

Evaluating The Role of Objective and Subjective Neighborhood Context with Mental
Health

and Well-Being in Midlife

by

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ABSTRACT

It is well known that neighborhood contexts form an integral part in shaping development across the lifespan. At the same time, it is recognized that there is variability in the manner with which the neighborhood context is associated with pertinent outcomes, such as mental health and psychological well-being. In this regard, empirical research has differentiated between subjective and objective neighborhood indicators. Midlife is a critical life stage due to middle-aged adults being “sandwiched” between generations and being firmly entrenched in the workforce; in this regard, the neighborhood context could play a role in shaping mental health and psychological well-being in midlife. Of importance is determining which factors account for development in midlife, and whether individuals can find protective factors in order to preserve their health and psychological wellbeing into older adulthood.

The purpose of this dissertation was to examine whether and how neighborhood context is associated with mental health and psychological well-being in midlife. The first study examined whether the subjective and objective neighborhood context moderates the impact of monthly adversity on mental health and psychological well-being in midlife. The second study aimed to examine whether and which potentially relevant latent factors exist among subjective and objective neighborhood indicators in a sample of middle-aged adults from the Phoenix Metropolitan area.

Taken together, the results of these studies provide evidence that neighborhood context is indeed relevant resource for middle-aged adults. Specifically, in Paper 1, found that individuals who live in neighborhoods with less disorder show fewer steep declines in mental health and well-being in months when an adversity was reported. Paper 2 found

that that there are distinct latent constructs that were primarily comprised of factors related to resource and prosperity and financial strain for the objective indicators. For subjective perceptions factors comprised neighborhood insights. These findings contribute to the literature on potential ways in which neighborhood context may serve as a resource and serve as the groundwork for future studies that test mechanisms linking the neighborhood context to mental health and well-being in midlife and inform future intervention studies.

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PREFACE

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CHAPTER 1

INTRODUCTION

Evaluating The Role of Objective and Subjective Neighborhood Context with Health and Well-Being in Midlife

The course of development is shaped by the context in which life transpires (Bronfenbrenner, 1986; Lawton, 1985a; Wahl & Gerstorf, 2018). The last few years has seen an influx of studies examining the nature of neighborhood context and its relations with mental health and well-being in adulthood and old age. While some individuals remain relatively healthy into old age, others become unhealthy, suggesting that declines are not an inevitable part of aging and postulate that the neighborhood context is one such factor that plays a role in the aging process. Wahl and Gerstorf (2018) brought forth a conceptual framework aiming to organize and integrate perspectives in contextual aging science as it relates to health and well-being. This framework emphasizes how the different context domains (SES/economic, social, and physical) shape health and well-being across adulthood and old age. The SES/economic contexts domain focuses on the package of characteristics pertaining to the wealth and poverty of a given neighborhood in which individuals live as well as crime rates, residential instability, and medical facilities. The social context involves the entire range of social life where individuals reside, including relationships with network members, such as family, friends, and neighbors. This also involves perceptions of one's neighborhood, including social cohesion, collective efficacy, and community culture. Lastly, the physical context encompasses the natural and built environments that surround neighborhoods, ranging

from the more immediate physical surrounding within the house (e.g., size of apartment), close environments (e.g., sidewalk length), to more structural levels of the neighborhood (e.g., public transportation networks).

There are a number of theoretical and methodological paths to measuring neighborhood context and their relations with health (Browning & Cagney, 2003; Cummins et al., 2007; Echeverria et al., 2004a; Eibner & Sturm, 2006; Macintyre & Ellaway, 2003; Sampson et al., 1997; Shaw & McKay, 1942). The common definitions of neighborhood context measures used in this research can generally be considered as either objective and subjective indicators. Here, I define objective measures of neighborhood as those measures that are area-level indicators that are often derived from the census data and other large surveys that are characterized to be independent of a resident's own perceptions and collected in a systematic way. The most commonly used objective measures quantify the sociodemographic characteristics of residents (e.g., residential mobility, median household income, unemployment rate). Amongst other types of objective based indicators include the use of outsider or research based observations of neighborhood conditions (Raudenbush & Sampson, 1999; Sampson et al., 1997), and the presence of counts of, or distance to certain types of institutions or facilities (e.g. medical facilities, toxic waste facilities, grocery stores, green spaces) (Cummins et al., 2007; Cummins & Macintyre, 2006; Jackson et al., 2016). On the other hand, subjective measures of neighborhood typically refer to the individual level assessments of a resident's perceptions of their neighborhood and measures have been

created that assess several domains, including perceived crime, safety, social cohesion, access to services (Browning, 2002; Humpel et al., 2002; Parkes & Kearns, 2006a; Sooman & Macintyre, 1995a). This framework will serve as the guiding framework for this dissertation.

Although theories on neighborhood environments have emerged discussing their influence as either direct effects or protective factors against the detrimental consequences of stress in relation to health and well-being, the scientific evidence investigating neighborhood context and health is inconclusive (Allen et al. 2014; Kim, 2008; McBride et al. 2011). There are also conflicting accounts of whether and to what extent the strength of the association between subjective assessments of the neighborhood context and/or more objective assessments and health may depend on whether those features measured were done objectively or subjectively. The current literature on health and well-being and neighborhood context needs greater clarity to ascertain the extent to which neighborhood context plays a role across adult development and health and well-being and whether perceived and objective measures may or may not accurately reflect similar features of the environment.

The goal of the present dissertation is to synthesize and review the current evidence and integrate studies that examine both neighborhood objective and subjective contexts and the changes in outcomes of mental health, well-being, and physical health in adulthood and old age. Previous studies have discussed the general evidence linking direct effects of neighborhood on health and mental health (Mair et al. 2008; Williamson & Pruchno; 2013). Other studies have considered the extent to whether there

is agreement between objective and subjective neighborhood context measures across physical health outcomes (Orstad et al. 2017). However, much less work focusing on outcomes of health and well-being and the subsequent consideration of both objective and subjective contexts of the neighborhood have been considered. Neither were they able to consider a perspective solely focused on adulthood. Here, the aim is to extend upon previous work and discuss the framework and definition of subjective and objective indicators of the neighborhood, review research solely on health and well-being, and lastly, discuss the methodological implications of incorporating both subjective and objective measures of the neighborhood context to study outcomes of health and well-being.

CHAPTER 2

LITERATURE REVIEW

The Importance of Neighborhood Context and Development

Socio-cultural and socio-contextual factors, such as the neighborhood context, have long acknowledged playing a large role in an individual's development over the course of life (Baltes, 1987; Bronfenbrenner, 1977). The ecological model set forth by Bronfenbrenner (1977) stipulates the importance of studying the organism and its subsequent accommodation in his or her immediate environments and how it is shaped by relations with the larger social contexts. Moreover, this highlights the importance of much larger macro-level contexts in shaping the course of developmental processes that occur at the individual level. One such example can be the physical and psychological benefits of interacting with nature within urban settings that include a wealth of positive

outcomes such as both mental and physical well-being (Berman et al., 2008; Wells, 2000; Kuo, 2001; Sullivan et al., 2004; Coley et al., 1997). Recent years has seen an emerging body of contextual research on adult development has transpired to examine these links. Early scholarly work has aimed to integrate and highlight the ecology of human development and how co-regulation of individuals and contexts operate with one another (Baltes & Carstensen, 1996; Baltes, 1987; Bronfenbrenner, 1977; Lawton, 1985; Snow, 1855).

More recently, work has focused on unifying the diversity of contexts and integrate them into a framework that expands on previous theoretical frameworks that have typically developed isolated from one another (Wahl & Gerstorf, 2018). This framework by Wahl and Gerstorf (2018) centers on refining previous approaches such as Bronfenbrenner's bio-ecological model (Bronfenbrenner, 1979). This bio-ecological model can be defined as the interactions an individual has with the environment, categorized into multiple systems, and their role in shaping their development over time. Therefore, it aims to integrate contextual research in aging research by considering how neighborhood context dynamics shift as individuals transition into the later stage of adulthood (over age 40), while also considering simultaneous consideration of proximal and distal contexts for development in key domains of life.

Recognizing that contextual exposure influences mental health, and how it simultaneously interacts with individual level characteristics and other system-levels is a crucial component of ecological theory, that has been refined in the latter part of the 20th century (Bronfenbrenner, 1977; Krieger, 2011). Thus, a neighborhood and contextual

research perspective can complement the often dominant biomedical and lifestyle models of research focusing on individual-risk factors for disease manifestation (Krieger, 2011). Examining neighborhood effects on health can and should take on new practical importance as the public health looks to place-based interventions to promote health across the lifespan (Frieden, 2010). Despite this, most of the focus on identifying whether and to what extent neighborhood characteristics such as subjective and more objective variables play a role in individuals' health remains a debate (Roux, 2007).

Methods for assessing subjective neighborhood context. Objective and subjective context can be assessed in a variety of ways. One of the more common approaches to assess subjective neighborhood context is through self-report assessments. Subjective measures typically measure individual-level assessments of the neighborhood where the individual resides and include domains like social cohesion, and safety, and neighborhood crime and disorder (Echeverria et al., 2004; Humpel et al., 2002; Parkes & Kearns, 2006; Sooman & Macintyre, 1995). For example, such subjective indicators provide better insight to the actual experience and perspective of an individual's outlook of their environment. These perceptions of the environment develop through social, cognitive and affective processes that are ongoing and evaluative in nature (Bandura, 1978; Nasar, 2008); whereas objective measures are assumed to capture the structural features of the environment in a systematic fashion. Also, there is some evidence that environmental perceptions may be conceptualized as being more proximal to health (Weden, Carpiano, & Robert, 2008) and health behavior (Caspi, Kawachi, Subramanian, Adamkiewicz, & Sorensen, 2012) than the objectively measured environment.

Methods for assessing objective neighborhood context. Objective context, on the other hand, can be measured through a variety of methods—including population and housing information across census defined tracts, block groups county, and even at the country level providing measurable data on specific structural characteristics of neighborhood. They are considered area level measures independent of individual resident subjectivities. For example, they include information derived from databases created by the Bureau of the Census but also consider researcher observations, or more direct geographical counts of spaces like parks or hospitals. The utility of these objective assessments becomes crucial as the use of more technological tools such as geographic information systems (GIS) are poised to facilitate examining the neighborhood context more objectively and directly. This notion gives way to the idea that perceived and objective measures may not reflect similar features of the environment (Brownson et al. 2009). Of the two modalities of assessing the neighborhood, subjective appraisals of the neighborhood conditions have been the primary type of assessment via self-report questionnaires. However, more work is needed that simultaneously examines both objective and subjective neighborhood characteristics' role on the pathways that link individual characteristics, neighborhood conditions, and mental health. Questions linger over interrelations between objective and subjective experiences within one's environment and their relative importance for health.

Effects of Neighborhood Context on Pertinent Outcomes in Adulthood and Old Age

While previous research has demonstrated how community-level characteristics are linked to individuals' well-being, functional health, and mortality rates (Balfour &

Kaplan, 2002; Kawachi & Berkman, 2003; Sampson et al., 2002; Silver et al., 2002). It was not until the last 20 years, however, that interest in understanding the effect neighborhood context has on health grown exponentially (Oakes et al., 2015). This trend coincides with the increasing patterns of diseases and health concerns across geographic areas and populations, as well as the recognition that individual health and well-being is particularly influenced not only by individual characteristics, but also via the neighborhood context individuals belong to (Kawachi & Berkman, 2003; Macintyre & Ellaway, 2003). Several attempts have been made to synthesize research on neighborhood and health outcomes (Oakes et al., 2015). Previous systematic reviews have found moderate correlations among neighborhood context and depression (Mair et al., 2008a) and mental health (Truong & Ma, 2006), and general health outcomes among others (Pickett & Pearl, 2001) over and above individual risk factors.

Despite all of this cumulative research on objective and subjective neighborhood indicators, a common criticism among the majority of studies highlight the poor measurement of the neighborhood, over reliance on traditional neighborhood definitions, cross-sectional designs and underdeveloped conceptual models which in the end contribute to inconsistent results. Previous reviews over the last decades also align with such critiques regarding the direction neighborhood and health research should move toward (Roux & Mair, 2010; Wahl & Gerstorf, 2018). These papers have articulated conceptual models describing how multiple aspects of neighborhood environments may affect health and have offered potential suggestions for future avenues of scientific inquiry emphasizing a richer theoretical ground. Therefore, calls for stronger designs,

more theoretical relevant scales and measures and better measures of neighborhood-level exposures will foster stronger methodological details in examining the state of objective and subjective neighborhood effects on health (Roux & Mair, 2010).

Gaps This Dissertation Aims to Address

There is a gap on the operational details of the quickly evolving neighborhoods and health research. While much of the empirical information cited above highlights details on specific health outcomes or neighborhood characteristics, this dissertation which reviews the neighborhood context and health and well-being will be one of the first to simultaneously consider multiple neighborhood contextual factors and define whether and to what extent they are interrelated in their predictive power. In general, multi-level analyses are those that rely on data to be indexed at more than one single level. As an example, data collected from individuals would be considered level 1, then residing in neighborhoods would be level 2. Multi-level models provide estimates of average relationships between exposure and outcomes as well as the variation in those averages by level. Statistically accounting for this complex population heterogeneity, multi-level models are perfectly suited for studying the effects of neighborhood on health and well-being (Subramanian, 2004).

Past neighborhood literature has attempted to examine the extent to which objective and subjective measures of the neighborhood context relate to mental health. Despite this, most research in this area has been lacking in regard to answering whether and which measures of the neighborhood context comparing objective and subjective are more likely to influence health and well-being. Previous studies on neighborhood

contexts and health examined mainly cross-sectional primary research (Orstad et al. 2017; Sallis et al. 2020). Collectively, aspects overlooked such as whether and how the subjective and objective neighborhood contexts relate to health and well-being have not been surveyed as extensively. Existing reviews were based on studies that solely focused on physical activity and consisted of cross-sectional research designs. Thus, longitudinal change over time among individuals has not been necessarily addressed with these techniques.

We purposefully examine our research questions in a midlife sample for several reasons. Midlife is a period in the life course characterized by individuals simultaneously juggling multiple roles (e.g., parent, spouse, and caregiver) and life transitions while balancing opportunities and challenges (Infurna et al., 2020). Not only are middle-aged adults undergoing major life transitions when it comes to juggling several roles, but they are also in a stage of life that is characterized by numerous challenges across work and family (Lachman, 2004). Recent research has shown that middle-aged adults nowadays are reporting notable increases in pain and declines in self-rated health compared to earlier born cohorts of middle-aged adults (Case & Deaton, 2017). Depression and stress are at an all-time high during these years especially in consideration of financial stress (Lang et al., 2011). It is not surprising to note that there is also a higher prevalence of metabolic disease and rates of disability found among midlife adults (Chen & Sloan, 2015; Masters et al., 2018). This evidence points to the important need to address the well-being and mental health of those in midlife and to consider potential routes of inquiry. Research on midlife has been primarily led in context of other age periods (i.e.,

earlier adulthood) or problems that are in relation to work or family. The lack of research is striking because the growing midlife population has solidified and is poised to become a major group that is worthy of study (Lachman, 2004). More research studies that specifically include middle-aged adults are needed to evaluate whether the trends identified are robust in nature and if they apply to other stages in life.

