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# Predicting mental well-being in assisted living communities : the roles of social capital and the built environment.

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PREDICTING MENTAL WELL-BEING IN ASSISTED LIVING COMMUNITIES:

THE ROLES OF SOCIAL CAPITAL AND THE BUILT ENVIRONMENT


By


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B.S., University of Michigan, 2000

M.P.H., Boston University, 2002


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DEDICATION

For my first teachers,

Mary and Rob Walsh.

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I am honored to have had so many shoulders to lean on throughout my studies. This dissertation would not have been possible without the guidance, input and moral support of more individuals than I can list.

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ABSTRACT

PREDICTING MENTAL WELL-BEING IN ASSISTED LIVING COMMUNITIES:

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Along the continuum of poor to good health, mental well-being refers to the positive state of being.  Mental well-being connotes the ability to manage stress, maintain independence, and is indicative of happiness and improved quality of life.  Mental well-being is critical to overall health throughout the lifespan, but it is of particular importance in the context of healthy aging since older adults are more likely to experience compromised mental health.

Existing research has identified factors that reduce the risk of poor mental health outcomes: the built environment and individual and community social capital are associated with overall health status and the incidence of mental illness.  This study explores the relationship between these variables and mental wellness, currently a gap in the literature.

This dissertation assessed the roles of social capital and the built environment on promoting and maintaining positive mental health, specifically for assisted living residents.  The study utilized a quantitative design to determine if built environment quality, community social capital and individual social connectedness were predictive of

mental well-being.  Site audits were used to assess built environment quality surrounding twelve assisted living facilities in Greater Louisville.  Of these twelve sites, six authorized individual interviews with their residents, and subsequently 76 individuals were surveyed.

Social connectedness explained about 15% of the variance in mental well-being. For older adults, knowing people who can provide them with resources or favors is predictive of increased happiness and enhanced mental well-being.  Although built environment quality did not emerge as a meaningful variable for predicting mental well-being, social connectedness and social capital explained about 27% of the variance in mental well-being.  In addition to the resources they may know, increased perceptions of community trust and reciprocity are associated with increased mental well-being for older adults.  In this regard, social capital and social connectedness are important predictors of mental wellness for older adults residing in assisted living communities.

Beyond reducing the risk of illness, this study demonstrates that social capital and social connectedness are associated with mental wellness.  In light of this, assisted living communities should evaluate the impact of their activities and programmatic offerings on resident social capital.  Every effort should be made to help residents maintain their pre-existing community ties as well as forge new relationships.

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NOTE ON TERMINOLOGY


Different theorists, researchers and academic disciplines define social capital differently. One school of thought holds that social capital is an individual attribute, resulting from the resources embedded in a person's social network. This idea is rooted the work of Pierre Bourdieu. An alternative interpretation is that social capital is a group attribute, representative not of the individual, but of the social cohesion of the community as a whole. This communitarian approach to social capital stems primarily from the work of Robert Putnam.

Both the individualistic and communitarian definitions of social capital have important implications for health, and experts recommend that both social cohesion and embedded resources be considered in social capital research (Kawachi, Subramanian, & Kim, 2010). As such, this dissertation will adopt an inclusive definition of social capital, exploring both the individual and group constructs. However, a discussion of both individual-level and community-level social capital presents some semantic difficulties and as McKenzie and Harpham noted, "terminological precision is usually a precondition for the building of effective theory" (2006, p. 16).

While both the individual- and community-level constructs can appropriately be described by the term "social capital," this dissertation will adopt different terminology for the two definitions. Individual-level social capital will be described as **social**

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**connectedness**, while community-level social capital will be described as **social capital.** This distinction was adopted to lend clarity to the text, and is not intended to discredit the use of the term "social capital" to describe the individual construct.

CHAPTER I

INTRODUCTION

While definitions for "healthy aging" vary slightly from one another, the underlying concept is certainly appealing. We cannot avoid getting older, but we can maintain our health. Who would not want to do that? One coalition has defined healthy aging as "the development and maintenance of optimal mental, social and physical well-being and function in older adults. This is most likely to be achieved when communities are safe, promote health and well-being, and use health services and community programs to prevent or minimize disease" (Joint Rural Health Advisory Committee & State Community Health Services Advisory Committe Work Group, 2006, p. 2). This definition makes it clear that where we live matters to our health, and this continues to be true throughout our lifespan.

In 2011, the first members of the "Baby Boomer" generation turned 65. The largest birth cohort in the history of the United States is getting older. Researchers from virtually every discipline in the health and social sciences are working to address the needs of our aging population. In Kentucky, there were 504,793 adults over the age of 65 living in the state at the time of the 2010 Census. By 2025, Kentucky's population of older adults is projected to increase by more than 50%. By 2050, there will be 1.08 million adults over 65 in the state. In Louisville, Kentucky's largest urban area, the trend

is the same.  There were 99,095 adults over the age of 65 at the time if the 2010 Census, and by 2050, there will be nearly 164,000 older adults in Jefferson County (Kentucky State Data Center, 2011).

As more adults face the inevitable fact of growing older, the idea of "healthy aging" becomes all the more important.  Yet, the goal of healthy aging is not attained by many Americans.  In a meta-analysis of 28 quantitative studies of healthy aging, the average rate of successful aging was just 35.8% (Depp & Jeste, 2006), suggesting that only about 1 in 3 adults can expect to age well.

In the field of urban planning, New Urbanism is a movement promoting livable, walkable communities.  New Urbanist designs are guided by the principles of "Smart Growth" and feature mixed land uses and increased building density, so community residents have easy access to public transit, shopping and community services.  Smart Growth principles emphasize walkability and a shift away from dependence on automobiles (Frumkin, Frank, & Jackson, 2004).  These communities are believed to promote "aging in place," because older residents will have access to all of the social supports they need to remain in their homes.  This is a noble goal, but it is far from the reality of how most Americans live.  Urban sprawl and suburban expansion have been the dominant forms of community development for decades, effectively isolating older adults from the social supports they may need in their later years (Duany, Plater-Zyberk, & Speck, 2000).

