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Examining the relationship between socioeconomic status and mental health quality of life in a rural neighborhood context

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EXAMINING THE RELATIONSHIP BETWEEN SOCIOECONOMIC STATUS AND MENTAL
HEALTH QUALITY OF LIFE IN A RURAL NEIGHBORHOOD CONTEXT

by

Megan Sunde Springer Evans

A thesis submitted in partial fulfillment
of the requirements for the Master of Science
degree in Community and Behavioral Health in the
Graduate College of
The University of Iowa

May 2016

Thesis Supervisor: Assistant Professor Dr. Barbara Baquero

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Graduate College
The University of Iowa
Iowa City, Iowa

CERTIFICATE OF APPROVAL

MASTER'S THESIS

This is to certify that the Master's thesis of

Megan Sunde Springer Evans

has been approved by the Examining Committee for
the thesis requirement for the Master of Science degree
in Community and Behavioral Health at the May 2016 graduation.

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To Andrew, for believing in me even when I struggle to believe in myself.

There is no health without mental health.

U.S. Surgeon General David Satcher

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ABSTRACT

The purpose of this study is to determine the relationship between socioeconomic status and mental health-related quality of life in a micropolitan community in Iowa and to determine the effect of neighborhood social cohesion, neighborhood violence, and unfair treatment on this relationship. I hypothesized that socioeconomic status would be correlated with mental health quality of life, such that those of low or middle socioeconomic status would have greater odds of reporting poor mental health quality of life than those of high socioeconomic status. Furthermore, I hypothesized that lower perceived neighborhood social cohesion, having reported neighborhood violence in the past six months, and having reported an experience of unfair treatment in the past six months would be associated with being of low socioeconomic status. I then explored which of these factors are the best predictors of poor mental health quality of life when considered together.

The study is a secondary data analysis of health information gathered from a large, random-digit dial telephone survey of residents of Ottumwa, Iowa. To address the research questions, responses from a total of 1079 surveys were analyzed. Participants were clustered into three socioeconomic status groupings based on the following factors: annual household income, highest level of education completed, current work status, whether the respondent owned or rented their home, and whether the respondent's household fell at or below 125 percent of the Federal Poverty Level. Mental health quality of life was measured using questions from the CDC's Healthy Days Measure that specifically ask about mental health. Bivariate relationships between variables were calculated utilizing chi-square tests of independence. A series of logistic regression models were then conducted to further explore these relationships.

Results showed that those belonging to the low socioeconomic status group had about four times the odds of reporting poor mental health quality of life than those in the high

socioeconomic status group. The relationship did not hold true for those in the middle socioeconomic status group, as they had similar odds of reporting poor mental health quality of life than those in the high socioeconomic status group. Results also showed that neighborhood violence, low neighborhood social cohesion, and experiencing unfair treatment were also independently associated with reporting poor mental health quality of life as well as being of low socioeconomic status. Results of the logistic regression model containing the social and neighborhood factors showed that neighborhood social cohesion and perceived unfair treatment were significantly associated with greater odds of reporting poor mental health quality of life. These relationships remained after including demographic co-variables in the model. Low socioeconomic status, lower neighborhood social cohesion, and reporting experience of unfair treatment significantly predicted greater odds of reporting poor mental health quality of life. These results should be interpreted with caution, as data was cross-sectional and inferences about causality cannot be made. Further research investigating the possible causal pathway underlying this relationship is needed.

PUBLIC ABSTRACT

This study examined the relationship between socioeconomic status and mental health quality of life in a community in Iowa, and then examined how this relationship is affected by the following factors: neighborhood social cohesion, neighborhood violence, and unfair treatment. Social cohesion is a measure of the level of trust and unity among neighbors. I theorized that a greater percentage of those of low or middle SES would report poor mental health quality of life than those of high SES. I also suggested that social cohesion, violence, and unfair treatment would help to explain why this relationship exists. I theorized that low levels of social cohesion and experiencing neighborhood violence or unfair treatment would increase the risk of reporting poor mental health quality of life.

Results showed that belonging to low SES was associated with significantly greater odds of reporting poor mental health quality of life. Those in the middle SES group, however, had similar odds of reporting poor mental health quality of life. Results also showed that neighborhood violence, low social cohesion, and experiencing unfair treatment were each associated with a greater likelihood of being of low SES and of reporting poor mental health quality of life. When all factors were considered together, low SES, lower neighborhood social cohesion, and unfair treatment remained associated with greater odds of reporting poor mental health quality of life. Further research examining possible causes underlying this relationship is needed.

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CHAPTER I: BACKGROUND & SIGNIFICANCE

Roughly half of all Americans experience a mental illness at some point during their lifetime (Levin, Petrilu, & Hennessy, 2004). During the year 2014, an estimated 18 percent of the United States adult population experienced any mental illness and four percent experienced a serious mental illness (Hedden, 2015). An adult with any mental illness (AMI) is defined as one who has had any mental, behavioral, or emotional disorder in the past year which met DSM-IV criteria (Hedden, 2015). An adult with a serious mental illness (SMI) not only meets criteria for a DSM-IV disorder, but also experiences substantial interference in one or more major life activities, assessed using the Global Assessment of Functioning scale (GAF < 60) (Hedden, 2015; Kessler, Barker, et al., 2003). People diagnosed with a serious mental illness have an average life expectancy that is approximately 25 years less than that of the US general population (Fagiolini & Goracci, 2009). This higher mortality rate results not only from causes specifically related to mental illness, such as suicide, but also from a higher prevalence of chronic physical diseases and medical conditions among those with SMI (Fagiolini & Goracci, 2009). People with serious mental illnesses are also more likely to have limited access to general health care than their non-mentally ill counterparts (Fagiolini & Goracci, 2009). Serious mental illnesses cost the United States at least \$193 billion annually in lost wages alone (Kessler & Wang, 2008) and mental illness is a leading cause of disability (Levin et al., 2004). In the United States, only about a third of those experiencing anxiety or depressive disorders receive any effective treatment (Levin et al., 2004). Among those diagnosed with a severe mental illness, such as schizophrenia or bipolar disorder, only half have had contact with a mental health professional during a given year (Levin et al., 2004). The high prevalence of mental health disorders, coupled with the paucity of affected individuals receiving effective treatment, makes mental health and its determinants especially important to consider.

Disparities in mental health exist between many groups of Americans and have gained increased attention from the professional and research community in recent decades (Safran et al., 2009). Health disparities arise when some segments of the population do not have equal access to circumstances which promote health, and therefore experience a greater burden of disease and disability. The Center for Disease Control and Prevention (CDC) defines a health disparity as a type of difference in health that is closely linked with social or economic disadvantage that negatively affects groups of people who have systematically experienced greater social or economic obstacles to health (U.S. Department of Health and Human Services, 2010). Mental health disparities often fall into one of these three categories: 1) disparities between the attention given to mental health relative to the attention given to other public health issues of comparable magnitude; 2) disparities between the health of persons with mental illness as compared to those without mental illness; or 3) disparities between populations with respect to mental health and the quality, accessibility, and outcomes of mental health care (Safran et al., 2009). This study will focus on disparities of the third category, specifically disparities in mental health between people of different socioeconomic statuses. Research has consistently shown a relationship between socioeconomic status or position and health outcomes, such that those with lower socioeconomic status suffer a disproportionate share of the burden and consequences of numerous chronic diseases (Berkman & Kawachi, 2000). This relationship between socioeconomic status and health outcomes also holds true for mental health and illness. In fact, the relationship between poverty and mental illness is one of the most established in psychiatric epidemiology (Belle, 1990). Sociologists have long shown that there is an inverse relationship between socioeconomic status and mental illness (Dohrenwend & Dohrenwend, 1969). People at the lowest level of socioeconomic status are estimated to be about 2 to 3 times as likely to have a mental disorder than are those at the

highest level of socioeconomic status (Safran et al., 2009). Studies have shown that people of lower socioeconomic status levels are diagnosed with major depressive disorder at a higher rate relative to those of higher socioeconomic position (Everson et al., 2002). Those at lower SES also experience more depressive symptomatology compared to their higher SES peers (Everson et al., 2002). Considering this relationship, there is a clear need to research this relationship and identify potential causal pathways upon which we may intervene to promote good mental health among people of lower socioeconomic status.

Disparities in access to and quality of mental health treatment exist between rural and urban areas (Crosby, Wendel, Vanderpool, & Casey, 2012; Hauenstein et al., 2006). While the prevalence of mental health disorders is at least as high in rural areas as in urban areas, the existence of mental health services tends to be much lower (Crosby et al., 2012). Men and women in rural areas are less likely to receive mental health treatment of any sort than their urban counterparts (Hauenstein et al., 2006). It is estimated that one-third of rural counties in the United States lack any health professionals equipped to deal with mental health issues, and the availability of specialty mental health services in rural areas is even more scarce (Crosby et al., 2012). Even when mental health services are available, rural patients are more likely to be treated with pharmacology and less likely to receive any form of psychotherapy (Crosby et al., 2012). Pervasive cultural messages in rural settings, which often revolve around self-reliance and independence, can increase the stigma related to mental health and impact treatment-seeking as well (Crosby et al., 2012). Decreased anonymity in receiving mental health care has also been identified as a barrier to receiving care in rural areas (Smalley et al., 2010). These conditions of lowered accessibility, acceptability, and availability of mental health services lead to rural residents suffering from mental health disorders to have a higher “need-for-care threshold” before seeking treatment, leading to poorer outcomes for these individuals (Smalley

et al., 2010). Rural residents with psychiatric disorders are more likely to be hospitalized and to attempt suicide than those in non-rural areas (Hauenstein et al., 2006). Another significant issue with mental health care access in rural areas is that public safety officers, such as law enforcement, are often the first and only responders to calls involving a mentally ill person (Stamm, Lambert, Piland, & Speck, 2007). Public safety officers are generally only provided rudimentary mental health training and their involvement can lead to legal problems and incarceration rather than mental health treatment. These issues with mental health care are significant; and research examining how we can effectively promote good mental health in rural communities is needed in order to intervene upon the problem further upstream.

There is also evidence that behavioral problems related to mental health may be disproportionately higher in rural areas than in their urban counterparts (Hauenstein et al., 2006; Smalley et al., 2010; Stamm et al., 2007). For example, substance use and abuse is especially prevalent in rural areas and up to 40 percent of mentally ill individuals in rural areas are also diagnosed with a comorbid substance abuse disorder (Smalley et al., 2010). Youth are more likely to drink alcohol and use illicit drugs in rural areas than in urban areas and also experience higher rates of depression (Smalley et al., 2010). Rates of depression in adults are also higher in rural areas than in urban areas, as is the prevalence of suicide (Smalley et al., 2010). Traumatic stress exposure is statistically greater in rural areas compared to urban areas because of demographic factors such as high-hazard occupations, large driving distances, and longer travel to essential care following an accident or injury (Stamm et al., 2007). Rural individuals are also more likely to be military veterans than their urban peers, which means that mental health problems associated with military service are also more common in rural areas (Crosby et al., 2012). While research has not consistently shown a systematic difference in rates of mental illness between rural and urban areas, the impact these disorders have is greater in

rural areas (Smalley et al., 2010). This is likely due to less available, accessible, and acceptable mental health care services in rural areas.

Mental Health-Related Quality of Life

Health-related quality of life is a multidimensional construct that incorporates any aspect of overall quality of life that affects physical or mental health (U.S. Department of Health and Human Services, 2010). The World Health Organization defines health as being a “state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 1946). This definition suggests more subjective feelings and experiences of health, which may or may not be related to a specific disease or disorder. The conceptualization of mental health, then, cannot just be the absence of a diagnosable mental illness. Rather, people’s perceptions of quality of life in regards to their mood, emotions, and overall feeling of mental well-being is also worth considering in the field of mental health. According to the United States Office of the Surgeon General, mental health is “the successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and to cope with adversity” (US Surgeon General, 1999). The concept of mental health is most frequently viewed as the opposite of mental illness, in both the field of mental health research and in the general public (Keyes, 2005). If a person does not meet the diagnostic criteria for a specific mental illness, are we to assume they are mentally healthy? Investigating the determinants of mental health-related quality of life can advance the field of research by approaching the concept of mental health differently, focusing on determinants that promote positive ratings of mental health-related quality of life as well as those that predict negative ratings of mental health-related quality of life.

Socioeconomic Status and Health: Historical Research and Theory

Socioeconomic status is a commonly used construct; however, there is no universally accepted measure of socioeconomic status and operationalizing social stratification has unique measurement issues. Measures of social stratification and socioeconomic status are unique to the social context of the society being studied. The measurement and conceptualization of socioeconomic status was greatly influenced by three major historical sociological traditions: Marxist, Weberian, and Functionalist (Berkman & Kawachi, 2000). The Marxist tradition presents a view of classes that are determined by relation to the means of production, specifically separating people into two classes: the bourgeoisie, the capitalists who own the means of production; and the proletariat, the much larger working class (Berkman & Kawachi, 2000). The Weberian tradition placed less emphasis on the structural relations of capitalism, and more on the groups of people who were created by this system (Berkman & Kawachi, 2000). In this view, social classes were viewed as groups of people with shared beliefs, values, circumstances, and life chances (Berkman & Kawachi, 2000). The Functionalist tradition built on Marxist and Weberian ideas, but asserted that social stratification of people into classes that are seen as more or less valuable to the progress of society is the natural order of things (Berkman & Kawachi, 2000). The Marxist tradition is highly critical of capitalism, the Functionalist highly supportive, and Weberian tradition somewhere in between. The Weberian idea of “life chances” has led to the use of indicators such as education, occupation, and income in measurement of socioeconomic status (Berkman & Kawachi, 2000).

In the context of this study, socioeconomic status is defined as an individual or group’s position within a hierarchical social structure and is measured by variables including education, occupation, income, wealth and place of residence (Adler & Rehkopf, 2008). The effects of low socioeconomic status appear to be cumulative throughout the life course, with those who have

experienced economic hardships for longer periods of time having the greatest risk for poor mental and physical health (Everson, Maty, Lynch, & Kaplan, 2002). Research has shown that differences in health outcomes exist at every gradient of socioeconomic status, not just in those who fall at the extreme ends of the spectrum (Adler et al., 1994; Fletcher & Wolfe, 2014; Phelan & Link, 2013; Vyncke et al., 2013). However, socioeconomic status is very frequently controlled for in studies of disease outcomes and much less research has been done using socioeconomic status as an important etiological factor in itself (Adler et al., 1994). It is plausible that socioeconomic status shapes life conditions which then, in turn, affect health (Adler & Rehkopf, 2008). To understand this relationship between socioeconomic status and health outcomes, we must examine the differential life conditions of different SES groups that may possibly mediate this relationship between socioeconomic status and health.

The most notable of studies that demonstrate this SES-health gradient is the historical Whitehall study (Marmot, Shipley, & Rose, 1984). The study compared mortality rates among different “classes” of British civil servants. The classes used in the analysis were “unskilled laborers”, “clerical workers”, “professionals”, “executives”, and “administrators”. Results showed relative risks of death corresponding to the social class one belonged to, so that those at the bottom had the highest risk. Furthermore, differences existed across all groups in a consistent pattern: the lower one’s socioeconomic status, the higher their risk of mortality. All subjects were office-based civil servants and the relative homogeneity across these groups made the finding of increased mortality based on lower socioeconomic status even more shocking. This evidence suggests that the effect of socioeconomic status on health does not only exist for those who fall below the poverty threshold, but rather people at every socioeconomic level.

Socioeconomic Status and Mental Health: Evidence and Theory

Psychiatric disorders have been consistently shown to be more common among people in lower social classes (Murali & Oyebode, 2004). Historical sociological research by Faris and Dunham (1939) showed that high rates of mental disorder emerged in the most dilapidated and run-down areas of the city (Faris & Dunham, 1939), while Hollingshead & Redlich (1953) provided evidence for a significant relationship between social class and prevalence of psychiatric disorders (Hollingshead & Redlich, 1953). Data from the Alameda County Study, a community-based longitudinal study of psychological and social factors and their role in health demonstrated a graded relationship between socioeconomic status and the prevalence and incidence of depression (Everson et al., 2002). More recent research has shown a moderate to strong negative correlation between socioeconomic status, measured on a community-level scale, and mental illness (Hudson, 2005). However, this relationship was found to be non-linear, suggesting that it is not the variation between middle-income and upper-income communities that is associated with higher levels of mental illness, but rather the variation between low- to middle-income areas. This relationship appears to hold true in adolescent populations as well (Costello, Compton, Keeler, & Angold, 2003; Miech, Caspi, Moffitt, Wright, & Silva, 1999).

There are two competing theories of the causal pathway of the association between socioeconomic status and mental illness: the social causation theory and the social selection theory (Hudson, 2005). The social causation theory purports that mental health is affected by adversity and stress associated with low social status; while the social selection theory asserts that people who are genetically predisposed to mental illness drift down or fail to rise out of poverty. The social causation theory suggests that the inverse relationship between socioeconomic status and mental illness is a function of stressful economic conditions or family fragmentation and lack of support (Hudson, 2005). Hypothesized pathways behind the social

selection theory include the geographical drift hypothesis, which purports that mentally ill individuals gravitate toward low-income communities as a result of their disability, perhaps drawn by lower cost of living, and the socioeconomic drift hypothesis, which purports that the relationship between SES and mental illness results from declining employment after initial psychiatric hospitalization (Hudson, 2005). Research has provided some support for both theories, suggesting that the two theories are not mutually exclusive and a combination of social selection and social causation processes may account for the relationship between SES and psychiatric morbidity (Dohrenwend et al., 1992; Miech et al., 1999). Much of the available research examining the roles of social selection versus social causation in the relationship between socioeconomic status and mental illness has been done for specific psychiatric conditions. Most studies that have found evidence for social selection have done so for serious mental illness, such as schizophrenia; while evidence for social causation has been more convincingly demonstrated with disorders of lesser severity, such as anxiety (Hudson, 2005). Costello et al (2003) conducted a natural experiment of the social causation hypothesis, in which a casino was opened in a community, causing the socioeconomic status of many of its residents to change drastically in a relatively short amount of time (Costello et al., 2003). This study found that moving out of poverty was associated with a decrease in frequency of psychiatric symptoms in children (Costello et al., 2003). On the other hand, an increase in income for families identified as never-poor was not associated with any decrease in psychiatric symptoms (Costello et al., 2003). This finding supports the social causation hypothesis. The present study operates under the social causation hypothesis, as this approach is more important from a public health perspective because it involves modifiable factors that may increase or decrease risk for mental health problems.

Differential exposure to stress may help to explain this association between lower socioeconomic status and poorer health outcomes, with regards to both mental health and physical health (Adler & Rehkopf, 2008). Living in a disadvantaged environment can expose individuals to greater uncertainty, conflicts, and threats for which there are often inadequate resources to respond effectively (Adler & Rehkopf, 2008). These experiences can create chronic stress, the effects of which continue to cumulate throughout the life course (Adler & Rehkopf, 2008). It is plausible that differential exposure to chronic stress helps to explain the relationship between low socioeconomic status and poorer mental health outcomes. The allostatic load hypothesis purports that exposure to stress leads our bodies to adapt physiologically to cope with stressors (McEwen, 1998; McEwen & Gianaros, 2010). However, these adaptations eventually take a toll, leading to allostatic load, the wear and tear on the body and brain resulting from chronic over-activity or inactivity of physiological responses involved in adapting to stress (McEwen & Gianaros, 2010). Several conceptual models of SES-related health disparities propose that life experiences inherent to being of a certain socioeconomic status could influence health and well-being through stress-related pathways (McEwen & Gianaros, 2010) Evidence shows that chronic life stress, whether environmental or psychosocial, contributes to poor mental health (Beckie, 2012). Thus, if individuals of lower socioeconomic status are exposed to more frequent or severe stressors than those of higher socioeconomic status, that may help to explain the observed disparity in mental health outcomes. In addition, if those with lower socioeconomic status also tend to have fewer social and psychological resources available to them to cope with stress, they may be even more likely to experience poor mental health. This study aims to examine neighborhood and social variables which may be sources of differential stress between socioeconomic groups, helping to explain observed disparities in mental health along socioeconomic lines.

The Causal Pathway and Potential Mediating Variables

It is possible that environmental stressors frequently associated with poverty or a serious lack of resources can lead directly to mental disorders. These stressors associated with extreme poverty, including poor nutrition, overcrowded or unsanitary living conditions, and inadequate medical care may well account for many of the negative effects of poverty on health. Physiological mechanisms related to stress processes and behavioral factors, such as physical activity, diet, and alcohol consumption may also be important mediators in this relationship between socioeconomic status and mental illness (Everson et al., 2002). However, it is also likely that other social factors, such as unfair treatment or neighborhood social conditions, mediate this relationship between socioeconomic status and mental health outcomes. It can be very difficult to separate the social factors at play in this relationship from the physical, since those without resources often have to settle for living conditions that are unhealthy while those with the means to do so are able to purchase housing in a healthier neighborhood environment. Components of socioeconomic status or position shape one's life course and are enmeshed in the circumstances of our lives, including the physical environment, the social environment, our socialization experiences, and our health behaviors (Adler et al., 1994). The social environment includes experiences of and exposure to interpersonal violence and access to social resources and social support. The stress-process approach posits that individuals are differentially exposed to stressors, such as financial strain, and have differential access to resources to combat stressors, such as social support, as a function of their socioeconomic status (Elliott, 2000). This may help to explain the relationship between socioeconomic status and mental health outcomes. Within these domains, many variables may independently contribute to the SES-health relationship.

Perceived Unfair Treatment

Perceived unfair treatment may play an important role in explaining the relationship between socioeconomic status and mental health outcomes. Many people in the United States experience unfair treatment due to their race or ethnicity, gender, or socioeconomic status (Kessler, Mickelson, & Williams, 1999). Experiences of unfair treatment or discrimination may be in the form of explicit discrimination or more insidious daily micro-aggressions (Shariff-Marco et al., 2011). Results from a large scale national survey, the MacArthur Foundation Midlife Development in the United States (MIDUS), show that about 34 percent of Americans have reported experiencing exposure to a major lifetime discrimination and 61 percent reported exposure to day-to-day discrimination (Kessler et al., 1999). Research has shown that experiences of discrimination or unfair treatment are associated with psychological distress, self-esteem, personal control, life satisfaction, and depression (Schulz et al., 2000). This relationship persisted regardless of whether the people lived in high or low poverty areas (Schulz et al., 2000). The experience of discrimination has been shown to be associated with poorer emotional well-being (Kessler et al., 1999). Perceived discrimination has also been shown to be one of the most important secondary stresses associated with a primary stressful event, such as job loss or exposure to violence (Wethington, Brown, & Kessler, 1995). The stress one experiences when they face unfair treatment can lead to alterations in physiological processes and adversely affect physical health, as well as mental health (Williams, Yu, Jackson, & Anderson, 1997). Stressors that are uncontrollable and unpredictable, as is often the case with perceived discrimination or unfair treatment, are particularly harmful to health (Pascoe & Smart Richman, 2009). Differential exposure to social stress along class and race distinctions has been shown to mediate the relationship between structurally based social disadvantage and adverse mental health outcomes (Turner & Avison, 2003). Those who perceive that they are being

discriminated against also may have less energy or resources to make healthy behavioral choices (Pascoe & Smart Richman, 2009). Perceived discrimination has been shown to be associated with mental health problems, such as nonspecific psychological distress and Major Depressive Disorder (Kessler et al., 1999). The experience of discrimination or unfair treatment is related to more severe mental illness symptomatology and leads to an increased probability of manifesting these symptoms above the clinical diagnostic threshold (Pascoe & Smart Richman, 2009). It has also been shown to be related to measures of general mental health and well-being, such as self-esteem, perceived stress, anger, positive and negative affect, happiness, and perceived quality of life (Pascoe & Smart Richman, 2009). The experience of discrimination or unfair treatment is important to consider as it may lead to higher levels of stress among those of low SES, which in turn negatively affects mental health outcomes.

Neighborhood Context

Neighborhood context variables may be implicated in the relationship between socioeconomic status and mental health outcomes in several ways. Social characteristics vary systematically across communities along dimensions of socioeconomic status, family structure and life cycle, residential stability, and racial-ethnic composition (Kawachi & Berkman, 2003). This inequality of available resources across neighborhoods continues today, with income inequality continuing to grow (DeSilver, 2013). The widening gap between rich and poor in the United States has also introduced more residential segregation, with affluent people more often living around and interacting with other affluent people and vice versa (Kawachi & Berkman, 2003). Evidence has shown that children living in neighborhoods marked by concentrated disadvantage were more likely to have internalizing emotional problems and to meet clinical thresholds for mental disorders than their peers in more advantaged neighborhoods (Xue, Leventhal, Brooks-Gunn, & Earls, 2005). Neighborhood poverty has also been shown to be

associated with suicidal thoughts and attempts among youth, even after controlling for pre-existing family and individual vulnerabilities, such as family SES, family problems, and externalizing or internalizing symptoms (Dupéré, Leventhal, & Lacourse, 2009). Also, experience of negative life events appeared to exert stronger effects among those living in disadvantaged neighborhoods compared to their peers who reside in more affluent neighborhoods (Dupéré et al., 2009).

In the context of this study, a neighborhood is conceptualized as a geographic unit of limited size, with relative homogeneity in housing and population, as well as some level of social interaction among residents (Chaskin, 1997). The identification of neighborhood boundaries is often subjective (Coulton, Korbin, Chan, & Su, 2001). An important distinction between explanations of how neighborhoods influence health should be made. The compositional explanation for area differences is that the areas include different types of individuals and differences between these individuals account for the observed differences in health outcomes (Berkman & Kawachi, 2000). Conversely, the contextual explanation posits that there are features of the social or physical environment which influence the health of those exposed to it (Berkman & Kawachi, 2000). Neighborhoods with poor-quality housing, unsafe conditions, and few resources can lead to stress which impacts mental health in a variety of ways. Most theories that conceptualize how stress can lead to poor mental health focus on individual stressors in people's lives; however, neighborhood context is important for a variety of reasons. Neighborhood characteristics influence the level of stress one is exposed to and affect the social ties and bonds among people (Cutrona, Wallace, & Wesner, 2006). Neighborhood stressors may be imposed by physical characteristics of the neighborhood as well as by the people who live in the neighborhood (Cutrona et al., 2006). One mechanism through which neighborhood factors can influence mental health is through a lack of resources, including health care, retail outlets,

and recreational facilities. Neighborhood context is important to consider for several reasons, including looking beyond individual responsibility in the development of mental health disorders. From a public health perspective, if threats to mental health are caused by characteristics of entire communities, it is prudent to address these threats at a community level rather than an individual level.

Neighborhood Violence

Neighborhood problems is a broad concept that encompasses both physical and material resources of neighborhoods, such as the presence of vandalism or run-down buildings, as well as social problems, such as crime and illicit drug use (Echeverría, Diez-Roux, Shea, Borrell, & Jackson, 2008). One aspect to consider with respect to neighborhood context is social disorder and neighborhood violence. Social disorganization theory posits that disadvantaged urban neighborhoods lack social and economic resources, predisposing them to high levels of physical and social disorder and low levels of informal social control (Sampson, Raudenbush, & Earls, 1997). Community social disorganization can be conceptualized as the “inability of a community structure to realize the common values of its residents and maintain effective social control” (Kawachi & Berkman, 2003, p. 132). Common values include the desire of residents to live in neighborhoods with good schools, adequate housing, absence of predatory crime, and a healthy environment (Kawachi & Berkman, 2003). Historical sociological research in Chicago by Shaw and McKay (1942) led to a general framework for understanding how community processes relate to a wide range of outcomes, including health (Kawachi & Berkman, 2003). Shaw and McKay focused on delinquency and argued that it was not an isolated phenomenon and showed relationships between neighborhoods and health (Shaw & McKay, 1942). In particular, Chicago neighborhoods characterized by residential instability, poverty, and dilapidated housing were found to suffer disproportionately high rates of infant mortality,

delinquency, crime, low birth weight, tuberculosis, physical abuse, and other detrimental factors (Shaw & McKay, 1942). Faris and Dunham applied the concept of social disorganization to mental health, showing that disorganized areas had disproportionately high rates of hospitalization for mental illnesses (Faris & Dunham, 1939). A fear of victimization in one's own neighborhood can lead to very high levels of stress, which in turn may affect mental health.

Studies have shown that neighborhood crime, perception of crime, and violence act as chronic stressors and are associated with higher levels of depression (Stockdale et al., 2007). Analysis of cross-sectional data also showed that stress from perceptions of the social environment is associated with higher levels of depression, anxiety, substance abuse, and psychological distress (Stockdale et al., 2007). Research has consistently found a link between exposure to community violence and externalizing problems and PTSD symptoms (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). A weaker association has also been found between neighborhood violence and internalizing problems (Fowler et al., 2009). The experience of witnessing neighborhood violence has been shown to increase the risk of clinically significant symptoms of anxiety or depression among women in urban neighborhoods (Clark et al., 2008). Social disorder has been shown to be linked with depressive symptomatology in adults and children (Cutrona et al., 2006). Another study conducted in Los Angeles found that the more threatening adolescents found their neighborhoods to be, the more common they were to report symptoms of depression, anxiety, oppositional defiant disorder, and conduct disorder (Aneshensel & Sucoff, 1996). Neighborhood violence, then, may be a causal pathway through which socioeconomic status affects mental health.

Social Cohesion

The level of social cohesion that exists in a neighborhood may also impact mental health. Social cohesion refers to the “extent of connectedness and solidarity among groups in society” (Berkman & Kawachi, 2000, p. 175). It refers to both the absence of latent social conflict, such as income inequality, racial or ethnic tensions, or disparities in political participation, as well as the presence of strong social bonds (Berkman & Kawachi, 2000). Social capital refers to the level of trust and reciprocity in communities and is closely related to social cohesion. Evidence has shown that children in neighborhoods with high levels of social cohesion and collective efficacy had lower levels of antisocial behavior than their peers in neighborhoods with lower levels of social cohesion (Odgers et al., 2009). This study also found that this protective effect was only significant in disadvantaged neighborhoods and did not apply to children who lived in affluent neighborhoods (Odgers et al., 2009). Social cohesion, measured at a community-level scale, has been shown to modify the effect of area income deprivation on poor mental health status, such that the effect of deprivation is significantly reduced in areas with high social cohesion and is greater in areas with low social cohesion (Fone et al., 2007). Social cohesion may promote positive mental health outcomes by providing individuals with meaningful connections and mutual respect, which in turn can influence psychosocial processes and stress (Echeverría et al., 2008). In neighborhoods where residential turnover is high or social disorder is high, people are less likely to form ties with one another (Cutrona et al., 2006), which can, in turn, affect mental health and coping.

It is likely that high levels of social cohesion among groups allows for the provision of more social support than low levels of social cohesion. Social support is very important in protecting against mental health disorders and could also be a pathway through which socioeconomic status affects mental health. Social support is usually categorized into subtypes,

including emotional, instrumental, appraisal, and informational support (Berkman & Kawachi, 2000). Emotional support refers to the amount of love, caring, and sympathy available from others. Instrumental support refers to the tangible aid provided by others, in the form of goods or services. Appraisal support is a type of social support in which people help each other make decisions and give each other feedback. The final type of social support, informational support, refers to the provision of advice or information to those in need. Together, these types of support have proven beneficial in the promotion of health as well as the management of disease. People's perceptions of the levels of available social support are just as important as the actual levels of such support, particularly because people are unlikely to utilize or solicit support from their social networks unless they perceive them to be able to provide such support. People who live in high social disorder neighborhoods have fewer ties with their neighbors and perceive their relationships as being less supportive than do people in neighborhoods with less social disorder (Aneshensel & Sucoff, 1996).

There are two possible causal pathways through which social relationships affects mental health: the main effect model and the stress-buffering model (Kawachi & Berkman, 2001). The main effects model asserts that social relationships are beneficial regardless of whether a person is experiencing stress or not, while the stress-buffering model posits that social ties are only beneficial for those currently undergoing stress (Kawachi & Berkman, 2001). The two models are not mutually exclusive, and each may explain a different aspect of social relationships. Integration in a social network may directly affect mental health by promoting positive psychological states such as feelings of belonging, purpose, or security. Indirectly, social relationships can influence normative behaviors, such as promoting regular exercise and discouraging alcohol and other drug use, which can impact mental health status. However, it should be noted that not all social relationships influence normative behavior in positive ways.

Social networks can also offer access to needed resources to cope with stressors (Berkman & Kawachi, 2000). Considering neighborhood social cohesion is important because high levels of such may help to protect low SES individuals from experiencing adverse mental health outcomes and help to redress this health disparity.

Significance

While the relationship between socioeconomic status and mental illness has been well-established, much less research has been done on mental health-related quality of life. Because there is no standard way to measure, diagnose, or study the presence of mental health; the default depiction of mental health has been the absence of psychopathology (Keyes, 2005). While diagnosable mental illness is indeed an important issue, the WHO's definition of health clearly states that health is not simply the absence of disease, but rather a complete state of physical, mental, and social well-being (World Health Organization, 1946). Mental health-related quality of life is therefore important from a public health perspective. Mental health quality of life is a subjective assessment of one's well-being, encompassing life satisfaction, happiness, anxiety, and depressive symptoms (Keyes, 2005). The construct also avoids the stigma attached to the diagnosis of a mental illness and allows for an accurate assessment of the frequency of poor mental health symptoms. Interventions that promote mental health could allow for primary prevention of mental illness and associated disability, and may be relevant to a greater proportion of the population than interventions targeted at individuals with specific diagnoses or mental health problems.

Income inequality in the United States has been increasing steadily since the 1970s and has now reached levels greater than those seen before the onset of the Great Depression (DeSilver, 2013). This dramatic widening of the gap between rich and poor has important

implications for health, in that health disparities will continue to grow, including mental health disparities. Examining the relationship between socioeconomic status and mental health, as well as inspecting potential mediating factors on the causal pathway, is therefore important in order to address disparities in mental health. Examining the effects of neighborhood context variables in the relationship between socioeconomic status and mental health-related quality of life is important when considering interventions, as strengthening neighborhoods and communities may well have a positive effect on mental health-related quality of life, leading to less mental illness and related disability.

This study also attempts to fill a gap in the literature with regards to micropolitan communities. Much of the existing research on neighborhood context variables has been conducted in large urban areas. However, geography often determines context, including physical, social, and community infrastructure. Rural health disparities are often a consequence of context. The demographic characteristics of rural populations also often differ from their urban counterparts. Many rural areas tend to have disproportionately high levels of less wealthy citizens, and the widening gap in income equality will likely influence rural areas significantly (Crosby et al., 2012). The vast majority of workers in rural areas are employed in low-wage, skilled, or unskilled labor positions with few opportunities for income growth or change in social status (Crosby et al., 2012). Rural locations in Iowa frequently have an older-than-average aged population due to out-migration of younger people (Crosby et al., 2012). Out-migration is a phenomenon where people leave rural areas to relocate to more urban areas, often in search of more and better employment opportunities. Rural populations, in general, tend to have an overall poorer health status when compared to their urban counterparts (Crosby et al., 2012). These disparities are due in part to lack of access to health care services in rural areas and affordability of health care (Crosby et al., 2012). Rural populations have been shown to have a

higher percentage of people living in poverty and also have less people who are insured. An estimated 14 percent of adults in rural areas live below the poverty line, compared to 11 percent of urban residents (Smalley et al., 2010). Minorities living in rural areas have even higher rates of poverty: 33 percent of rural African Americans and 27 percent of rural Hispanics live below the poverty line (Smalley et al., 2010). The geographical layout of many rural communities also frequently requires longer travel to needed health care services. Health promotion programs and policies that are successful in urban areas may not necessarily translate well into rural contexts, because of demographic, social, cultural, and geographical differences. It is therefore important to conduct research on neighborhood context factors in smaller, rural communities.

Description of Proposed Research

In this study, I examine the relationship between socioeconomic status and mental health quality of life ratings among residents of a micropolitan Iowa community in a rural county. The Office of Management and Budget (OMB) defines micropolitan communities as areas with populations between 10,000 and 50,000 people, essentially small cities (Office of Management and Budget, 2015). All counties that are not part of a metropolitan statistical area with a population of 50,000 or more are considered rural (Office of Management and Budget, 2015). The socioeconomic status classification in this research incorporates level of education, work status, annual household income, home ownership, and presence of poverty. On the basis of these variables, respondents were classified as belonging to high socioeconomic status, middle socioeconomic status, or low socioeconomic status groups. I then explore factors that may potentially mediate this relationship between socioeconomic status and mental health quality of life, specifically, neighborhood violence, social cohesion, and perceived discrimination. I hypothesized that socioeconomic status (SES) is negatively and significantly associated with

mental health quality of life, such that those with lower SES or middle SES will experience poor mental health-related quality of life at a greater rate than those with high SES. I hypothesized that high levels of social cohesion will act as a protective factor and high levels of neighborhood violence and perceived unfair treatment as risk factors.

CHAPTER II: SOCIAL AND NEIGHBORHOOD FACTORS: A POTENTIAL MECHANISM LINKING SOCIOECONOMIC STATUS AND MENTAL HEALTH QUALITY OF LIFE

Introduction

Mental health problems are a significant health issue and leading cause of disability in the United States today (Levin et al., 2004). In fact, roughly half of the American population will experience a mental illness at some point in their lives (Levin et al., 2004). Rural populations are in a unique position with regards to mental health, as they experience similar rates of mental health problems, yet do not have nearly the mental health services that are available to urban residents (Crosby et al., 2012). In fact, one in three rural counties lack any health professional at all who is equipped to treat any mental health problem, and existence of specialty mental health services is even more scarce (Crosby et al., 2012). The lack of mental health services in rural areas means that often the first contact a mentally ill person will have with a professional is with law enforcement (Stamm et al., 2007). It is thus of utmost importance to investigate upstream causes of poor mental health in a rural context.

Research has consistently shown a relationship between socioeconomic status and health outcomes, with those on the lower end of the spectrum of socioeconomic status experiencing a disproportionate share of the burden of chronic disease and disability (Berkman & Kawachi, 2000). This relationship also holds true for mental health outcomes. In fact, people at the lowest level of socioeconomic status are estimated to be about two to three times more likely to have a mental disorder than are those at the highest level of socioeconomic status (Safran et al., 2009). Some research suggests that this relationship exists along the continuum of socioeconomic status (Adler et al., 1994), while other research suggests the opposite. One study found a moderate to strong negative correlation between socioeconomic status, measured on a community-level scale, and mental illness (Hudson, 2005). This relationship was found to be

non-linear, suggesting that it is not the variation between middle-income and upper-income communities that is associated with higher levels of mental illness, but rather the variation between low- and high-income areas. In addition, Costello et al (2003) conducted a natural experiment in which a casino was opened in a community, causing the socioeconomic status of many of its residents to change drastically in a relatively short amount of time (Costello et al., 2003). This study found that moving out of poverty was associated with a decrease in frequency of psychiatric symptoms in children (Costello et al., 2003). On the other hand, an increase in income for families identified as never-poor was not associated with any decrease in psychiatric symptoms (Costello et al., 2003). In the context of this study, socioeconomic status is defined as an individual or group's position within a hierarchical social structure and is measured by variables including education, occupation, income, wealth and place of residence (Adler & Rehkopf, 2008). This conceptualization of socioeconomic status is consistent with the theoretical understanding of socioeconomic status in the United States (Berkman & Kawachi, 2000; Mueller & Parcel, 1981).

Social or neighborhood context factors may help to explain this relationship. Socioeconomic status and available financial resources often dictate the quality of neighborhood environment one can choose to live in, and may account for a significant proportion of the differential exposure to stress and stressful situations, leading to poorer mental health-related quality of life. Exposure to neighborhood violence and experience of discrimination or unfair treatment may be one way in which socioeconomic status or position in society could lead to mental health problems. High levels of social cohesion in communities may result in the provision of affective social support which can mitigate effects of stress and help to protect individuals from developing poor mental health (Berkman, Glass, Brissette, & Seeman, 2000; Fone et al., 2007). This study attempts to fill a gap in the research with regards to

micropolitan communities and the effect of social and neighborhood context factors on the association between socioeconomic status and mental health quality of life outcomes in a rural context in Iowa. The study seeks to answer the following research questions:

RQ1: Is the relationship between socioeconomic status and mental health-related quality of life in this sample similar to the inverse relationship consistently demonstrated in the literature?

H1a: Respondents with low SES will be more likely to report poor mental health-related quality of life than respondents with high SES.

H1b: Respondents with middle SES will be more likely to report poor mental health-related quality of life than respondents with high SES.

RQ2: What is the relationship between social and neighborhood context proxy variables (perceived neighborhood social cohesion, neighborhood violence, and perceived unfair treatment) and mental health-related quality of life in a micropolitan community in Iowa?

H2a: Respondents who perceive their neighborhood to be lower on social cohesion will be more likely to report poor mental health-related quality of life than those who perceive their neighborhood to be higher on social cohesion.

H2b: Respondents who reported neighborhood violence in the past six months will be more likely to report poor mental health-related quality of life than respondents who did not report neighborhood violence in the past six months.

H2c: Respondents who reported experiencing unfair treatment in the past six months will be more likely to report poor mental health-related quality of life than respondents who did not report any experiences of unfair treatment in the past six months.

RQ3: What is the relationship between social and neighborhood context proxy variables (perceived neighborhood social cohesion, neighborhood violence, and perceived unfair treatment) and socioeconomic status in a micropolitan community in Iowa?

H3a: Respondents with low socioeconomic status will be more likely to perceive their neighborhood to be lower on social cohesion than those with high socioeconomic status.

H3b: Respondents with low socioeconomic status will be more likely to report neighborhood violence in the past six months than respondents with high socioeconomic status.

H3c: Respondents with low socioeconomic status will be more likely to report experiencing unfair treatment in the past six months than respondents with high socioeconomic status.

RQ4: Given the set of socioeconomic status, social and neighborhood context proxy variables, and demographic variables, what are the best predictors of poor mental health quality of life in a rural micropolitan community?

As an exploratory question, there are no a priori hypotheses.

Methods

Study Design

This study is a secondary data analysis of health information gathered in the Ottumwa Community Health Survey conducted from April to June 2013 via random-digit dial telephone interviews. The survey was undertaken as part of a community-academic partnership between the University of Iowa's College of Public Health Prevention Research Center and organizations

and residents of Ottumwa, Iowa. The partnership utilizes a community-based participatory research approach, with representatives of community-based organizations, public health agencies, and university personnel involved as partners in all aspects of the research process (Israel, Eng, Schulz, & Parker, 2013). The partnership between Ottumwa community members and the University of Iowa's College of Public Health Prevention Research Center began in April 2012 with the formation of the Community Advisory Board. The Community Advisory Board chose to execute the survey as a community health assessment to identify strengths and needs of the community of Ottumwa in 2013. The survey was developed as a joint effort between a subset of the university and community partners and the final draft was approved by the full Community Advisory Board. The University of Iowa Institutional Review Board approved all protocols for the study.

Setting & Sample

Ottumwa, Iowa is a micropolitan community with a population of 24,847 at the time of the 2014 American Community Survey and is the county seat of Wapello County (United States Census Bureau, 2016). The Office of Management and Budget (OMB) defines micropolitan communities as urban areas with populations between 10,000 and 50,000 people, essentially small cities (Office of Management and Budget, 2015). Ottumwa is located in the southeastern region of the state. Wapello county is currently the poorest county in the state of Iowa (Frohlich, 2016). Ottumwa has higher rates of poverty (19%) and unemployment (9%) than the state of Iowa as a whole (12% and 6% respectively) (United States Census Bureau, 2016). Among survey respondents, 31 percent fall at or below 125 percent of the federal poverty level.

Ottumwa is also a new destination community for Latinos, with a Latino population that has grown substantially in the past two decades to now account for 11 percent of the

population (United States Census Bureau, 2016). The demographic shift has brought new life to an otherwise stagnant community but has also introduced challenges regarding social cohesion in the community. Further descriptive statistics of the sample are reported in Table 1.

Survey respondents were randomly drawn from a dual sampling frame of landlines and cell phone numbers. Respondents were called at varying times of the day and week to achieve maximum reach. The eligibility criteria for participation was respondents must be at least 18 years old and have lived in Ottumwa for at least six months. Telephone interviews were conducted in English and Spanish. Participants received a \$25 gift card for completing the survey.

Measures

The Ottumwa Community Survey consisted of 89 questions that assessed many health-related behaviors including quality of life, community involvement, neighborhood context, and perceived unfair treatment as well as demographic information.

Mental Health Related Quality of Life (QoL)

The main outcome variable in this study is Mental Health-Related Quality of Life, which was measured utilizing the Center for Disease Control's (CDC) Healthy Days Measure (Centers for Disease Control & Prevention, 2000). This study utilized three of the health-related quality of life questions in the measure that specifically ask about mental health:

- Now thinking about your mental health, which includes stress, depression, and problems with emotions, how many days during the past 30 was your mental health not good?
- During the past 30 days, for about how many days have you felt sad, depressed or blue?

- During the past 30 days, for about how many days have you felt anxious, stressed, or tense?

Results to each of these questions were dichotomized, such that those who reported 13 or less days per month of experiencing the phenomenon were coded as 0 and those who reported 14 or more days per month coded as 1. A sum score was then completed and dichotomized, with those who reported more than 14 days of any of these mental health indicators classified as having “poor mental health-related quality of life” and those who reported less than 14 days of any of the indicators classified as having “good mental health-related quality of life.”

Socioeconomic Status

A socioeconomic status composite measure was created using a two-step cluster analysis. Cluster analysis is a group of multivariate techniques used to group objects based on their similarities. A two-step cluster analysis is an exploratory tool used to reveal natural clusters within a data set. It identifies the groupings by first pre-clustering and then incorporating hierarchical clustering methods. A two-step cluster analysis is able to incorporate categorical variables and was thus chosen over other cluster analysis methods. It utilizes a log-likelihood distance measure to cluster similar cases into groups. Based on commonly used classifications of socioeconomic status, the data was clustered into three groups. The following variables were included in the cluster analysis to create the three classes of socioeconomic status: level of education, ownership of home, work status, annual household income, and poverty. The inclusion of these variables was determined based on a thorough review of the literature regarding the various components that make up socioeconomic status. Level of education was classified into the following categories: did not graduate high school, high school graduate, some college, college degree, and graduate or professional school. Work status was categorized into four classifications: employed, unemployed, retired, and homemaker, student, or unable to

work. Poverty was calculated based on an 11-item measure of income and reported number of residents in the household. Respondents were considered to be in poverty if they fell at or below 125 percent of the 2012 U.S. Department of Health and Human Services Poverty Guidelines (Office of Assistant Secretary for Planning and Evaluation, 2016). The resulting clusters were classified as high socioeconomic status, middle socioeconomic status, and low socioeconomic status. Respondents who were classified as high SES had, on average, annual household incomes above \$75,000, were employed, had 5 or more years of college education, owned their home, and their households did not fall at or below 125 percent of the federal poverty level. Those classified as middle SES had, on average, annual household incomes between \$20,000 and \$25,000, were retired, high school graduates, owned their home, and did not fall at or below 125 percent of the federal poverty level. Those classified as low SES had, on average, annual household incomes below \$10,000, were employed, high school graduates, owned their homes, and their household did fall at or below 125 percent of the federal poverty level.

Social Cohesion

Neighborhood context proxy variables, including social cohesion, were measured utilizing a set of validated neighborhood perception scales (Mujahid, Diez Roux, Morenoff, & Raghunathan, 2007). Social cohesion was assessed utilizing a set of four questions, with responses on a five-point scale from strongly disagree to strongly agree, with higher scores indicating higher perceptions of social cohesion (Mujahid et al., 2007). Respondents were asked the extent they agreed with the following statements:

- People around here are willing to help their neighbors.
- People in my neighborhood generally get along with each other.

- People in my neighborhood can be trusted.
- People in my neighborhood share the same values.

Reliability of the scale is adequate ($\alpha = 0.74$), as is reliability of the scale in this sample ($\alpha = 0.804$) (Mujahid et al., 2007). Results were dichotomized at the median due to non-normality into “higher perceived social cohesion” and “lower perceived social cohesion.” Respondents included in the “higher perceived social cohesion” classification had an average rating of four or above (Agree to Strongly Agree) and those in the “lower perceived social cohesion” had average responses less than four (Strongly Disagree, Disagree, or Neither Agree nor Disagree).

Neighborhood Violence

Neighborhood violence was also measured utilizing a four-item validated neighborhood perception scale (Mujahid et al., 2007). Responses were on a four-point scale ranging from often to never, with lower scores reflecting higher perceptions of neighborhood violence.

Respondents were asked how often in the past six months did the following occur:

- Was there a fight in your neighborhood in which a weapon was used?
- Were there gang fights in your neighborhood?
- Was there a sexual assault or rape in your neighborhood?
- Was there a robbery or mugging in your neighborhood?

Reliability of the scale ($\alpha = 0.83$) is good, as is the reliability in this sample ($\alpha = 0.83$) (Mujahid et al., 2007). Results were dichotomized at the median due to non-normality into “did not witness neighborhood violence within last six months” and “did witness neighborhood violence within last six months.”

Unfair Treatment

Unfair treatment was measured using a five-item self-report Day-to-Day Unfair Treatment scale (Williams et al., 1997). Respondents were asked how frequently they felt they experienced discrimination, such as feeling harassed or threatened or receiving poor service. Responses were rated on a six-point scale, ranging from never to almost every day. Questions were as follows:

- How often are you treated with less courtesy or respect than other people?
- How often do you receive poorer service than other people at restaurants or stores?
- How often do people act as if they think you are not smart?
- How often do people act as if they are afraid of you?
- Again thinking about your day-to-day life, how often are you threatened or harassed?

The scale demonstrates good reliability ($\alpha = 0.80$), although reliability in this sample was lower ($\alpha = 0.679$) (Taylor, Kamarck, & Shiffman, 2004). Due to non-normality, results were dichotomized into those who reported never experiencing these situations of discrimination and those who had at least one experience in the past six months.

Statistical Methods

Parent Study

Because there was a considerable amount of missing data for neighborhood perceptions (11%), social support (10%), and income measures (22%), the data was multiply imputed so that all cases could be used in analysis. Patterns of missing data were assessed and the data was found to have an arbitrary missing pattern. Upon advice of a biostatistician, data was multiply imputed using a fully conditional specification method in SAS 9.4 using PROC MI ($m = 5$) (Van

Buuren, 2012). Variables were imputed according to their data type. Continuous variables were imputed with a regression format and variables with multiple discrete categories were imputed using predictive mean matching. Dichotomous, ordinal, and nominal variables were computed using binary, cumulative, and generalized logit models, respectively. When multiple imputation is performed, the result is multiple data sets, each with different imputed values. Database 1 was used for this study.

Secondary Data Analysis

Descriptive and inferential statistical analyses were performed in SPSS Version 23. To answer RQ1, a χ^2 test of independence between SES and mental health-related quality of life was performed and a binary logistic regression was conducted. For RQ2, χ^2 tests of independence were performed between each social and neighborhood context proxy (perceived neighborhood social cohesion, neighborhood violence, and perceived unfair treatment) and mental health-related quality of life. To answer RQ3, χ^2 tests of independence between SES and each social and neighborhood context proxy (perceived neighborhood social cohesion, neighborhood violence, and perceived unfair treatment) were performed. To answer RQ4, a binary logistic regression was performed including socioeconomic status and social and neighborhood context proxies. A final logistic regression was then conducted including demographic covariates.

Results

A total of 1101 respondents completed the survey, although age and ethnicity information was missing for 14 respondents and information used to cluster respondents into socioeconomic status was missing for eight respondents, resulting in a final analytic sample size of 1079. Descriptive statistics are presented in Table 1 below. The sample was 63 percent

female, with a mean age of 57 years and a median household size of two. The highest level of education of the sample was as follows: 11 percent did not graduate high school, 38 percent were high school graduates, 29 percent had some college, 12 percent were college graduates, and 10 percent attended graduate or professional school. The majority were employed (46%), followed by retired (35%), homemaker, student, or unable to work (16%), and out of work (4%). The sample was mostly non-Hispanic white (89%). About a third of the households fell at or below 125 percent of the Federal Poverty Level. Twenty-three percent of the sample was classified as having poor mental health quality of life. Results of the cluster analysis resulted in three levels of socioeconomic status: high SES (35%), middle SES (34%), and low SES (31%). Across the sample, 45 percent reported low neighborhood social cohesion, 41 percent reported neighborhood violence in the past six months, and 65 percent reported experiencing unfair treatment in the past six months. Descriptive statistics of the correlates are summarized in Table 2 below.

Table 1. Demographics of the Ottumwa Community Survey Respondents (N=1079)

Variable	<i>n</i>	Mean ± SD
Age	1079	57 ± 18.602
Number of people in household	1079	Median (Range) 2 (1-12)
Gender	<i>n</i>	Percentage
Male	402	37.3
Female	677	62.7
Level of Education		
Did not graduate high school	120	11.1
High school graduate	405	37.5
Some college	311	28.8
College graduate	131	12.1
Graduate/professional school	112	10.4
Work Status		
Employed	491	45.5
Out of work	43	4.0
Homemaker, student, unable to work	173	16.0
Retired	372	34.5
Annual Household Income		
Less than \$10,000	114	10.6
\$10,000-24,999	291	27.0
\$25,000-49,999	319	29.6
\$50,000-74,999	154	14.3
\$75,000 or more	201	18.6
Ownership of Home		
Owns	807	74.8
Rents	272	25.2
Race and Ethnicity		
Non-Hispanic White	960	89.0
Non-Hispanic, Other Race	48	4.4
Hispanic, Any Race	71	6.6
Marital Status		
Married or living with partner	614	57.0
Divorced or separated	167	15.5
Widowed	162	15.0
Single	135	12.5
Household at or below 125% of FPL*		
Yes	329	30.5
No	750	69.5

Note. *Federal Poverty Level

Table 2. Descriptive Statistics of Correlates

(N=1079)

Variable	<i>n</i>	Percentage
Mental Health Quality of Life (QoL)	1079	
Good MH QoL	832	77.1
Poor MH QoL	247	22.9
Socioeconomic Status (SES)		
High SES	380	35.2
Middle SES	370	34.3
Low SES	329	30.5
Neighborhood Violence in Past 6 Months		
Did not report neighborhood violence	633	58.7
Reported neighborhood violence	446	41.3
Neighborhood Social Cohesion		
High Perceived Social Cohesion	592	54.9
Low Perceived Social Cohesion	487	45.1
Perceived Unfair Treatment in Past 6 Months		
Did not report unfair treatment	378	35.0
Reported unfair treatment	701	65.0

Research Question 1

Research Question 1 sought to determine the relationship between socioeconomic status and mental health-related quality of life in this sample. The association between these two variables was found to be significant, $\chi^2(2) = 80.16$, $p = .000$, with a higher proportion of low SES individuals reporting poor mental health-related quality of life than middle or high SES individuals (refer to Figure 1). Results are summarized in Table 3. A test of the logistic regression model of mental health quality of life regressed on socioeconomic status yielded statistically significant results, $\chi^2(2) = 74.72$, $p = .000$. Those in low socioeconomic status had 4.01 times greater odds of reporting poor mental health quality of life than those of high socioeconomic status ($p = .000$). The middle socioeconomic status group, on the other hand, had an odds ratio not significantly different than that of the higher SES group (OR = 1.19, $p = .387$). Results of the logistic regression are summarized in Table 10. With regards to Research Question 1, results supported Hypothesis 1a but not Hypothesis 1b. Thus, socioeconomic status was associated

with poor mental health-related quality of life for those in the lower SES group compared to the high SES group, but not for the middle SES group compared to high.

Figure 1. Differences in Mental Health-Related Quality of Life

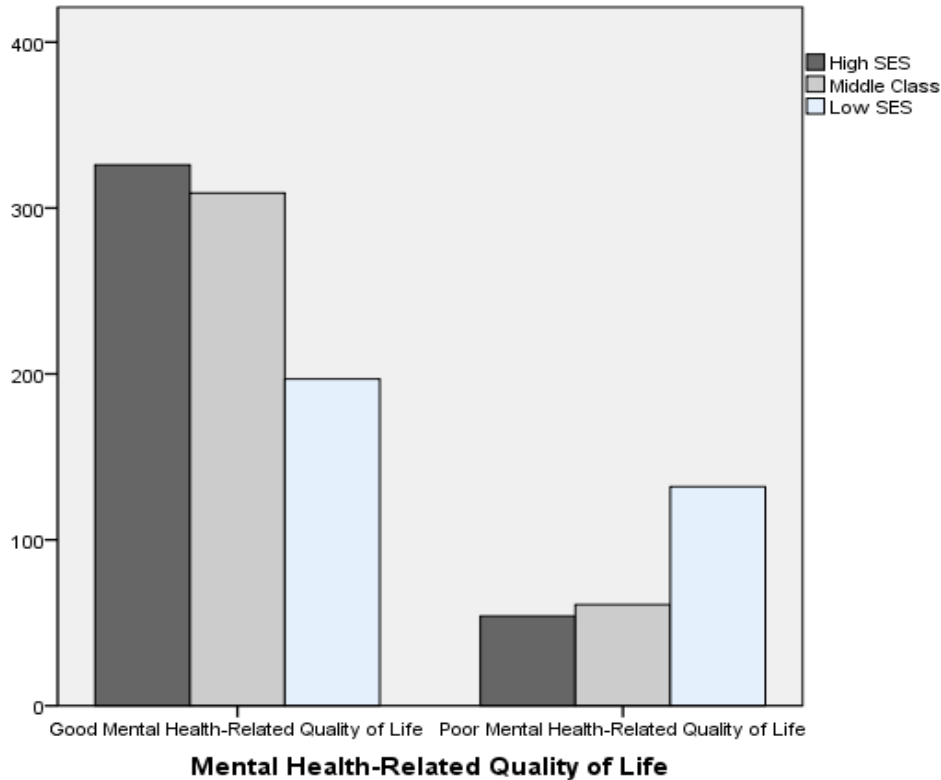


Table 3. Results of Chi-square Test and Descriptive Statistics for Mental Health-Related Quality of Life by Socioeconomic Status

Socioeconomic Status (SES)	Mental Health-Related Quality of Life (QoL)	
	Poor	Good
Low SES	132 (53.4%)	197 (23.7%)
Middle SES	61 (24.7%)	309 (37.1%)
High SES	54 (21.9%)	326 (39.2%)

Note. $\chi^2 = 80.157^{***}$, $df = 2$. Numbers in parentheses indicate column percentages. $^{***}p < .001$

Research Question 2

Research Question 2 sought to determine the relationship between social and neighborhood context proxy variables (neighborhood social cohesion, neighborhood violence,

and unfair treatment) and poor mental health-related quality of life. Results are summarized in Tables 4, 5, and 6. Results of a χ^2 test of independence showed that a significantly higher proportion of people who reported lower social cohesion reported poor mental health quality of life than did those who reported higher social cohesion ($\chi^2 = 22.42$ (1), $p = .000$). There was also an association between reporting neighborhood violence in the past six months and mental health quality of life ($\chi^2 = 20.679$ (1), $p < .001$). A higher proportion of those who reported neighborhood violence in the past six months were classified as having poor mental health quality of life than those who did not report any neighborhood violence. Finally, those who reported an experience of unfair treatment in the past six months constituted a significantly greater proportion of those with poor mental health quality of life than those who did not report any such experiences ($\chi^2 = 17.48$ (1), $p < .001$).

Table 4. Results of Chi-square Test and Descriptive Statistics for Mental Health-Related Quality of Life by Perceived Neighborhood Social Cohesion

Perceived Neighborhood Social Cohesion	Mental Health Related Quality of Life (QoL)	
	Poor	Good
Lower social cohesion	144 (58.3%)	343 (41.2%)
Higher social cohesion	103 (41.7%)	489 (58.8%)

Note. $\chi^2 = 22.42^{***}$, $df = 1$. Numbers in parentheses indicate column percentages. $^{***}p < .001$

Table 5. Results of Chi-square Test and Descriptive Statistics for Mental Health-Related Quality of Life by Neighborhood Violence

Neighborhood Violence in Past 6 Months	Mental Health Related Quality of Life (QoL)	
	Poor	Good
Did not report neighborhood violence	114 (46.2%)	519 (62.4%)
Reported neighborhood violence	133 (53.8%)	313 (37.6%)

Note. $\chi^2 = 20.679^{***}$, $df = 1$. Numbers in parentheses indicate column percentages. $^{***}p < .001$

Table 6. Results of Chi-square Test and Descriptive Statistics for Mental Health-Related Quality of Life by Perceived Unfair Treatment

Perceived Unfair Treatment in Past 6 Months	Mental Health Related Quality of Life (QoL)	
	Poor	Good
Did not report unfair treatment	59 (23.9%)	319 (38.3%)
Reported unfair treatment	188 (76.1%)	513 (61.7%)

Note. $\chi^2 = 17.484^{***}$, $df = 1$. Numbers in parentheses indicate column percentages. $^{***}p < .001$

Research Question 3

Research Question 3 sought to determine the association between socioeconomic status and social and neighborhood context proxy variables (social cohesion, neighborhood violence, and unfair treatment). To determine this, χ^2 tests of independence were conducted between each social or neighborhood proxy variable and socioeconomic status. Results of these tests are summarized in Tables 7, 8, and 9. Neighborhood social cohesion was found to be significantly associated with socioeconomic status, with a greater proportion of low socioeconomic status individuals reporting witnessing neighborhood violence in the past six months than middle or high socioeconomic status individuals ($\chi^2 = 28.87 (2)$, $p < .001$). A statistically significant relationship also exists between perceived neighborhood social cohesion and socioeconomic status, such that a higher proportion of those reporting lower social cohesion are classified as low socioeconomic status ($\chi^2 = 32.07 (2)$, $p < .001$). An intriguing relationship exists between perceived unfair treatment and socioeconomic status in this population. Both individuals in low socioeconomic status and those in high socioeconomic status reported experiencing unfair treatment at a higher rate than those in the middle socioeconomic status classification. This association was statistically significant ($\chi^2 = 16.76 (2)$, $p < .001$).

Table 7. Results of Chi-square Test and Descriptive Statistics for Socioeconomic Status by Perceived Neighborhood Social Cohesion

Perceived Neighborhood Social Cohesion	Socioeconomic Status		
	Low SES	Middle SES	High SES
Lower Social Cohesion	189 (57.4%)	159 (43.0%)	139 (36.6%)
Higher Social Cohesion	140 (42.6%)	211 (57.0%)	241(63.4%)

Note. $\chi^2 = 32.071^{***}$, $df = 2$. Numbers in parentheses indicate column percentages. $^{***}p < .001$

Table 8. Results of Chi-square Test and Descriptive Statistics for Socioeconomic Status by Neighborhood Violence

Neighborhood Violence in Past 6 Months	Socioeconomic Status		
	Low SES	Middle SES	High SES
Did not report neighborhood violence	153 (46.5%)	237 (64.1%)	243 (63.9%)
Reported neighborhood violence	176 (53.5%)	133 (35.9%)	137 (36.1%)

Note. $\chi^2 = 28.867^{***}$, $df = 2$. Numbers in parentheses indicate column percentages. $^{***}p < .001$

Table 9. Results of Chi-square Test and Descriptive Statistics for Socioeconomic Status by Perceived Unfair Treatment

Perceived Unfair Treatment in Past 6 Months	Socioeconomic Status		
	Low SES	Middle SES	High SES
Did not report unfair treatment	103 (31.3%)	160 (43.2%)	115 (30.3%)
Reported unfair treatment	226 (68.7%)	210 (56.8%)	265 (69.7%)

Note. $\chi^2 = 16.764^{***}$, $df = 2$. Numbers in parentheses indicate column percentages. $^{***}p < .001$

Research Question 4

Research Question 4 sought to determine the best set of predictors of poor mental health quality of life, considering SES, social and neighborhood context proxy variables, and demographic variables. As an exploratory question, there were no a priori hypotheses. Results of the logistic regression model of mental health-related quality of life regressed on socioeconomic status and the social and neighborhood context proxies reveal further details about the relationships between these variables. These results are summarized in Table 10. The

overall model was significant ($\chi^2 = 102.72$ (5), $p = .000$), as was the contribution of the social and neighborhood context proxy variables ($\chi^2 = 28.01$ (3), $p = .000$). Those who reported lower neighborhood social cohesion had greater odds of reporting poor mental health quality of life than those higher on social cohesion (OR = 1.43, $p = .029$). Those who reported neighborhood violence in the past six months had greater odds of reporting poor mental health than those who did not report witnessing any violence, although this relationship was not statistically significant (OR = 1.35, $p = .063$). Finally, the relationship between unfair treatment in the past six months and poor mental health quality of life was significant, with those who reported any experiences of unfair treatment in the past six months having greater odds of reporting poor mental health quality of life than those who did not report any such experiences (OR = 1.76, $p = .001$).

Results of the final regression model including covariates are summarized in Table 10. The overall model was significant ($\chi^2 = 112.60$, $p = .000$), however, the contribution of the demographic covariates did not significantly add to the model ($\chi^2 = 9.88$, $p = .196$). Being of low SES continued to be significantly associated with greater odds of reporting poor mental health quality of life (OR = 3.50, $p = .000$). Likewise, being of middle SES continued to not be associated with significantly greater odds of reporting poor mental health quality of life (OR = 1.22, $p = .347$). Lower neighborhood social cohesion continued to be significantly associated with greater odds of reporting poor mental health quality of life (OR = 1.47, $p = .02$), as was reporting experiencing unfair treatment in the past six months (OR = 1.85, $p = .001$). Reporting neighborhood violence in the past six months was associated with greater odds of being of poor mental health quality of life, however, this relationship was not statistically significant (OR = 1.35, $p = .066$). None of the demographic covariates were significantly associated with greater odds of reporting poor mental health quality of life.

Table 10. Results of Logistic Regression of MH QoL on SES, Social & Neighborhood Variables, & Demographic Covariates

Predictor	β	SE(β)	Odds Ratio	Model χ^2	Pseudo-R ²
Model 1 (MH QoL on SES)				74.72***	.102
Middle SES ^a	.18	.20	1.19		
Low SES ^a	1.40	.19	4.01***		
Constant	-1.80	.15			
Model 2 (MH QoL on SES and Social & Neighborhood Context Proxies)				102.72***	.138
Middle SES ^a	.22	.21	1.24		
Low SES ^a	1.30	.19	3.67***		
Neighborhood Social Cohesion ^b	.35	.16	1.43*		
Neighborhood Violence ^c	.30	.16	1.35		
Unfair Treatment ^d	.56	.18	1.76**		
Constant	-2.48	.21			
Model 3 (MH QoL on SES, Social & Neighborhood Context Proxies, & Demographic Covariates)				112.60***	.151
Middle SES ^a	.20	.21	1.22		
Low SES ^a	1.25	.20	3.50***		
Neighborhood Social Cohesion ^b	.38	.17	1.47*		
Neighborhood Violence ^c	.30	.16	1.35		
Unfair Treatment ^d	.62	.19	1.85**		
Age	.00	.01	1.00		
Divorced/Separated ^e	.38	.21	1.46		
Widowed ^e	.00	.26	1.00		
Single ^e	-.11	.25	0.90		
Hispanic, Any Race ^f	-.40	.33	0.67		
Non-Hispanic, Other Race ^f	.11	.34	1.11		
Constant	-2.00	.16			

Note. ***p < .001, **p < .01, *p < .05

^a Comparison group is High SES

^b Those with lower social cohesion compared to those with higher social cohesion

^c Those who reported neighborhood violence in past six months compared to those who did not

^d Those who reported unfair treatment in past six months compared to those who did not

^e Compared to Married or Living with Partner

^f Compared to Non-Hispanic White

Discussion

The purpose of this study was to determine the relationship between socioeconomic status and mental health-related quality of life in a micropolitan community in rural Iowa, as well as the impact of social and neighborhood context factors, specifically social cohesion, neighborhood violence, and unfair treatment, on this relationship. Being of low socioeconomic status was found to be associated with about four times greater odds of reporting poor mental

health-related quality of life compared to being of high socioeconomic status. However, the same is not true of this relationship when comparing middle SES individuals to high SES individuals, congruent with some previous research suggesting that it is not the variation between middle and high SES that is associated with differential mental health quality of life, but rather the variation between low SES and high SES (Costello et al., 2003; Hudson, 2005). These results suggest that it is not necessarily small differences in gradient of socioeconomic status that are associated with poor mental health quality of life, but rather greater and more dramatic differences in socioeconomic status. This finding is especially important when considered in the context of the community of Ottumwa, which is located in the poorest county in Iowa with a median household income that is \$11,197 less than is typical for Iowa as a whole (Frohlich, 2016). This emphasizes the critical need for increased access to mental health services in rural counties such as Wapello County, as well as efforts to promote good mental health in areas that face substantial economic burden and high rates of poverty.

Perceived neighborhood social cohesion and unfair treatment were also found to be significantly associated with mental health quality of life. Those lower on social cohesion were more likely to report poor mental health quality of life than those higher on social cohesion. These results are consistent with prior research, suggesting that high levels of neighborhood social cohesion act as a protective factor against poor mental health outcomes (Fone et al., 2007; Odgers et al., 2009). Similarly, those who reported experiencing unfair treatment in the past six months were also more likely to report poor mental health quality of life than their peers who reported no such experiences. This finding is consistent with previous research, suggesting that perceived unfair treatment negatively affects mental health (Kessler et al., 1999; Pascoe & Smart Richman, 2009; Williams et al., 1997). Bivariate analyses showed that those who reported neighborhood violence in the past six months were more likely to report poor mental

health quality of life than those who did not report violence, although this relationship was not statistically significant when included in a logistic regression model with all social and neighborhood context proxies. This relationship is congruent with previous research, although the lack of a statistically significant relationship may be due to the little variance observed neighborhood violence in this sample (Aneshensel & Sucoff, 1996; Clark et al., 2008; Stockdale et al., 2007). Also, neighborhood violence may present differently in micropolitan communities in a rural context such as this one. Future research examining neighborhood violence in rural communities may shed further light on this issue.

Perceived neighborhood social cohesion, neighborhood violence, and unfair treatment were also found to be significantly associated with level of socioeconomic status. In particular, those of low socioeconomic status were more likely to perceive lower neighborhood social cohesion and to report neighborhood violence than those of middle or high socioeconomic status. The relationship between socioeconomic status and perceived discrimination in this sample is interesting, in that similar proportions of high and low socioeconomic status individuals reported experiencing any unfair treatment, and both groups had a higher proportion than the middle class group. It is important to note that this question in the survey asked about experiences of unfair treatment for any reason, not differentiating between those who felt that they were treated unfairly because of race, ethnicity, gender, socioeconomic status, or any other particular reason. Further qualitative data exploring people's reports of unfair treatment may help us to better understand this relationship.

Considered together, we have evidence that lower socioeconomic status, lower neighborhood social cohesion, and having reported unfair treatment in the past six months are all significantly associated with greater odds of reporting poor mental health quality of life. In addition, lower social cohesion was also more common in those of low socioeconomic status.

These results suggest a compounding effect for those of low socioeconomic status: they are more likely to perceive their neighborhood as lower on social cohesion, and this may put them at an even greater risk for poor mental health quality of life. These findings highlight the vulnerable position of micropolitan community residents with low SES. Interventions designed to promote high levels of neighborhood social cohesion may be one strategy to address disparities in mental health among socioeconomic lines in micropolitan communities. While the relationship between experience of unfair treatment and socioeconomic status is not as straightforward, the experience of unfair treatment is significantly associated with almost double the odds of reporting poor mental health quality of life. This relationship is less intertwined with being of low socioeconomic status in this sample, so it is difficult to make conclusions about the role of unfair treatment in the relationship between socioeconomic status and mental health quality of life. This relationship may be due to differential levels of stress, such that those who report unfair treatment experience greater stress compared to their counterparts who do not report such experiences, which may contribute to poorer mental health quality of life. Further research may show differences in perceived unfair treatment by attributed cause, which may help us to understand the relationship between it and mental health quality of life. Similarly, those who perceive their neighborhood to be lower on social cohesion may have less resources in order to cope with stress, again resulting in poorer mental health quality of life. These results underscore the need to further investigate neighborhood context factors in smaller micropolitan communities, as they are noticeably and significantly related to mental health quality of life in the micropolitan community under study. Results clearly demonstrate a strong relationship between being of low SES and reporting poor mental health quality of life.

Strengths & Limitations

Strengths of this study include the use of a population-based survey with a large sample size. The unique conceptualization of mental health quality of life is able to capture mental health issues that may not meet diagnostic criteria, allowing us to examine mental health in a broader and more population-based manner. In the context of public health, it is advantageous to conceptualize mental health in a more global way, rather than focusing on specific diagnoses and diagnostic criteria. The examination of neighborhood factors in a rural micropolitan community is another strength, as these measures have most frequently been used in urban settings. The observed association between low socioeconomic status and poor mental health quality of life in this study replicated the relationship consistently documented in the literature in a rural setting.

This study uses cross-sectional data, so inferences about causality cannot be made. Information about socioeconomic status, social and neighborhood factors, and mental health quality of life were all collected at the same time, so we cannot be certain of the directionality of any observed relationship. While this study takes a social causation theoretical approach, it is possible that social selection causes those with poor mental health quality-of-life to be of lower socioeconomic status or to live in this community. Another limitation of the study is the use of self-report measures. It may be that those with poor mental health quality of life are more likely to perceive unfair treatment or low neighborhood social cohesion because they are experiencing poor mental health quality of life, not because their actual experiences of these things are different. While the study explored neighborhood context factors, it did not make use of observational measures, so perceptions of respondents could not be validated. Asking people to rate the quality of their own neighborhoods can be misleading; however, subjective ratings should not be abandoned altogether (Kawachi & Berkman, 2003). For example, perceptions of

crime are stronger predictors of behavior than actual crime rates, supporting the use of subjective data in this research (Kawachi & Berkman, 2003). However, the effect mental health may have on one's perceptions warrants thorough consideration when interpreting findings. Future research should make use of observational and qualitative data in order to gain a deeper understanding of neighborhood context factors, as well as to validate subjective ratings. Due to the non-normal distribution of several of the variables examined in this study, analyses relied heavily on dichotomization of variables; therefore, results should be interpreted with caution. Additionally, given the use of cross-sectional data, a true test of mediation cannot be performed. Future research may use conditional process analysis to determine if a mediating relationship exists between socioeconomic status, social and neighborhood context, and mental health quality of life.

CHAPTER III: DIRECTIONS FOR FUTURE RESEARCH AND IMPLICATIONS FOR PUBLIC HEALTH

This study was intended to help fill a gap in the research on the association between socioeconomic status and mental health-related quality of life in a rural micropolitan community context. Much of the existing research on neighborhood factors has been conducted in urban settings and may not be representative of or applicable to rural communities. Results showed that socioeconomic status is significantly associated with mental health quality of life, such that those in low socioeconomic status had four times greater odds of reporting poor mental health quality of life than those in high socioeconomic status. This relationship did not hold for those of middle socioeconomic status, as they had similar odds of reporting poor mental health as those in high socioeconomic status. This finding implies that it is not the variation between middle and high socioeconomic status that is important when considering mental health outcomes, but rather the variation between low socioeconomic status with middle and high. This study attempted to help explain why low socioeconomic status is associated with poor mental health quality of life, hypothesizing that social and neighborhood factors may help to explain this relationship. Neighborhood social cohesion, neighborhood violence, and perceived unfair treatment were shown to each be independently significantly related to mental health quality of life. When considered together, only neighborhood social cohesion and perceived unfair treatment significantly affected the odds of reporting poor mental health quality of life. One possible explanation is that experiences of low social cohesion and perceived unfair treatment lead to high levels of chronic stress, which then leads to poor mental health quality of life. On the other hand, this relationship may be due to those with poor mental health quality of life being more likely to perceive their neighborhoods to be low on social cohesion and to perceive unfair treatment than their counterparts with good mental health quality of life. The findings of this study show that those in low socioeconomic status are more likely to witness neighborhood

violence and to rate their neighborhoods as lower on social cohesion, and that these factors, independently of socioeconomic status, are associated with greater odds of reporting poor mental health quality of life. These findings highlight the necessity of focusing on low socioeconomic status populations when addressing mental health issues, as they appear to be facing risk factors at a greater rate than those in other socioeconomic groups. This classifies this population as a vulnerable one, since they are at a greater risk of experiencing the risks associated with poor mental health quality of life (Frohlich & Potvin, 2008). Further research could build on this study in order to gain a deeper understanding of these phenomena and the relationships between them, as well as shed light on possible ways to intervene for better mental health quality of life for this population.

Directions for Future Research

To better understand the effect of neighborhood social cohesion and perceived unfair treatment on the relationship between socioeconomic status and mental health quality of life, a longitudinal study design collecting socioeconomic status and social and neighborhood information prior to the collection of mental health information may be useful. A conditional process analysis could be performed, allowing us to consider mediation and moderation in the same model, and thus, describe the conditional nature of the mechanisms by which a variable transmits its effect on a consequent variable through intermediary variables (Hayes, 2013). Performing this analysis would allow us to describe the relationship between socioeconomic status and mental health quality of life, considering neighborhood social cohesion and perceived discrimination as mediating variables while simultaneously considering the moderating effect between middle and low socioeconomic status groups. A longitudinal study design and a conditional process analysis would allow us to better understand the causal pathway between

socioeconomic status and mental health quality of life and what role neighborhood social cohesion and perceived unfair treatment might play in this relationship.

Gathering qualitative and observational data is another important first step in furthering this research. In order to gain a better understanding of perceived unfair treatment experiences, qualitative interviews probing into the specific experience of unfair treatment should be conducted. Information gathered during these interviews will allow us to examine the types and severity of discrimination experiences, and explore differences in experiences of perceived unfair treatment between those who attributed it to a specific factor, such as race, sexual orientation or gender, and those who did not. The Life Events and Difficulties Schedule, a widely used semi-structured interview format, could prove useful in providing contextual information to experiences of unfair treatment and the stress associated with such experiences (Brown & Harris, 2012). This approach allows interviewees to provide a rich account of the experience and focuses heavily on contextual factors (Brown & Harris, 2012). The narrative is then rated by “blind” raters using contextual information to determine the classification of the event as well as its threat of unpleasantness (Brown & Harris, 2012). This interview has been utilized to study the effects of stressful life events and discriminatory experiences in relation to both psychiatric and physical illnesses. Analyzing data from such interviews may provide further insight into the experiences of unfair treatment in this community and shed light on strategies that may be useful in combatting negative effects of such experiences.

Likewise, gathering observational and interview data regarding neighborhood context factors may also prove useful in gaining a deeper understanding of the findings of this study. Interviewing neighborhood residents is necessary as the constructs of neighborhood social cohesion and neighborhood social disorder are inherently subjective. However, it may also be informative to gather objective data on aspects of social disorder, including the presence of bars

or liquor stores, rundown or defaced property, and the presence of drugs or drug paraphernalia, in order to better understand the neighborhood context (Kawachi & Berkman, 2003). Because this study focuses on a micropolitan community in a rural context, findings may indicate that the presence of neighborhood social disorder presents differently in a rural context as compared to an urban context. One strategy to uncover contextual factors is the “go-along” interview, in which the researcher accompanies a knowledgeable community member, or a key informant, on an outing in the community (Carpiano, 2009). This approach allows the researcher to interview the informant while receiving a tour of the neighborhood, allowing the informant to walk the researcher through their lived experiences and provide a deeper understanding of the neighborhood context (Carpiano, 2009). An approach like this allows the community members to identify strengths and needs in their own communities, information that can be invaluable when strategizing how to intervene for better mental health outcomes.

Studying neighborhood effects and socioeconomic status considerations on a community-level scale may provide more insight into the relationship between these factors and mental health-related quality of life as well. This study examined some limited neighborhood context variables, albeit as perceived by individual respondents. Future research should consider examining the effects of neighborhood context from an ecological perspective. Ecological studies are those in which groups act as the units of analysis and both independent and dependent variables are measured for groups, with outcomes examined as a function of group-level variables (Kawachi & Berkman, 2003). Future research utilizing geocoding of neighborhoods may help to shed light on area-based risk and protective factors for mental health and illness outcomes. Geocoding refers to the process of identifying an address’s geographical position into its relevant census tract, with lower levels of grouping such as census blocks and block-groups also identified (Kawachi & Berkman, 2003). These groupings are then

used as the unit of analysis, so area-based contextual factors are taken into account. With regards to this research, examination of the relationship between socioeconomic status of an entire area and mental health outcomes may shed further light on the possible causes and risk factors underlying such a relationship. This may help us to better understand what specific aspect of low socioeconomic status is truly associated with mental health quality of life. For example, it may be the individual or family-level stressors of living with less resources that contributes to poor mental health quality of life, but it may also be the community-level neighborhood context that is associated with being of low socioeconomic status. While care must be taken to avoid generalizing results of an ecological study to specific individuals, research that incorporates group-level data may help to further understand the relationship between socioeconomic status and mental health outcomes. This research is important, again, as the majority of research on neighborhood context has been done in urban areas, but much less has examined these factors in smaller communities in rural settings.

Implications for Public Health

The findings of the study have several important implications for public health. Firstly, there is a need for public mental health promotion. The World Health Organization defines health promotion as action and advocacy to address the full range of potentially modifiable determinants of health, including actions of individuals as well as the contextual and environmental factors (Herrman, 2001). However, with respect to mental health, common approaches tend to be focused on providing effective treatment to ill individuals, rather than attempting to intervene on the upstream causes (World Health Organization, 2004). This is partly due to the stigmatization of mental illness, in that it has been historically thought of as both purely biological in nature and incurable (World Health Organization, 2004). This stigma

has led to the compartmentalization of mental health and physical health, when in reality, they are closely related.

Therefore, mental health promotion is necessary not only to prevent mental illness and promote good mental health, but also to aid in promoting good physical health. Research has shown a consistent link between mental health status and chronic disease, such that a substantial portion of people who have chronic physical disorders also have comorbid mental disorders (Kessler, Ormel, Demler, & Stang, 2003; Neeleman, Ormel, & Bijl, 2001). Furthermore, comorbid mental-physical disorders impair functioning more so than either physical or mental disorders on their own (Kessler, Ormel, et al., 2003; Parker, Wilson, Vandenberg, DeJoy, & Orpinas, 2009). Research has also shown higher rates of chronic diseases such as diabetes, chronic obstructive pulmonary disease and emphysema in those diagnosed with a serious mental illness than in the general population, as well as higher rates of smoking and obesity (Sokal et al., 2004). Similarly, major depressive disorder and depressive symptoms have been shown to be risk factors for cardiovascular disease (World Health Organization, 2004). Patients diagnosed with depressive disorders also have poorer medical care outcomes and have been shown to be about three times more likely to be non-compliant with medical treatment as their non-depressed peers (DiMatteo, Lepper, & Croghan, 2000). This heightened risk for many unfavorable physical health problems underscores the need for inclusion of mental health promotion programs in interventions to promote overall health, not just mental health.

Furthermore, the significant relationship between being of low socioeconomic status and reporting poor mental health quality of life stresses the need for public mental health interventions to reach those at the lowest socioeconomic status. Because people of low socioeconomic status frequently have many demands on their time and resources, special consideration as to how to engage people from this group is necessary. It has been shown that

those with the greatest resources tend to be the first to derive maximum benefits from population-based public health interventions, which can widen disparities even further (Frohlich & Potvin, 2008). Mental health promotion programs should prioritize working with the vulnerable population of people with lower socioeconomic status in order to address this disparity. It is imperative that programs which focus on vulnerable populations such as those of low socioeconomic status include individuals from this population in all aspects of planning, implementing, and evaluating the intervention. It is also important to avoid solely focusing on the deficits and problems in the community. Rather, identification of community assets and strengths is vital. Because of the relationship between economic and social factors and mental health, successful mental health promotion programs must involve creating partnerships with a variety of agencies in the public, private, and non-profit sectors (Elderon & Whooley, 2013). Engaging existing community networks, such as churches, community groups, and local non-profit organizations, will assist to design and implement interventions that will be relevant to the specific community of interest and build on existing community assets. Creating networks of interested citizens and community associations may also prove to be helpful in advocating for policy changes with regards to the dearth of mental health services in rural areas.

Interventions designed to promote mental health must address determinants at multiple levels of the social ecological model, including interpersonal and community factors. As this study showed, neighborhood and social context factors are independently associated with poor mental health quality of life, above and beyond the association with low socioeconomic status. As people of low socioeconomic status were also more likely to have reported neighborhood violence and lower neighborhood social cohesion, it is imperative to address neighborhood and social factors in low socioeconomic status areas. Interpersonal interventions targeted at increasing social support and positive social networks should be considered, as well

as community-level interventions focused on structural and environmental determinants of mental health. Collaboration with informed community members and key decision makers is essential in order to design and implement a public mental health intervention targeting neighborhood and social factors. Finally, efforts to alleviate poverty are an essential component of emotional and behavioral health and thus need to be addressed in order for a mental health promotion program to be successful (Kuruville & Jacob, 2007). Although it is not possible for public health researchers and practitioners to singlehandedly change the socioeconomic status of vulnerable populations, though community building and organizing, they can assist in empowering communities, organizations, and individuals to actively engage in the political process and advocate for better education and employment opportunities for marginalized populations. It is vital to the health of our citizens and the nation as a whole to apply a social justice framework in regards to mental health.

REFERENCES

- Adler, N. E., Boyce, T., Chesney, M. A., Cohen, S., Folkman, S., Kahn, R. L., & Syme, S. L. (1994). Socioeconomic status and health: the challenge of the gradient. *American psychologist, 49*(1), 15.
- Adler, N. E., & Rehkopf, D. H. (2008). US disparities in health: descriptions, causes, and mechanisms. *Annu. Rev. Public Health, 29*, 235-252.
- Aneshensel, C. S., & Sucoff, C. A. (1996). The neighborhood context of adolescent mental health. *Journal of health and social behavior, 293-310*.
- Beckie, T. M. (2012). A systematic review of allostatic load, health, and health disparities. *Biological research for nursing, 14*(4), 311-346.
- Berkman, L., & Kawachi, I. (2000). *Social epidemiology*. New York, New York: Oxford University Press, Inc.
- Berkman, L. F., Glass, T., Brissette, I., & Seeman, T. E. (2000). From social integration to health: Durkheim in the new millennium. *Social science & medicine, 51*(6), 843-857.
- Brown, G. W., & Harris, T. (2012). *Social origins of depression: A study of psychiatric disorder in women*: Routledge.
- Carpiano, R. M. (2009). Come take a walk with me: The "Go-Along" interview as a novel method for studying the implications of place for health and well-being. *Health & place, 15*(1), 263-272.
- Centers for Disease Control & Prevention. (2000). Measuring healthy days: Population assessment of health-related quality of life. *Atlanta: CDC, 4-6*.
- Chaskin, R. J. (1997). Perspectives on neighborhood and community: a review of the literature. *The Social Service Review, 521-547*.
- Clark, C., Ryan, L., Kawachi, I., Canner, M. J., Berkman, L., & Wright, R. J. (2008). Witnessing community violence in residential neighborhoods: a mental health hazard for urban women. *Journal of Urban health, 85*(1), 22-38.

- Costello, E. J., Compton, S. N., Keeler, G., & Angold, A. (2003). Relationships between poverty and psychopathology: A natural experiment. *Jama*, *290*(15), 2023-2029.
- Coulton, C. J., Korbin, J., Chan, T., & Su, M. (2001). Mapping residents' perceptions of neighborhood boundaries: a methodological note. *American journal of community psychology*, *29*(2), 371-383.
- Crosby, R. A., Wendel, M. L., Vanderpool, R. C., & Casey, B. R. (2012). *Rural Populations and Health: Determinants, Disparities, and Solutions*: John Wiley & Sons.
- Cutrona, C. E., Wallace, G., & Wesner, K. A. (2006). Neighborhood characteristics and depression: an examination of stress processes. *Current directions in psychological science*, *15*(4), 188-192.
- DeSilver, D. (2013). U.S. income inequality, on rise for decades, is now highest since 1928. *Fact Tank*. Retrieved from Pew Research Center website: <http://www.pewresearch.org/fact-tank/2013/12/05/u-s-income-inequality-on-rise-for-decades-is-now-highest-since-1928/#> Retrieved from <http://www.pewresearch.org/fact-tank/2013/12/05/u-s-income-inequality-on-rise-for-decades-is-now-highest-since-1928/#>
- DiMatteo, M. R., Lepper, H. S., & Croghan, T. W. (2000). Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. *Archives of internal medicine*, *160*(14), 2101-2107.
- Dohrenwend, B. P., & Dohrenwend, B. S. (1969). *Social status and psychological disorder: A causal inquiry*: Wiley-Interscience New York.
- Dohrenwend, B. P., Levav, I., Shrout, P. E., Schwartz, S., Naveh, G., Link, B. G., . . . Stueve, A. (1992). Socioeconomic status and psychiatric disorders: the causation-selection issue. *Science(Washington)*, *255*(5047), 946-952.
- Dupéré, V., Leventhal, T., & Lacourse, E. (2009). Neighborhood poverty and suicidal thoughts and attempts in late adolescence. *Psychological medicine*, *39*(08), 1295-1306.
- Echeverría, S., Diez-Roux, A. V., Shea, S., Borrell, L. N., & Jackson, S. (2008). Associations of neighborhood problems and neighborhood social cohesion with mental health and health behaviors: the Multi-Ethnic Study of Atherosclerosis. *Health & place*, *14*(4), 853-865.

- Elderon, L., & Whooley, M. A. (2013). Depression and cardiovascular disease. *Progress in cardiovascular diseases*, 55(6), 511-523.
- Elliott, M. (2000). The stress process in neighborhood context. *Health & place*, 6(4), 287-299.
- Everson, S. A., Maty, S. C., Lynch, J. W., & Kaplan, G. A. (2002). Epidemiologic evidence for the relation between socioeconomic status and depression, obesity, and diabetes. *Journal of psychosomatic research*, 53(4), 891-895.
- Fagiolini, A., & Goracci, A. (2009). The effects of undertreated chronic medical illnesses in patients with severe mental disorders. *J Clin Psychiatry*, 70 Suppl 3, 22-29.
doi:10.4088/JCP.7075su1c.04
- Faris, R. E. L., & Dunham, H. W. (1939). Mental disorders in urban areas: an ecological study of schizophrenia and other psychoses.
- Fletcher, J., & Wolfe, B. (2014). Increasing Our Understanding Of The Health-Income Gradient In Children. *Health economics*, 23(4), 473-486.
- Fone, D., Dunstan, F., Lloyd, K., Williams, G., Watkins, J., & Palmer, S. (2007). Does social cohesion modify the association between area income deprivation and mental health? A multilevel analysis. *International Journal of Epidemiology*, 36(2), 338-345.
- Fowler, P. J., Tompsett, C. J., Braciszewski, J. M., Jacques-Tiura, A. J., & Baltes, B. B. (2009). Community violence: A meta-analysis on the effect of exposure and mental health outcomes of children and adolescents. *Development and psychopathology*, 21(01), 227-259.
- Frohlich, K. L., & Potvin, L. (2008). Transcending the known in public health practice: the inequality paradox: the population approach and vulnerable populations. *American Journal of Public Health*, 98(2), 216-221.
- Frohlich, T. C., Kent, A., Sauter, M., & Stebbins, S. (2016). Poorest County in Each State. 24/7 Wall Street. <http://247wallst.com/special-report/2016/01/05/poorest-county-in-each-state/> Retrieved from <http://247wallst.com/special-report/2016/01/05/poorest-county-in-each-state/>
- Hauenstein, E. J., Petterson, S., Merwin, E., Rovnyak, V., Heise, B., & Wagner, D. (2006). Rurality, gender, and mental health treatment. *Family & Community Health*, 29(3), 169-185.

- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*: Guilford Press.
- Hedden, S., Kennet, J., Lipari, R., Medley, G., Tice, P., Copello, E., Kroutil, L. (2015). *Behavioral health trends in the United States: Results from the 2014 National Survey on Drug Use and Health* (HHS Publication No. SMA 15-4927, NSDUH Series H-50). Retrieved from <http://www.samhsa.gov/data/>
- Herrman, H. (2001). The need for mental health promotion. *Australian and New Zealand Journal of Psychiatry*, 35(6), 709-715.
- Hollingshead, A. B., & Redlich, F. C. (1953). Social stratification and psychiatric disorders. *American Sociological Review*, 18(2), 163-169.
- Hudson, C. G. (2005). Socioeconomic status and mental illness: tests of the social causation and selection hypotheses. *American journal of Orthopsychiatry*, 75(1), 3.
- Israel, B., Eng, E., Schulz, A. J., & Parker, E. A. (2013). *Methods in community-based participatory research for health* (2nd ed.).
- Kawachi, I., & Berkman, L. F. (2001). Social ties and mental health. *Journal of Urban health*, 78(3), 458-467.
- Kawachi, I., & Berkman, L. F. (2003). *Neighborhoods and health*: Oxford University Press.
- Kessler, R. C., Barker, P. R., Colpe, L. J., Epstein, J. F., Gfroerer, J. C., Hiripi, E., . . . Walters, E. E. (2003). Screening for serious mental illness in the general population. *Archives of general psychiatry*, 60(2), 184-189.
- Kessler, R. C., Mickelson, K. D., & Williams, D. R. (1999). The prevalence, distribution, and mental health correlates of perceived discrimination in the United States. *Journal of health and social behavior*, 208-230.
- Kessler, R. C., Ormel, J., Demler, O., & Stang, P. E. (2003). Comorbid mental disorders account for the role impairment of commonly occurring chronic physical disorders: results from the National Comorbidity Survey. *Journal of Occupational and Environmental Medicine*, 45(12), 1257-1266.

- Kessler, R. C., & Wang, P. S. (2008). The descriptive epidemiology of commonly occurring mental disorders in the United States. *Annu Rev Public Health, 29*, 115-129. doi:10.1146/annurev.publhealth.29.020907.090847
- Keyes, C. L. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of consulting and clinical psychology, 73*(3), 539.
- Kuruvilla, A., & Jacob, K. (2007). Poverty, social stress & mental health. *Indian Journal of Medical Research, 126*(4), 273.
- Levin, B. L., Petrila, J., & Hennessy, K. D. (2004). *Mental health services: A public health perspective*: Oxford University Press, USA.
- Marmot, M. G., Shipley, M. J., & Rose, G. (1984). Inequalities in death—specific explanations of a general pattern? *The Lancet, 323*(8384), 1003-1006.
- McEwen, B. S. (1998). Stress, adaptation, and disease: Allostasis and allostatic load. *Annals of the New York Academy of Sciences, 840*(1), 33-44.
- McEwen, B. S., & Gianaros, P. J. (2010). Central role of the brain in stress and adaptation: links to socioeconomic status, health, and disease. *Annals of the New York Academy of Sciences, 1186*(1), 190-222.
- Miech, R. A., Caspi, A., Moffitt, T. E., Wright, B. R. E., & Silva, P. A. (1999). Low socioeconomic status and mental disorders: a longitudinal study of selection and causation during young adulthood 1. *American journal of sociology, 104*(4), 1096-1131.
- Mueller, C. W., & Parcel, T. L. (1981). Measures of socioeconomic status: Alternatives and recommendations. *Child Development, 13*-30.
- Mujahid, M. S., Diez Roux, A. V., Morenoff, J. D., & Raghunathan, T. (2007). Assessing the measurement properties of neighborhood scales: from psychometrics to econometrics. *Am J Epidemiol, 165*(8), 858-867. doi:10.1093/aje/kwm040
- Murali, V., & Oyebode, F. (2004). Poverty, social inequality and mental health. *Advances in psychiatric treatment, 10*(3), 216-224.

- Neeleman, J., Ormel, J., & Bijl, R. (2001). The distribution of psychiatric and somatic ill health: associations with personality and socioeconomic status. *Psychosomatic medicine*, 63(2), 239-247.
- Odgers, C. L., Moffitt, T. E., Tach, L. M., Sampson, R. J., Taylor, A., Matthews, C. L., & Caspi, A. (2009). The protective effects of neighborhood collective efficacy on British children growing up in deprivation: a developmental analysis. *Developmental psychology*, 45(4), 942.
- Office of Assistant Secretary for Planning and Evaluation. (2016). Poverty Guidelines. Retrieved from <https://aspe.hhs.gov/poverty-guidelines>
- Office of Management and Budget. (2015). OMG Bulletin No. 15-01. Retrieved from <https://www.whitehouse.gov/sites/default/files/omb/bulletins/2015/15-01.pdf>
- Parker, K. M., Wilson, M. G., Vandenberg, R. J., DeJoy, D. M., & Orpinas, P. (2009). Association of comorbid mental health symptoms and physical health conditions with employee productivity. *Journal of Occupational and Environmental Medicine*, 51(10), 1137-1144.
- Pascoe, E. A., & Smart Richman, L. (2009). Perceived discrimination and health: a meta-analytic review. *Psychological bulletin*, 135(4), 531.
- Phelan, J. C., & Link, B. G. (2013). Fundamental cause theory *Medical sociology on the move* (pp. 105-125): Springer.
- Safran, M. A., Mays Jr, R. A., Huang, L. N., McCuan, R., Pham, P. K., Fisher, S. K., . . . Trachtenberg, A. (2009). Mental health disparities. *American Journal of Public Health*, 99(11), 1962-1966.
- Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, 277(5328), 918-924.
- Schulz, A., Williams, D., Israel, B., Becker, A., Parker, E., James, S. A., & Jackson, J. (2000). Unfair treatment, neighborhood effects, and mental health in the Detroit metropolitan area. *Journal of health and social behavior*, 314-332.
- Shariff-Marco, S., Breen, N., Landrine, H., Reeve, B. B., Krieger, N., Gee, G. C., . . . Alegría, M. (2011). Measuring everyday racial/ethnic discrimination in health surveys. *Du Bois Review: Social Science Research on Race*, 8(01), 159-177.

- Shaw, C. R., & McKay, H. D. (1942). Juvenile delinquency and urban areas. *Chicago, Ill.*
- Smalley, K. B., Yancey, C. T., Warren, J. C., Naufel, K., Ryan, R., & Pugh, J. L. (2010). Rural mental health and psychological treatment: A review for practitioners. *Journal of Clinical Psychology, 66*(5), 479-489.
- Sokal, J., Messias, E., Dickerson, F. B., Kreyenbuhl, J., Brown, C. H., Goldberg, R. W., & Dixon, L. B. (2004). Comorbidity of medical illnesses among adults with serious mental illness who are receiving community psychiatric services. *The Journal of nervous and mental disease, 192*(6), 421-427.
- Stamm, B. H., Lambert, D., Piland, N. F., & Speck, N. C. (2007). A rural perspective on health care for the whole person. *Professional Psychology: Research and Practice, 38*(3), 298.
- Stockdale, S. E., Wells, K. B., Tang, L., Belin, T. R., Zhang, L., & Sherbourne, C. D. (2007). The importance of social context: neighborhood stressors, stress-buffering mechanisms, and alcohol, drug, and mental health disorders. *Social science & medicine, 65*(9), 1867-1881.
- Taylor, T. R., Kamarck, T. W., & Shiffman, S. (2004). Validation of the Detroit Area Study Discrimination Scale in a community sample of older African American adults: the Pittsburgh healthy heart project. *International journal of behavioral medicine, 11*(2), 88-94.
- Turner, R. J., & Avison, W. R. (2003). Status variations in stress exposure: Implications for the interpretation of research on race, socioeconomic status, and gender. *Journal of health and social behavior, 488*-505.
- U.S. Department of Health and Human Services. (2010). *Healthy People 2020*. Washington, D.C. Retrieved from <http://www.healthypeople.gov/>.
- United States Census Bureau. (2016). Quick Facts. Retrieved from <http://www.census.gov/quickfacts/table/PST045215/1960465,19,19179>
- US Surgeon General. (1999). *Mental health: A report of the surgeon general*. Rockville, MD: US Department of Health and Human Services. Retrieved from
- Van Buuren, S. (2012). *Flexible imputation of missing data*: CRC press.

- Vyncke, V., De Clercq, B., Stevens, V., Costongs, C., Barbareschi, G., Jónsson, S. H., . . . Maes, L. (2013). Does neighbourhood social capital aid in levelling the social gradient in the health and well-being of children and adolescents? A literature review. *BMC Public Health, 13*(1), 1.
- Wethington, E., Brown, G. W., & Kessler, R. C. (1995). Interview measurement of stressful life events. *Measuring stress: A guide for health and social scientists, 59-79*.
- Williams, D. R., Yu, Y., Jackson, J. S., & Anderson, N. B. (1997). Racial differences in physical and mental health socio-economic status, stress and discrimination. *Journal of health psychology, 2*(3), 335-351.
- World Health Organization. (1946). *Preamble to the Constitution of the World Health Organization*. Paper presented at the International Health Conference, New York.
- World Health Organization. (2004). Promoting mental health: Concepts, emerging evidence, practice: Summary report.
- Xue, Y., Leventhal, T., Brooks-Gunn, J., & Earls, F. J. (2005). Neighborhood residence and mental health problems of 5-to 11-year-olds. *Archives of general psychiatry, 62*(5), 554-563.