The overarching goal of this dissertation is to expand knowledge examining the extent to which both the objective and subjective neighborhood environments relate to mental health and well-being in midlife. The aims of this dissertation are threefold: (1) examine the overlap across objective and subjective indicators of the neighborhood context and, (2) evaluate the extent of which objective and subjective neighborhood context is associated with health and well-being in midlife and (3) examine whether objective and subjective indicators of neighborhood are associated with changes in health and well-being

Extension of previous research by dissertation paper one. In a first step, we will first evaluate the extent to which objective and subjective neighborhood factors that may increase or decrease one's vulnerabilities to monthly stress on mental health and well-being in midlife. To do so, we use longitudinal data from a sample of middle-aged adults (50-65) who were assessed monthly for a period of two years. The follow-up at monthly intervals allows for examination of objective and subjective neighborhood factors in the context of dynamic processes over a monthly time frame.

Extension of previous research by dissertation paper two. In a second step, we will evaluate the measurement properties of both objective and subjective indicators. The

data to be used is from a midlife sample (ages 40-65) who were assessed longitudinally for a period 30 days. This approach will allow for the examination of relationships among objective and subjective factors as well as seeking the number of factors that emerge from this unique sample in midlife.

CHAPTER 3

STUDY 1

Dissertation Paper 1

Do Objective and Subjective Neighborhood Indicators Protect Against the Detrimental Effects of Monthly Adversity on Mental Health and Well-Being in Midlife?

Abstract

The neighborhood context through which individuals interact is shown to be associated with mental and physical health across adulthood. Much less is known regarding potential underlying reasons why, such as protecting against the deleterious effects of stress. This study explores whether objective and subjective neighborhood factors are associated with maintenance of mental health and well-being in the context of monthly adversity. We use longitudinal data from a sample of midlife ($N = 362$) who completed monthly questionnaires for two years. Results show that experiencing a monthly adversity was associated with poorer mental health and well-being. Living in a neighborhood with more disorder was associated with stronger declines in mental health and well-being when a monthly adversity was reported. Our discussion focuses on why the neighborhood context is relevant for middle-aged adults and the various ways through which neighborhood context has the potential to shape the course of development in adulthood.

Lifespan psychological perspectives have long suggested a symbiotic relationship between development and major life events, with the context in which individuals live having the potential to shape the course of this relationship across the lifespan (Baltes, 1987; Bronfenbrenner, 1977; Lawton, 1985; Birren, Cunningham & Yamamoto, 1983). An abundant body of research has shown the links between individuals' functional health, well-being, and mortality with community-level characteristics to support these perspectives (Balfour & Kaplan, 2002; Kawachi & Berkman, 2003; Sampson et al., 2002; Silver et al., 2002; Wilkinson & Marmot, 2003). For example, Irvine and colleagues (2013) found that proximity to urban nature (i.e., parks), and other green spaces are associated with an abundant number of health-related outcomes such as better mental and physical health, and longevity. However, it remains to be seen whether and to what extent certain neighborhood-level and geographic factors are a protective resource for individuals in midlife can rely on to promote positive mental health and well-being in the context of adversity. In the current study, we use longitudinal data from individuals in midlife to examine the role of objective and subjective neighborhood contexts for moderating the link between monthly adversity and multiple facets of mental health and well-being. More specifically, we first examine whether monthly adversity is concurrently related to multiple outcomes of mental health (depressive symptoms, anxiety, and life satisfaction) and well-being. Second, we will investigate whether subjective and objective neighborhood contexts moderate the potential impact of monthly adversity on each outcome of mental health and well-being.

Implications of Monthly Adversity for Mental Health and Well-Being

Adversity has been a topic of much debate over the years and has been extensively documented in the literature. Not surprisingly, there have been several approaches and traditions for studying adversity that have been developed over the years and examining how it impacts overall human development. Initially, Holmes and Rahe (1967) were some of the first to develop methods to assess adversity and studied whether and to what extent the impact and severity of adversity dealt on individuals. Recent work by Cohen and colleagues (2019) has brought forth a comprehensive review of how stressful life events play a role on health and determined that there are multiple types of adversities that individuals experience and that these have the potential to impact individuals in many different ways. One of the more common approaches to studying adversity is via the use of longitudinal panel surveys to examine how singular adversities impact human development. Seminal research by Lucas (2007) and Luhmann and colleagues (2014) have found that major life events like disability, unemployment, divorce and spousal loss lead to substantial and sustained declines in mental health and well-being. Infurna and Luthar (2016, 2018) built upon this approach through the use of growth mixture modeling to reveal the substantial amount of between-person differences in how adversity impacts pertinent outcomes across the adult lifespan.

Another approach that has been used to study adversity is via examining how their cumulative aspect impacts development. For example, Seery and colleagues (2010) used a measure of cumulative lifetime adversity as a method to assess whether the number of adversities individuals are confronted with over the course of their life impacts pertinent outcomes. Cumulative lifetime adversity is assessed using a measure of total life events from different domains. Using this measure of cumulative lifetime adversity, Seery and colleagues (2010)

observed a U-shaped association with mental and physical health outcomes; individuals with moderate lifetime adversity reported better life satisfaction, lower levels of psychological distress, and better physical functioning, compared to people without a history or a high history of adversity. Following these notions, a recent systematic review by Holtger and colleagues (2018) focused on examining the extent to which experiencing moderate levels of adversity may be associated with better outcomes across mental and physical health. Across the studies that they reviewed, they found mixed evidence whether experiencing moderate amounts of adversity is associated with better mental and physical health. Based on this empirical evidence, researchers have discussed the potential for some “good” or “strength from adversity” that could arise from the experience of moderate levels of adversity (Infurna & Jayawickreme, 2019). Taken together these findings reveal that cumulative adversities can potentially have an additive effect beyond that of singular events.

A third approach to studying adversity is via the use of daily diary surveys or more broadly, intensive longitudinal research designs, to examine how adversities that transpire have more immediate impacts on mental health and well-being. Through these daily diary surveys participants are instructed to look back upon their day and provide pertinent information on the adversities or stressors that occurred, report on their health and well-being and researchers can collectively explore the interplay of adversity and the outcomes examined (Hoppmann & Gerstorf, 2009; Ram & Gerstorf, 2009). There is a strong research history that documents how the daily dynamics play a significant role on well-being and physical health (Almeida, 2005; Sliwinsky & Mogle, 2008; Zautra 2003). Research on stressors and well-being shows that daily stressors that individuals encounter such as a work deadline or even arguments with a friend

impact well-being (Almeida, 2005). Empirical evidence utilizing this approach has led to findings that elucidate the long-term consequences of daily stressors, specifically as it relates to reactivity to daily stressors (Piazza et al. 2012; Mroczek et al., 2013; Piazza et al. 2013).

Given all this, research findings illustrate that there are large between-person differences in the extent to which adversity (across the various approaches of study) is associated with mental health and well-being. This indicates that some individuals can overcome and even resist the negative effects of adverse events, whereas others succumb to the toll that adversity takes on them (Rutter, 1999; Silver 2009). The term often linked to overcoming adversity is *resilience*, a complex process of adaptation following exposure to stressful life events and emphasize that it is not an extraordinary phenomenon (Rutter, 1985). Given the varied nature of monthly adversity on mental health and well-being, a consideration of factors that moderate this association is necessary. In this regard, we seek to better understand and examine whether and how objective and subjective contextual factors may provide a source to these between-person differences that are observed in the relations between monthly adversity and mental health and well-being.

The How and Why Contextual Factors Matter in Shaping Development

Socio-cultural and socio-contextual factors have been long acknowledged in playing a large role in an individual's development over the course of life (Baltes, 1987; Bronfenbrenner, 1977). The ecological model set forth by Bronfenbrenner (1977) stipulates the importance of studying the organism and its subsequent accommodation in his or her immediate environments and how it is shaped by relations with the larger social contexts. Moreover, this highlights the importance of much larger macro-level contexts in shaping the course of developmental processes that occur at the individual level. One such example can be the physical and

psychological benefits of interacting with nature within urban settings that include a wealth of positive outcomes such as both mental and physical well-being (Berman et al., 2008; Wells, 2000; Kuo, 2001; Sullivan et al., 2004; Coley et al., 1997). Studies that link population health with urban, green space suggest that there is an association between green space proximity and urban dwellers' health status, increased longevity, and lower anxiety and depression. While these associations between resources and health are well known, less is known about the capacities of green spaces as potentially buffering the link between lifetime adversity and physical health.

Neighborhood contextual factors can be assessed with both objective and subjective indicators. Objective indicators are typically taken from the Census, specifically the American Community Survey, which tracks detailed population and housing information across zip codes and census tracts. Neighborhood factors that are assessed subjectively asks individuals to rate various facets of their community, such as collective efficacy, social ties, and neighborhood disorder.

We consider to the importance of the neighborhood contexts for mental health and well-being in midlife and its role as a resource to mitigate against the detrimental consequences of monthly adversity. Neighborhood contextual factors can be assessed with both objective and subjective indicators. Objective indicators are typically taken from the Census, specifically the American Community Survey, which tracks detailed population and housing information across zip codes and census tracts. Neighborhood factors that are assessed subjectively asks individuals to rate various facets of their community, such as collective efficacy, social ties, and neighborhood disorder. Below, we discuss the several neighborhood indicators that we focus on in the present study, including objective indicators of green space, income inequality,

unemployment, neighborhood stability, and socio-demographics, as well as subjective indicators of neighborhood cohesion and neighborhood disorder.

Green Space. Green spaces broadly relate to the density of parks and public open spaces in a given area. One of the more common ways that green space is measured is through land use/land cover data. These land cover attributes are then matched via x and y coordinates to identify the percentage of green space in a given radius from the location of interest (Thunissen & De Wit, 2000). From this, a score is created that reflects the percentage of green space you have proximity due within a 1, 3, or 5 mile radius. Research from Van den Berg and colleagues (2010) found that proximity to green space within a 3-km radius moderated the association between stressful life events and number of health complaints and perceived general health. Individuals who had a higher amount of green space were less affected by stressful life events than individuals with a low amount of green space. Based on this evidence, green spaces have the potential to indirectly affect health by serving as buffers against the consequences of stressful life events (Wells & Evans, 2003). This involves examining the buffering effects of green spaces on various outcomes based on the relative proximity to these places. Previous research has largely focused on the buffering effects of green space on general well-being and health but less so on physical health outcomes (van den Berg et al., 2010). Possible reasons why green spaces may buffer the consequences of monthly adversity include their role in encouraging an abundance of health behaviors that help protect against poorer outcomes (Koohsari et al., 2015). Furthermore, green spaces may operate as a place in which social contact may happen amongst individuals, especially if they are well-maintained and safe (Kemperman & Timmermans, 2014). For example, there have been studies that report associations between green spaces and

gardening activities and do-it-yourself activities (Mein, Shipley, Hillsdon, Ellison, & Marmot, 2005; Okvat & Zautra, 2011)). However, what has increasingly become an issue is the identification of whether and to what extent access to green space has an effect on overall physical activity and not necessarily on the types of activity that occur in green space (Mytton, 2012).

Unemployment. Economic characteristics are among the central features studied when evaluating the effects of neighborhood contextual factors. Income, gross domestic product (GDP), rate of unemployment, income inequality, financial aid, and poverty are among these factors that have been studied. More importantly, the structure of wealth in a home, neighborhood, or community appears to shape the progressions of individuals' lives (Gerstorff & Ram, 2012). For example, regions with lower average income and high rates of unemployment typically face shortfalls in revenues for the local economies, which can translate into poor economic structures that may limit investments in service infrastructure and other social program availability (Gerstorff & Ram, 2012). These findings speak to the nature of the potential influence that income and employment related factors have on individuals' development. The uniformity, or lack thereof among economic status in certain communities are cause for concern and it is imperative to determine mechanisms at play as well as the implications of health. Neighborhood income and unemployment appears to be directly tied with structural factors that either are detrimental or facilitate health outcomes for individuals. County-level factors have demonstrated that neighborhood income is associated with the level of availability of resources, services and other environments (Gerstorff et al., 2010).

Neighborhood Stability. Neighborhood stability characteristics include the percentage of owner-occupied residences and is shown to help build a sense of community through knowing the individuals who comprise that community. Residential stability provides a context in which individuals' social networks are situated (Oishi, 2010) and is typically found to promote quality of life of individuals (Ross et al., 2000). Oishi (2010) found that neighborhood mobility within a neighborhood was associated with lower levels of well-being. Other findings highlight the importance of neighborhood stability and health via building a sense of community. For example, Farrell and colleagues (2004) found that the relationship between neighborhood characteristics and well-being are mediated by neighboring sense of community and behavior. These findings highlight the importance of individuals' living, working and leisure environments that are broadly tied to processes of social cohesion (Bandura, 1986; Sampson et al., 1997), further signifying the importance of considering the relevance of stability within neighborhoods and the benefits of building a sense of community.

Income inequality. Income inequality is an economic characteristic that is defined as the distribution of income across a population (Bureau, n.d.). By far, the most popular measure of income inequality is the GINI Coefficient (Ceriani & Verme, 2012; Kawachi & Kennedy, 1997). The GINI coefficient ranges from 0 to 1 with 0 representing perfect equality and 1 representing perfect inequality. More importantly, while the GINI coefficient is an important tool for analyzing income or wealth distribution with a country or a given region, it should not be mistaken for an absolute measurement of income or wealth (Kawachi & Kennedy, 1997). Early on, hypotheses focused on the shape of income distribution within a community or a society as a predictor of its overall health-level; this hypothesis remained largely untested for individual

health especially with respect to the impact of inequality within neighborhoods. However, evidence that large income differences have repercussions for health and social consequences has strengthened the literature in recent years (Wen et al. 2008; Pickett et al., 2015).

Neighborhood disorder and cohesion. Neighborhood factors that are assessed subjectively focus on individuals' perceptions of their community, such as collective efficacy, social ties, and neighborhood disorder (Echeverria et al., 2004; Humpel et al., 2002; Parkes & Kearns, 2006; Sooman & Macintyre, 1995). Neighborhood problems and disorder encompass the physical and material features of the neighborhood as well as elements of social disorder (i.e., crime, loitering, street conflict; Ross & Mirowski, 2001). Work looking at subjective related experiences and neighborhood such as social ties and neighborhood disorder (Cummins et al., 2007; Macintyre & Ellaway, 2003) provide promising evidence considering other aspects of the neighborhood context that are not objective in nature. Research on subjective neighborhood conditions and health finds that perceptions of living in a neighborhood with less disorder and better social ties is associated with better mental and physical health (Cummins et al., 2007; Cummins et al., 2005; Macintyre, et al., 2007).

The Present Study

The overarching goal of this study is to examine the role of objective and subjective neighborhood factors as moderators of the relation between monthly adversity and mental health and well-being among individuals in midlife. There are several reasons why we focus on middle-aged adults. Midlife largely remains uncharted territory when it comes to its scientific study (Infurna, Gerstorf, & Lachman, 2020). During this time in the life course, individuals juggle multiple facets of life, such as simultaneously being a spouse/partner, parent, caregiver, and

having a career (Lachman, 2004). Furthermore, midlife is a period in the life course characterized by opportunities of career development and gains in well-being and control beliefs, while simultaneously contending with changing intergenerational dynamics and financial vulnerabilities in the form of economic failures and insufficient paid family leave and healthcare coverage (Infurna et al., in press).

There is a large amount of heterogeneity in the extent to which adversity is associated with mental and physical health. This indicates that not all individuals are similarly impacted by monthly adversity, suggesting the importance of examining which factors may moderate this relationship (Infurna & Luthar, 2018). Facets of the neighborhood may be a protective resource between the relations of adversities specific and subsequent health outcomes but there is also the possibility that in some cases they are not. The acquisition of subjective contextual factors goes beyond the objective measurement of neighborhood and adds a substantial component of understanding from the individual perspective regarding their daily stressors and affects (Robinette, 2013). More importantly, the inclusion of self-reported subjective reports on neighborhood cohesion along with the inclusion of objective measures of neighborhood is poised to make for a compelling multi-method approach to the study of adversity.