Independent living, or aging in place, is a hallmark of healthy aging.  Yet, while aging in place is an ideal, it is not the reality for many older adults.  For the foreseeable future, many older adults will continue to need to leave their primary residence and

relocate to retirement homes, continuing care settings, nursing homes and assisted living communities.  Acknowledging this reality, researchers from public health, psychology, gerontology, urban planning and other disciplines will need to work together to create healthy spaces for older adults for whom independent living is no longer an option.

Despite the increased interest in healthy aging research, assisted living communities have been largely overlooked by the academic community.  Assisted living is often perceived as a luxury service because historically it has not been covered by most insurance plans, including Medicare and Medicaid.  In light of the increased demand, coverage models may be shifting as assisted living typically represents a less costly alternative for adults who do not need the services of a skilled nursing facility.  The number of Americans living in assisted living facilities is projected to double in the next twenty years (Ortiz, n.d.).  By definition, assisted living communities – the focus of the current study – help residents with activities of daily living, such as dressing and bathing, but do not provide advanced medical services.  Beyond this, assisted living communities should be healthy environments that preserve and promote the physical, mental and social health of residents.

As the literature review will demonstrate, social capital and social connectedness are linked with social well-being and overall health (Giordano & Lindstrom, 2011; Kawachi, Kennedy, & Glass, 1999; Poortinga, 2006; Wen, Cagney, & Christakis, 2005).  Moving to an assisted living community is likely to be a disruptive event in an individual's social network of friends and neighbors.  Ideally, an assisted living community will foster new relationships and social connections, to help preserve the benefits of social capital and social connectedness.  Despite the growing body of

literature on the health impacts of social capital, little is known about this construct in assisted living communities. This dissertation addresses this gap in the literature and helps increase understanding of the association between social capital and mental well-being.

## Problem Statement

Given the aging population in the United States, and the need for support services such as those provided in an assisted living community, many older adults will continue to rely on assisted living communities in their later years. In light of this growing demand, it is imperative that assisted living facilities be designed to promote and maintain physical, mental and social health for their residents. The purpose of this dissertation is to assess the roles of social capital and the built environment on promoting and maintaining positive mental health for assisted living residents.

## Research Questions

The primary study utilized a quantitative design to determine if built environment quality, community social capital and individual social connectedness are predictive of individual mental well-being. It employed a multi-level framework, and explored the influence of both individual-level (social connectedness) and community-level (social capital and built environment quality) factors on the dependent variable. Specifically, this study answers the following research questions:

**Research Question 1:** Is an adapted version of a Resource Generator an appropriate instrument for measuring individual social connectedness among residents of assisted living communities in Greater Louisville?

**Research Question 2:** What are the mental health and social capital characteristics of assisted living residents in Greater Louisville?

**Research Question 3:** What are the characteristics of the built environment at assisted living communities in Greater Louisville?

**Research Question 4:** Is there a positive relationship between individual social connectedness and mental well-being for residents in assisted living communities in Greater Louisville? **Hypothesis:** Mental well-being will be significantly positively associated with social connectedness in the study population.

**Research Question 5:** What other factors are predictive of mental well-being for assisted living facility residents in Greater Louisville?

**Hypothesis:** Mental well-being will be significantly positively associated with social connectedness, social capital and built environment quality in the study population.

## Delimitations

The study was delimited to residents of six selected assisted living communities located in Louisville, Kentucky. For inclusion in the study, authorized representatives of the assisted living community staff needed to consent to the facility's participation and individual participants had to volunteer for the study and consent to be interviewed.

Exclusion criteria for individuals were age less than 65, difficulty communicating in

spoken English, and severe cognitive impairment.


Limitations

The study findings include several known limitations as a result of the research

design.  First, the narrow geographic scope of the project may limit the generalizability of

the findings to communities beyond Louisville.  Additionally, the study participants were

identified through volunteer sampling.  Because participants were not randomly selected,

they may not be representative of the general population of assisted living residents in

Louisville.

Study results were based on self-reported data obtained during in-person

interviews.  Generally speaking, the proposed instrumentation had been validated

previously and found to be reliable with older adults.  However, not all of the measures

had been used with an assisted living population in the past, and the psychometric

properties for older adults living independently or those in nursing homes may not be the

same for assisted living residents.

The primary independent variable, social connectedness, was measured using an

adaptation of an existing instrument, in order to tailor the instrument to the study

population.  As a result of this modification, the psychometric properties for this measure

are unknown.

<u>Operational Definitions</u>

A criticism that often emerges within the social capital literature is the variation in definitions and measurement of social capital itself. Is social capital an individual or community construct? Does it originate in perceptions of trust and norms of reciprocity or the tangible resources that can be obtained through social networks? Accepting that both the individual- and community-level conceptions of social capital, and the various components therein, are important for health, this dissertation used an inclusive conception of social capital.

**Social connectedness** was operationalized as an individual's access to the resources needed to attain his or her goals. **Social capital** was operationalized as aggregate levels of trust, participation, and reciprocity in a community (Figure 1). This delineation was not intended to discredit alternative conceptualizations of social capital, merely to make the definitions used in this dissertation explicit and address concerns about the murkiness of social capital literature.
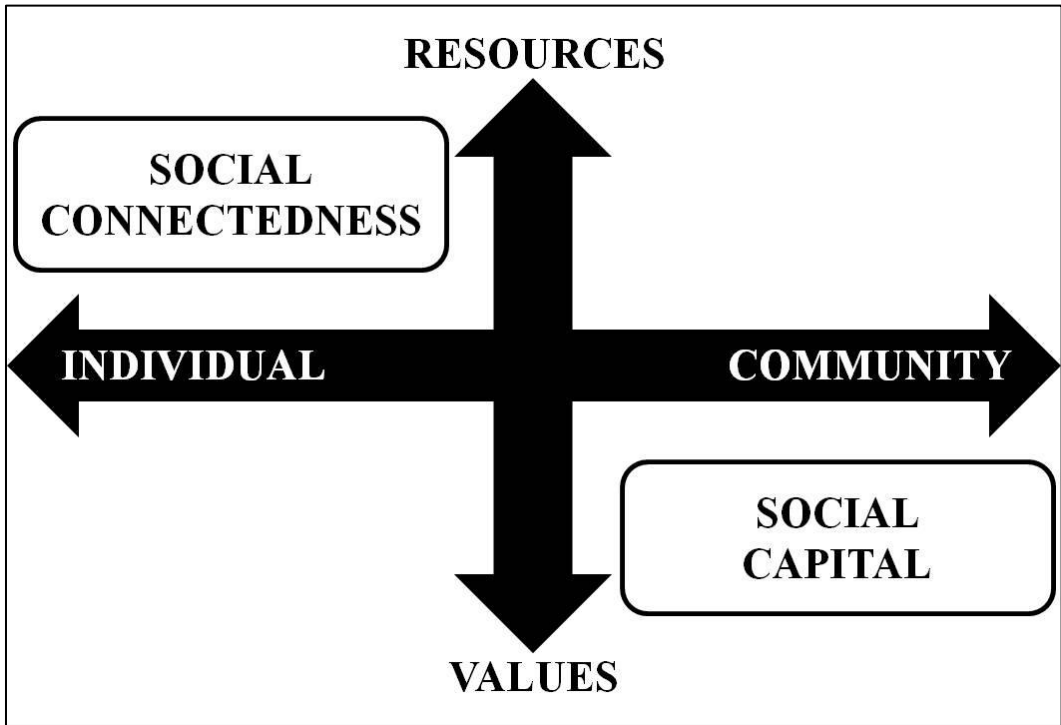
*Figure 1.* **Operational definitions of social connectedness and social capital.**

A central assumption of this dissertation is that where we live affects our health, and the built environment shapes the spaces where we live. According to Sallis, the **built environment** "includes all buildings, spaces, and objects that are created or modified by people. It includes homes, schools, workplaces, parks and recreation areas, greenways, transportation systems, and motor vehicles. The built environment is shaped by land-use and transportation planning and policies (2009, p. S87)." In the case of the study population, the built environment would consist of the assisted living facility in which they reside, and the portions of the surrounding neighborhood to which they have ready access.

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The dependent variable in the current study is **mental well-being** or wellness. As it is used in this study, mental wellness "refers to the degree to which one feels positive and enthusiastic about life. It includes the capacity to manage one's feelings and related behaviors, including the realistic assessment of one's limitations, development of autonomy, and ability to cope effectively with stress" (Manderscheid et al., 2010, p. 1).

The setting for this study also warrants its own definition: an **assisted living community** is a long term care facility in which residents receive some help with activities of daily living, however no advanced medical services are provided on an ongoing basis.[1] There is a continuum of housing and service options for older adults. At one end of this spectrum are residences in a traditional neighborhood and independent living communities, a term which refers to any form of housing targeting adults over age 55 wherein residents can perform activities of daily living without assistance. At the other end of the spectrum is a nursing home, which provides more advanced medical care than assisted living and makes nursing staff available around the clock. Assisted living communities are something of a midpoint along this continuum between independent living and skilled nursing care.

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[1] In Kentucky, assisted living communities are certified annually by the Kentucky Department for Aging and Independent Living. The requirements for this certification are defined by statute (KRS 194A.700 to KRS 194A.729). Personal care communities are licensed by the Office of the Inspector General, and must comply with certain administrative regulations (902 KAR 20:036). The difference in these designations pertains to the availability of nursing staff and the type of assistance with medication management that is available. In general, both assisted living and personal care communities provide assistance with activities of daily living, coordinate social activities, and offer meals and housekeeping services. For the purposes of this dissertation, the term "assisted living" will be used as an umbrella term for both types of facility.

CHAPTER II

REVIEW OF LITERATURE

The World Health Organization (WHO) defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" ("WHO Constitution," 1948). While physical, mental and social well-being are given equal weight in this definition, each may vary in relative importance throughout one's life cycle. For older adults, the transition from independent living to residence in an assisted living facility is generally indicative of compromised physical or cognitive health. While assisted living communities do not provide skilled nursing care or ongoing medical services, by definition, residents of these facilities require assistance with activities of daily living (e.g. bathing, dressing). In light of these physical challenges, mental and social well-being are likely to be of particular importance to the overall conception of health for elderly residents of assisted living communities. For that reason, this dissertation will explore these two facets of overall health: mental and social well-being. More specifically, it will examine the relationship between social capital and mental well-being among elderly residents of assisted living communities.

As described in Chapter I, the primary study will utilize a quantitative design to determine if built environment quality, community social capital and individual social connectedness are predictive of individual mental well-being. It will employ a multi-

level framework, and explore the influence of both individual-level (social connectedness) and community-level (social capital and built environment quality) factors on the dependent variable. Specifically, the proposed study will answer the following five research questions:

**Research Question 1:** Is an adapted version of a Resource Generator an appropriate instrument for measuring individual social connectedness among residents of assisted living communities in Greater Louisville?

**Research Question 2:** What are the mental health and social capital characteristics of assisted living residents in Greater Louisville?

**Research Question 3:** What are the characteristics of the built environment at assisted living communities in Greater Louisville?

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**Research Question 5:** What other factors are predictive of mental well-being for assisted living facility residents in Greater Louisville?

**Hypothesis:** Mental well-being will be significantly positively associated with social connectedness, social capital and built environment quality in the study population.

To provide context for the current study, a systematic review of the literature was conducted using the U.S. National Library of Medicine's MEDLINE® database and other

search indices. All English-language citations published between 2005 and 2011 were searched using the terms *social capital, social connectedness,* or *social network* in combination with any of the following: *built environment, elderly, aging, assisted living, nursing homes, mental health, mental well-being,* and *depression.* Subsequently, the reference sections of included articles were reviewed to identify additional relevant publications and researchers.

Research suggests that the influence of social capital on health is related to the level of egalitarianism in the research population. Social capital was more likely to be significantly associated with health outcomes in non-egalitarian countries[2] like the United States (Islam, Merlo, Kawachi, Lindstrom, & Gerdtham, 2006). For this reason, where available, research studies conducted in the United States were given precedence in the literature review for this dissertation.

This chapter will explore each of the primary variables proposed for this research in depth. Building on the theoretical foundations for social capital, social connectedness and built environment quality, the health impact of each construct will be described along with a description of its measurement. Next, the public health significance of mental well-being will be discussed, as well as recommendations for the measurement of this construct. Then, a theoretical framework describing the links between community design, social capital and health outcomes will be described using the Glover/Parry Model. This model will drive the design of the current study. Finally, this chapter will present several potential confounding variables which must be factored into the study design.

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[2] National levels of egalitarianism were determined based on the proportion of the Gross Domestic Product (GDP) used for social welfare expenditures and the Gini-coefficient (a measure of income inequality).

A frequent criticism of social capital research is the variation in how social capital is defined and measured, and others have noted the need for increased clarity of scope for the field (Bezanson, 2006; Briggs, 2004; Harpham, 2011). Because different theorists, researchers and academic disciplines define social capital differently, an artificial delineation has been adopted for this dissertation using the terms social capital and social connectedness. Social connectedness is an individual attribute. Analogous to the economic concept of financial capital, it is a function of the resources embedded within an individual's social network. Just as financial capital can be leveraged to support entrepreneurial ventures, social connectedness can be leveraged to help an individual achieve his or her goals. As it is used in this dissertation, social connectedness is defined as "the collection of resources owned by the members of an individual's personal social network, which may become available to the individual as a result of the history of these relationships" (Van der Gaag & Snijders, 2004).

Conversely, social capital is a group attribute, representative not of the individual, but of the social cohesion of the community as a whole. Robert Putnam defined social capital as "features of social organizations, such as networks, norms and trust that facilitate action and cooperation for mutual benefit" (1993, p. 167) though ultimately, there are nearly as many definitions of social capital as there are social capital researchers.

Both social connectedness and social capital are often subdivided by the nature of the underlying social relationships (Eicher & Kawachi, 2011). *Bonding social capital* is social capital within a homogenous group, in this case, among the residents of an assisted

living facility. *Bridging social capital* is social capital that crosses the boundaries of social identity between otherwise equitable groups, for example, between residents of an assisted living facility and the community at large. A third type of social capital was proposed by Szreter and Woolcock (2004): *linking social capital* is social capital that crosses the boundaries of power and authority, for example, between residents and staff at an assisted living facility, or between the residents and their health care providers. Both bridging and linking social capital are particularly useful for introducing new resources into a community.

As the next sections will demonstrate, social connectedness and social capital are correlated with many positive health outcomes. However, social capital is not an exclusively positive force. Research suggests that in disadvantaged communities, bonding social capital may have a negative influence on health and well-being. In some communities, bonding social capital may serve as a force to discourage social mobility and the utilization of bridging social capital. By emphasizing social connections within a group, bonding social capital can also be an exclusionary force, keeping others from joining a group or community (Mulcahy, Parry, & Glover, 2010; Portes, 1998).

## Social Capital

### Theoretical Foundation

The recent surge in interest in social capital research has been largely credited to the work of Robert Putnam and the influence of his work in *Bowling Alone* (2001)*,* a seminal work on the decline of social capital in American society. Putnam's work focused on social capital as a property of communities – a network of norms and

reciprocity that goes beyond direct, individual relationships to serve the whole through indirect connections. Since the publication of *Bowling Alone*, growing numbers of researchers have embraced this communitarian concept of social capital in their work.

Three concepts typically used to describe social capital are trust, reciprocity, and civic engagement. In each case, these factors can be measured at the individual level, but social capital is more accurately a property of the whole community. For example, reciprocity is not a quid pro quo arrangement between individuals. "The touchstone of social capital is the principle of generalized reciprocity – I'll do this for you now, without expecting anything immediately in return and perhaps without even knowing you, confident that down the road you or someone else will return the favor" (Putnam, 2001, p. 134). Through this arrangement and inherent trust in one's fellow community members, social capital promotes a more efficient society. Putnam calls this inherent trust *thin trust* – trust in the "generalized other" – as distinct from *thick trust,* which is rooted in direct experience with a distinct individual (p. 136). Rather than trust in specific individuals, it more closely resembles putting good out in the world with the anticipation that good things will happen in return (Siisiainen, 2000).

Indicators of civic engagement, such as participation in political organizations, attendance at religious services, active membership in community organizations have been declining in American society since the 1950s (Putnam, 2001). This decline has coincided with a decline in reported public trust. It is unfortunate that it is only since the onset of this decline that researchers have begun to recognize the health impacts of social capital.

Collectively, these concepts form social capital – a diffuse property of communities shared by all members of the community. The next section will discuss the impact of social capital on individual and community health.

Impact on Health

A considerable body of research has explored the impact of social capital on health outcomes of interest. This section will explore several of these outcomes as they relate to this dissertation, specifically, overall mortality rates and self-rated health status.

The potential benefits of community-level social capital were evaluated using aggregate data from the General Social Survey (GSS) (Smith, Marsden, Hout, Kim, & Davis, n.d.), including "Generally speaking, would you say most people could be trusted?" and "Would you say that most of the time people try to be helpful, or are they mostly looking out for themselves?" Researchers compared these measures from the General Social Survey with state data on income inequality and mortality (Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997). High levels of community mistrust were strongly correlated with higher total mortality rates (r = .77, p<0.05). Group membership was inversely correlated with mortality, such that higher levels of participation appear to have a protective effect (r = -.49, p<0.05). A subsequent study using the GSS found a similar correlation between social mistrust and total mortality (r = .76, p<0.05), and this relationship was independent of any relationship between mortality and area crime statistics (Wilkinson, Kawachi, & Kennedy, 1998).

Another team of researchers examined the relationship between social capital and mortality for adults ages 45-64 residing in Chicago neighborhoods (Lochner, Kawachi,

Brennan, & Buka, 2003).  Social capital data were collected through the Project on Human Development in Chicago Neighborhoods – Community Survey (PHDCN-CS). Adjusting for levels of neighborhood deprivation, the results were stratified by race and gender.  For white men and white women, increased neighborhood levels of trust, civic participation and reciprocity were associated with a statistically significant decrease in mortality.  For black men, civic participation and reciprocity were associated with a statistically significant decrease in mortality.  For black men, the β value for trust was also negative, but it was not significant.  For black women, trust and civic participation were associated with a statistically significant decrease in mortality.  For black women, the β value for reciprocity was also negative, but it was not significant.  These findings suggest that while there is some variation by race and gender, social capital appears to have a protective effect against mortality for all groups.

The PHDCN-CS, the same study of neighborhood-level social capital used by Lochner et al., was used in a study of individual mortality among peoples over the age of 67 who had been hospitalized for one of several diseases, including acute myocardial infarction, congestive heart failure, cancer, stroke and hip fractures.  An aggregate social capital score called the Collective Efficacy Scale was protective against mortality for this population (Wen et al., 2005).

In addition to mortality, many social capital researchers have evaluated self-rated health status.  Typically, self-rated health is assessed using a Likert scale and dichotomized to fair/poor health and good or better health.  Generally, community-level social capital is not significantly associated with individual-level self-rated health status

(Poortinga, 2006; Subramanian, Kim, & Kawachi, 2002). However, social capital is associated with improved health status at the aggregate level.

The potential benefits of community-level social capital were evaluated using aggregate data from two large surveys of adults in the United States (Kawachi et al., 1999). Social capital measures were obtained from questions on the GSS (Smith et al., n.d.), including "Generally speaking, would you say most people could be trusted?" and "Would you say that most of the time people try to be helpful, or are they mostly looking out for themselves?" The same survey was used to calculate per capita participation in voluntary organizations. Kawachi, Kennedy and Glass (1999) compared state-level social capital with self-reported general health status data obtained from the Behavioral Risk Factor Surveillance System (Centers for Disease Control and Prevention, n.d.). Controlling for other demographic characteristics, residents of states with low levels of interpersonal trust were more likely to report "fair" or "poor" health status (as opposed to "good," "very good," or "excellent" health status) compared to residents of states with high levels of trust (OR 1.41, p<0.05). Low levels of reciprocity, or the extent to which people were perceived to help one another, were also associated with poorer health status (OR 1.48, p<0.05). Low participation in voluntary groups was also associated with poorer health status (OR 1.22, p<0.05). These odds ratios for social capital measures are comparable to the association between smoking and poor health status (OR 1.51, p<0.05) (Kawachi et al., 1999).

The majority of studies investigating the relationship between social capital and mental illness focus on a finite number of common mental disorders, frequently depression and anxiety (De Silva, 2006). Using an ethnographic approach, one

researcher immersed himself as a participant observer for two years in a small London

community with elevated rates of common mental disorders.  This qualitative study did

not find the expected shortage of community social capital, although direct comparisons

to other communities are not possible with this type of research (Whitley, 2006; Whitley

& Prince, 2005).

While there is considerable variability in the procedures used to measure social

capital and the magnitude of its impact, the evidence is quite clear that social capital is an

important factor in overall health and well-being.  The next section will consider the best

practices for social capital measurement.


Measurement of Social Capital

At the community level, many studies of social capital explore only a single

attribute (e.g. levels of trust, or levels of participation in civic organizations).  This

frequently stems from efforts to capitalize on existing data sets, and there is a clear need

for more direct and comprehensive measurement of social capital (Harpham, 2011; Kim,

Subramanian, & Kawachi, 2010).  However, a few scales, like the Putnam Social Capital

Index and the Collective Efficacy Scale, are designed to capture multiple facets of social

capital: social cohesion and social control.  Social cohesion and social control are formed

through norms of trust, reciprocity and civic engagement.

For this dissertation, social capital data was collected at the individual level, but

aggregated into a community-level score for each assisted living facility to better reflect

the communitarian nature of the term as it is used in this dissertation.  Measurements of

trust provide a useful illustration of why this is necessary.  Robert Putnam's conception

of trust is generalized trust, and is bolstered by norms of reciprocity. Typically, trust is measured by surveying individuals, yet individual-level trust is not considered a valid measure of individual-level social connectedness (Kawachi et al., 2010; Lin, 1999). However, aggregated responses to these survey questions are a valid measure of group-level trustworthiness (Kawachi et al., 2010). This distinction is important in order to avoid measuring the same construct under the guise of social capital and social connectedness.

Other researchers have provided guidance on selecting appropriate measures. In designing surveys to assess social capital, the reference area should be explicitly defined in a way that is meaningful to respondents (Harpham, 2011). For this reason, the survey questions used in this study were modified to define the "community" as the residents of the respondent's assisted living facility. The reference period for evaluating social capital should also be matched to the time measures used on the mental well-being survey instrument (in the past week/month/year) (Harpham, 2011). However, since the instrument selected to measure mental well-being (Quality of Life Inventory, described later in this chapter) does not specify a time period, a reference period was not added to the social capital instrument.

In light of these considerations, the Collective Efficacy Scale was selected to measure social capital in the current study. The Collective Efficacy Scale (CES) measures aggregate community social capital using a combination of social cohesion and social control (Browning & Cagney, 2002). A modified version of the CES scale was developed as part of the Project on Human Development in Chicago Neighborhoods – Community Survey (PHDCN-CS) (Wen et al., 2005). Five items were used to assess

social cohesion and two items were used to evaluate informal social control (Appendix A) resulting in potential scores ranging from 5 to 35. These scores were combined to form a single social capital score. With a complete dataset, the hierarchical linear modeling process was not necessary for this dissertation. The reliability for this scale was 0.80.

While there is considerable variability in the procedures used to measure social capital, the Collective Efficacy Scale is a promising best practice for measurement. The previous sections have described the magnitude of social capital's impact on health outcomes and identified an appropriate measurement instrument. The next section will explore these same considerations for social connectedness.

<center>Social Connectedness</center>

<center>Theoretical Foundation</center>

While Robert Putnam can be credited with fostering recent interest in social capital, his communitarian approach to social capital is not the only school of thought. Recently, social capital researchers have renewed their interest in the work of Pierre Bourdieu, and his individualistic approach to social capital, described here as social connectedness.

Pierre Bourdieu's work on social connectedness emphasizes the resources of the group, which have the potential to be leveraged by an individual for his or her own gain. Specifically, Bourdieu defined social connectedness as "the aggregate of actual or potential resources linked to possession of a durable network" (Bourdieu, 1986, p. 248).

Bourdieu viewed social connectedness (he used the term social capital) as one of three

forms of capital, in addition to economic capital (money) and cultural capital (education).

Currently, there is limited research available on individual social connectedness.

However, established literature on social networks, social support and social integration

can inform our understanding of social connectedness and health (Kim et al., 2010).

A frequent research schema is to measure the individual-level equivalents of

communitarian social capital measures: generalized trust, reciprocity and civic

participation. Given the overlap with community social capital, this approach is not ideal

for research using a multi-level framework such as this dissertation. That said, this body

of research can still be informative and is included in the subsequent section.


Impact on Health

This section will address the impact of constructs related to social connectedness

on overall mortality, self-rated health status and mental health, followed by a review of

studies better aligned with Bourdieu's work, which use social connectedness as a

measure of resource access.

One key construct relating to social connectedness is social isolation, which is

functionally the antithesis of social connectedness. Record-setting temperatures in

Chicago during the summer of 1995 created a tragic natural experiment that demonstrates

the health impact of social isolation. More than 700 people died due to the extreme

temperatures. Interviews with surviving family members and matched controls indicated

that the heat-related deaths were not randomly distributed. Socially-isolated individuals

who lived alone were more likely to die during the heat wave than those who had friends in the area or who participated in group activities (Semenza et al., 1996).

Another study looked at individual-level equivalents of communitarian social capital measures: Giordano and Lindstrom used data from the British Household Panel Survey to explore the impact of social connectedness on psychological health (2011). Responses to the 12-item General Health Questionnaire were stratified as better or worse psychological health. Individuals who reported being able to trust others were significantly more likely to experience better psychological health (OR 1.32, 95% C.I. 1.17 – 1.48). Civic participation was not associated with better or worse psychological health. The study also investigated contact with neighbors, a variable more aligned with the resource network definition of social connectedness used here. Talking with neighbors less than twice per week was modestly associated with worse psychological health (OR 1.12, 95% C.I. 1.01 – 1.24) (Giordano & Lindstrom, 2011).

To control for the potentially confounding effects of childhood environment, a cross-sectional study of twins was used to evaluate the health impacts of social connectedness on adults. Researchers assessed social connectedness as a function of sense of belonging, interpersonal trust, community participation and service (Fujiwara & Kawachi, 2008). Adjusting for gender, educational attainment, employment and marital status, increased self-reported trust, belonging, and community participation were significantly associated with higher self-rated health status. Trust and belonging were also significantly associated with higher self-rated mental health status. Individuals who reported higher levels of trust, belonging, and participation were also less likely to report depressive symptoms. When the study population was subdivided into monozygotic and

dizygotic twin pairs, only the relationship between trust and physical health status was statistically significant.

Using Bourdieu's conception of individual access to resources, some differences emerge between community social capital and individual social connectedness. In the previous section, it was noted that while community-level social capital impacts collective measures of health, it is not predictive of individual-level self-rated health status (Poortinga, 2006; Subramanian et al., 2002). This is not the case for individual-level social connectedness: severe lack of social support more than doubled the likelihood that an individual would report fair/poor health (OR 2.17, 95% C.I. = 1.72-2.73) in a large European study (Poortinga, 2006).

A study of older adults in Finland explored the impact of social connectedness, measured in this case as "access to help from other persons," for individuals across the urban-rural continuum. Individuals who reported a high level of access to help from other persons were significantly more likely to report that they were in good health (Nummela, Sulander, Karisto, & Uutela, 2009). This same study employed other measures of individual social connectedness that would more appropriately be used to develop aggregate community social capital values (e.g. trust and participation).

In a recent study of community-dwelling older adults, a distinction was made between social connectedness and social support. The authors defined social support as a relationship involving an exchange of resources – emotional support, informational or material support. They used the term social connectedness to describe relationships that provided companionship and helped stave off loneliness. Ultimately, it was social connectedness, and having a dense social network nearby, that were most associated with

better self-rated health status (Ashida & Heaney, 2008). Social connectedness and social support were strongly interrelated concepts, and these findings suggest that measures of social connectedness should account for the potential resources embedded in a dense social network. In this regard, potential resources may be more important to health status than resources actually utilized (e.g. it is more important for an individual to believe his/her connections would do a favor for him/her, than for that individual to have actually obtained favors in the past).

Another study approached social connectedness as a potential mediator of social and environmental stress (Mitchell & LaGory, 2002). Although influenced by the work of Putnam, this research explored individual-level social ties as a means to access resources (Usher, 2006), and is most analogous to social connectedness as it is defined in this dissertation. Notably, in an economically distressed community, social connectedness did not temper the effects of environmental stress (Mitchell & LaGory, 2002).

The social ties and relationships that are the foundation of social connectedness are clearly linked to mental health, though the magnitude of the impact varies among demographic groups (Kawachi & Berkman, 2001). While further research is needed to define a causal link between social connectedness and mental health outcomes, several pathways have been proposed. One theory holds that perceived availability of social resources – that is, social connectedness – acts as a protective buffer when individuals are confronted with stressful life events. An alternative conceptualization holds that social connectedness has a direct, positive effect on mental health outcomes, independent of any

stressors.  There is evidence to support both the direct and buffer hypotheses (S. Cohen &

Wills, 1985; Kawachi & Berkman, 2001).

Whatever the pathway, the evidence is clear that social connectedness is related to

overall health and well-being.  Further research is needed to ascertain the impact of social

connectedness on mental well-being for older adults.

Measurement of Social Connectedness

At the individual level, social connectedness should be measured by the extent to

which a person's social network is effective at helping him reach his goals.  However,

different relationships – and the different resources they represent – may be useful to an

individual at different times (Van der Gaag & Webber, 2010).  For this reason, social

connectedness instruments are designed to assess an individual's access to a variety of

resources that are likely to be useful.  Because of the potential variability in individual

need for assistance during the recall period, measuring the resources an individual has

actually utilized is a flawed measure of social connectedness.  Perceived access is

considered a more useful measure, even though these perceptions may be untested (Van

der Gaag & Snijders, 2004; Van der Gaag & Webber, 2010).

Because individual goals are as diverse as the individuals who harbor them, the

resources that would be most useful to have within one's social network are highly

variable.  Lindenberg's work with Social Production Function (SPF) Theory is useful to

classify universal needs.  The SPF Theory outlines six shared, intermediary goals needed

to attain physical well-being and social approval: mental stimulation, external comfort,

fulfillment of physiological needs, attainment of status, behavioral confirmation, and affection.

An emerging method for measuring social connectedness is the Resource Generator questionnaire (Van der Gaag & Snijders, 2004, 2005), which was developed to measure the constructs of SPF Theory. Although there is some overlap between a given resource and the goals that it supports, the Resource Generator was designed to capture information in each of these six SPF domains (Van der Gaag & Snijders, 2004). The Resource Generator was developed to measure social connectedness in a general population sample of Dutch adults, so some items are not suited to all audiences. However, the process used to develop the Resource Generator remains informative.

In the context of the Resource Generator, resources are people who may be able to provide the respondent with a socially helpful service, ranging from keeping a spare key, to providing a job reference, to lending money. The tool assesses the presence or absence of a given resource, as well as the strength of the respondent's relationship with the resource – can this resource be accessed from a casual acquaintance, a close friend or family member? The Resource Generator questionnaire can be summed to create several subscales, with Personal Skills Social Capital and Personal Support Social Capital being of particular relevance to this dissertation.

Lindenburg's work with SPF Theory, which serves as the foundation for the Resource Generator, was later adapted for healthy aging research (Steverink, Lindenberg, & Ormel, 1998). This work can guide adaptations to the Resource Generator that may be necessary in order to tailor it to the study population of elderly residents of assisted living communities.

## Social Capital and Social Connectedness

Ideally, a multi-level framework should be used to evaluate the distinct but related concepts of social connectedness and social capital. This framework acknowledges that health outcomes are likely the result of both individual risk factors (such as social connectedness) and exposure to community factors (such as social capital) (Kawachi et al., 2010).

This multi-level framework is important due to the ways that social capital and social connectedness confer benefits. Social connectedness is accrued by individuals, and varies with individual socioeconomic status. Social capital is more diffuse, varying by geography or community boundary, and impacts everyone in a group whether or not they contributed to the creation of the social capital (Whitley, 2010).

Rob Whitley uses a weather related analogy to advocate for an integration of social capital and social connectedness in research:

> As part of Putnam's miasma-like theory, neighborhood social capital has hitherto generally been treated like ambient air temperature, an area level variable which all residents experience equally. In fact, the qualitative studies suggest that social capital may be more like indoor air temperature, a variable somewhat dependent upon ambient air temperature, but open to manipulation by those who have money, apparatus and know-how, through interventions such as central heating and air-conditioning. In contrast, the marginalized may be at the mercy of "meteorological" processes, whether they like them or not, with few resources available to

> alter or change events to their advantage.  Again, greater application of
>
> Bourdieu's theory of [social connectedness] may be important in this
>
> regard. (Whitley, 2010, p. 112)

This dissertation incorporated both of these concepts; figuratively measuring both the

ambient air temperature and central heating for residents of assisted living communities.

## Built Environment Quality

### Theoretical Foundation

Just as social capital and social connectedness were grounded in theory, so too is

built environment quality.  As noted in Chapter I, the built environment "includes all

buildings, spaces and objects that are created or modified by people" (Sallis, 2009, p.

S87).  Whereas this definition incorporates just about every facet of our surroundings, a

quality built environment is more narrowly defined.  New Urbanist architects, planners

and researchers have proposed the principles of Smart Growth to create high quality built

environments.  Increasingly, the public health community has embraced these same

design principles (Geller, 2003).

The principles of Smart Growth (Figure 2) are intended to mitigate urban sprawl

through design and policy changes (Smart Growth Network, n.d.).  The aims of Smart

Growth are diverse and include improved aesthetics, reduced pollution, increased

property values, increased physical activity and improved quality of life.  While these are

all noble goals, it is the relationship between Smart Growth design and healthy aging that

is relevant to the current work.  For older adults, the quality of the built environment

takes on increasing importance.

Lawton and other researchers proposed an ecological theory of adaptation and aging to better understand individuals' abilities to adapt to their environment throughout the course of their life. According to this ecological theory, as physical health, cognitive health, psychological adjustment and other characteristics decline with advancing age, the behavior of older adults is increasingly controlled by environmental characteristics rather than personal characteristics (Lawton & Nahemow, 1973). As the health of an older adult declines, his or her ability to adapt to various environmental forces also declines, so a supportive environment takes on increasing importance. The importance of congruence between an individual's needs and their environment posited by the ecological theory of adaptation and aging has been borne out by other studies of well-being (Izal, Montorio, Marquez, & Losada, 2005).

In many ways, the emergence of Smart Growth principles is an extension of the ecological theory of adaptation and aging. In 1973, Lawton and Nahemow noted that:

A major task of planning has been that of matching individuals with environments meeting their needs. A necessary first step in this process is the ability to describe environments. While we do not yet have a satisfactory taxonomy of environments, there have been some beginning efforts to classify them in both a priori and empirical fashions. (p. 624)

Forty years later, the principles of Smart Growth and the field of urban planning have brought increasing clarity to this taxonomy. The next section will explore the links between built environment quality and health outcomes.

- Mix land uses.
- Take advantage of compact building design.
- Create a range of housing opportunities and choices.
- Create walkable neighborhoods.
- Foster distinctive, attractive communities with a strong sense of place.
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Strengthen and direct development toward existing communities.
- Provide a range of transportation choices.
- Make development decisions predictable, fair and cost effective.
- Encourage community and stakeholder collaboration in development decisions.

*Figure 2.* **Smart Growth Principles. Source: Smart Growth Network (n.d.).**

Impact on Health

The Smart Growth principles described in the previous section define best practices for an ideal environment. This section will provide a synopsis of the available literature linking facets of the built environment, including place attachment, accessibility, density and overall neighborhood quality, contact with nature, and walkability. In short, this section will demonstrate that where we live matters to our health.

Cooper Marcus used a drawing exercise and guided interviews to elicit individuals' values and emotions surrounding their houses. She found that where we live, and how we make a space our own, is directly related to our self-image (Marcus, 1997). Familiar environments are mentally restorative, particularly for older adults (Berto, 2007). This link between home and identity helps to explain the significance of aging in place, and the inherent difficulties of the transition from independent living to an assisted living community.

Without a supportive environment, aging in place is not an option for most people. The extent to which a physical limitation affects quality of life is related to the adaptive technology available to that individual. A poor physical environment can exacerbate physical disability by limiting access to the surrounding community. Ramps, handrails, sidewalks, curb cuts and other accommodations can minimize the impact of a mobility impairment. Absent these modifications, one's home may become an "invisible jail" (Gilderbloom & Rosentraub, 2008). In a survey of more than 1600 Houston residents, features of the built environment deemed particularly important by elderly residents and those with disabilities included access to bus lines, medical centers and shopping, sidewalks and handrails. The same survey found respondents also valued factors related to social capital such as safety and the presence of similar people, family and friends (Gilderbloom & Rosentraub, 2008).

Community density – how closely residents live to their neighbors – appears to influence social capital, with moderate density being the ideal setting to foster social capital. One advantage to very high-density communities is increased use of public amenities and facilities; this would lead to more opportunities for social interaction. Yet

residents of very low-density communities have more pride about their homes and personal spaces.  A medium-density community seems to strike a balance between these features, giving people a space to call their own as well as opportunities for unplanned interactions.

For multi-tenant spaces, population density is an even more critical issue. Personal space and privacy – both visual and auditory privacy – are important for mental health (Evans, 2003).  This is likely to be a key consideration for assisted living communities, where population density is typically higher than in communities of single-family homes.

The Whitehall Study is well-known for providing the first evidence of a social gradient among British civil servants, whereby incremental increases in income were associated with corresponding improvements in health outcomes (Marmot, Rose, Shipley, & Hamilton, 1978).  Longitudinal data from the Whitehall II Study demonstrated an independent influence of neighborhood characteristics on mental and physical health outcomes (Stafford, Gimeno, & Marmot, 2008).  After controlling for socioeconomic status, Stafford et al. found that neighborhood deprivation, as measured by the Townsend index[3], and social fragmentation, the absence of social connections, were associated with decreased mental health scores.  Mental health scores tended to improve as the study cohort aged, but improvement over time was diminished for those with long-term residence in deprived or socially-fragmented neighborhoods.  This suggests that communities should be designed in ways that will foster social connectivity and decrease fragmentation.

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[3] The Townsend Index of Disadvantage and Deprivation is calculated based on local unemployment, households without a car, non-owner-occupied households and household overcrowding (Townsend, Phillimore, & Beattie, 1988).

Gidlow and colleagues further explored neighborhood perceptions. The researchers used interviewer-administered surveys to assess self-reported health status and perceptions about the neighborhood environment with 761 residents of Stoke-on-Trent in Staffordshire, England (Gidlow, Cochrane, Davey, Smith, & Fairburn, 2010). Regression analysis was used to determine the relative importance of various factors for both physical and mental health status. Mental health status was predicted by: traffic hazards, street connectivity, land use diversity, residential diversity, social support, age and household income. Neighborhood quality explained 13.9% of the variance in self-reported mental health status. The presence of social support was the strongest predictor of positive mental health status, while land use diversity was the most significant of the physical environmental characteristics studied. Given the importance of social support, planning professionals should work to maintain existing social connections while designing spaces to foster new ties.

A Canadian research team developed cluster maps based on focus group brainstorming sessions to identify the community factors positively or negatively associated with mental well-being (O'Campo, Salmon, & Burke, 2009). The five positive factors that emerged were social services, resident support, green space, demographic characteristics, and affordability. Negative community factors like crime, noise, and odors were perceived to have a negative impact on mental well-being. It is notable that the positive well-being appears to stem from specific positive factors, rather than a mere absence of negative factors.

It is not a coincidence that green space was positively associated with mental well-being. Preservation of open space and natural beauty is a principle of Smart

Growth, and there is considerable evidence to support the idea that access to natural light and green space confers health benefits. Contact with nature can decrease stress and promote relaxation (Davis, 2004; Hull & Michael, 1995), improve sleep and decrease agitation (Chalfont & Rodiek, 2005).

Another principle of Smart Growth is the benefit of walkable neighborhoods. Walkability is a function of the interplay of many objective and subjective aspects of an environment, some more significant than others. As would be expected, increased walkability in a community corresponds to increased walking and physical activity among all demographic groups (Frank, Kerr, Sallis, Miles, & Chapman, 2008; