390	0.028	[-1.62 , -.092]	-0.065	
HDs * Homophily	-0.354	0.091	0.000	[-.532 , -.177]	-0.440	
HDs * Closeness	1.121	0.411	0.006	[.316 , 1.926]	0.244	
HDs * Frequency	1.187	1.142	0.298	[-1.051 , 3.426]	0.029	
HDs * Early Arrival	0.143	0.239	0.549	[-.325 , .611]	0.019	
HDs * Early Departure	-0.057	0.164	0.726	[-.379 , .264]	-0.019	
HDs * Late Arrival	0.389	0.182	0.033	[.032 , .745]	0.069	
HDs * Late Departure	-0.196	0.229	0.393	[-.645 , .253]	-0.026	
HDs * Inconsistent	-0.148	0.334	0.658	[-.803 , .507]	-0.013	
Age	1.268	0.130	0.000	[1.013 , 1.522]	0.295	
R: Asian	2.469	5.869	0.674	[-9.033 , 13.972]	0.012	
R: Black	9.073	8.503	0.286	[-7.593 , 25.74]	0.030	
E: Hispanic	5.491	7.770	0.480	[-9.738 , 20.72]	0.022	
R: Indigenous	48.976	15.065	0.001	[19.449 , 78.503]	0.092	
R: Latinx	22.366	16.201	0.167	[-9.387 , 54.12]	0.040	
R: Other	-1.739	7.891	0.826	[-17.205 , 13.728]	-0.006	
EDU: No HS	42.570	26.327	0.106	[-9.029 , 94.169]	0.046	
EDU: Some College	4.561	8.727	0.601	[-12.543 , 21.665]	0.024	
EDU: Bachelors	-7.615	8.264	0.357	[-23.813 , 8.582]	-0.048	
EDU: Grad. Degree	-12.527	8.491	0.140	[-29.17 , 4.115]	-0.073	
Male	8.779	4.479	0.050	[.001 , 17.557]	0.054	
Intercept/Const.	192.925	39.035	0.000	[116.417 , 269.432]	2.489	

There were three significant interactions in the final model. These interactions are shown in Figures 14 – 16. The interaction between household dysfunction and homophily was

statistically significant ($b = -0.354, p = 0.000$). Homophily served as a strong protective factor predicting a decrease in the number of health conditions as household dysfunctions increase compared to not having any homophily, which predicted an increase in health conditions. There was also a significant interaction between emotional closeness and household dysfunctions ($b = 1.121, p = 0.006$). Participants with the maximum possible closeness were predicted to have significantly higher health conditions as household dysfunctions increase than those with no emotional closeness to their network. Finally, the interaction of late-arriving friends in the network and household dysfunction was significant in the model ($b = 0.389, p = 0.033$). Similar to emotional closeness, late-arriving friends served as a risk factor. As household dysfunctions increased, people were more likely to report increased health conditions, but having all friends be a late-arrival predicted a significantly higher rate of increase in health conditions.

Figure 14

Interaction of Household Dysfunction and Homophily for Number of Health Conditions

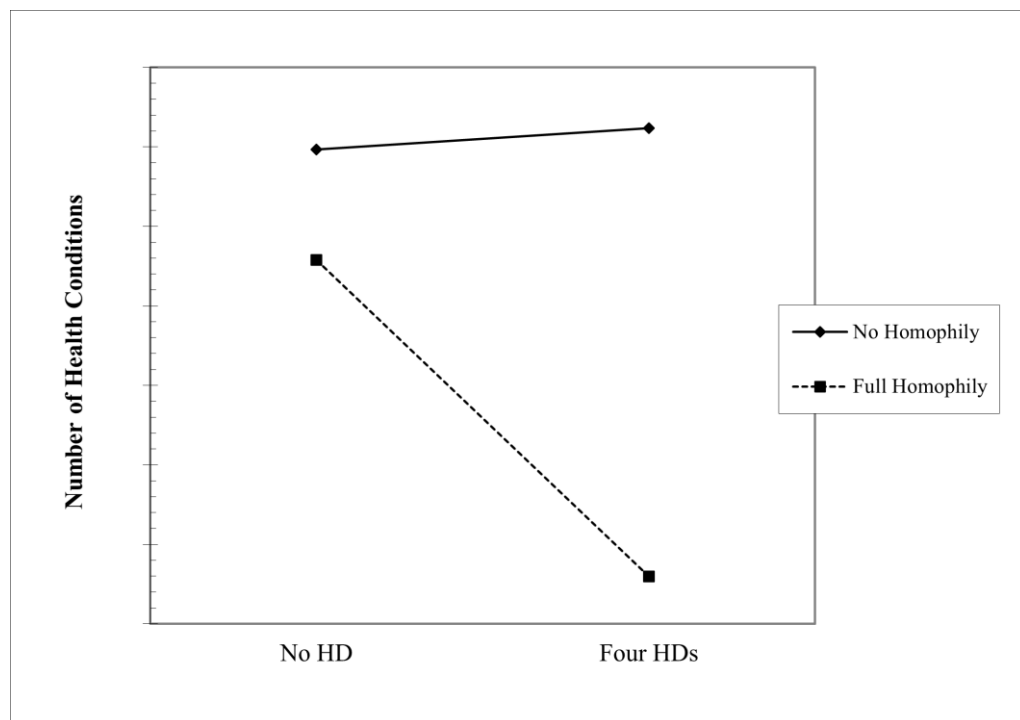


Figure 15

Interaction of Household Dysfunction and Closeness for Number of Health Conditions

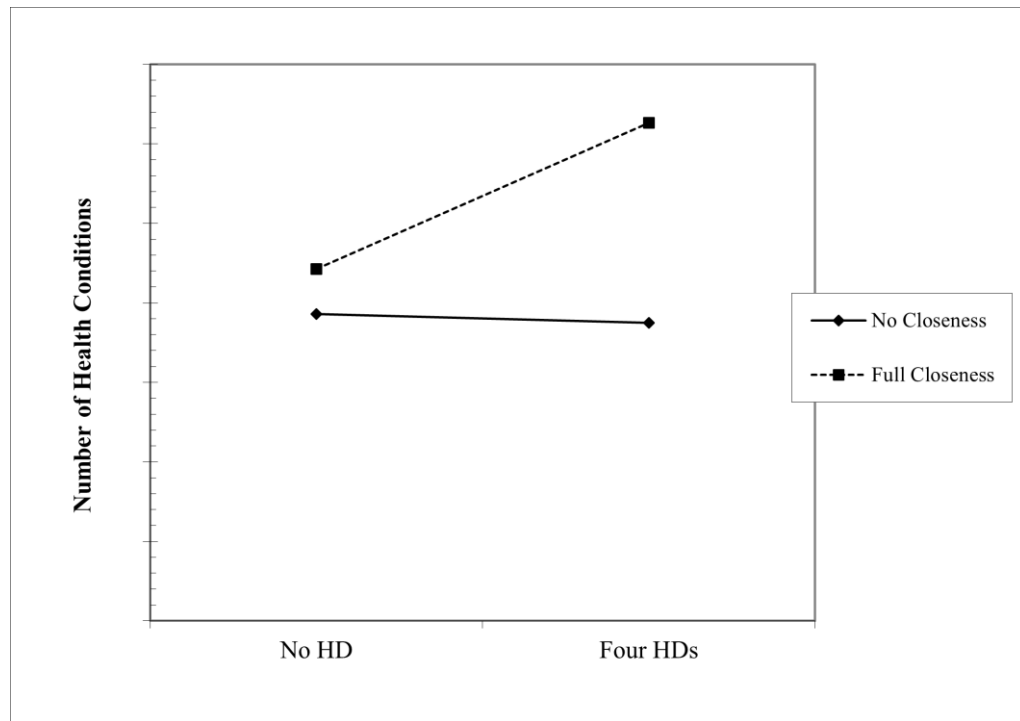
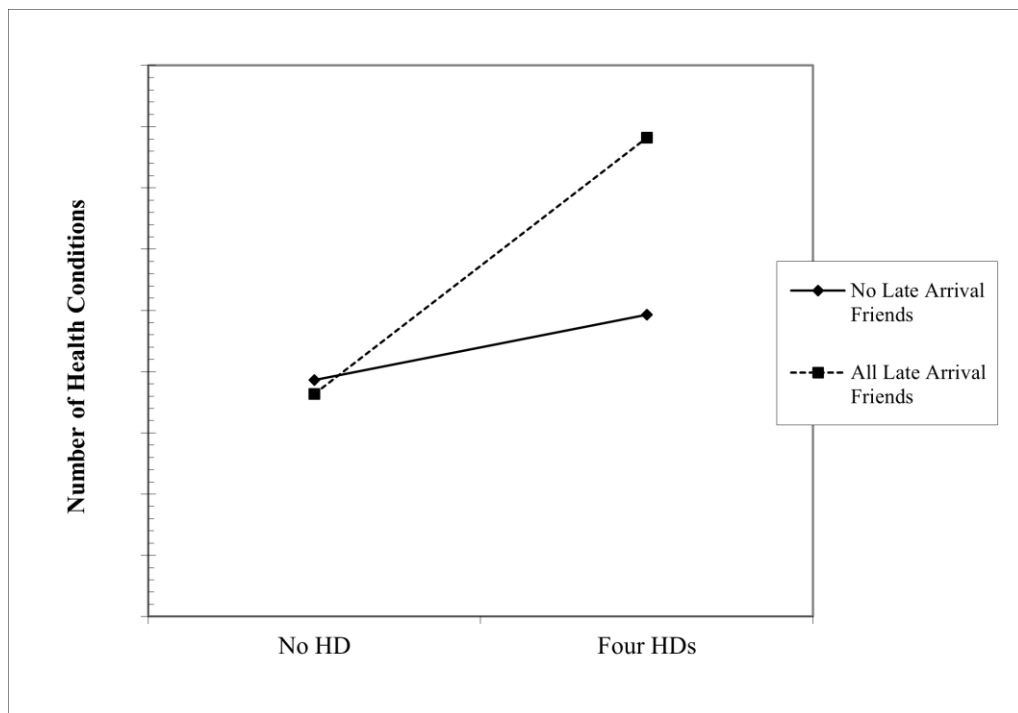


Figure 16

Interaction of Household Dysfunction and Late Arriving Friends for Number of Health Conditions



BMI

Body mass index had a different pattern in the models compared to other health outcomes. Age was positively associated with BMI ($b = 0.064, p = 0.000$) as was identifying as Black ($b = 2.096, p = 0.002$). However, Asian identified participants were predicted to have lower BMIs than their white counterparts ($b = -1.069, p = 0.021$). Those with graduate degrees were also predicted to have lower BMIs ($b = -1.679, p = 0.012$) than those with high school degrees. In all, personal characteristics explained 8% of the variance in BMI ($R^2 = 0.082$).

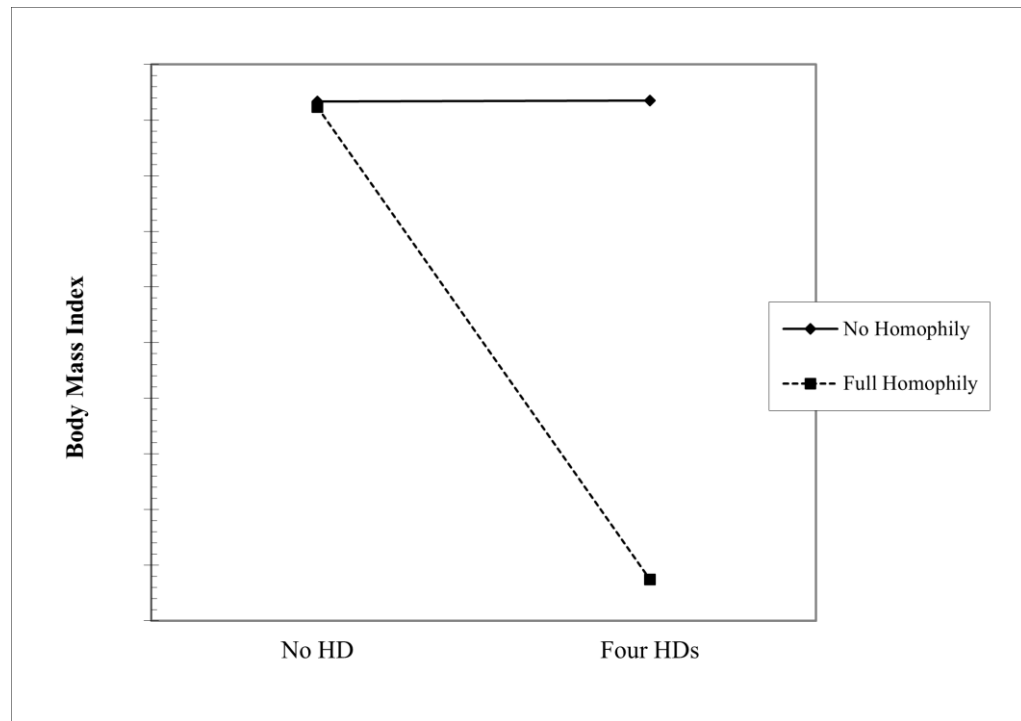
Household dysfunction alone did not significantly predict body mass index ($b = 0.269, p = 0.070$). However, homophily ($b = -0.019, p = 0.000$), early departure friends ($b = -0.081, p = 0.000$), late arrival friends ($b = -0.047, p = 0.000$), and late departure friends ($b = -0.044, p = 0.028$) all predicted lower BMI. These relationships remained the same after controlling for all other variables in the model. The models can be seen in Table 15.

Table 15
Regression Analysis for Outcome: BMI

	<i>b</i>	<i>se</i>	<i>p</i>	95% <i>CI</i>	β	<i>R</i> ²
Model 1						0.082
Age	0.064	0.010	0.000	[.045 , .084]	0.200	
R: Asian	-1.069	0.465	0.021	[-1.98 , -.158]	-0.069	
R: Black	2.096	0.672	0.002	[.779 , 3.412]	0.092	
E: Hispanic	-0.256	0.607	0.674	[-1.445 , .934]	-0.014	
R: Indigenous	-0.380	1.177	0.747	[-2.687 , 1.926]	-0.010	
R: Latinx	-1.580	1.277	0.216	[-4.083 , .923]	-0.038	
R: Other	0.837	0.628	0.182	[-.394 , 2.069]	0.039	
EDU: No HS	0.959	2.063	0.642	[-3.084 , 5.002]	0.014	
EDU: Some College	0.219	0.687	0.750	[-1.128 , 1.566]	0.015	
EDU: Bachelors	-0.715	0.645	0.268	[-1.98 , .55]	-0.061	
EDU: Grad. Degree	-1.679	0.665	0.012	[-2.982 , -.375]	-0.130	
Male	-0.461	0.349	0.187	[-1.145 , .224]	-0.037	
Model 2						0.003
Household Dysfunction	0.269	0.148	0.070	[-.022 , .56]	0.055	
Model 3						0.042
Homophily	-0.019	0.004	0.000	[-.027 , -.011]	-0.337	
Emotional Closeness	0.020	0.016	0.197	[-.01 , .051]	0.070	
Frequency of Contact	0.063	0.105	0.553	[-.144 , .269]	0.017	
Early Arrival Friends	-0.029	0.023	0.207	[-.074 , .016]	-0.043	
Early Departure Friends	-0.081	0.014	0.000	[-.109 , -.053]	-0.400	
Late Arrival Friends	-0.047	0.018	0.007	[-.082 , -.013]	-0.098	
Late Departure friends	-0.044	0.020	0.028	[-.082 , -.005]	-0.073	
Inconsistent Friends	-0.012	0.031	0.703	[-.073 , .049]	-0.012	
Model 4						0.107
Household Dysfunction	0.158	0.149	0.289	[-.134 , .45]	0.032	
Homophily	-0.014	0.004	0.001	[-.023 , -.006]	-0.259	
Emotional Closeness	0.012	0.015	0.451	[-.018 , .042]	0.040	
Frequency of Contact	0.047	0.105	0.653	[-.158 , .252]	0.013	
Early Arrival Friends	-0.028	0.022	0.205	[-.072 , .016]	-0.042	
Early Departure Friends	-0.066	0.014	0.000	[-.094 , -.038]	-0.326	
Late Arrival Friends	-0.036	0.017	0.033	[-.07 , -.003]	-0.075	
Late Departure Friends	-0.036	0.019	0.062	[-.074 , .002]	-0.060	
Inconsistent Friends	-0.018	0.030	0.547	[-.078 , .041]	-0.018	
Age	0.053	0.010	0.000	[.033 , .073]	0.163	
R: Asian	-0.948	0.462	0.040	[-1.855 , -.042]	-0.061	
R: Black	2.275	0.669	0.001	[.963 , 3.587]	0.100	
E: Hispanic	-0.178	0.605	0.769	[-1.363 , 1.008]	-0.009	
R: Indigenous	-0.771	1.180	0.514	[-3.084 , 1.543]	-0.019	
R: Latinx	-1.643	1.271	0.196	[-4.134 , .849]	-0.039	
R: Other	0.813	0.624	0.193	[-.411 , 2.037]	0.038	
EDU: No HS	0.220	2.057	0.915	[-3.812 , 4.251]	0.003	
EDU: Some College	0.406	0.687	0.554	[-.939 , 1.752]	0.028	
EDU: Bachelors	-0.513	0.648	0.429	[-1.783 , .758]	-0.043	
EDU: Grad. Degree	-1.615	0.666	0.015	[-2.921 , -.309]	-0.125	
Male	-0.514	0.350	0.142	[-1.2 , .171]	-0.042	
Model 5						0.115
Household Dysfunction	0.273	0.221	0.217	[-.16 , .706]	0.056	
Homophily	-0.017	0.006	0.003	[-.028 , -.006]	-0.305	
Emotional Closeness	0.031	0.026	0.237	[-.02 , .081]	0.106	
Frequency of Contact	0.048	0.104	0.648	[-.157 , .252]	0.013	
Early Arrival Friends	-0.032	0.022	0.158	[-.076 , .012]	-0.047	
Early Departure Friends	-0.067	0.014	0.000	[-.096 , -.039]	-0.331	
Late Arrival Friends	-0.038	0.017	0.027	[-.072 , -.004]	-0.078	
Late Departure Friends	-0.041	0.020	0.037	[-.079 , -.002]	-0.068	
Inconsistent Friends	-0.017	0.030	0.587	[-.076 , .043]	-0.017	
HDs * Homophily	-0.014	0.007	0.037	[-.028 , -.001]	-0.238	
HDs * Closeness	0.033	0.032	0.308	[-.03 , .095]	0.095	
HDs * Frequency	-0.028	0.090	0.753	[-.204 , .148]	-0.009	
HDs * Early Arrival	0.027	0.019	0.146	[-.009 , .064]	0.047	
HDs * Early Departure	-0.029	0.013	0.021	[-.055 , -.004]	-0.131	
HDs * Late Arrival	0.021	0.014	0.141	[-.007 , .049]	0.050	
HDs * Late Departure	-0.006	0.018	0.762	[-.041 , .03]	-0.010	
HDs * Inconsistent	0.020	0.026	0.455	[-.032 , .071]	0.023	
Age	0.050	0.010	0.000	[.03 , .07]	0.156	
R: Asian	-1.148	0.465	0.013	[-2.059 , -.237]	-0.074	
R: Black	2.243	0.669	0.001	[.93 , 3.555]	0.098	
E: Hispanic	-0.015	0.607	0.980	[-1.204 , 1.175]	-0.001	
R: Indigenous	-0.387	1.183	0.744	[-2.705 , 1.932]	-0.010	
R: Latinx	-1.741	1.271	0.171	[-4.231 , .75]	-0.042	
R: Other	0.796	0.622	0.201	[-.423 , 2.016]	0.037	
EDU: No HS	-0.183	2.061	0.929	[-4.222 , 3.856]	-0.003	
EDU: Some College	0.253	0.686	0.712	[-1.091 , 1.597]	0.018	
EDU: Bachelors	-0.615	0.650	0.344	[-1.889 , .659]	-0.052	
EDU: Grad. Degree	-1.714	0.667	0.010	[-3.022 , -.406]	-0.133	
Male	-0.451	0.351	0.199	[-1.14 , .238]	-0.037	
Intercept/Const.	33.295	3.036	0.000	[27.344 , 39.246]	5.724	

Figure 17

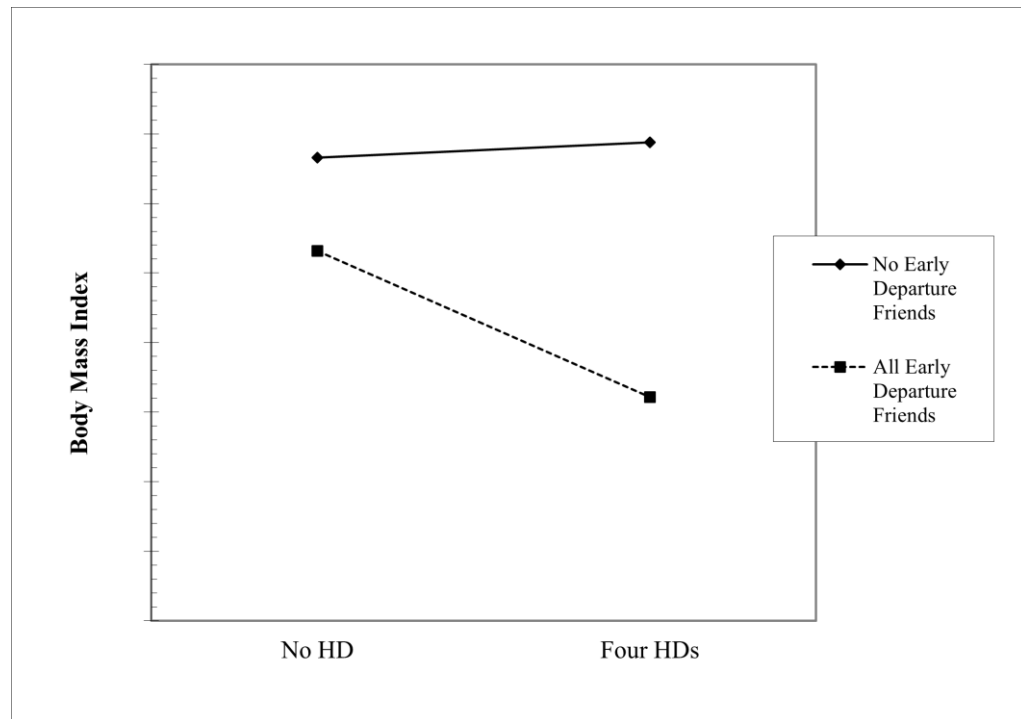
Interaction of Household Dysfunction and Homophily for BMI