In this study, we hypothesize that facets of the objective neighborhood will moderate the relations between monthly adversity and mental health and well-being, such that abundance of or access to green spaces (i.e., greater use of green spaces), lesser unemployment, less income inequality and better neighborhood stability protect against negative effects of lifetime adversity. It may be that the relations between monthly adversities and mental health and well-being to be moderated by the subjective environment; high levels of cohesion and low levels of crime

perception protect against the negative effects of severe adversities, relative to moderate or low levels of cohesion and moderate to high levels of crime in the neighborhood (Barnett, et al., 2013; Hoppman et al., 2011; Peek & Markides, 2003; Stimpson et al., 2006). The findings up to this point are mixed. For example, Sugiyama and colleagues (2008) found associations of perceived neighborhood “greenness” with physical health, mental health as well as social factors like walking and engaging in social coherence. Other findings suggest that neighborhood stress can trickle an abundance of negative influences such as higher community-level fear of safety, family conflict, as well as symptoms of depression that contributed to parenting practices (Barajas-Gonzalez & Brooks-Gunn, 2014). There is still much work ahead on determining the role of objective and subjective neighborhood varies on mental health and well-being.

Method: Study 1

Participants

Participants were drawn from the Pathways to Character project (PTC), which is a study of individuals in midlife (50-65 years) from the Phoenix Metropolitan area. Broadly speaking, the study focuses on the nature of resilience and growth that follows adversity across measures of depression. Participants complete monthly questionnaires for a period of two years and due to the ongoing longitudinal nature of the study, we use monthly data. We use 24 waves of data in this analysis.

We use data from 362 participants. Participants were, on average, 58 years of age ($SD = 4.38$, range 50 to 65), 54% were women, 66% received a college education, 73% were married or partnered, 91% are white, 61% are working, on average, reported annual income was \$88,123 ($SD = 59,000$ \$, range: \$0 to \$425,000) and their total number of roles was on average 3.3. The total number of roles variable was measured by calculating a cumulative count score of the total roles individuals reported at baseline. The sum scores included: total amount of roles (6 roles): $M = 3.25$, $SD = 1.18$, range 0 to 6; volunteer role: $M = .23$, $SD = .42$, range 0 to 1; friend role: $M = .64$, $SD = .47$, range 0 to 1; employee role: $M = .62$, $SD = .48$, range 0 to 1; religious role: $M = .27$, $SD = .44$, range 0 to 1; parent role: $M = .76$, $SD = .42$, range 0 to 1; spouse role: $M = .73$, $SD = .44$, range 0 to 1.

Sampling and recruitment. We used multiple modalities for recruitment which took place from April 2017 to November 2017. Potential participants were recruited through (1) flyer advertisements that were distributed through the community at businesses, coffee shops, community gatherings and churches, (2) advertisements on Facebook, other social media sites

(i.e., NextDoor), and e-mail list serves, and (3) advertisements in the newspaper and other local print publications. Prior to participation, participants provided informed consent. Participants were compensated up to \$290 for participating in the entire study (i.e., monthly questionnaires for two years, including bonuses). The Arizona State University Institutional Review Board reviewed and approved the study.

Measures

Monthly adversity. Exposure to adversity was assessed monthly by asking participants whether they had experienced each of 63 negative events in the last month. The measure was adapted from previous research (Seery et al., 2010) and expanded to include a wider array and number of adversities. The specific items that comprise this index is shown in Table 1. A dichotomous variable was created stating whether or not individuals reported an adversity. Participants reported an adversity on 67% of their observations, on average.. For parsimony, we only give a brief description here. If participants indicated an adversity transpired in the past month, they were asked a follow-up question of how much distress it caused them on a scale from 1 (*none at all*) to 5 (*a great deal*). If an event did not occur, a zero was given for the severity score.

Monthly: Life Satisfaction. A single item was used to assess participant's life satisfaction in the longitudinal assessment. Participants were asked "How satisfied are you with your life, all things considered?" and answered using a scale from totally unsatisfied (0) to totally satisfied (10). This item is considered a measure of cognitive-evaluative (as opposed to emotional) aspects of well-being and has been used widely in psychological research (Gerstorf et al., 2008).

Monthly: Depressive symptoms. We used 10 items from the CES-D scale (Radloff, 1977) to assess depressive symptoms in the longitudinal assessment. Items asked participants the extent to which they had experienced symptoms *rarely or none of the time* (0) to *most of the time* (3) during the past week. An example item was: “I was bothered by things that don’t usually bother me”. Cronbach’s alpha ranged from 0.88 to 0.94 at each assessment.

Monthly: Anxiety. We used 20 items from the Zung self-rating anxiety scale (1971) in the longitudinal assessment. The mean across items was taken as an indicator of the amount of anxiety individuals experienced. Cronbach’s alpha ranged from 0.85 to 0.92 at each assessment.

Monthly: Positive and Negative Affect. Each month, participants completed items pertaining to positive and negative affect (PANAS; Watson, Clark, & Tellegen, 1988). Negative affect consisted of five items that assessed a general dimension of aversive affective states, such as being a nervous person, down in the dumps, downhearted and blue, worn out, and tired. Positive affect consisted of four items that assessed a general dimension of uplifting or positive affective states, such as full of pep, calm and peaceful, lot of energy, and happy. Respondents indicated how often they had felt this way during the past month on a 6-point scale ranging from 1 (*none of the time*) to 6 (*all of the time*). Cronbach’s alpha ranged from 0.89 to 0.93 for positive affect and 0.86 to 0.92 for negative affect at each assessment.

Neighborhood Indicators

The American Community Survey provides information gathered by the Census Bureau regarding neighborhood composition and socioeconomic information. The nationwide American Community Survey stems from the decennial census program from the Census Bureau (United States Census, 2019). The American Community Survey aims to update and provide data about

communities every year, rather than once every 10 years. Data from the ACS 2017-2019 were used in this study to provide information about the key socioeconomic variables of most interest. Several measures included in the American Community Survey held special relevance for this study and are operationalized as follows:

Green Space: Abundance of green spaces will be calculated via the percentage of green space within a given zip code where the respondent lives. This percentage of green space was calculated using information from the Maricopa County database on green space data providing information on the acreage of green areas(parks) in greater Phoenix area. All urban, green areas are to be regarded as green spaces in this study. The total number of green spaces considered parks in the greater Maricopa county consisted of 1084 parks. The Maricopa County provides information on the areas and their use as well as the location in which they are located and ultimately, acreage. Percentage of green space was then calculated per zip code by dividing the acreage of green areas by the total acreage of a given zip code. This permits the opportunity for providing a better indication of greenness in areas where individuals reside.

Unemployment. Unemployment status was determined by asking whether individuals are: (a) “employed”, (b) “unemployed”, (c) “not in labor force” . This data measure stems from the ACS and was calculated by creating a percentage of the population that answered this question as “unemployed” relative to the rest of the population.

Income inequality. Income inequality was calculated via the Gini index using data from the ACS in years 2017-2019. This coefficient is a statistical measure of wealth distribution developed to gauge economic inequality, income distribution and overall levels of wealth distribution among a population (United States Census, 2019). The range of the Gini index is

from 0 (complete equality) to 1 (complete inequality). Thus, a higher score in the Gini index indicates greater inequality, with high income individuals receiving much larger percentages of the total income of the population.

Percent Renter. The measure of percent renter used in this study was determined from the U.S Census data, ACS in years 2017-2019 and was calculated as the percentage of individuals renting property in a given zip code.

In addition to gathering socioeconomic information, participant's zip code will be used to link information from the American Community Survey to provide an indication of objective measures in the individual's neighborhood.

Subjective perceptions of the neighborhood. Neighborhood cohesion and disorder was assessed using an adapted questionnaire by Mendes de Leon et al. (2009). For neighborhood cohesion, participants responded statements that “pertain to vies, thoughts, and feelings about the neighborhood you live in.” Specific items include: (a) people around here are willing to help, (b) close knit neighborhood, (c) people in this neighborhood can be trusted, (d) People in this neighborhood generally do not get along with each other, (e) People in this neighborhood do not share the same values. For neighborhood disorder, participants responded to “whether they agree or disagree with the following statements about their neighborhood”. Specific items for neighborhood disorder include: (a) there is a lot of graffiti in my neighborhood, (b) neighborhood is noisy, (c) neighborhood is clean, (d) there are lots of abandoned buildings, (e) vandalism is common in my neighborhood (f) people in my neighborhood take good care (g) there are too many people hanging around my home. Neighborhood cohesion and disorder was measured with responses to these questions: (1) “Strongly disagree” to (4) “strongly agree.”

Higher scores for neighborhood cohesion pertain to a greater sense of perceived closeness or cohesion ($M = , SD = ,$ range: 1 to 5, $\alpha = .84$) and higher scores for neighborhood disorder pertain to more perceived disorder in the neighborhood ($M = , SD = ,$ range: 1 to 5, $\alpha = .89$)

Statistical analyses

We estimated a multilevel model (Grimm et al., 2017) to examine whether neighborhood factors moderated the impact of monthly adversity on changes in psychological well-being.

Models were specified as

$$WB_{it} = \beta_{0i} + \beta_{1i} (adversity_{it}) + e_{it} \quad (1)$$

where person i 's level of well-being at month t , WB_{it} , is a function of an individual-specific intercept parameter that represents levels on months when no adversity was reported, β_{0i} ; an individual-specific emotional reactivity slope parameter, β_{1i} , that captures rates of change in the outcome on months when an adversity was reported; and residual error, e_{it} .

Following standard multilevel modeling procedures, individual-specific intercepts and slopes (β s from the Level 1 model given in Equation 1) were modeled in the Level 2 model where between-person differences were estimated (i.e., variance parameters) and assumed to be normally distributed, correlated with each other, and uncorrelated with the Level 1 residual errors, e_{it} . The expanded model that included objective and subjective neighborhood factors took the form

$$\beta_{0i} = \gamma_{00} + \gamma_{01} (\text{monthly adversity}_i) + \gamma_{02} (\text{gender}_i) + \gamma_{03} (\text{education}_i) + \gamma_{04} (\text{age}_i) + \gamma_{05} (\text{income}_i) + \gamma_{06} (\text{green}_i) + \gamma_{07} (\text{unemploy}_i) + \gamma_{08} (\text{percentrent}_i) + \gamma_{09} (\text{disorder}_i) + \gamma_{010} (\text{cohesion}_i) + u_{0i},$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} (\text{monthly adversity}_i) + \gamma_{12} (\text{gender}_i) + \gamma_{13} (\text{education}_i) + \gamma_{14} (\text{age}_i) + \gamma_{15} (\text{income}_i) + \gamma_{16} (\text{green}_i) + \gamma_{17} (\text{unemploy}_i) + \gamma_{18} (\text{percentrent}_i) + \gamma_{19} (\text{disorder}_i) + \gamma_{110} (\text{cohesion}_i) + u_{1i}, (2)$$

All models were estimated using SAS (PROC MIXED; see Littell et al., 2006), with incomplete data accommodated under missing at random assumptions at the within- and between-person levels (Little & Rubin, 1987). We centered the predictor variables in accordance with standard multilevel modeling procedures. Because we are interested in cross-level interactions we conducted group-mean centering all the level 1 predictors while we conducted grand mean centering at the level 2 to improve computation and interpretation of the main effects when we test for cross-level interactions (Bauer & Curran, 2005). Generally, speaking centering makes the predictor values more interpretable because the expected value of Y when x (centered X) is zero represents the expected value of Y when X is at its mean.

In total four models were tested. The first model tested the extent to which monthly adversity impacts each indicator of psychological well-being. The second model included objective neighborhood indicators to examine the extent to which they moderated the impact of monthly adversities on health and well-being. The third model was similar to the second model, only that subjective neighborhood indicators were included. The final model included both objective and subjective neighborhood indicators, as well as covariates to examine whether objective or subjective indicators are more strongly predictive of changes in psychological well-being as a function of monthly adversity.

Results

Descriptive Data

In a first step, we created an aggregate measure of the outcomes as a way to examine general relationships. The mean scores represent an individual's overall levels of NA, PA, depressive symptoms, anxiety, and life satisfaction. Table 2 shows the descriptive statistics and correlations of all the variables included in the study. Overall, the correlations from Table 1 suggest that the objective and subjective neighborhood characteristics show low to moderate overlap (r 's range from $-.02$ to $.26$). Significant associations were observed between objective neighborhood characteristics and positive affect with lower levels greenness being indicative of higher PA ($r = -.003, p < .05$). Percent renter was negatively associated with PA ($r = -.005, p < .05$). Unemployment was also negatively associated with PA ($r = -.005, p < .05$). Subjective neighborhood ratings and PA were significantly correlated with Disorder ($r = -.21, p < .05$) and neighborhood cohesion ($r = .20, p < .05$).

Significant associations between objective neighborhood characteristics and NA with higher levels greenness being indicative of higher NA ($r = .004, p < .05$). On the other hand, Percent renter was positively associated with NA ($r = 0.005, p < .05$). Unemployment was also positively associated with NA ($r = 0.005, p < .05$). Subjective neighborhood ratings and negative affect were significantly correlated with Disorder being positively correlated with NA ($r = .20, p < .05$) and neighborhood cohesion being negatively related with NA ($r = -0.18, p < .05$).

Significant associations between objective neighborhood characteristics and life satisfaction were present with higher levels greenness being indicative of lower life satisfaction ($r = -.001, p < .05$). Percent renter was negatively associated with life satisfaction ($r = -0.008, p < .05$). Unemployment was also negatively associated with life satisfaction ($r = -0.006, p < .05$).

On the subjective neighborhood ratings and life satisfaction, they were significantly correlated with Disorder being negatively correlated with life satisfaction ($r = -.20, p < .05$) and neighborhood cohesion being positively related with life satisfaction ($r = 0.26, p < .05$).

Significant associations between objective neighborhood characteristics and depressive symptoms were present with higher levels greenness being indicative of higher levels of depressive symptoms ($r = .05, p < .05$). Percent renter was positively associated with higher levels of depressive symptoms ($r = 0.09, p < .05$). Unemployment was positively associated with depressive symptoms ($r = 0.07, p < .05$). On the other hand, subjective neighborhood ratings and depressive symptoms were significantly correlated with Disorder being negatively correlated with depressive symptoms ($r = 0.24, p < .05$) and neighborhood cohesion being negatively related with depressive symptoms ($r = -0.22, p < .05$).

There were some significant associations between objective neighborhood characteristics and anxiety with higher levels greenness being indicative of higher anxiety ($r = .07, p < .05$). Similarly, percent renter was positively associated with anxiety ($r = 0.08, p < .05$). Unemployment was also positively associated with anxiety ($r = 0.06, p < .05$). Subjective neighborhood ratings and negative affect were significantly correlated with Disorder being positively correlated with anxiety ($r = .21, p < .05$) and neighborhood cohesion being negatively related with anxiety ($r = -0.16, p < .05$).

Among the notable associations between subjective indicators of neighborhood and outcomes of health the strongest association appears to be between neighborhood cohesion and life satisfaction ($r = 0.26, p < .05$) and between neighborhood disorder and depressive symptoms ($r = 0.24, p < .05$). Focusing on the objective indicators the strongest associations appear to be

between life satisfaction and percent renter ($r = -0.08, p < .05$) and percent renter associations with depressive symptoms ($r = 0.09, p < .05$).

Examining Whether Monthly Adversity Impacts Mental Health and Well-Being

Tables 4-8 shows the results from our multilevel model where monthly adversity was predictive of each outcome. On average, on months when individuals reported a monthly adversity, they reported lower levels of life satisfaction and PA and higher levels of anxiety, NA, and depressive symptoms. The random effects at the bottom of Table 4-8 indicate that there is significant heterogeneity in the effect of monthly adversity on each outcome. We next examine whether objective and subjective neighborhood indicators moderate the impact of monthly adversity on each outcome.

Neighborhood Context Relations to Monthly Adversity

Tables 4-8 show results from the series of multilevel models that examined whether neighborhood factors moderated changes in psychological well-being in the context of monthly adversities. Of the objective neighborhood factors examined, we observed that neighborhood disorder moderated the link between monthly adversity and negative affect (see Table 6). Figure ... graphically illustrates that compared to participants who live in neighborhoods with lower levels of community disorder, participants living in neighborhoods with more disorder, on average, were more likely to report stronger declines in negative affect on days when individuals reported a monthly adversity. Neighborhood income inequality also moderated the effect of monthly adversities on negative affect. Participants who lived in areas with less income

inequality were more likely to report higher negative affect on days when adversities were reported.

In the models including the subjective neighborhood indicators, we observed that neighborhood cohesion moderated the link between monthly adversity and anxiety. Figure ...graphically illustrates that compared to participants who live in neighborhoods with lower levels of cohesion, participants who live in neighborhoods with higher levels of cohesion, on average, were more likely to report stronger declines in anxiety on days when individuals reported a number of adversities.

Discussion

The overarching goal was to examine whether indicators of the objective and subjective neighborhood context moderate the impact of monthly adversity on psychological well-being in midlife. Overall, we found subjective neighborhood indicators to be more consistent moderators of the impact of monthly adversity on psychological well-being. Neighborhood income inequality moderated the effect of monthly adversity on NA, such that individuals who lived in neighborhoods with less inequality, on average, experienced stronger declines in NA on months when adversity was reported. Focusing on the subjective neighborhood indicators, living in a neighborhood with more disorder was associated with stronger declines in psychological well-being when a monthly adversity was reported. Neighborhood cohesion moderated the link between monthly adversity and anxiety in that living in a neighborhood with higher levels of cohesion is associated with stronger declines in anxiety on months when individuals reported an adversity. Our findings reveal how some aspects of the neighborhood context may be relevant in midlife in the context of experiencing adversity.

The Importance of Objective and Subjective Neighborhood Factors in the Context of Adversity and Well-Being

The overarching theories underlying this study are contextual theories of individual development that signify the importance contextual influences on aging (M. M. Baltes & Carstensen, 1996; Bronfenbrenner, 1977; Elder, 1975; Lawton, 1985b; Riley, 1987; Wahl & Gerstorf, 2018). Even though these theories may have varying degrees and specifications of the types, relations between, and the number of contexts, they agree on the salient role of contexts impacting the course of development across adulthood and into old age across various levels, including those that are investigated in this study. Both objective and subjective experiences of the neighborhood context examined here all directly shape outcomes of individual development in behavior, thoughts and well-being.

The findings of this study support—to some extent—the above-described contextual theories and previous empirical support. Our findings are in line with showing that a variety of contextual units such as social vulnerabilities, wealth, violence, residential stability and presence of supermarkets, storefronts are related to individual outcomes (Pruchno et al., 2012; Schuz et al., 2015; Uchino, 2006) and that macro, exo, and microsystems are related to well-being outcomes in adults (Inglehart et al., 2008; Kotakorpi & Laamanen, 2010; Ramsey & Gentzler, 2015). More specifically, we found that both objective and subjective neighborhood indicators, namely living in residential areas with more income inequality and more community disorder were associated with less overall well-being. On the other hand, this study shows that more cohesive neighborhoods were associated with better overall well-being when faced with monthly adversity. Lastly, contrary to our expectations, neighborhood contexts (both subjective and

objective) did not play a more significant role when individuals were faced with monthly adversity

This study found that some but not all of the neighborhood context features examined had effects on well-being. First, we address the finding where living in residential areas with more income inequality were associated with less psychological well-being on days where an adversity was present. Previous research is mixed in terms of results regarding the association between income inequality and well-being. For example, one study found that individuals were, on average, happier in the years with less national income inequality than in years with more income inequality (Oishi et al., 2011). What was interesting is that they found that this result was explained by perceived fairness and general trust—or the fact that individuals trusted other people less and perceived people to be less fair in years with more inequality. A systematic review and meta-analysis on income inequality and subjective well-being found mixed findings regarding the association between income inequality and subjective well-being. (Ngamaba et al., 2018). One of the potential reasons is that they theorize the relationship between income-inequality and subjective well-being may differ between developed countries and developing countries. Our sample was collected in the US and our findings align with typical findings of other studies finding the detrimental effects of income inequality.

We observed that living in neighborhoods with more cohesion was associated with better psychological well-being. Several studies align with the findings of our study. For example, a body of research has found that higher social cohesion is associated with better health and well-being outcomes (Kawachi & Berkman, 2003; Kawachi & Subramanian, 2007; E. S. Kim et al., 2020; Robinette et al., 2013, 2018). While the results in this study align with past research there

are still some negative sides to social cohesion that we feel may need to be addressed in future. For example some research has found that perceived neighborhood social cohesion is associated with higher levels of binge drinking (Villalonga-Olives & Kawachi, 2017). The interpretation of these results can be thought of in several ways: For example, some contextual variables/features might be more relevant than others, emerging as significant effects. However, this could also be traced back to methodological issues of operationalization and measurement of these contexts (i.e. assessment of green spaces, income inequality, neighborhood stability etc.) in the used datasets, an insufficient number of cases (i.e. low number of individuals in some zip codes) for which these are estimated (see Bryan & Jenkins, 2015, for a methodological discussion), and measurement of different outcomes (i.e. some studies measure cardiovascular conditions versus others use composite measures). It is also possible that a number of relevant indicators were not included that could potentially reveal significant associations as they relate to monthly adversity.

Limitations and Conclusion

In this section, limitations with respect to measures, and design will be discussed. While there are shortcomings in this study, the quality of this study conducted will mutually advance our knowledge of how contextual systems shape development of well-being in midlife and into later life. First, neighborhood context was operationalized with different degrees of specification in this study in comparison to other studies which may have led to some contexts being represented more thoroughly than others. While precise quantitative measures were available for greenness, measures of quality (i.e. quality of these green spaces) and account of other greenness factors (i.e. other green spaces that were not considered parks, recreation facilities etc.) were not available. However, the tradeoff for using these measures is having uniform measures of green

spaces for each zip code in Maricopa county we considered. Although highly specific and both quantitative and qualitative in nature, the social context variables in our study consist of single dimensions. For example, there are likely different components that comprise neighborhood cohesion and disorder. It is likely that there can be neighborhoods that have higher disorder manifested in crime rates whereas they may have low disorder in terms of cleanliness. For cohesion, could it be possible that there are features in the neighborhood that may represent more cohesion versus others (i.e. perhaps religion or even some core values that neighborhoods value more than others)? With contextual data becoming more and more of interest and available in research, future studies will be able to investigate more precise, quantitative and qualitative components, and constructs of contextual data.

Finally, due to constraints in data availability, only a limited set of correlates were examined in this study and further individual-level (i.e. Social resources such as families living nearby) or context factors (i.e. health care funding in Maricopa county) might contribute to moderating the impact of monthly adversity on psychological well-being. One of the most striking questions with respect to the contributions of contextual features, which this study was unable to track due to the lack of data, is whether individuals freely choose a context or its simply unavoidable (i.e. use of services, unpleasant interaction with family member) or even whether and to what extent individuals move locations during the course of the study and how this could impact potential findings. Another limitation is the ability to track these movements would be imperative to better understand neighborhood effects in the long-term. Therefore, future studies should incorporate measures of choice of societal structures in order to enable

researchers to investigate the association between opportunities of adults to shape their environments (Lang & Heckhausen, 2006) and well-being outcomes.

While the causal directions in our statistical models was that contexts influence individuals' health and well-being, reverse causality is also a possibility. For example, more satisfied individuals might seek different kinds of services or even move to an area with characteristics enhancing quality of life. For example, individuals with higher SES are more likely to move to more affluent neighborhoods. While some research examining the direction causality has been done, more needs to be examined. Oishi and Talhelm (2012) have done some research examining links between residential mobility and long-term consequences on subjective well-being and mortality risk in adulthood finding that individual level variables such as anxiety, familiarity liking, and sense of belonging underlie sociological links between residential mobility and community-level phenomena. However, there is still more to be done in regards to understanding how psychological phenomena is associated with other major neighborhood contextual factors affecting neighborhoods and well-being.

Our findings point to the importance of taking into consideration the neighborhood context in shaping development in adulthood (i.e. Ferraro & Shippee, 2009; Glass & McAttee, 2006). First, there needs to be a consideration that early exposure to the same contexts shapes later associations between health and well-being and the context at hand. For example, the role of important interactions on affect arousal might be shaped from early childhood when children visit their parents' affective arousal reactions to a broad range of social contexts. Second the onset of such an exposure needs to be tracked. Lastly, a context needs to be understood with respect to its cumulative effects. Does it matter for well-being reports whether our participants

have been exposed to their contextual environment for a short or long period of time? These aspects would be ideal in better understanding the interrelations of context and well-being in adults from a lifespan perspective.

CHAPTER 4

STUDY 2

Dissertation Paper 2

Assessing the Structure of Subjective and Neighborhood Indicators in Midlife

Abstract

Neighborhood contexts form an integral part of and have the potential to shape the course of development (Baltes, 1987; Bronfenbrenner, 1977). However, less is known regarding the structure of subjective and objective neighborhood indicators in midlife. Using data from a sample of middle-aged adults (n=800), we examined whether objective and subjective indicators constitute distinct latent factors. Exploratory and confirmatory factor analyses were applied to data on subjective and neighborhood indicators. Results revealed three distinct latent factors, namely financial strains, resource and prosperity, and neighborhood insights. Overall, the findings based on an SEM framework support the interrelationships among the three constructs where they were in moderate range. The discussion focuses on evaluating our findings in the context of previous research and points to future directions for how our approach can be implemented to better understand the role of the objective and subjective neighborhood for mental and physical health in midlife.

CHAPTER 4

INTRODUCTION

Over the years, the identification of neighborhood factors, both subjective and objective has been a topic of much debate in the literature (Mair et al. 2008; William-Genderson & Pruchno; 2013). Much of this stems from the increasing attention in health research on neighborhood context factors that influence human health and well-being and how health and well-being outcomes could be improved by modifying these factors. Some of these factors that have been observed in the literature include demographic characteristics, socioeconomic status, social inequality (Haseda et al., 2018; Weden et al., 2008; Zhang et al., 2019), physical activity (Cerin et al., 2018; Dawson et al., 2007; Eriksen et al., 2013; Van Cauwenberg et al., 2018), lifestyle (Ford et al., 2011), diet (Rummo et al., 2015), obesity (Powell-Wiley et al., 2013; Wong et al., 2018) neighborhood cohesion (Baum et al., 2009; N. G. Choi et al., 2015; Y. J. Choi & Matz-Costa, 2018; Cramm et al., 2013), longevity (Takano et al., 2002), quality of life (Wen et al., 2006) and disorder (Geis & Ross, 1998; Latkin & Curry, 2003; Ross & Mirowsky, 2001). Most of this has been collected in many countries and counties throughout the United States but little is known about the relationship between the neighborhood context relevant variables among midlife adults from Phoenix, Arizona. While there have been many documented studies examining direct relations between neighborhood environment and adults as well as those understanding the underlying relationship between objective neighborhood context and subjective neighborhood (DeSantis et al., 2016; Dubowitz et al., 2019; Ross & Mirowsky, 2001; Steptoe et al., 2005; Weden et al., 2008; Wen et al., 2006) to date there have not been many studies that do so with a unique midlife sample of adults in Southwest United States. Despite the

preliminary evidence, it is necessary to assess if such relationships are maintained or how they differ among the midlife sample of individuals from Phoenix, Arizona as it is currently unknown if this population may be less or more susceptible to changes in the urban environment.

Few studies have examined and compared the structure of subjective and objective neighborhood indicators in midlife. Midlife is a critical time in which individuals are juggling with a variety of life transitions and the simultaneous balance of roles, such as becoming a parent, spouse, or caregiver (Infurna et al., 2020). Up to this point, research on midlife has been primarily led in the context of other age time periods; for example, much is known about middle-aged parents from the literature on child development—with the focus placed on the children and parental styles. This is striking because the growing midlife population has solidified and is poised to become an integral group because of their role in bridging the younger and older generations, their sensitivity to financial vulnerabilities, and recent evidence documenting historical declines in their mental and physical health (Infurna et al., 2021). Our focus here is on the development of measures to better understand the salient features that may enhance and facilitate our understanding of objective and subjective neighborhood features in midlife.

Assessment of the Neighborhood Context

The assessment of the neighborhood context falls within subjective accounts and objective indicators. One way to ascertain information about neighborhoods is to solicit self-reported characteristics of neighborhoods from residents or local experts. Examples of indicators that have arisen from this method of assessment is social cohesion, collective efficacy, and neighborhood disorder (Echeverria et al., 2004; Humpel et al., 2002; Parkes & Kearns, 2006; Sooman & Macintyre, 1995). Research using this approach has found that subjective perceptions

of living in a neighborhood with less disorder and better neighborhood cohesion are associated with better health and well-being (Cummins et al., 2007; Cummins et al., 2005; Macintyre, et al., 2007). The challenge with this is that perceptions of the same neighborhood may differ by such factors as gender, age, or socioeconomic status. Further, a major weakness of subjective measures is that when they are investigated in relation to health, any association between subjective neighborhood context and health may be partly attributable to same source bias (Duncan et al. 1999). Same source bias occurs when a third, unobserved factor, like psychological disposition, influences both a respondent's reporting on his/her neighborhood and his/her health. Although same source bias is an important limitation for studies using subjectively measured constructs, Ellaway and Macintyre (1998) suggest that subjectively assessed neighborhood stressors and several physical health outcomes remain independently associated regardless of such dispositional factors in findings controlling for health outcomes.

Another common approach to studying the neighborhood is through the use of objective indicators. Typically, researchers link participant data on their census tract with information that can be retrieved from the American Community Survey or Census Bureau (Pasco et al., 2021; White et al., 2020). Examples of objective neighborhood indicators are unemployment rate and income inequality. Research using this approach has found that there can be physical and psychological benefits of interacting with nature within urban settings that include a wealth of positive outcomes such as both mental and physical well-being (Berman et al., 2008; Wells, 2000; Kuo, 2001; Sullivan et al., 2004; Coley et al., 1997). There are many challenges to using secondary neighborhood data to measure features of the neighborhood environment that may support health and well-being (Day et al. 2006). An important challenge is that often only easily

collected existing data is used in these analyses, such as from government GIS sources or by review of aerial maps. Yet, secondary data rarely contain the detail necessary to test desirable hypotheses. Relying solely on objective sources to represent a neighborhood may provide an oversimplified understanding of neighborhoods and may mask within-neighborhood variability that exists (Caughy et al. 2008). Moreover, data are often non-comparable because they may not have been collected in the same way or during the same time period. There may also be differences in scale, especially for aerial photos. Another challenge is that existing data are rarely able to capture the rapid development or deterioration that characterizes neighborhoods in transition. Thus, it is not possible to assess measures such as social interaction within neighborhood by relying on objective sources only. Although objective measures of neighborhood context allow for summary assessments of the local area, they are usually based on census data or other available data that may not well characterize the range of neighborhood domains that are relevant to health (Cummins et al., 2007; Cummins et al., 2005). Therefore, objective neighborhood measures may not provide the best assessments of how neighborhood residents are exposed to, experience, or interact with their neighborhoods in ways that affect health.

Alternatively, researchers have considered neighborhood audits to collect data using observations on a street-by-street basis. In the social sciences, neighborhood audits and systematic social observation protocols represent salient neighborhood characteristics (McGuire et al 1997; Raudenbush et al. 1999). More recently, researchers interested in the relationship of the environment to health and well-being considered neighborhood audits designed for research purposes as a potential data source that provides additional information to what is available

through secondary objective data sources (Pikora et al. 2002). Historically, a number of audit tools were developed to assist communities in making decisions or community members in advocating for changes to pedestrian and bicycling infrastructure (Moudon et al. 2003).

There are several challenges in using neighborhood audits to examine associations with health and well-being (Brownson et al. 2013). The audits generally include many variables, but not much work has been done to create constructs from these individual items. Generally, no consideration is given to incorporating secondary objective data into the constructs. Past audits exploring associations with health and well-being for example also generally have small sample sizes, because the effort to collect this on-the-ground data is substantial (e.g., Carpiano, 2007; Eibner & Sturm, 2006; Franzini et al., 2005; Ross & Mirowsky, 2001). It is not known if whether the constructs will operationalize and what adaptations might be needed.

Conceptual and Empirical Research on Objective Neighborhood Indicators

The majority of recent research on neighborhood context as it relates to health measures objective characteristics of neighborhoods. This typically involves reliance upon the single- or multiple item indexes of census measures of socioeconomic conditions measured either at the block groups, census tract, or zip code level (i.e. see reviews Cummins et al., 2007; Peters et al., 2020; Pickett & Pearl, 2001). Specific indicators include the amount, quality, access, or exposure to natural elements (i.e. green spaces) (Ulmer et al., 2016; van den Berg et al., 2010), institutions and facilities (i.e. health care facilities, recreational areas, shopping facilities) (Spring, 2018), public infrastructure, dwellings (Evans, 2003), walkability (Chandrabose et al., 2019; Frank et al., 2006; Grasser et al., 2013) and social capital (Carpiano, 2007). Findings arising from these studies suggest there is an overarching index commonly referred to as disadvantage; this has

been determined through the use of single measure items such as percentage of unemployment or poverty in the neighborhood (Barrett et al., 2022; Krieger et al., 2003) or via the use of composite indexes that combine these measures together (Carpiano, 2007; Frank et al., 2019; Ross & Mirowsky, 2001; Zhang et al., 2019). It is important to note that the studies that have created composite indices have primarily done so via the use of primary component analysis which is substantially different in nature from exploratory and confirmatory factor analysis. Principal component analysis includes correlated variables with the purpose of reducing the number of variables and explaining the same amount of variance with fewer components (principal components whereas exploratory factor analysis estimates factors, underlying constructs that cannot be measured directly (Joliffe & Morgan, 1992). ...

Other studies that have considered objective measures of neighborhood have created composite indexes that reflect advance or affluence. Advantage or affluence reflects the general premise that exposure to the higher proportions of socioeconomically advantaged individuals may provide psychological resources that are beneficial for mental and physical health (Kuras et al., 2020; Massey, 1996). Neighborhood affluence (is also referred to concentrated affluence or neighborhood affluence) has been deemed in health research as using the percentage of households with income above \$30,000 (in some cases \$75,000), percentage of individuals who have a college degree, or individuals who are employed in more professional and/or managerial positions (Browning & Cagney, 2003). Browning and Cagney (2003) defined neighborhood affluence as the percentage of households with annual family income over \$50,000 and over. ...

While most research on objective neighborhood context demonstrates associations with health outcomes (Cummins et al., 2007; Pickett & Pearl, 2001; Zhang et al., 2019), research

remains inconclusive on whether affluence in the neighborhood or disadvantage in the neighborhood is more strongly associated with better health outcomes. For example, some studies find that neighborhood affluence is associated with health in samples located primarily in the United States, such as Chicago Illinois, Madison Wisconsin, and Norfolk Virginia (Browning & Cagney, 2003; Cagney et al., 2005; Garcia et al., 2021; O'Brien et al., 2020). Conversely, researchers suggest that poverty is one of the strongest measures associated with a variety of health outcomes (Boing et al., 2020; Krieger et al., 2003). Although these objective measures reflect the actual neighborhood context, they are less likely to provide complete and accurate evaluations of how individuals are exposed to, and experience their neighborhoods in ways that influence their health and behaviors (Weden et al., 2008). Therefore, the impacts of how objective neighborhood characteristics may influence health may be different than influences that consider both objective and subjective characteristics.

Conceptual and Empirical Research on Subjective Neighborhood Indicators Subjective assessments of neighborhoods entail asking residents for their assessments regarding their views on neighborhood safety, cleanliness, pollution, social cohesion, or access to services (Echeverria et al., 2004a; Hackman et al., 2021; Humpel et al., 2002; Kowitt et al., 2020; Parkes & Kearns, 2006a). In a similar fashion to objective measures, subjective measures have been examined one indicator at a time (Parkes & Kearns, 2006a; Zhang et al., 2019) as well as in composite index scales (Ellaway & Macintyre, 1998; Marquez et al., 2019). Subjective neighborhood measures often examine specific features of neighborhood context that may be health promoting or health damaging for the individuals (Cummins et al., 2005; Serra et al., 2018) and may point to subjective context being more proximal to health. Thus, subjective neighborhood indicators may

affect residents' health outcomes through behaviors and emotional responses that are triggered by their perceptions and satisfaction of the neighborhood context.

Recent studies have overcome limitations of the early studies that utilize only objective or only subjective indicators of neighborhood by simultaneously taking into account the links between objective and subjective characteristics together (Ettema & Schekkerman, 2016; Godhwani et al., 2019; Pfeiffer et al., 2020; Weden et al., 2008; Yakubovich et al., 2020). However, since both objective and subjective neighborhood characteristics differ greatly in terms of measurement and even meaning, their impact differs greatly. For example, Lin and Moudon (2010) examined the strength of the associations between objective and subjective built environment on walkability; they found that the influence of objective characteristics were more than that of subjective characteristics on walking. They discuss that this could be due to objective measures being more likely to capture the structural characteristics of neighborhoods that form the perceived environment. On the other hand, other studies have found that perceptions of objectively defined walkable neighborhoods improved physical activity (Gebel et al., 2011). Other studies discussed above also discovered that subjective characteristics were more likely to influence self-reported health and well-being than objectively defined characteristics (Ettema & Schekkerman, 2016; Mouratidis, 2019; Weden et al., 2008; Zhang et al., 2019).

Data availability plays a determining factor in the type of measures that will be used in a study. This signifies the common over-reliance of the use of census neighborhood measures (Cummins et al., 2005; Serra et al., 2018). While there have been several studies that have used both objective and subjective measures of neighborhood conditions many have focused solely on

older adults (Bowling & Stafford, 2007; Chen et al., 2021; Lai et al., 2021; Wen et al., 2006), focused on crime and disorder (Kepper et al., 2019; Rodriguez-Stanley et al., 2020; Sampson & Raudenbush, 2004; Sooman & Macintyre, 1995a) or face the limitations of smaller sample sizes when modeling the relationships between different dimensions of neighborhood context (Ehsan et al., 2019; Elliot et al., 2000; Steptoe & Feldman, 2001). In this study the aim is to extend this literature by using a large dataset in which rigorous statistical assessment can be conducted to examine the interrelations among subjective and objective neighborhood context factors in a sample of middle-aged adults who were assessed soon after the Great Recession of 2008.

The Present Study

The purpose of this study was to derive constructs to describe neighborhoods by using subjective and objective neighborhood indicators. The overarching goal is to examine whether objective measures of neighborhood conditions as well as subjective perceptions of neighborhood conditions uniquely contribute to a construct of neighborhood conditions. The methodology that will be used will be to explore a factor structure of these neighborhood constructs and assess the degree of overlap between different sources of neighborhood factors. Ultimately, this will allow us to directly model the relationships between neighborhood constructs. Both databases were brought together in R. This work is to be guided by an a priori framework and conducted to explore whether we can derive constructs via an Exploratory Factor Analysis.

Method: Study 2

Participants

We used data derived from the AS U Live project, which is a study of middle-aged (40-65 years) residents of the greater Phoenix metropolitan area ($N = 800$) that focuses on individual, and community factors in resilience (see Infurna et al., 2015). A total of 800 participants were recruited for the study and participated in the initial phase of data collection that involved self-report questionnaires. Participants completed self-report questionnaires about traumatic and stressful events, family life, and personality, as well as qualitative interviews about participants' stressful experiences. One quarter of the sample (~200) completed daily diaries covering a period of 30 days.

On average, participants were 53.27 years of age ($SD = 7.48$, range 40-65), 54% were women, 51% attained at least a college education.

Sampling and recruitment

The main study utilized sampling strategies referred to as sampling for heterogeneity in order to recruit 800 participants from over 40 census tracts across the greater Phoenix metropolitan area between 2007 and 2012. Ultimately, this method of sampling increased the external validity of research findings through the diversity of individuals, neighborhood environments, and measured outcomes.

The main study used multiple modalities for recruitment. Participants were recruited through (1) mailed recruitment letters printed in English and Spanish, and (2) recruiters traveling to houses after mailing letters to introduce the study, provide materials and request participation. Prior to participation, participants provided consent. Participants were compensated \$100 for participation in the main study and the additional group selected for the daily diaries was compensated up to \$140.

Measures

Table 3 contains the measures that were used to assess the core variables of objective and subjective factors in this study.

Subjective Neighborhood Perceptions/Individual Level Indicators

Fear of crime scale. A fear of crime scale adapted from Perkins and Taylor (1996) included 7 items that broadly pertain to safety in the neighborhood (e.g., “*How safe would you feel being alone in your neighborhood during the day?*” and “*How worried are you about your home being broken into when no one is home?*”) Higher scores for neighborhood safety pertain to a greater sense of safety in one’s neighborhood ($M = 3.15$, $SD = 0.59$, range: 1 to 4, $\alpha = .86$).

Neighborhood collective efficacy scale. Individuals responded to one indicator of neighborhood collective efficacy: social cohesion. These were measured via items from a scale developed by Sampson (1997), which included items that broadly pertain to “measure how well communities work together to make things happen”. Specific items include: (a) “People around here are willing to help their neighbors”, (b) “This is a close-knit neighborhood”, (c) “People in this neighborhood can be trusted”, (d) “People in this neighborhood generally don’t get along with each other”, (e) “People in this neighborhood do not share the same values”. Neighborhood cohesion was measured with responses to these questions: (1) “strongly disagree” to (5) “strongly agree”. Higher scores pertain to a greater sense of togetherness and how well communities work together ($M = 3.70$, $SD = 0.80$, range: 1 to 5, $\alpha = .91$).

Community involvement & trust scale. Community involvement & trust included items that broadly pertain to “feelings of connection and of community” (Putnam, 2000). Specific items include: (a) old and new friends, (b) the people in your neighborhood, (c) living in

your city, (d) your place of worship, (e) the people from work or school, (f) people who share same ethnic background, (h) people you have met online. Neighborhood cohesion was measured with responses to these questions: (1) “not at all” to (4) “a lot”. Higher scores pertain to having a greater sense of involvement and connection in the community ($M = 2.67$, $SD = 0.59$, range: 1 to 4, $\alpha = .90$).

Sense of community scale. Sense of community scale includes items that pertain to measuring and gauge a sense of community (McMillan & Chavis, 1986). Specific items include (a) I can recognize most people in my neighborhood, (b) Very few neighbors know me, (c) I care about what my neighbors think of my actions, (d) I have no influence over what this neighborhood is like, (e) If there was a problem in this neighborhood, people who live here get it solved. Sense of community scale was measured with responses to these questions: (1) “Not true at all” to (4) “True”. Higher scores represent a greater sense of community ($M = 2.44$, $SD = 0.51$, range: 1 to 4, $\alpha = .88$).

Objective Indicators of the Neighborhood

The American Community Survey provides information gathered by the Census Bureau regarding neighborhood composition and socioeconomic information. The nationwide American Community Survey stems from the decennial census program from the Census Bureau (United States Census, 2019). The American Community Survey aims to update and provide data about communities every year, rather than once every 10 years. Data from the ACS 2010 was used in this study to provide information about the key socioeconomic variables of most interest. Several measures included in the American Community Survey held special relevance for this study and are operationalized as follows:

Greenness. Objective indicators were assessed by combining information attained from available census tract data. Greenness was calculated via the Normalized Difference Vegetation Index (NDVI) within the given location of each census tract in which individuals reside. This vegetation index was calculated using remote sensing data from the LandSat website and calculates the level of greenness at a range of 30 meters per pixel captured via satellite imagery of the area we studied. This allows for providing a better indication of greenness in areas where individuals reside. Higher NDVI scores signify a much greater coverage of green areas in each 30 meters per pixel.

Unemployment. Unemployment status was determined by asking whether individuals are: (a) “employed”, (b) “unemployed”, (c) “not in labor force” . This data measure stems from the ACS and was calculated by creating a percentage of the population that answered this question as “unemployed” relative to the rest of the population.

Percent renter. Percent of renters in the neighborhood was determined from U.S Census data, ACS. The measure was calculated as a percent of the number of individuals renting properties compared to the total number of individuals living in a designated area.

Income inequality. Income inequality was calculated via the GINI index via the decennial census program from the Census Bureau in 2010. This coefficient is a statistical measure of distribution developed by to gauge economic inequality, income distribution and overall levels of wealth distribution among a population (United States Census, 2019). The range of the GINI index is from 0 (complete equality) to 1 (complete inequality). Thus, a higher score in the GINI index indicates greater inequality, with high income individuals receiving much larger percentages of the total income of the population.

Public Assistance. Public assistance was calculated from the US Census data, ACS. The measure was calculated as a percentage of the number of individuals who received benefits from the Food Stamp Program (SNAP) in the last 12 months in a designated area or census tract.

Poverty. Percentage of poverty was derived from the US Census data, ACS. The measure was calculated as a percentage of the number of individuals in the U.S population who are below the poverty level.

Education. Education was calculated as the percentage of individuals who have a college or greater in education (>12 years) via the US Census data, ACS.

Means and standard deviations at the individual, subjective, objective neighborhood levels for the variables used in the model are in table 3.

Statistical Analyses

The statistical analyses for examining our research questions proceeded in several steps. We first subjected ratings on the subjective and objective items to an exploratory factor analysis. Second, we computed alpha coefficients for the entire items as well as for the latent variables. The goal was to determine the factor structure of the objective and subjective measure scales based on a midlife sample in the immediate time following the Great Recession of 2008 to understand the nature by which objective and subjective actors present themselves in different aged samples. We conducted a parallel analysis using the “psych package” *fa.parallel* option to determine the number of factors that we will select for confirmatory factor analysis. A parallel analysis will begin our process to conducting the exploratory factor analysis on a random half of the sample followed by a confirmatory factor analysis on the entire sample and comparing the

findings. Subsequently, we will conduct an Exploratory Factor Analysis in R using the “psych package” *fa()* function. All Syntax used for analysis is located in Appendix... of this document.

After we determined the appropriate number of factors through the exploratory factor analysis, we conducted a confirmatory factor analysis within an SEM framework. This procedure will help estimate the common factors that make up objective and subjective neighborhood factors in midlife. The dataset is prepared for analyses by merging data from the census tract and questionnaire to conduct and derive estimations. This enables for specifying the model that includes within-level and between level indirect effects. Essentially, SEM allows for the researcher to account for measurement error and thereby correcting for attenuation that would be found in regression analysis. Additionally, SEM offers direct tests for confounding and allows a researcher to directly model the relationship between neighborhood constructs.

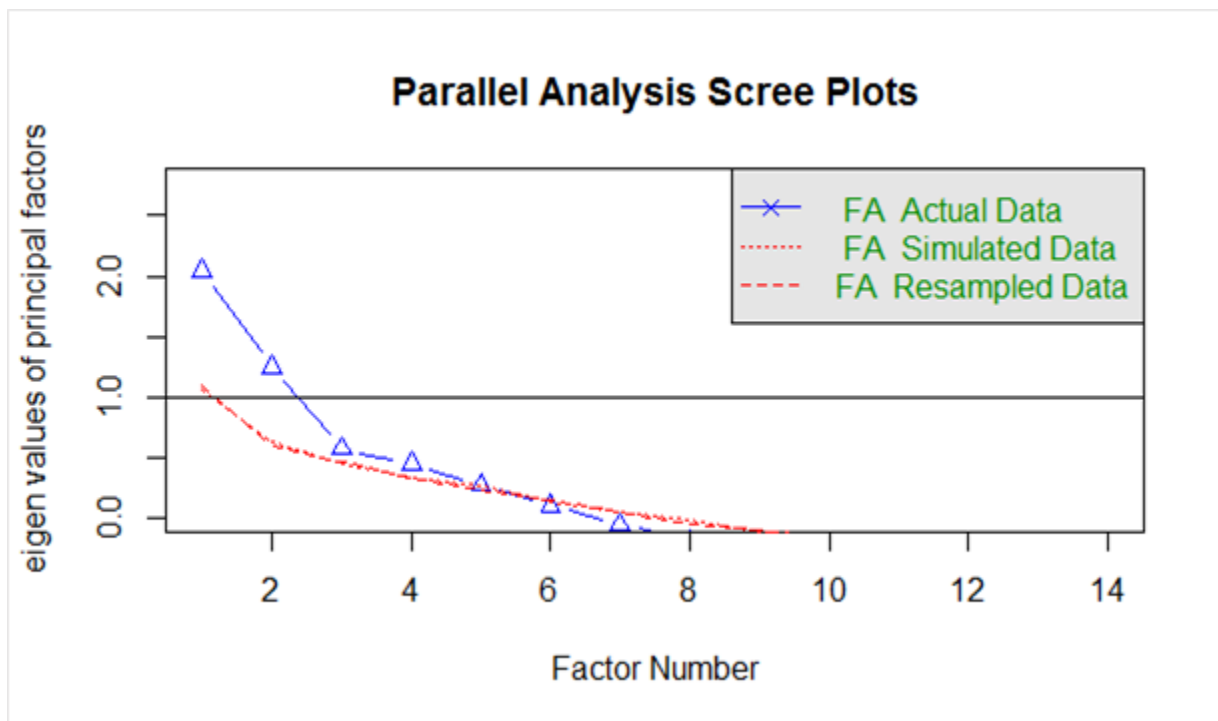
Results

Exploratory Factor Analysis: Inclusion of Objective and Subjective Neighborhood

Indicators

We performed an exploratory factor analysis that included each of the objective and subjective neighborhood indicators and described in the measures section. By utilizing the *fa* function, we ran three models that included one, two, and three factors. Oblique rotations were conducted in each model because this allowed for the correlation to be estimated between the latent factors, whereas other methods assume that all factors are correlated. Oblique rotation also allows us to drop restrictions that the factors are completely uncorrelated and results in better, simpler structures with easier interpretation, and more accurate identification of factors and more

realistic approach to search for factors. We used Ordinary Least Squares as it is known to provide results similar to Maximum Likelihood without assuming Multivariate normal distribution. We also only considered loadings higher than 0.4 and not loading on more than one factor. In order to understand the number of factors needed before factor analysis, we conducted parallel analysis to determine the acceptable number of factors and generated a scree plot. The plot is a procedure for inspecting the series of eigenvalues to identify the last discontinuity in their sequence. The blue line shows eigenvalues of actual data, and the two red lines show simulated data and resampled data. Here, we look at the large drops in the actual data and spot the point of inflection- the point where the gap between simulated data and actual data tends to be minimum. The plot and parallel analysis reveal that anywhere between 1 to 5 factors would be a good choice.



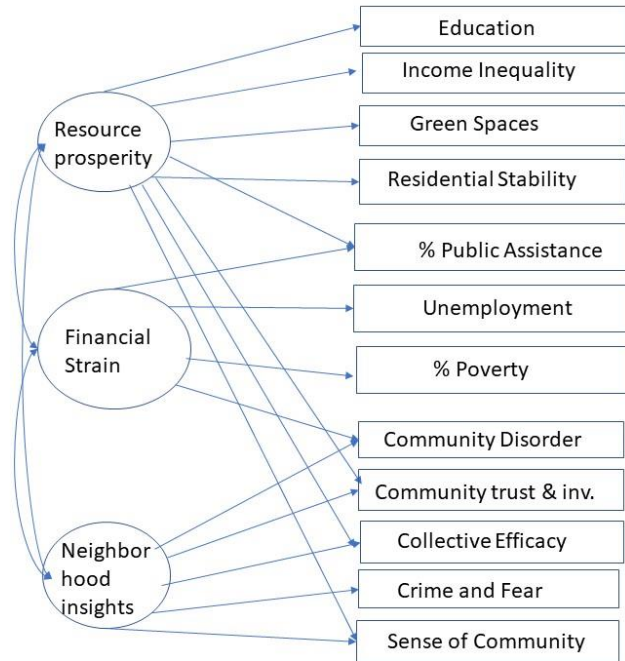
1 factor solution. For the first EFA model, we performed a factor analysis of the data using the maximum likelihood estimation with oblique rotation, produced a 1 factor solution. The model fit was good but not excellent, with a TLI of 0.955 and RMSEA of 0.075. The one-factor model did fit the data significantly better than a single factor solution X^2 (174.57, $N = 191$, $p < .05$).

2 factor solution. For the second EFA model, we performed a factor analysis of the data using the maximum likelihood estimation with oblique rotation, produced a 1 factor solution. The model fit was good but not excellent, with a TLI of 0.945 and RMSEA of 0.07. For the two-factor solution, the inter-factor correlations suggest that factor 2 which represents the all of the subjective variables of collective efficacy, sense of community, perceived disorder, sense of community, urban crime and fear, and community involvement and trust have strong loadings with the exception of perceived disorder. Factor 1 represents all of the objective neighborhood variables. Overall, the correlation of scores with factors is fairly moderate: (0.53, 0.46). The factor loading matrix for the two-factor solution has items with moderate factor loadings which map onto each factor which means that the relationship of each of these variables to the underlying factor structures is decent.

3 factor solution. For the third EFA model, we performed a factor analysis of the data using the maximum likelihood estimation with oblique rotation, produced a 1 factor solution. The model fit was good but not excellent, with a TLI of 0.986 and RMSEA of 0.053. The three-factor model did fit the data significantly better than a 2-factor solution X^2 (207.19, $N = 400$, $p < .05$). For the three-factor solution, the inter-factor correlations suggest that factor 1 which represents the all of the subjective variables of collective efficacy, sense of community,

perceived disorder, social coping, adaptive coping, and community involvement and trust have strong loadings with the exception of perceived disorder. On the other hand, factors 2 and 3 represent the objective neighborhood variables. Overall, the correlation of scores with factors is strong good: (0.88, 0.84, 0.79). The factor loading matrix for the three-factor solution has items with decently high factor loadings which map nicely onto each factor which means that the relationship of each of these variables to the underlying factor structures is fairly good.

4 factor solution. For the third EFA model, we performed a factor analysis of the data using the maximum likelihood estimation with oblique rotation, produced a four-factor solution. The model fit was good but not excellent, with a TLI of 0.885 and RMSEA of 0.035. The four-factor model did not fit the data significantly better than a 3-factor solution $X^2(153.21, N = 400, p > .05)$. For the three-factor solution, the inter-factor correlations suggest that factor 1 and 2 which represents the all of the subjective variables of collective efficacy, sense of community, perceived disorder, social coping, adaptive coping, and community involvement and trust have strong loadings with the exception of perceived disorder. On the other hand, factors 3 and 4 represent the objective neighborhood variables. Overall, the correlation of scores with factors is fairly poor: (0.26, 0.35, 0.37, 0.50). The factor loading matrix for the one-factor solution has items with decently high factor loadings which map nicely onto each factor which means that the relationship of each of these variables to the underlying factor structures is fairly poor.



Confirmatory Factor Analysis

Based on the exploratory factor analysis, we concluded that a 3-factor solution best fit the data. We next conducted a confirmatory factor analysis for the neighborhood constructs and this is detailed in the specified model in Figure 1. The standardized paths are indicated by single headed arrows between observed variables (denoted by rectangles) and the latent constructs (denoted by circles). This analytic approach established a measurement model for the three unobserved latent constructs that were determined from the exploratory factor analysis. The three latent constructs are called resource and prosperity, financial strain, and neighborhood insights. The CFA helped explore the relationship between the three constructs. In Table 9 the unstandardized estimates for the Confirmatory Factor Analysis will be found. In some cases, we include cross loadings to see whether the relevant indicators of each of the constructs loads on the other constructs that are not necessarily expected by theory. For example, we explore the

extent to which neighborhood insights are more or less strongly associated with neighborhood resources and prosperity and financial strain.

The resource and prosperity construct is strongly determined by the presence of lesser neighborhood income inequality and stability as indicated by the large, positive and statistically significant standardized paths (0.92, 0.91 respectively, all at $p < 0.001$) and somewhat less strongly by green space (0.44, $p < 0.001$). The financial strain construct is most strongly determined by the degree of unemployment, percentage of public assistance, poverty, in a census tract (0.89, 0.88, 0.85, respectively, all at $p < 0.001$). The neighborhood insights construct is comprised by all of the subjective neighborhood indicators and is strongly determined by the lack of presence of neighborhood disorder, urban crime and fear, and high levels of a sense of community; this is indicated by the large, positive and statistically significant standardized paths (-0.74, -0.68, and 0.67 respectively, all at $p < 0.001$) and somewhat less strongly by collective efficacy and community involvement and trust (0.41, 0.35 $p < 0.001$).

Although all constructs are all inter-related, the neighborhood insights construct is more strongly related to neighborhood financial strains (-0.47, $p < .0001$) than to neighborhood prosperity characteristics (0.35, $p < .0001$). The model fit statistics indicate a good fit $X^2 = 500.09$, RMSEA = .06 and CFI = 0.975.

Discussion

The overarching objective of this study was to explore and determine the overlap between subjective and objective neighborhood indicators in a midlife sample. Although previous research has examined both subjective and objective neighborhood conditions in the

context of health (Ross & Mirowsky, 2001; Steptoe et al., 2005; Wen et al., 2003; Zhang et al., 2019), we extended research on this topic by using a diverse sample in the Phoenix metropolitan area who were assessed in the years following the Great Recession of 2008. We conducted both exploratory and confirmatory factor analysis and our findings revealed that there were three latent neighborhood constructs. We found that two of the latent constructs were primarily comprised by the objective neighborhood indicators and labeled them resource and prosperity and financial strain. The third latent construct was primarily comprised of the subjective neighborhood indicators and we labeled this neighborhood insights. Our use of a SEM framework also permitted to accounting for and determining the interrelationships amongst the three constructs, where were in the moderate range. Our discussion focuses on evaluating our findings in the context of previous research and points to future directions for how our approach can be implemented to better understand the role of the objective and subjective neighborhood for mental and physical health in midlife.

Assessment of the Neighborhood Context

Consistent with previous research and literature (Barnett et al., 2018; Bowling & Stafford, 2007; O'Brien et al., 2020; Wen et al., 2006), we found that objective and subjective measures of the neighborhood shared overlap, but distinctions from one another were observed. Our 3 factor model was the most parsimonious and suggests that individual characteristics may play a role in explaining the associations between neighborhood conditions given that it was able to clearly define both subjective and objective neighborhood (resource and prosperity, neighborhood insights, and financial strains) within a midlife sample

We found that the objective neighborhood indicators showed to be distinct in the two latent constructs of prosperity of resources and financial strains. Resource and prosperity refer to measures of income inequality, greenness, residential stability and education representing a set of gains in resources within a neighborhood. Financial strains refer to measures capturing percentage of poverty, percentage of public assistance and unemployment as these represent the nature of a specific set of financial vulnerabilities... Our findings are similar to previous research that has examined neighborhood affluence versus disadvantage among younger and older adult population (Alidoust et al., 2019; Cagney et al., 2005; Garcia et al., 2021). Our findings are distinct and significant because a majority of studies focus primarily on single measures of disadvantage and may omit potential positive neighborhood contexts assessed via objective measures. For example, Carpiano (2009) showed that higher levels of neighborhood affluence as measured percentage of affluent families, income over \$100,000, and affluent males, income over \$60,000 and %percentage of affluent females, income over \$60,000. ... may indicate higher levels of neighborhood social capital that residents may be able to use for pursuing individual and health promoting activities.

We found that subjective perceptions of neighborhood were the most parsimonious when considering neighborhood insights of one's own views of neighborhood. One reason this could be is due to the self-report nature of the subjective perceptions of neighborhood. This likely indicates that that the subjective assessments of neighborhood are more proximate determinants among individuals than are the objective neighborhood conditions. Previous research has alluded to the fact that subjective perceptions could be more relevant because of the nature in which researchers ask their assessments—via questionnaires. Moreover, researchers have been

able to ask residents to give assessments of various aspects of their neighborhoods such as safety, cleanliness, pollution, and social cohesion (Echeverria et al., 2004a; Parkes & Kearns, 2006a; Serra et al., 2018; Zhang et al., 2019). Much more research needs to be done to better understand how subjective perceptions may or may not give a more accurate picture than objective measurements of the same measures.

Implications for the Utility of Subjective and Objective Neighborhood Indicators

Our findings have important implications for how researchers measure neighborhood conditions. Because subjective neighborhood measures are more strongly associated with each other, research that uses only objective measures of neighborhood conditions may be limited by not measuring more proximate aspects of perceived conditions. On the other hand, research that only examines perceived neighborhood quality may overlook the objective neighborhood conditions that form a partial basis for perceived neighborhood quality and that may operate through different pathways to impact individuals. Because we have 3 distinct latent factors—one subjective and two objectives, we could potentially examine whether and to what extent subjective and objective factors are closely associated with health and/or psychological well-being in a midlife. Then, it would be of extreme importance to assess the overlapping relationships between neighborhood constructs and wellbeing and the further consideration of individual characteristics such as race, gender and age. It would also be important to consider a wider breadth of outcomes that extend beyond well-being as well...

Limitations

Our study has a number of limitations that point to directions for future research. First, although the use of EFA and SEM is a strength of our study, we recognize that a weakness of SEM is that several models can meet the same standards of goodness of fit. Therefore, we would need to conduct additional sensitivity tests such as testing models with better fit to explore whether alternative specifications of the models might provide a similar or even better fit. The final models presented here had the best goodness of fit statistics among all of the models that were shown and not shown. Second, we examined the relationship between neighborhood conditions in one geographical and unique location at one specific time (2008-2012). It is likely that the reciprocal and reinforcing relationships described in this study may present themselves differently as well as across cultures. Future work needs to examine how individual and neighborhood factors contribute differentially over the life course, for different racial and socioeconomic groups, and for different cohorts of people.

Third, our analyses were also limited by the number and types of measures of neighborhood characteristics available to us. For example, additional theoretical constructs, such as perceptions of recreation, litter, and even air quality, could enhance our understanding of the subjective components of the neighborhood. Moreover, objective neighborhood measures need to come from not only the census. Census variables are limited in the range of objective aspects of neighborhoods they capture, and the different boundaries that might be important to health beyond census-defined boundaries. Lastly, the need to explore measures of health and wellbeing are critical to our understanding of how individuals age. It is possible that by including health outcomes and testing those associations that we may better understand relevant indicators of neighborhood in midlife.

CHAPTER 5

CONCLUDING REMARKS

It is clear that research on neighborhood contexts necessitates a better understanding of the relevant objective and subjective measures of neighborhood environments across the adult lifespan—and more specifically midlife. By improving our understanding of how these neighborhood factors interact, it will provide us with a better understanding to improve the lives of many. Today, a staggering 23% of all deaths can be attributed to environmental factors (World Health Organization, 2016). Therefore, it is imperative to understand how individual exposure to favorable contexts may enhance individuals' health and mitigate the negative impacts of other factors. In an attempt to contribute to the state of knowledge of how neighborhood contexts influence psychological well-being in midlife, the purpose of this dissertation was to conduct two studies to determine whether neighborhood context factors may potentially improve psychological well-being as well as to understand the underlying nature of the overlap between objective and subjective neighborhood context by using structural equation modeling. The findings of the two studies will be summarized in the following section.

The first study examined the influence of neighborhood context on the association between individuals' experience of adversity and psychological well-being in a sample of participants from the Pathways to Character project at ASU. The findings supported the notion that experiencing a monthly adversity was associated with poorer psychological well-being. Living in neighborhoods with more disorder was associated with stronger declines in psychological well-being when a monthly adversity was reported. Neighborhood cohesion moderated the link between monthly adversity and anxiety in that living in a neighborhood with

higher levels of cohesion is associated with stronger declines in anxiety on months when individuals reported an adversity. The results also suggested that Neighborhood income inequality moderated the effect of monthly adversity on NA, such that individuals who lived in neighborhoods with less inequality, on average, experienced stronger declines in NA on months when adversity was reported. These results of this study are in some ways consistent with previous studies where adversity is linked to poorer well-being and that within and between person differences in well-being are modified by neighborhood context in midlife. Overwhelming support for the idea that more neighborhood context factors would be more closely associated with well-being was not supported, but that could easily be attributed to the fact that the Pathways to Character sample is a select sample in Phoenix Arizona where there may not have been enough neighborhood variability to detect stronger associations.

Data from the As U Live project were used to examine the overlap between subjective and objective neighborhood context in a midlife sample. In general, the results suggest that two of the latent constructs were primarily comprised by the objective neighborhood indicators and labeled them resource and prosperity and financial strain. The third latent construct was primarily comprised of the subjective neighborhood indicators, and we labeled this neighborhood insights. Our use of a SEM framework also permitted to accounting for and determining the interrelationships amongst the three constructs, where were in the moderate range. The results suggest that neighborhood context in midlife appears to have unique constructs that could serve as a starting ground to better understand the role of neighborhood context of the objective and subjective neighborhood of psychological well-being in midlife.

Collectively, these studies suggest that neighborhood contextual factors can potentially influence psychological well-being in midlife. The first study added new insight into how neighborhood context features moderate the association between monthly adversity and psychological well-being. This is important given that future contextual research in adulthood can benefit from taking lifespan approach (Ferraro & Shippee, 2009; Glass & McAttee, 2006). The second study shed light on whether there was overlap between different neighborhood indicators and how that could be uniquely distinct in a sample of midlife in Phoenix, Arizona. Understanding how and whether certain neighborhood indicators differentially impact individuals in midlife can help target future research.

LIMITATIONS

Although each of the studies provided new insight into the relation between neighborhood context and psychological well-being, their limitations should be acknowledged. First, study 1 had different specifications in the manner in which neighborhood was operationalized. For example, the greenness measure was simplified to account for the percentage of green space in a given area. However, measures of quality, different types of green spaces (i.e. facilities) were not considered. Second,

First, neighborhood context was operationalized with different degrees of specification in this study in comparison to other studies which may have led to some contexts being represented more thoroughly than others. While precise quantitative measures were available for greenness, measures of quality (i.e. quality of these green spaces) and account of other greenness factors (i.e. other green spaces that were not considered parks, recreation facilities etc.) were not available. However, the tradeoff for using these measures is having uniform measures of green

spaces for each zip code in Maricopa county we considered. Although highly specific and both quantitative and qualitative in nature, the social context variables in our study consist of single dimensions. For example, there are likely different components that comprise neighborhood cohesion and disorder. It is likely that there can be neighborhoods that have higher disorder manifested in crime rates whereas they may have low disorder in terms of cleanliness. For cohesion, could it be possible that there are features in the neighborhood that may represent more cohesion versus others (i.e. perhaps religion or even some core values that neighborhoods value more than others)? With contextual data becoming more and more of interest and available in research, future studies will be able to investigate more precise, quantitative and qualitative components, and constructs of contextual data. Second, the Pathways to Character sample was not able to be tracked continuously which meant that it was difficult to understand neighborhood effects in the long-term. Future studies should examine the association between these neighborhood contexts and incorporate measures relating to choosing societal structures to better understand how adults shape their environments and vice versa.

Limitations of Study 2 include the fact that the As U Live sample can also be considered a select sample of midlife adults living in Phoenix, Arizona which can limit the external validity of the findings as well as limit the amount of variability in changes in well-being. In addition, the type of analyses was also limited by the number and types of measures of neighborhood factors available with the data. Lastly, although this study sought to better understand relevant and theoretically driven measures of neighborhood, we were not able to explore measures of health and wellbeing, which are critical to our understanding of how individuals change. Future

studies should examine outcomes of health and test those associations with neighborhood context in midlife.

A general limitation across the studies that is also noteworthy is the fact that 2 different samples were used for each of the studies which does not allow for comparisons to be made with respect to the relative importance of each of the neighborhood contextual factors in relation to psychological well-being.

FUTURE DIRECTIONS

This dissertation research was driven by the desire to further our understanding of how neighborhood context factors are related to psychological well-being in midlife. Ultimately, these, and other similar studies will guide future intervention studies designed to help midlife adults improve, maintain, or delay the deleterious effects they may experience during the aging process. Key questions for future studies in this are with respect to timing. For example, is it ever too late to change behaviors, or can adults in midlife benefit overall psychological well-being by modifying their behavior and how they interact with their environment? Will the greatest benefits be seen if changes are implemented earlier (prior to midlife) or rather later in life (old age) and how long do individuals need to engage in such interactions with their environments to benefit their well-being? It is absolutely imperative that future studies investigating neighborhood context and well-being are conducted from a lifespan approach in order to disentangle the complex associations between these factors and psychological well-being.

Another key issues when examining the association between neighborhood context variables and psychological well-being is the underlying mechanisms. The current studies were limited by the data available, but future studies should examine how neighborhood context

factors affect well-being at the neurophysiologic level. For example, studies will need to include measures of brain imaging and biomarkers in order to investigate the structural and functional underpinnings of how resident's health, nutrition, perceptions of neighborhood and other characteristics of the built environment affect health and well-being in the long term.

One final direction for future studies is examining ways to potentially identify as early as possible those who are most susceptible to poorer well-being in midlife and beyond who would stand to benefit most from the concepts investigated in the current dissertation. This will allow for the implementation of interventions at the most opportune time in order to maximize their effectiveness and ultimately reduce the incidence of poorer health outcomes in the future.

In conclusion, the current dissertation addressed an important theoretical and public issue that is expected to affect millions of Americans in the near future as the baby boomer generation comes of age and heading into late life. Although the results found in these two studies described are not definitive, they lend support for the belief that neighborhood contexts are every bit important in shaping development across the lifespan.

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APPENDIX A

TABLE 1

Table 1

Adversity Items in the Monthly Assessment by Domain

Personal Illness or Injury

Motor vehicle accident that was near-fatal or life-threatening
Physical injury during physical activity
Surgical operation
Overnight hospitalization
Illness that caused loss of multiple days at work or productivity at home
Arrested for violating the law
Severe physical injury of any kind

Family and Friend Illness or Injury

Your spouse or partner was involved in a motor vehicle accident that was near-fatal or life-threatening
One or both parents were involved in a motor vehicle accident that was near-fatal or life-threatening
One or both in-laws were involved in a motor vehicle accident that was near-fatal or life-threatening
Your child was involved in a motor vehicle accident that was near-fatal or life-threatening
A close friend or family member was involved in a motor vehicle accident that was near-fatal or life-threatening
Severe physical injury to your spouse or partner
Severe physical injury to your parent(s)
Severe physical injury to your in-law(s)
Severe physical injury to your child
Severe physical injury to a close family member or friend
Diagnosis of an illness or chronic disease to your spouse or partner
Diagnosis of an illness or chronic disease to your parent(s)
Diagnosis of an illness or chronic disease to your in-law(s)
Diagnosis of an illness or chronic disease to your child
Diagnosis of an illness or chronic disease to a close family member or friend
Overnight hospitalization of your spouse or partner
Overnight hospitalization of your parent(s)
Overnight hospitalization of your in-law(s)
Overnight hospitalization of your child
Overnight hospitalization of a close family member or friend
Your spouse or partner was arrested for violating the law
One or both parents were arrested for violating the law
One or both in-laws were arrested for violating the law
Your child was arrested for violating the law
A close family member or friend was arrested for violating the law

Your spouse or partner was involved in a motor vehicle accident that was near-fatal or life-threatening

One or both parents were involved in a motor vehicle accident that was near-fatal or life-threatening

One or both in-laws were involved in a motor vehicle accident that was near-fatal or life-threatening

Your child was involved in a motor vehicle accident that was near-fatal or life-threatening

A close friend or family member was involved in a motor vehicle accident that was near-fatal or life-threatening

Violence

Victim of a robbery

Witness of a robbery

Physically assaulted

Witness to a physical assault

Sexually assaulted

Bereavement

Death of your spouse or partner

Death of your parent(s)

Death of your in-law(s)

Death of your child

Death of a close family member or friend

Death of a celebrity you had a close emotional bond to or looked up to/admired

Death of a beloved pet

Social-Environmental

Served as caretaker for your spouse or partner

Served as a caretaker for your parent(s)

Served as a caretaker for your in-law(s)

Served as caretaker for a close family member or friend

Financial loss (e.g., fraud, stock market)

Unable to cover living expenses due to financial loss

Foreclosure on a mortgage or loan

Repossession of your car

Fired from employment

Had trouble with your boss at work that interfered with daily living

Demoted at work

Unfavorable change in job position

Had a significant conflict at work

Took a cut in wage or salary without a demotion

Your spouse or partner was fired from employment

Unfavorable change in house/apartment/residence

Involved in a law suit
Unable to take a planned vacation
Have been unemployed for at least a month
Experienced property damage
Inhibited by the weather
Felt the weather prohibited you from accomplishing something you wanted to accomplish
A current event caused you distress (e.g., act of terrorism, congressional decision, shooting). Please describe the event in the space provided.

Relationship Stress

Marital separation/divorce
Relations with your spouse or partner changed for the worse, without separation or divorce
Major conflict with your spouse or partner
Major conflict with your parent(s)
Major conflict with your in-law(s)
Major conflict with your child/children
Major conflict with a close family member or friend
Periods of great concern for a loved one

Natural Disaster

Major fire damaged your home or property
Major flood damaged your home or property
Major storm damaged your home or property

Note. For each event, participants responded yes or no if the event occurred during the course of their life. If participants responded yes, follow-up questions included “In what year did the event occur?” and “How much distress did it cause you?” The question pertaining to distress was answered on a scale from (1) None at all, (2) A little, (3) A moderate amount, (4) A lot, and (5) A great deal

APPENDIX B

TABLE 2

Table 2

Means, Standard Deviations, and intercorrelations among the variables in study 1 at baseline ($N = 362$)

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Income Inequality	0.43	0.05	–												
2. Greenness	0.13	0.67	0.20*	–											
3. Percent Renter	38.1	15.68	0.30*	0.04*	–										
4. Unemployment	5.54	2.04	0.09*	-0.08*	0.36*	–									
5. Neighborhood Disorder	1.41	0.47	0.07*	-0.02*	0.40*	0.36*	–								
6. Neighborhood Cohesion	3.49	0.93	0.06*	0.05*	-0.10*	-0.10*	-0.41*	–							
7. Positive Affect	4.01	1.18	0.002	-0.03*	-0.05*	-0.05*	-0.21*	0.20*	–						
8. Negative Affect	2.22	1.06	-0.007	0.04*	0.05*	0.05*	0.20*	-0.18*	-0.78*	–					
9. Depressive Symptoms	7.67	6.88	0.006	0.05*	0.09*	0.07*	-0.24*	-0.22*	-0.79*	0.86*	–				
10. Life Satisfaction	7.59	2.16	-0.01	-0.008	-0.08*	-0.06*	0.20*	0.26*	0.75*	-0.73*	-0.77*	–			
11. Anxiety	1.57	0.43	-0.01	0.07*	0.08*	0.06*	0.21*	-0.16*	-0.70*	0.81*	0.80*	-0.65*	–		
12. Gender	0.55	0.49	0.01	0.020	-0.01	-0.07*	-0.04*	0.20*	0.002	0.04*	0.01	0.05*	0.01	–	
13. Age	58.14	4.35	0.04*	-0.08*	-0.02	0.03	-0.04*	0.10*	0.07*	-0.05*	-0.06*	0.07*	-0.03*	0.07*	–

 $P < .05$ *

APPENDIX C

TABLE 3

Table 3

Means, Standard Deviations, and intercorrelations among the variables in study 2 (N = 800)

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12
1. Income Inequality	0.04	0.05	–											
2. Greenness	0.01	0.06	-0.008	–										
3. Percent Renter	38.1	15.68	0.27*	-0.21*	–									
4. Unemployment	0.05	0.02	0.08*	-0.06*	0.41*	–								
5. Education	6.39	1.86	0.46*	0.52	-0.21	-0.08	–							
6. Residential Mobility	0.39	0.01	-0.15	0.08	0.45*	0.52*	-0.05	–						
7. Poverty	0.09	0.10	0.23*	-0.10	0.24	0.35	0.12	-0.07	–					
8. Public Assistance	0.02	0.03	0.16	-0.06*	0.13	0.29*	-0.12	0.02	0.46*	–				
9. Disorder	3.02	1.05	0.18*	0.07	0.03	0.11	-0.04*	0.05	0.14	0.02	–			
10. Collective Efficacy	3.70	0.81	0.05*	0.05*	-0.25*	-0.41*	0.15	0.10	-0.03	-0.06	-0.12	–		
11. Involvement & Trust	2.68	0.58	0.12*	-0.09*	-0.06*	-0.19*	0.43*	0.08	-0.06	-0.03	-0.13	0.65*	–	
12. Fear of Crime	3.15	0.57	-0.01	0.03*	-0.27*	-0.33*	0.43*	0.26*	0.15	0.09	0.32*	-0.53*	-0.46*	–

P < .05 *

APPENDIX D

TABLE 4

Table 4
Examining Whether Neighborhood Indicators Protect Against Detrimental Effects of Adversity on Life Satisfaction

Variable	Model 1		Model 2		Model 3		Model 4	
	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>
Fixed Effects								
Intercept	7.88*	0.07	7.83*	0.09	7.79*	0.09	7.84*	0.09
Age	0.02	0.01	0.03	0.02	0.02	0.02	0.02	0.02
Gender	0.33*	0.14	0.36	0.18	0.14	0.18	0.20	0.18
Income Inequality			-1.88	1.83			-2.06	1.76
Greenness			0.11	0.16			0.08	0.16
Unemployment			0.01	0.04			0.05	0.04
Percent renter Disorder			-0.01	0.006	-0.31	0.20	-0.004	0.006
Cohesion					0.47*	0.10	0.49*	0.11
Adversity Monthly			-0.27*	0.03	-0.28*	0.03	-0.27*	0.03
Adv x Income			1.20	0.76			1.26	0.77
Adv x Green			-0.11	0.08			-0.11	0.08
Adv x Unemploy			-0.04*	0.02			-0.04	0.02
Adv x Perc Rent			0.001	0.002			0.001	0.002
Adv x Disorder					-0.08	0.09	-0.06	0.10
Adv x Cohesion					-0.01	0.04	-0.02	0.04
Random Effects								
Intercept	1.48*	0.09	2.73*	0.23	2.57*	0.22	2.47*	0.21
Adv Monthly	0.11	0.07	0.07*	0.01	0.06*	0.03	0.07*	0.03
Residual	1.31*	0.02	1.24*	0.22	1.32*	0.02	1.24*	0.02

Note: * $p < .05$.

APPENDIX E

TABLE 5

Table 5

Examining Whether Neighborhood Indicators Protect Against Detrimental Effects of Adversity on Depressive Symptoms

Variable	Model 1		Model 2		Model 3		Model 4	
	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>
Fixed Effects								
Intercept	6.97*	0.29	6.76*	0.30	6.92*	0.28	7.35*	0.89
Age	-0.09	0.06	-0.09	0.06	-0.06	0.06	-0.07	0.06
Gender	-0.07	0.59	-0.14	0.60	0.46	0.57	0.28	0.58
Income Inequality			-0.38	6.06			1.70	5.80
Greenness			0.03	0.52			0.09	0.50
Unemployment			0.02	0.15			-0.10	0.15
Percent renter			0.03	0.02			0.007	0.02
Disorder					2.13*	0.65	2.17*	0.75
Cohesion					-1.17*	0.34	-1.22*	0.35
Adversity			1.15*	0.11	1.13*	0.11	1.16*	0.11
Adv x Income			-2.61	2.34			-2.79	2.35
Adv x Green			0.45	0.26			0.48	0.26
Adv x Unemploy			0.03	0.06			0.03	0.06
Adv x Perc Rent			-0.003	0.008			-0.005	0.008
Adv x Disorder					0.05	0.27	0.19	0.31
Adv x Cohesion					0.08	0.13	0.12	0.13
Random Effects								
Intercept	28.74*	2.40	27.90*	2.39	25.60*	2.18	25.17*	2.18
Adv Monthly	0.58*	0.32	0.70*	0.33	0.60*	0.32	0.71*	0.33
Residual	12.17*	0.21	11.85	0.21	12.19*	0.21	11.85*	0.21

Note: * $p < .05$.

APPENDIX F

TABLE 6

Table 6

Examining Whether Neighborhood Indicators Protect Against Detrimental Effects of Adversity on Anxiety

Variable	Model 1		Model 2		Model 3		Model 4	
	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>
Fixed Effects								
Intercept	1.54*	0.01	1.53*	0.01	1.54*	0.01	1.53*	0.01
Age	-0.004	0.004	-0.004	0.13	-0.003	0.004	-0.003	0.004
Gender	0.007	0.03	0.007	0.04	0.02	0.03	0.02	0.03
Income Inequality			-0.38*	0.40			-0.28	0.39
Greenness			0.02	0.03			0.02	0.003
Unemployment			-0.001	0.01			-0.01	0.01
Percent renter			0.002	0.001			0.002	0.001
Disorder					0.11*	0.04	0.14*	0.05
Cohesion					-0.05	0.02	-0.05*	0.02
Adversity			0.04*	0.006	0.04*	0.006	0.04*	0.006
Adv x Income			-0.004*	0.13			-0.03	0.13
Adv x Green			0.02	0.01			0.02	0.01
Adv x Unemploy			0.008*	0.003			0.007	0.003
Adv x Perc Rent			-0.0002	0.0005			-0.0003	0.0005
Adv x Disorder					0.03*	0.01	0.02	0.01
Adv x Cohesion					0.01	0.007	0.01	0.008
Random Effects								
Intercept	0.12*	0.01	0.12*	0.01	.11*	0.009	0.11*	0.01
Adv Monthly	0.002*	0.001	0.002*	0.001	0.001*	0.001	0.002*	0.001
Residual	0.04*	0.0007	0.04*	0.0007	0.04*	0.0007	0.04*	0.0007

Note: * $p < .05$.

APPENDIX G

TABLE 7

Table 7

Examining Whether Neighborhood Indicators Protect Against Detrimental Effects of Adversity on Positive Affect

Variable	Model 1		Model 2		Model 3		Model 4	
	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>
Fixed Effects								
Intercept	4.11*	0.05	4.14*	0.05	4.12*	0.05	4.15*	0.05
Age	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
Gender	0.04	0.10	0.06	0.10	-0.03	0.10	-0.007	0.10
Income Inequality			0.13	1.12			-0.25	1.08
Greenness			0.009	0.09			-0.003	0.09
Unemployment			0.001	0.02			0.02	0.02
Percent renter			-0.002	0.003			0.002	0.004
Disorder					-0.25*	0.12	-0.33*	0.14
Cohesion					0.21*	0.06	0.22*	0.06
Adversity			-0.16*	0.02			-0.16*	0.02
Adv x Income			0.07	0.14			0.15	0.12
Adv x Green			-0.04	0.04			-0.04	0.04
Adv x Unemploy			-0.005	0.01			-0.003	0.01
Adv x Perc Rent			-0.001	0.001			-0.001	0.001
Adv x Disorder					-0.07	0.05	-0.05	0.05
Adv x Cohesion					-0.04	0.02	-0.04	0.02
Random Effects								
Intercept	0.96*	0.07	0.96*	0.08	0.89*	0.07	0.88*	0.07
Adv Monthly	0.03*	0.01	0.03*	0.01	0.03*	0.01	0.03*	0.01
Residual	0.33*	0.006	0.32*	0.005	0.33	0.006	0.32*	0.005

Note: * $p < .05$.

TABLE 8

APPENDIX H

Table 8

Examining Whether Neighborhood Indicators Protect Against Detrimental Effects of Adversity on Negative Affect

Variable	Model 1		Model 2		Model 3		Model 4	
	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>
Fixed Effects								
Intercept	2.11*	0.04	2.08*	0.04	2.10*	0.04	2.08*	0.04
Age	-0.01	0.01	-0.01	0.01	-0.006	0.01	-0.009	0.01
Gender	0.05	0.09	0.04	0.09	0.12	0.09	0.09	0.09
Income Inequality			-0.23	0.98			0.10	0.96
Greenness			0.01	0.08			0.02	0.08
Unemployment			0.004	0.02			-0.01	0.02
Percent renter			0.002	0.003			-0.001	0.003
Disorder					0.18	0.10	0.22	0.12
Cohesion					-0.17*	0.05	-0.18*	0.05
Adversity			0.15*	0.01			0.15*	0.01
Adv x Income			-0.39*	0.15			-0.49*	0.15
Adv x Green			0.04	0.04			0.04	0.03
Adv x Unemploy			0.001	0.009			-0.002	0.009
Adv x Perc Rent			0.001	0.001			0.0002	0.001
Adv x Disorder					0.09*	0.04	0.10*	0.04
Adv x Cohesion					0.03*	0.02	0.04	0.02
Random Effects								
Intercept	0.74*	0.06	0.74*	0.06	0.69*	0.05	0.69*	0.06
Adv Monthly	0.01*	0.007	0.01*	0.007	0.01*	0.007	0.01*	0.007
Residual	0.28*	0.005	0.27*	0.004	0.28*	0.005	0.27*	0.004

Note: * $p < .05$.

APPENDIX I

TABLE 9

Table 9

Unstandardized Estimates of Confirmatory Factor Analysis for Subjective and Objective Neighborhood Factors

	Resource and prosperity		Financial strains		Neighborhood insights		Residual variance	
	Factor Loading		Factor loading		Factor loading		Residual variance	
	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>	<i>Est.</i>	<i>SE</i>
Variables								
1. Education	0.95	0.04					1.15	0.04
2. Income Inequality	0.92	0.09					1.22	0.01
3. Green Spaces	0.44	0.07					1.13	0.09
4. Residential Stability	0.91	0.06					0.99	0.02
5. Public Assistance			0.88	0.02			0.97	0.02
6. Unemployment			0.89	0.05			0.99	0.03
7. % Poverty			0.85	0.03			1.05	0.04
8. Community Disorder					-0.74	0.03	1.12	0.03
9. Trust and Involvement					0.68	0.09	0.89	0.01
10. Collective Efficacy					0.67	0.06	0.88	0.02
11. Crime and Fear					-0.46	0.04	0.77	0.03
12. Sense of Community					0.52	0.04	0.73	0.02
variance								
Resource and prosperity			0.88	(0.02)				
Financial strains			1.11	(0.03)				
Neighborhood Insights			1.27	(0.02)				
correlation								
Prosperity and strains			-0.47					
Prosperity and insights			0.35					
Strain and insights			-0.53					
Model fit statistics								
RMSEA			.06					
CFI			0.975					

Note: RMSEA root mean square error of approximation; CFI Comparative Fit Index

APPENDIX J

FIGURE 1

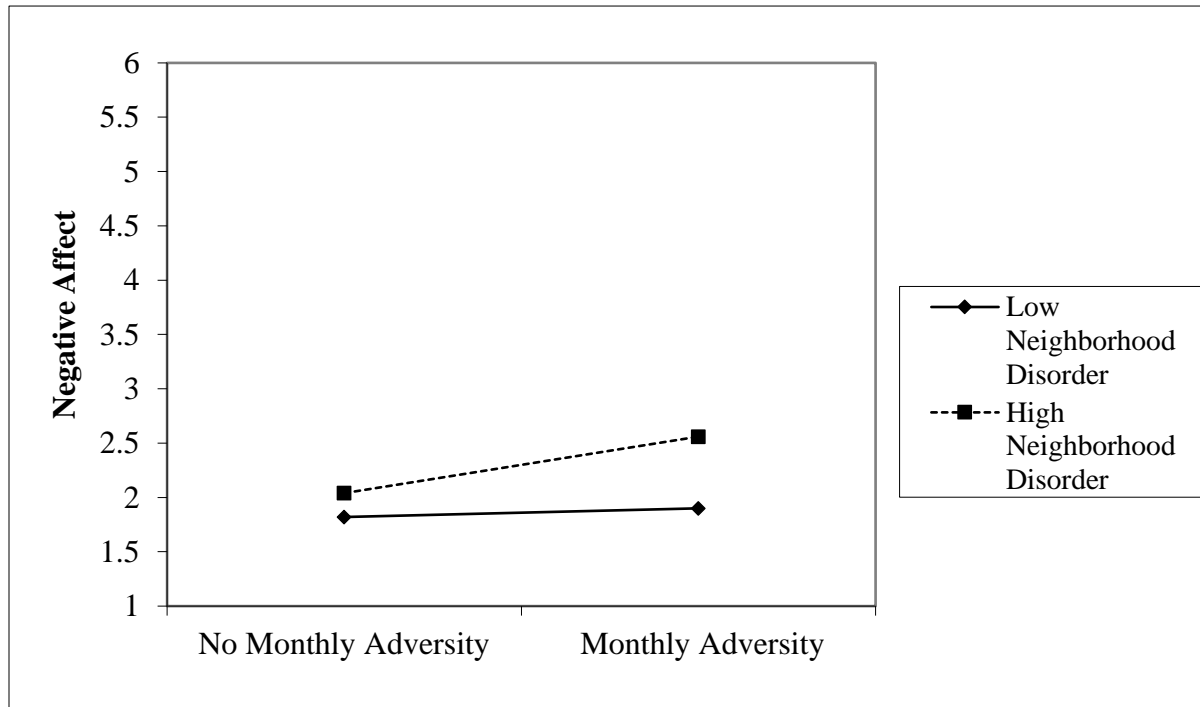


Figure 1. Compared to participants who live in neighborhoods with lower levels of community disorder, participants living in neighborhoods with more disorder, on average, were more likely to report more negative affect on months when individuals reported a monthly adversity.

APPENDIX K

FIGURE 2

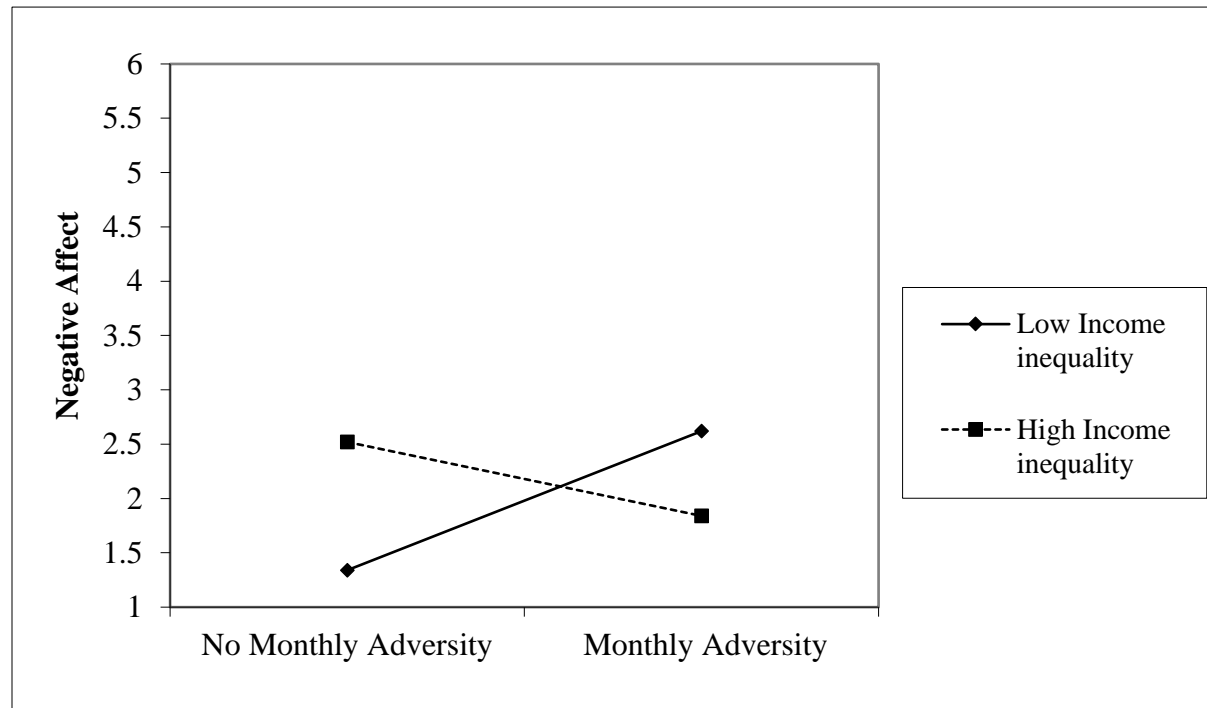


Figure 2. Illustrating the moderating effect of income inequality on monthly adversity events. Compared to participants who lived in neighborhoods with more income inequality, participants living in a neighborhood with less income inequality were more likely to report higher negative affect on months when they experienced a monthly adversity.