Household dysfunctions alone explained less than 1% of the variance in difficulties due to health ($b = 5.697, p = 0.002, R^2 = 0.008$). In addition to household dysfunction being positively associated with difficulties due to health, frequency of contact was also positively associated with difficulties ($b = 6.482, p = 0.000$). However, homophily ($b = -0.331, p = 0.000$) and early departure friends ($b = -0.196, p = 0.006$) were negatively associated with difficulties due to health, predicting a lower number of difficulties. In the fourth model, when controlling for all other predictors, early departure was no longer significant, but the late departure was significantly related to increased difficulties due to health ($b = 0.537, p = 0.000$). These results can be seen in Table 16.

Figure 18

Interaction of Household Dysfunction and Early Departing Friends for BMI



Difficulties Due to Health

There were numerous significant predictors of difficulties due to health in the models presented. Individual characteristics explained 10% of the variance in difficulties ($R^2 = 0.096$). Specifically, age was positively related to difficulties ($b = 0.994, p = 0.000$) as was identifying as Black ($b = 20.546, p = 0.014$). However, education was negatively related to difficulties with having a bachelors degree predicting lower difficulties ($b = -18.055, p = 0.025$) and having a graduate degree also predicted lower difficulties ($b = -28.129, p = 0.001$). Education had the largest effect on difficulties due to health.

Table 16
Regression Analysis for Outcome: Difficulties due to Health

	<i>b</i>	<i>se</i>	<i>p</i>	95% <i>CI</i>	β	<i>R</i> ²
Model 1						0.096
Age	0.994	0.124	0.000	[.752 , 1.236]	0.244	
R: Asian	-2.242	5.777	0.698	[-13.563 , 9.08]	-0.011	
R: Black	20.546	8.375	0.014	[4.132 , 36.96]	0.071	
E: Hispanic	-3.552	7.610	0.641	[-18.468 , 11.364]	-0.015	
R: Indigenous	3.395	14.765	0.818	[-25.545 , 32.335]	0.007	
R: Latinx	6.695	16.028	0.676	[-24.72 , 38.11]	0.013	
R: Other	-8.931	7.839	0.255	[-24.295 , 6.433]	-0.033	
EDU: No HS	34.452	25.882	0.183	[-16.276 , 85.179]	0.039	
EDU: Some College	-1.377	8.584	0.873	[-18.201 , 15.447]	-0.008	
EDU: Bachelors	-18.055	8.058	0.025	[-33.848 , -2.262]	-0.121	
EDU: Grad. Degree	-28.129	8.307	0.001	[-44.41 , -11.847]	-0.173	
Male	7.440	4.371	0.089	[-1.126 , 16.007]	0.048	
Model 2						0.008
Household Dysfunction	5.697	1.864	0.002	[2.044 , 9.35]	0.092	
Model 3						0.049
Homophily	-0.232	0.055	0.000	[-.339 , -.124]	-0.331	
Emotional Closeness	0.290	0.198	0.144	[-.099 , .678]	0.080	
Frequency of Contact	6.482	1.329	0.000	[3.877 , 9.087]	0.142	
Early Arrival Friends	0.017	0.291	0.954	[-.553 , .587]	0.002	
Early Departure Friends	-0.502	0.182	0.006	[-.858 , -.146]	-0.196	
Late Arrival Friends	0.035	0.220	0.875	[-.397 , .467]	0.006	
Late Departure friends	0.357	0.249	0.152	[-.131 , .845]	0.047	
Inconsistent Friends	-0.036	0.394	0.926	[-.809 , .736]	-0.003	
Model 4						0.14
Household Dysfunction	5.372	1.855	0.004	[1.736 , 9.008]	0.087	
Homophily	-0.188	0.056	0.001	[-.297 , -.079]	-0.269	
Emotional Closeness	0.202	0.192	0.292	[-.174 , .579]	0.056	
Frequency of Contact	6.404	1.297	0.000	[3.862 , 8.945]	0.140	
Early Arrival Friends	0.121	0.278	0.664	[-.424 , .666]	0.014	
Early Departure Friends	-0.249	0.180	0.167	[-.601 , .104]	-0.097	
Late Arrival Friends	0.268	0.211	0.205	[-.146 , .682]	0.044	
Late Departure Friends	0.537	0.238	0.024	[.07 , 1.004]	0.071	
Inconsistent Friends	-0.054	0.377	0.887	[-.793 , .685]	-0.004	
Age	0.886	0.126	0.000	[.638 , 1.133]	0.217	
R: Asian	-0.144	5.687	0.980	[-11.29 , 11.003]	-0.001	
R: Black	23.947	8.255	0.004	[7.769 , 40.126]	0.083	
E: Hispanic	-3.502	7.504	0.641	[-18.209 , 11.205]	-0.015	
R: Indigenous	-11.031	14.661	0.452	[-39.767 , 17.705]	-0.022	
R: Latinx	3.014	15.780	0.849	[-27.914 , 33.942]	0.006	
R: Other	-7.091	7.705	0.357	[-22.192 , 8.01]	-0.026	
EDU: No HS	36.387	25.539	0.154	[-13.668 , 86.443]	0.041	
EDU: Some College	1.366	8.501	0.872	[-15.295 , 18.028]	0.008	
EDU: Bachelors	-14.443	8.021	0.072	[-30.164 , 1.278]	-0.097	
EDU: Grad. Degree	-25.593	8.243	0.002	[-41.75 , -9.437]	-0.157	
Male	10.258	4.335	0.018	[1.761 , 18.754]	0.066	
Model 5						0.173
Household Dysfunction	15.110	2.705	0.000	[9.808 , 20.412]	0.245	
Homophily	-0.362	0.070	0.000	[-.5 , -.224]	-0.515	
Emotional Closeness	0.800	0.317	0.012	[.179 , 1.421]	0.221	
Frequency of Contact	6.511	1.283	0.000	[3.997 , 9.026]	0.143	
Early Arrival Friends	0.137	0.276	0.620	[-.404 , .678]	0.016	
Early Departure Friends	-0.134	0.180	0.456	[-.487 , .219]	-0.052	
Late Arrival Friends	0.229	0.211	0.276	[-.184 , .643]	0.037	
Late Departure Friends	0.476	0.241	0.048	[.005 , .948]	0.063	
Inconsistent Friends	-0.251	0.375	0.504	[-.986 , .485]	-0.020	
HDs * Homophily	-0.381	0.088	0.000	[-.553 , -.21]	-0.499	
HDs * Closeness	1.002	0.399	0.012	[.221 , 1.783]	0.229	
HDs * Frequency	-1.705	1.108	0.124	[-3.877 , .467]	-0.044	
HDs * Early Arrival	0.107	0.232	0.646	[-.348 , .561]	0.015	
HDs * Early Departure	0.004	0.159	0.978	[-.308 , .317]	0.002	
HDs * Late Arrival	0.605	0.176	0.001	[.26 , .951]	0.113	
HDs * Late Departure	0.262	0.223	0.240	[-.175 , .699]	0.036	
HDs * Inconsistent	0.718	0.325	0.027	[.082 , 1.355]	0.067	
Age	0.941	0.125	0.000	[.696 , 1.186]	0.231	
R: Asian	-1.648	5.661	0.771	[-12.743 , 9.447]	-0.008	
R: Black	21.847	8.191	0.008	[5.793 , 37.9]	0.076	
E: Hispanic	0.803	7.479	0.914	[-13.856 , 15.462]	0.003	
R: Indigenous	-6.185	14.537	0.671	[-34.677 , 22.307]	-0.012	
R: Latinx	-1.526	15.634	0.922	[-32.168 , 29.115]	-0.003	
R: Other	-6.681	7.613	0.380	[-21.603 , 8.241]	-0.025	
EDU: No HS	30.014	25.418	0.238	[-19.804 , 79.832]	0.034	
EDU: Some College	-1.872	8.412	0.824	[-18.358 , 14.615]	-0.010	
EDU: Bachelors	-16.997	7.970	0.033	[-32.618 , -1.376]	-0.114	
EDU: Grad. Degree	-27.361	8.186	0.001	[-43.406 , -11.317]	-0.168	
Male	13.437	4.319	0.002	[4.971 , 21.902]	0.086	
Intercept/Const.	40.698	37.662	0.280	[-33.117 , 114.513]	0.553	

Difficulties due to health had the most significant interactions within the entire model. Homophily, emotional closeness, late arrival friends, and inconsistent friends moderated the relationship between household dysfunction and difficulties due to health. The interaction of household dysfunction and homophily is significant ($b = -0.381, p = 0.000$), where those with no homophily had a slight increase in health difficulties as household dysfunctions increased. However, those with full homophily in their networks significantly predicted decreases in difficulties due to health. This relationship can be seen in Figure 19. Emotional closeness moderated the relationship differently ($b = 1.002, p = 0.012$). Emotional closeness was a risk factor, significantly increasing how people experience difficulties due to health as household dysfunctions increase. This relationship can be seen in Figure 20. Finally, inconsistent friends also moderated the relationship between household dysfunction and difficulties due to health ($b = 0.718, p = 0.027$). If someone had no inconsistent friends and no household dysfunction, they were likely to have fewer difficulties than those with four household dysfunctions. However, those with four household dysfunctions were more likely to have more difficulties with no inconsistent friends than with all inconsistent friends. This relationship can be seen in Figure 22.

Figure 19

Interaction of Household Dysfunction and Homophily for Difficulties due to Health

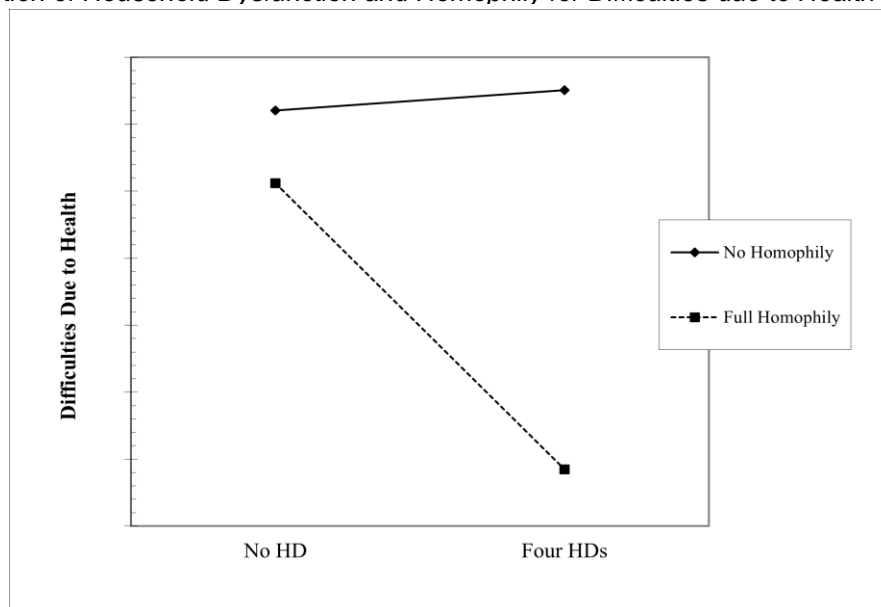


Figure 20

Interaction of Household Dysfunction and Closeness for Difficulties due to Health

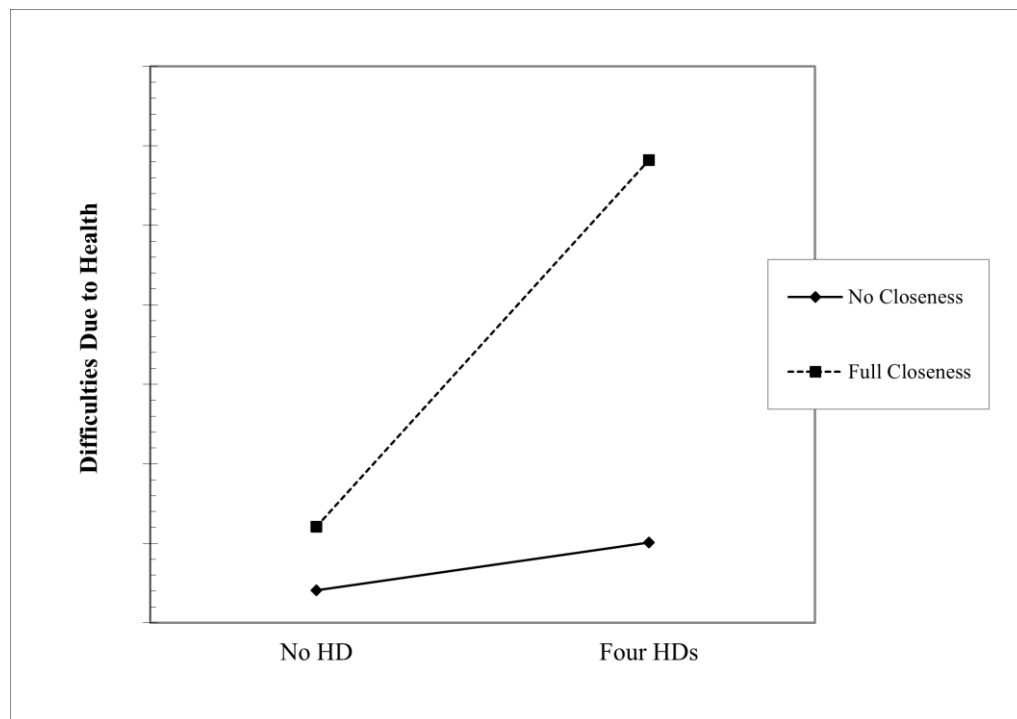


Figure 21

Interaction of Household Dysfunction and Late Arriving Friends for Difficulties due to Health

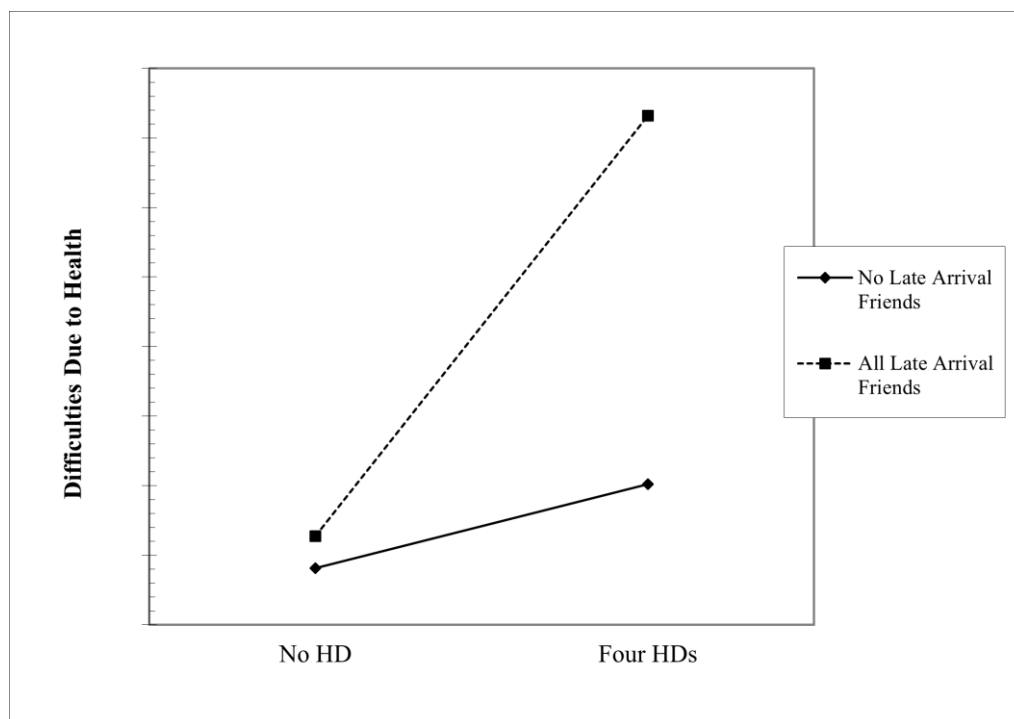
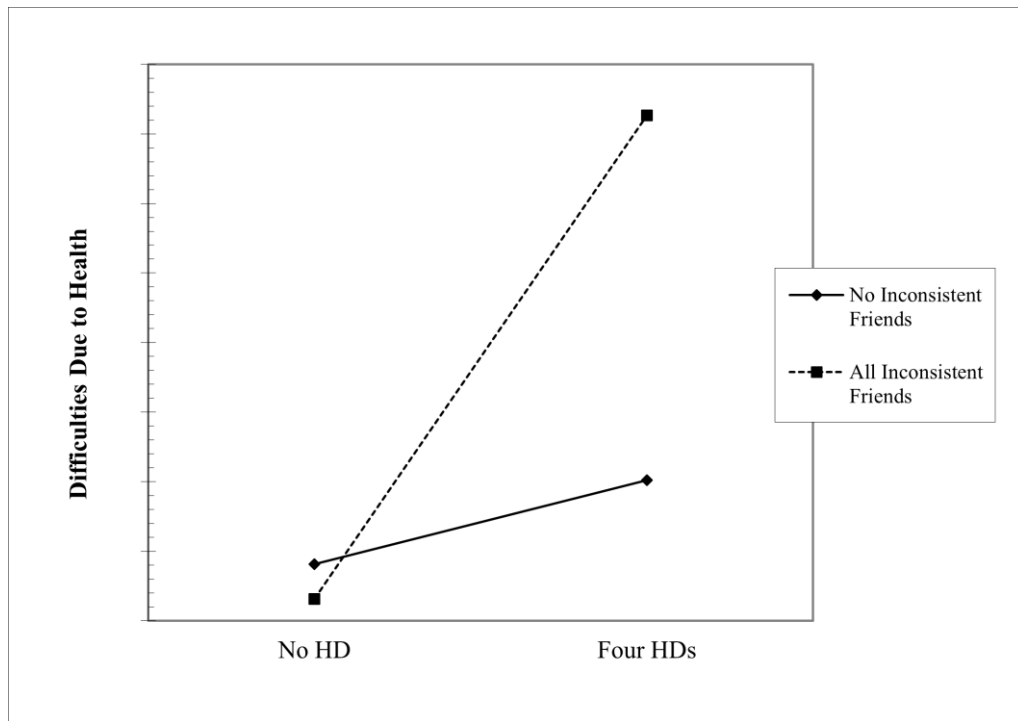


Figure 22

Interaction of Household Dysfunction and Inconsistent Friends for Difficulties due to Health



Discussion

This study sheds light on the role that social networks play in adult health outcomes for those who have faced adverse childhood experiences. Five outcomes (general health, mental health, health conditions, BMI, and difficulties due to health) were examined in a single analysis with five separate models being run. The results of this study support the argument that household dysfunction affects health outcomes. However, the results did not wholly support the hypothesis that closeness, frequency, social network stability, and homophily would moderate the relationship between household dysfunction and individual health outcomes. While the results did support some of the hypotheses, there are notable differences in health outcomes. In all, the results suggest meaningful opportunities for future research and adaptation of community engagement and interventions.

Household Dysfunction's Effects on Health

The basic assumption of these models was that household dysfunction affects health outcomes. This assumption was demonstrated by household dysfunction directly affecting general/poor health, mental health, health conditions, and difficulties due to health. In particular, household dysfunction had the most substantial effect on mental health, where an increase in household dysfunctions predicted a decrease in mental health. Further, household dysfunction was the second most substantial effect for general/poor health and difficulties due to health.

It has been previously found that ACEs do not directly cause health outcomes, but instead, evidence suggests that trauma changes brain structure and stress responses, affecting health outcomes (Anda et al., 2006). In the present study, it was found that household dysfunctions were not the strongest predictor of health conditions but still had a significant effect. Further, suppose the mechanism through which people face poor health is physiological. In that case, it is also reasonable to assume that difficulties due to health may not be as influenced by household dysfunction.

One result that contradicts previous findings is that household dysfunction did not predict BMI in this sample. ACEs have been associated with obesity in children (Ahn et al., 2019) and adults, resulting in numerous adverse health outcomes such as cardiovascular disease (Allen et al., 2019; Felitti et al., 1998). The BMI measure used in this study was calculated from the height and weight of participants and is a simplistic measure that has errors for measuring obesity (Rothman, 2008). Furthermore, BMI may be more closely related to abuse and neglect ACEs, not studied here. What is not understood in this study is an individual's pattern of weight gain or diet. Furthermore, while high BMI can be a health concern, so can low BMI.

Protective Factor: Homophily

This study examined homophily, how similar people's social connections are to them, as a proxy for social capital as suggested in the literature (Kawachi et al., 2008; Poortinga, 2012). Homophily included age, gender, race, political orientation, and religion. The results of this study

supported the hypothesis that homophily moderated the relationship between household dysfunction and health outcomes. Homophily was protective in every outcome in the analysis. Not only was homophily protective, but it was also a stronger predictor for health conditions and general/poor health than was household dysfunction. The interaction of household dysfunction and homophily having strong positive effects suggests that homophily is a powerful tool that can foster resilience in individuals.

Identifying homophily as a protective factor directly contradicts the previous literature. Whereas Poortinga (2012) suggests that bridging capital in the form of trust across groups and inter-group cohesion is positively associated with personal health. Kawachi et al. (2008) state that these results are often associated at the community level rather than the individual level as studied here. Bonding social capital represented in this study by homophily has been identified as challenging due to the burden of friendships and connections (Mitchell & LaGory, 2002). However, it also can be protective for some groups to avoid bridging to stressful communities that may promote racism or oppression (Shan et al., 2014).

Risk Factors

This study also used emotional closeness, frequency of contact, and stability of friends as other indicators of the quality of the social network for individuals. Unlike homophily which was universally positive for all outcomes, the other network measures were risk factors and less consistent.

Emotional Closeness and Frequency of Contact

This study also supports the hypothesis that emotional closeness and frequency of contact moderated the relationship between household dysfunction and health outcomes. However, emotional closeness and frequency of contact were identified as risk factors in this study, which was not hypothesized. Closeness moderated the relationship of household dysfunction to health conditions and made the relationship stronger. The number of health conditions hardly increases as household dysfunctions increase for participants who have no closeness but significantly

increased with full closeness. Similarly, closeness amplified the negative relationship of household dysfunction on difficulties due to health. Frequency of contact had no interaction with household dysfunction, but it still increased the risk of difficulties due to health, health conditions, mental health, and poor health.

Closeness had a significant interaction with household dysfunction increasing the risk of adverse health outcomes, while frequency directly influenced negative health outcomes but did not moderate household dysfunction. One plausible explanation for this is directionality. People could seek out closer friends or have more frequent contact with friends when their health is poor. Causal relationships are challenging to establish due to the cross-sectional constraints placed on the data.

Friendship Stability

Less clear is the role that friendship stability plays on health outcomes. This study used categories of friendships to identify stability types. Friends who were present in all three waves of data were considered stable. In contrast, those who did not appear after wave one were early departures, and those who appeared in wave two were considered early arrivals. Similarly, those who disappeared after wave two were late departures, and those who appeared in wave three were late arrivals. All other patterns were considered inconsistent.

Late arrival friends moderated the relationship of household dysfunction on general/poor health and difficulties due to health by increasing the risk for those health outcomes. However, late arrival friends also decreased the risk of health conditions for those experiencing household dysfunction. It is unclear how late arrival friends may play a causal relationship in these health outcomes. Early departure friendships predicted lower BMI, interacting with household dysfunction, despite household dysfunction not significantly predicting BMI independently. A possible reason for this could be those losing friends, particularly early, can increase body dysmorphia. It has been found that people establish friendships with those of similar body image

(Christakis & Fowler, 2007; Webb & Zimmer-Gembeck, 2015), and the rejection of a friend could prompt a change in habits relating to BMI.

Conclusion

This study uncovered how social networks could mediate the relationship of household dysfunction on general health, mental health, health conditions, BMI, and difficulties due to health. Specifically, this study hypothesized that emotional closeness, frequency of contact, and stability would protect individuals while homophily would increase the risk of adverse health. Ultimately, these hypotheses were not upheld. Evidence indicating the opposite relationships than hypothesized was demonstrated in these analyses.

Areas for Future Research

The unique way homophily was found to protect individuals who experienced increasing household dysfunction was an unexpected finding. Future research should examine this further by looking at potential interactions of homophily and racial groups or three-way interactions of homophily, racial groups, and adverse childhood experiences. Indeed, a future study could parse out individual types of homophily, such as political homophily or racial homophily, to see if all types are equally important in protecting individuals.

Another area for future research is better understanding how the timing of friendships relates to health outcomes. Due to the cross-sectional nature of this data with analysis constraints, it is unclear if people who have greater emotional closeness and increased frequency of contact with friends had more health problems or if people with more health problems sought out friends. Examining the temporal relationship would help explain these causal relationships.

This study uses household dysfunction as a proxy for all ACEs. There is a considerable difference between household dysfunction and abuse or neglect. The results of this study suggest that further studying ACEs would be warranted. People may develop social networks differently when facing abuse or neglect compared to those only experiencing household dysfunction.

However, this study did not exclude those who experienced abuse or neglect; instead, the study did not ask participants about those experiences.

Strengths & Limitations

Poortinga (2012) noted tremendous potential in using homophily as a proxy for bonding capital. This study demonstrated that using homophily is possible and has significant results for social capital research. However, this study is also limited by using homophily and heterophily as opposite constructs. People can have both strong bridging and bonding capital. This data provides a percentage of relationships that were homophilous or heterophilous, which does not address the nuance of the strength of each type.

The nature of the secondary data limited the study design. In particular, collapsing alters and waves into single averaged measures limits the nuance detected in a multilevel structural equation model. Furthermore, by collapsing these variables, survey weights were not able to be applied as intended. Therefore, generalizability should be used with caution, as it may not accurately represent the population of the bay area of California.

Finally, this sample is based in the bay area of California. It is difficult to know how representative this sample is to the general US population. Factors such as rurality, political leanings, and access to healthcare vary drastically across the country and could play a factor in these results. However, the sample is racially and age-diverse representing people from a wide range of backgrounds.

Implications

As states have begun to try and address the negative outcomes associated with adverse childhood experiences, the notion of self-healing communities has been discussed as a potential intervention (Porter et al., 2016). One component that could be added to the self-healing community model is to intentionally foster opportunities for those with similar backgrounds and experiences to come together for healing. While this study did not examine if the friendship

networks were homophilous concerning household dysfunction, there is potential that bringing people together with high ACE scores could promote positive health outcomes. Aligned with past research, proper social networks can promote resilience for those experiencing ACEs (Schneider et al., 2020).

This study further confirms that ACEs predict poor health. In particular, that household dysfunction independently predicts poor health. It also contributes to the ongoing development of the literature on the mechanisms in which ACEs predict and cause poor health. Social networks need to be examined more and fostered appropriately in interventions. This study suggests that mental health specialists should encourage participants to establish networks of similar people while also recognizing the potential risk of establishing close relationships. Future research can guide how interventions are established and better understand social networks' risks and protective factors.

CHAPTER IV

CONCLUSION

Summary of Major Findings

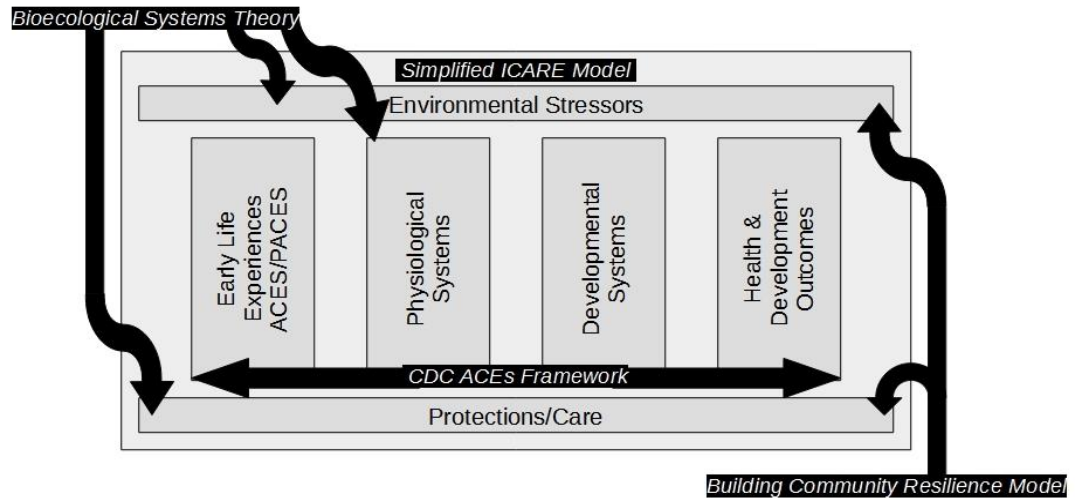
This dissertation aims to understand the community factors that predict adverse childhood experiences and how social relationships can protect individuals from the negative health effects of adverse childhood experiences. This was accomplished using two separate analyses. The first one in Chapter 2, presented a study of how community factors of SES, engagement, neighborhood amenities and detractors, safety, schools, and adult mentors predict adverse childhood experiences. The second study in Chapter 3, examined how social relationships moderate the relationship between adverse childhood experiences and health outcomes. The present chapter summarizes the findings from Chapter 2 and Chapter 3 while relating the findings to the theoretical framework discussed in Chapter 1.

This dissertation was built on one central theoretical framework and three supplemental frameworks guiding the process. A visualization of these models is shown in Figure 23. The Intergenerational and Cumulative Adverse and Resilient Experiences (ICARE) Model is the leading theory that guides this dissertation (Hays-Grudo & Morris, 2020). This model proposes that early life experiences affect individual health and development outcomes, as suggested by the process of adverse childhood experiences from the Centers for Disease Control (2020). Further, the model suggests that environmental characteristics, including stressors and protections, influence a person's development. This proposition borrows from bioecological systems by Bronfenbrenner and Ceci (1994), where over time, contextual factors influence the biological

and physiological processes. Finally, the community can build capacity and ultimately help individuals' opportunities to develop resilient communities. This last aspect is aligned with the Building Community Resilience (BCR) model from Ellis and Dietz (2017).

Figure 23

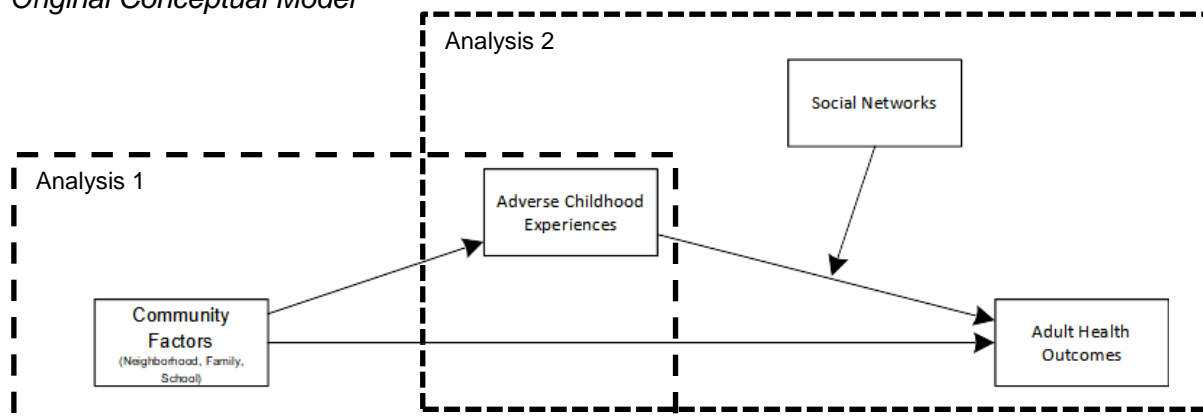
Visualization of Interconnected Theories



The two studies presented in this dissertation explain the pathways in the original conceptual model, presented in Figure 24. Some community factors were found to predict adverse childhood experiences in the form of household dysfunction and adverse family experiences. Furthermore, adverse childhood experiences predicted many, but not all, health outcomes in adults. Some social network characteristics moderated this relationship.

Figure 24

Original Conceptual Model



Note. Adverse Childhood Experiences includes household dysfunction and adverse family experiences

Study 1

The hypothesis of Chapter 2 was: Poor neighborhood quality, lower economic stability, low-quality schools, and low student engagement are positively related to household dysfunction and adverse family experiences. This study explored the ecological factors of safe schools, neighborhood quality, and social activities that mitigated the risk of a child experiencing household dysfunction and adverse family experiences. The hypothesis overall supported. Overall results can be seen in Table 17 below.

Six variables were related to the adverse experiences index. The presence of community amenities and having an adult mentor both predicted higher adverse experience scores. SES, engagement, safety, and school attendance, however, were negatively related to adverse experiences. Higher SES predicted a lower number of adverse experiences. Similarly, school and extracurricular engagement predicted lower levels of adverse experiences. Finally, increased perceptions of school and neighborhood safety predicted lower adverse experiences.

The household dysfunction index was significantly associated with five predictors. Similar to the total adverse experiences, there was a negative relationship with SES, engagement, safety, and school attendance, and there was a positive relationship with having an adult mentor.

However, neighborhood amenities did not predict household dysfunction as they did with all adverse experiences. The data suggest that adverse family experiences such as neighborhood violence and racism are more closely tied to the neighborhood amenities. In contrast, household dysfunctions such as divorce or mental illness are not closely tied to the neighborhood.

Only four measures were significantly related to adverse family experiences. As with total adverse experiences, there was a negative relationship from SES, safety, and school attendance to adverse family experiences. However, unlike household dysfunction, community amenities were positively related to adverse family experiences. Unlike with total adverse experiences, there was no significant relationship between engagement and having an adult mentor. Given that adverse family experiences affect the family unit, engagement and adult mentors are more likely to be directly tied to the child.

Table 17

Overview of Results from Study 1

	Household Dysfunction	Adverse Family Experiences	Adverse Experiences
SES	Negative	Negative	Negative
Engagement	Negative	None	Negative
Amenities	None	Positive	Positive
Detractions	None	None	None
Safety	Negative	Negative	Negative
School Attendance	Negative	Negative	Negative
Adult Mentor	Positive	None	Positive
Adequate Insurance	None	None	None

Note. The direction of significant relationships is noted

Study 2

Chapter 3 explored the role social networks play in moderating the relationship between household dysfunction and health outcomes. The hypothesis tested in Chapter 3 was: Closeness, frequency, social network stability, and homophily will moderate the relationship between household dysfunction and individual health outcomes (self-reported health, mental health, physical health). Specifically, emotional closeness, more frequent contact, more stable networks over time, and heterophily of individual characteristics such as race, religion, gender, and political orientation will protect individuals from the adverse health outcomes of household dysfunction.

There was significant moderation identified for the various health outcomes studied. A table of significant and insignificant results can be seen in Table 18 below. Household dysfunction was found to predict poor general health, lower mental health, a higher number of health conditions, and greater difficulties due to health. Household dysfunction was not significantly related to BMI. Moderation tested the role that various social network characteristics play in protecting individuals.

It was consistently found that homophily moderated the relationship between household dysfunction and all health outcomes. Homophily served as a protective factor. In contrast, emotional closeness negatively moderated the relationship between household dysfunction and two health outcomes: the number of health conditions and difficulties due to health. Thus, emotional closeness was a risk factor for these health outcomes. Not every variable, however, had a clear pattern of moderation.

Two social network variables that did not have a clear pattern of moderation served as a risk factor for some health outcomes and a protective factor for other health outcomes. The frequency of contact with friends served as a protective factor for mental health but a risk factor for general health. Increased frequency of contact increased the potential for poor health and increased the potential for good mental health for those experiencing household dysfunction. This

contradiction could occur due to two reasons. First, Christakis and Fowler (2007) suggest that negative health outcomes such as obesity spread through a network, which this result supports. However, a high frequency of contact with friends may help serve as a mental health barrier, despite the spread of other negative health outcomes. Similarly, frequency of contact may be a coping mechanism for individuals facing increased health challenges, which results in better mental health.

Social network instability, represented by variables of network patterns that did not have an important person named in all three time points, was also both a protective factor and a risk factor. However, in the model, all instability variables, combined, were never unanimously predictive of a specific health outcome, suggesting that in comparison to stable relationships, only certain types of instability affect health outcomes. Aspects of instability were a risk factor for poor general health, increased number of health conditions, and difficulties due to health. However, aspects of instability also predicted positive mental health, yet did not moderate the relationship between household dysfunction and mental health. This result suggests that people may seek out new friendship networks either by adding or removing friends when they face challenges, resulting in better mental health outcomes, but that has no bearing on the relationship between ACEs and mental health. Finally, some aspects of instability decreased BMI for those experiencing household dysfunction, while household dysfunction did not predict BMI independently. Ultimately BMI is relatively constant with people with no household dysfunction to having four household dysfunctions present. Nevertheless, people have lower BMI when their friends are likely to leave their network early. It is possible that personal characteristics such as neuroticism associated with body weight (Vainik et al., 2019) could also create unstable networks.

Table 18*Overview of Results from Study 2*

	Poor General Health	Mental Health	Health Conditions	BMI	Difficulties Due to Health
Relationship					
Household Dysfunction	Positive	Negative	Positive	None	Positive
Moderation					
Emotional Closeness	None	None	Positive	None	Positive
Frequency of Contact	None	Non	None	None	None
Social Network Instability	Some Positive	None	Some Positive	Some Negative	Some Positive
Homophily	Negative	Positive	Negative	Negative	Negative

Note. The direction of significant relationships is noted

Discussion

The two manuscripts presented in this dissertation contribute to the literature around adverse childhood experiences. Specifically, it justifies the need to study and work with the communities in which people live to decrease the likelihood of experiencing adverse childhood experiences. It also explores the possibility that social connections serve as protective and risk factors for individuals who have faced childhood adversity. Additionally, these two manuscripts emphasize the need to be specific when measuring adverse childhood experiences because there are consequences of using limited measures such as household dysfunction.

There is more to the relationship between adverse childhood experiences and negative health outcomes than the causal pathway established by these constructs. The ICARE Model (Hays-Grudo & Morris, 2020) postulates that environmental stressors increase the risk of having negative early life experiences and the risk of negative health outcomes, among other physiological and developmental challenges. Stress appears to have a significant role in adverse childhood experiences and health outcomes. This relationship is primarily seen in the community context for children's adverse experiences. The data shows that with increased stressful situations such as low SES and poor neighborhood environments, children are at increased risk of

household dysfunction and adverse family experiences. Additionally, with more frequent contact with individuals, people's positive health outcomes are decreased. This relationship could be explained by the notion that social capital has a dark side (Villalonga-Olives & Kawachi, 2017). Individuals can burden others and increase the stress of all involved. People are not always just affected by their immediate environment, and stress is passed throughout a community.

The communities where people live have a direct effect on experiencing household dysfunction. Specifically, the idea that stress due to daily life routines and economic conditions can spill over into the family is supported (Haas et al., 2018; Maguire-Jack & Font, 2017a). Stress is not a variable measured in this study, but the previously mentioned literature has suggested that these community measures of neighborhood quality and economic stability are factors that increase stress. In this dissertation, SES and safety both predict adverse experiences, while school attendance and engagement predict lower adverse experiences. Interestingly, neighborhood detractors did not predict adverse experiences. While neighborhood litter, blight, and vandalism are consequential, they might not be aspects of the community that increases stress. Continuing the idea of stress spillover, those who have experienced household dysfunction had increased health risks when having frequent contact with friends but had better mental health outcomes. Connections might be a key to reducing stress when facing increased health challenges, and in turn, increasing emotional stability.

However, stress spillover is not wholly supported by the data. It was assumed that having an adult mentor would predict lower ACEs due to relieving stress among family. It has been found that adult mentors are protective for children facing abuse (Beier et al., 2000; Weber Ku et al., 2020). However, in this study, having an adult mentor was associated with an increase in adverse experiences. This may be attributed to the study's correlational nature, where children in households with higher dysfunction and more adverse family experiences are more likely to require an adult mentor. Similar to requiring more frequent contact with important people, the presence of individuals may or may not reduce stress as much as it serves to address specific

needs. Similarly, as Christakis (2004) and Christakis and Fowler (2007, 2008) note in their research, negative health behaviors also can spread throughout the network resulting in poor health outcomes. This data supports both ideas that social connections might be needed for those who are facing poor health outcomes and that poor health outcomes could be spread throughout a network.

This dissertation conceptualized that contextual factors such as SES, neighborhood qualities and safety would increase adverse childhood experiences, decreasing later-life health outcomes. Additionally, the relationship between ACEs and health outcomes would be moderated by social networks. This entire pathway was not able to be studied with the data used for this dissertation. In Chapter 2, the first part of the pathway was established, connecting contextual factors to household dysfunction. In Chapter 3, it was established that household dysfunction predicts poorer health outcomes and that social relationships serve as both a protective factor and a risk factor. This dissertation does not establish the pathway between contextual factors and health outcomes or the relationship to childhood abuse and neglect.

This dissertation demonstrates the need to measure adverse childhood experiences with specificity. Felitti et al. (1998) did not study individual ACEs in their grand ACE study and thus did not emphasize a specific ACE type. This study only used household dysfunction ACEs due to data limitations. Therefore, caution needs to be applied when extrapolating these results to all ACEs. Further, the National Survey of Children's Health (U.S. Census Bureau, 2018) uses an ACE measure that includes the household dysfunction ACEs from the original study by Felitti et al. (1998), as well as measures that were not studied in the original ACE study. The results of this dissertation identify differences in the household dysfunction ACEs and the aforementioned adverse family experiences. Researchers should be specific when articulating what measures they use and not conflate ACEs beyond the original study as generalized adverse childhood experiences.

Strengths and Limitations

This work contributes to a more complete picture of adverse childhood experiences. It expands upon the body of literature about the health outcomes for those who face childhood adversity that has evolved since Felitti et al. (1998). It uses social network measures as a moderator for the negative health outcomes of household dysfunction. In prior research, social networks have only been examined with abuse and neglect (Savla et al., 2013) and general adult trauma (McLafferty et al., 2019; Wilkins et al., 2017). While the social network measures were self-reported by respondents, they represent greater specificity to understanding someone's network than asking attitudinal questions about their friendships.

This dissertation also examined the conditions in which ACEs can thrive, providing valuable context for understanding how and why ACEs occur. Similar to social networks, child abuse and neglect have often been the adversity studied when examining contextual factors and their impact on ACEs (Maguire-Jack & Font, 2017a, 2017b; Maguire-Jack & Showalter, 2016; Maguire-Jack & Wang, 2016; Molnar & Beardslee, 2014; Molnar, Beatriz, et al., 2016; Molnar, Goerge, et al., 2016). This study examines these community factors concerning household dysfunction ACEs.

This work also exposes several limitations that should be noted. First, secondary data sources are constrained by the survey items and selected populations. Not having weights for the subsamples used in these studies limited the generalizability of the findings to the population being studied. Second, the data are analyzed cross-sectionally. Even though longitudinal data was included, averaging data over time made it impossible to maintain the time variability to better address the research question.

Finally, a strength and limitation of this dissertation is the use of two manuscripts to address an overall research question. An extremely complex study design would be required to understand an extensive theoretical process such as how ACEs mediate the relationship between contextual factors and health outcomes and how social networks moderate the relationship

between ACEs and health outcomes. Using two studies to examine different parts of this relationship is an asset to the body of literature around ACEs. However, because they are two separate studies, assumptions are limited to how the entire process works. The first study does not understand how ACEs mediate health outcomes due and the second study does not account for childhood contextual factors such as neighborhood safety, violence, and engagement. Thus, the theoretical model is supported but not thoroughly tested.

Implications

This dissertation uses a variable-centered approach with person-specific elements to deepen the understanding of the research question. The traditional variable-centered approach focuses on explaining the relationship between the variables of interest, while the person-specific approach assumes that “an individual’s prior behaviors, genetic makeup, and contextual risk or protective factors operate as an integrated whole” (Sterba & Bauer, 2010 as cited in Howard & Hoffman, 2018, p. 851). The first study examined the role of community factors using a variable-centered question. However, the second study examined the role of social networks using a variable-centered approach while integrating person-specific elements of social networks to the analysis. This dissertation has highlighted that person-specific approaches are helpful for ACEs research and should be considered in future studies (Howard & Hoffman, 2018).

For praxis, this dissertation also highlights the need to focus on both individuals and communities. Significant factors such as neighborhood and school safety significantly predicted adverse childhood experiences. However, social networks also served a mediating role for individuals. True to Bronfenbrenner and Ceci’s (1994) bioecological systems theory, a multifaceted approach should address adverse childhood experiences and later-life health outcomes. Individual characteristics are important, but so are factors in the microsystem such as friends, family and the mesosystem, such as the community. Indeed, there should be a focus on building capacity within communities to address ACEs and thus later-life health outcomes, as modeled by the Building Community Resilience Model (Ellis & Dietz, 2017). Capacity building

includes bringing people together to learn about ACEs and having a shared understanding of past trauma as well as general community engagement and cross-sector engagement opportunities.

The results of this dissertation also highlight the support for the Robert Wood Johnson Foundation's self-healing communities model (Porter et al., 2016). In particular, this dissertation emphasizes focusing on the community to enhance resilience for those facing adversity. Knowing that the community plays a role in increasing the risk for adversity, changing the community can reduce the intergenerational transmission of ACEs. This action is similar to how schools can protect individuals caught in an intergenerational poverty loop (Barker et al., 2019). Further, recognizing that the community does not stop with the contextual factors and includes social networks emphasizes promoting positive social networks.

One particular focus of self-healing communities is reducing intergenerational ACEs. This dissertation highlights that ACEs affect people at multiple points throughout their lives. Woods-Jaeger et al. (2018) interviewed individuals who had experienced ACEs as a child and were now parents. They note that participants describe a burden of ACEs that people carry. Participants described three socially focused factors: resilience-promoting factors of open communication, expressions of love, and close family relationships. Social connections need to be emphasized in any intervention and future research.

Future Research

There are four ways in which future research can expand upon the observations made in this study. First, a longitudinal approach could help further recognize causal relationships between ecological factors and childhood adversity. Further, knowing if friendships change health outcomes or if people are more likely to seek out certain friendships based on health outcomes is crucial before implementing large-scale social programs.

Future studies should also do social network analysis using adverse childhood experiences. Given that people who interact with similar individuals have better health outcomes, it raises the hypothesis that people with similar ACE scores who come together might heal each

other. This relationship could be further studied by doing a social network analysis of individuals and their social networks asking ACE questions – a study that has not been conducted thus far.

There appears to be a great deal of variability between household dysfunction ACEs and the abuse and neglect ACEs. While this dissertation supplements previous literature that focuses on abuse and neglect and uses some of the standard ACE measures of household dysfunction, this dissertation does not examine the role that abuse and neglect play. This dissertation provides evidence to support multiple directions of future research. Future research can replicate these studies using the complete ACE measure.

Finally, the data presented here are quantitative and do not explore the nuances of these relationships. A qualitative study of how friendships affect individuals and how individuals handle the stressors of their environment would supplement the results presented here. These findings provide evidence for the need to conduct this future research and expand upon our knowledge of ACEs

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APPENDICES

APPENDIX A

Institutional Review Board Status



Oklahoma State University Institutional Review Board

Date: 12/17/2020
Application Number: IRB-20-557
Proposal Title: Community Context, Social Networks, and ACEs: Impacts on Health

Principal Investigator: Patrick Grayshaw
Co-Investigator(s):
Faculty Adviser: MIKE STOUT
Project Coordinator:
Research Assistant(s):

Processed as: Not Human Subjects Research

Status Recommended by Reviewer(s): Closed

Based on the information provided in this application, the OSU-Stillwater IRB has determined that your project does not qualify as human subject research as defined in 45 CFR 46.102 (d) and (f) and is not subject to oversight by the OSU IRB. Should you have any questions or concerns, please do not hesitate to contact the IRB office at 405-744-3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB

APPENDIX B

Questions used in Chapter 2

Table 19

National Survey of Children's Health – Select Survey Questions Used for Analysis

Number	Question	Response Options
A3	How often does this child... <i>Choices of Always, Usually, Sometimes, Never</i>	Show interest and curiosity in learning new things? Work to finish tasks he or she starts? Stay calm and in control when faced with a challenge? Care about doing well in school? Do all required homework? Argue too much?
E1	DURING THE PAST 12 MONTHS, was this child EVER covered by ANY kind of health insurance or health coverage plan?	Yes, this child was covered all 12 months → SKIP to question E4 Yes, but this child had a gap in coverage No
E3	Is this child CURRENTLY covered by ANY kind of health insurance or health coverage plan?	Yes No → SKIP to question F1 on page 12

Table 19 Continued

Number	Question	Response Options
E4	Is this child CURRENTLY covered by any of the following types of health insurance or health coverage plans? <i>Mark (X) Yes or No for EACH item</i>	<p>Insurance through a current or former employer or union</p> <p>Insurance purchased directly from an insurance company</p> <p>Medicaid, Medical Assistance, or any kind of government assistance plan for those with low incomes or a disability</p> <p>TRICARE or other military health care</p> <p>Indian Health Service</p> <p>Other, specify:</p>
E5	How often does this child's health insurance offer benefits or cover services that meet this child's needs?	<p>Always</p> <p>Usually</p> <p>Sometimes</p> <p>Never</p>
E6	How often does this child's health insurance allow him or her to see the health care providers he or she needs?	<p>Always</p> <p>Usually</p> <p>Sometimes</p> <p>Never</p>
E7	Thinking specifically about this child's mental or behavioral health needs, how often does this child's health insurance offer benefits or cover services that meet these needs?	<p>This child does not use mental or behavioral health services</p> <p>Always</p> <p>Usually</p> <p>Sometimes</p> <p>Never</p>

Table 19 Continued

Number	Question	Response Options
G1	DURING THE PAST 12 MONTHS, about how many days did this child miss school because of illness or injury? <i>Include days missed from any former home schooling</i>	No missed school days 1-3 days 4-6 days 7-10 days 11 or more days This child was not enrolled in school
G4	DURING THE PAST 12 MONTHS, how often did you attend events or activities that this child participated in?	Always Usually Sometimes Rarely Never
G5	DURING THE PAST 12 MONTHS, did this child participate in... <i>Options of Yes/No for response options</i>	A sports team r did he or she take sports lessons after school or on weekends? Any clubs or organizations after school or on weekends? Any other organized activities or lessons, such as music, dance, language, or other arts? Any type of community service or volunteer work at school, place of worship, or in the community? Any paid work, including regular jobs as well as babysitting, cutting grass, or other occasional work?

Table 19 Continued

Number	Question	Response Options
I8	Which of these statements best describes your household's ability to afford the food you need DURING THE PAST 12 MONTHS?	<p>We could always afford to eat good nutritious meals</p> <p>We could always afford enough to eat but not always the kinds of food we should eat</p> <p>Sometimes we could not afford enough to eat</p> <p>Often we could not afford enough to eat</p>
I9	At any time DURING THE PAST 12 MONTHS, even for one month, did anyone in your family receive...	<p>Cash assistance from a government welfare program?</p> <p>Food Stamps or Supplemental Nutrition Assistance Program (SNAP) benefits?</p> <p>Free or reduced-cost breakfasts or lunches at school?</p> <p>Benefits from the Woman, Infants, and Children (WIC) Program?</p>
I10	In your neighborhood, is/are there...	<p>Sidewalks or walking paths?</p> <p>A park or playground?</p> <p>A recreation center, community center, or boys' and girls' club?</p> <p>A library or bookmobile?</p> <p>Litter or garbage on the street or sidewalk?</p> <p>Poorly kept or rundown housing?</p> <p>Vandalism such as broken windows or graffiti?</p>

Table 19 Continued

Number	Question	Response Options
I11	<p>To what extent do you agree with these statements about your neighborhood or community?</p> <p><i>Options of: definitely agree, somewhat agree, somewhat disagree, definitely disagree</i></p>	<p>People in this neighborhood help each other out</p> <p>We watch out for each other's children in this neighborhood</p> <p>This child is safe in our neighborhood</p> <p>When we encounter difficulties, we know where to go for help in our community</p> <p>This child is safe at school</p>
I12	<p>Other than you or other adults in your home, is there at least one other adult in this child's school, neighborhood, or community who knows this child well and who he or she can rely on for advice or guidance?</p>	<p>Yes</p> <p>No</p>
I13	<p>The next questions are about events that may have happened during this child's life. These things can happen in any family, but some people may feel uncomfortable with these questions. You may skip any question you do not want to answer.</p> <p>To the best of your knowledge, has this child EVER experienced any of the following?</p> <p><i>Options of Yes/No for response options</i></p>	<p>Parent or guardian divorced or separated</p> <p>Parent or guardian died</p> <p>Parent or guardian served time in jail</p> <p>Saw or heard parents or adults slap, hit, kick, punch one another in the home</p> <p>Was a victim of violence or witnessed violence in his or her neighborhood</p> <p>Lived with anyone who was mentally ill, suicidal, or severely depressed</p> <p>Lived with anyone who had a problem with alcohol or drugs</p> <p>Treated or judged unfairly because of his or her race or ethnic group</p>

Table 19 Continued

Number	Question	Response Options
J6	What is the highest grade or level of school you have completed? <i>Mark (X) ONE box</i>	8 th grade or less 9 th – 12 th grade; No diploma High School Graduate or GED Completed Completed a vocational, trade, or business school program Some College Credit, but no Degree Associate Degree (AA, AS) Bachelor’s Degree (BA, BS, AB) Master’s Degree (MA, MS, MSW, MBA) Doctorate (PhD, EdD) or Professional Degree (MD, DDS, DVM, JD)
J18	<i>If primary caregiver is not completing the survey...</i> What is the highest grade or level of school this primary caregiver has completed? <i>Mark (X) ONE box.</i>	8 th grade or less 9 th – 12 th grade; No diploma High School Graduate or GED Completed Completed a vocational, trade, or business school program Some College Credit, but no Degree Associate Degree (AA, AS) Bachelor’s Degree (BA, BS, AB) Master’s Degree (MA, MS, MSW, MBA) Doctorate (PhD, EdD) or Professional Degree (MD, DDS, DVM, JD)

Table 19 Continued

Number	Question	Response Options
K3	<p>Income in 2017 <i>Mark (X) for the “Yes” box for each type of income this child’s family received, and give your best estimate of the TOTAL AMOUNT IN THE LAST CALENDAR YEAR. Mark (X) the “No” box to show types of income NOT received</i></p>	<p>Wages, salary, commissions, bonuses, or tips for all jobs.</p> <p>Self-employment income from own nonfarm businesses or farm businesses, including proprietorships and partnerships</p> <p>Interest, dividends, net rental income, royalty income, or income from estates and trusts</p> <p>Social security or railroad retirement; retirement, survivor, or disability pensions</p> <p>Supplemental security income (SSI); any public assistance or welfare payments from the state or local welfare office.</p> <p>Any other sources of income received regularly such as Veterans’ (VA) payments, unemployment compensation, child support, or alimony.</p>
K4	<p>The following question is about your 2017 income. Think about your total combined family income INT THE LAST CALENDAR YEAR for all members of the family. What is that amount before taxes? <i>Include money from jobs, child support, social security, retirement income, unemployment payments, public assistance, and so forth. Also, include income from interest, dividends, net income from businesses, farm or rent, and any other money income received.</i></p>	

Note. Survey questionnaires for two age groups were used: T2 & T3

APPENDIX C

Questions Used in Chapter 3

Table 20

UCNets – Select Survey Questions Used for Analysis

Number	Question	Response Options
00	What month and year were you born?	Month: Year:
Sc008	What is your gender?	Male Female
A.11.a. <i>W1 only</i>	Did your parents ever get divorced or split up?	Yes No
B.2.a	Please think about people you typically do these sorts of things with – or other social things as well, such as going shopping, out for drinks, to the park, or just hanging out. Who are the people you usually do these sorts of things with?	
B.4	Sometimes personal matters come up that concern people, like issues about relationships, important things in your life, difficulty experiences. Do you <u>ever</u> confide in someone about these sorts of things or do you never confide in someone?	Yes No, never confide <i>Skip B.4.a</i>
B.4.a	Who do you confide in about these sorts of things?	

Table 20 Continued

Number	Question	Response Options
B.5	When you have to make important decisions – for example, about taking a job, family issues, or health problems – are there <u>any</u> people whose advice you seek out or would seek out in making those decisions? They can be family, friends, or professional advisors.	Yes, there are people No people <i>Skip B.5.a</i>
B.5.a	Whose advice do you or would you seek out?	
B.6.a	In the last few months, have any friends, relatives, or acquaintances given you any practical help like moving furniture, doing repairs, picking up something at the store, looking after a child, giving you a ride, or things like that?	Yes No <i>Skip B.6.b</i>
B.6.b	Please give us the names of people who have done things like this for you in the last few months	
B.7.a	If you were seriously injured or sick and needed some help for a couple of weeks with things such as preparing meals and getting around, who would you ask?	Ask particular people I know for help Ask a group for help: what group would that be? Pay for help
B.7.b.	<i>If ask particular in B.7.a is not checked...</i> But if you needed to, are there particular people you could ask for help?	Other: What would that be? Yes No <i>Skip B.7.C.</i>
B.7.c.	Who would these people be? These can be people you have named before or new people.	

Table 20 Continued

Number	Question	Response Options
B.8.a.	We have been asking about people who help you out in different ways. Now, let's turn things around. Who are the people that <u>you</u> help our practically, or with advice, or in other kinds of ways at least occasionally? They can be people you've already named or new people.	
B.9.a.	There are sometimes people we know who ask a lot of us, who are sometimes demanding or difficulty. Who are the people that you sometimes find demanding or difficulty? They can be people you've already named or new people	
C1b_Nsamesex	Which of the people on this list are also [gender]?	Yes Blank Not applicable
C1c_Nsameage	Which of the people on this list are about [] to [] years old? (R's age plus/minus 5 years)	Missing Yes Blank Not applicable
C1c_Nolder	Which of the people on this list are about [] or older? (R's age plus 6)	Missing Yes Blank Not applicable Missing

Table 20 Continued

Number	Question	Response Options
C2b_Nclose	Which of the people on this list do you feel especially close to?	Yes Blank Not Applicable Missing
C2f_Nsamerel	Which of the people on this list are of the same religion as you are [if you have no religion, then check those whom you know also have no religion]	Yes Blank Not Applicable Missing
C2g_Nsamerace	Which of the people on this list are from the same racial or ethnic background as you are? [However you define your race or ethnicity for yourself.]	Yes Blank Not Applicable Missing
C2h_Ndifpolitics	Which of the people on this list hold political opinions that are <u>different</u> from yours? (If you are unsure about their opinions, do not read off the name)	Yes Blank Not Applicable Missing
D.1.f.	About how often do you see _____ <u>in person these days?</u>	At least once a day At least once a week At least once a month Several times during the year Once a year or less Never

Table 20 Continued

Number	Question	Response Options
D.1.g.	About how often do you talk to _____ by <u>phone</u> [home phone or cellphone] these days?	At least once a day At least once a week At least once a month Several times during the year Once a year or less
D.1.h	And about how often do you communicate with _____ by text, email, or other ways <u>online</u> these days?	Never At least once a day At least once a week At least once a month Several times during the year Once a year or less
G.1	Much of this study concerns health. Would you say your health is excellent, very good, good, fair, or poor?	Never Excellent Very Good Good Fair Poor

Table 20 Continued

Number	Question	Response Options
G.7	We have a few more health questions. Has a doctor <u>ever</u> told you (not just in the last year or so) that you had any of these conditions?	<p>High blood pressure or hypertension</p> <p>Diabetes or high blood sugar</p> <p>A heart attack, coronary heart disease, angina, congestive heart failure, or another heart problem</p> <p>Asthma or another breathing issue</p> <p>Arthritis or rheumatism</p> <p>Depression or another psychological problem</p>
G.10.a	We need to understand the difficulties some people may have with various activities. Please check whether you have any difficulty doing each of the activities listed here	<p>No – None of the above</p> <p>Difficulty walking several blocks</p> <p>Difficulty dressing, including putting on shoes and socks</p> <p>Difficulty bathing or showering</p> <p>Difficulty hearing what people are saying</p> <p>Difficulty seeing or reading</p> <p>No difficulty with any of these</p>
H1 <i>Wave 1 only</i>	What is your height?	Feet:
H2	What is your weight?	Inches: Pounds:

Table 20 Continued

Number	Question	Response Options
H.16.a	The next 10 questions are about how you have been feeling during <u>the past 30 days</u> . About how often during the past 30 days did you feel <u>nervous</u> ?	All of the time Most of the time Some of the time A little of the time
H.16.b	During the past 30 days, about how often did you feel <u>hopeless</u> ?	None of the time All of the time Most of the time Some of the time A little of the time
H.16.c	During the past 30 days, about how often did you feel <u>hopeful</u> about the future?	None of the time All of the time Most of the time Some of the time A little of the time
H.16.d	During the past 30 days, about how often did you feel <u>restless or fidgety</u> ?	None of the time All of the time Most of the time Some of the time A little of the time None of the time

Table 20 Continued

Number	Question	Response Options
H.16.e	During the past 30 days, about how often did you feel <u>irritable</u> or have angry outbursts?	All of the time Most of the time Some of the time A little of the time
H.16.f	During the past 30 days, about how often did you feel so <u>depressed</u> that nothing could cheer you up?	None of the time All of the time Most of the time Some of the time A little of the time
H.16.g	During the past 30 days, about how often did you feel that you <u>enjoyed</u> life?	None of the time All of the time Most of the time Some of the time A little of the time
H.16.h	During the past 30 days, about how often did you feel that everything was an <u>effort</u> ?	None of the time All of the time Most of the time Some of the time A little of the time None of the time

Table 20 Continued

Number	Question	Response Options
H.16.i	During the past 30 days, about how often did you feel <u>worthless</u> ?	All of the time Most of the time Some of the time A little of the time None of the time
H.16.j	During the past 30 days, about how often have you been bothered by repeated, <u>disturbing memories</u> , thoughts, or images of a stressful experience from the past?	All of the time Most of the time Some of the time A little of the time None of the time
H.17	During the last year or so, have you ever seriously thought about committing suicide?	Yes
H19 <i>Wave 2 only</i>	When you were growing up, was anyone in your household violent?	No
H21 <i>Wave 3 only</i>	When you were growing up, was there anyone in your household who had problems with drugs or alcohol?	Yes
H22 <i>Wave 3 only</i>	When you were growing up, did any adult in your home swear at you, or insult you, or put you down?	No (Or: not that I knew of)
		Never Once or twice Sometimes Often Very Often

Table 20 Continued

Number	Question	Response Options
K.1	What is the highest year or degree of schooling that you have COMPLETED?	Less than 9 th grade 9 th grade to 12 th grade, but did not graduate High school graduate GED or equivalent Some college Associate's degree Bachelor's degree Master's degree Higher professional degree (like MD, JD, or PhD)
K.5 <i>Wave 1 Only</i>	Are you of Hispanic, Latino, or Spanish origin?	Other: Yes No
K.6 <i>Wave 1 Only</i>	What is your race? Is it white, black or African American, American Indian, Asian, or something else?	White Black, African American, Negro American Indian, Alaskan Native Asian Hispanic, Latino Other:

Note. Questions are on all three waves of surveys unless otherwise noted.

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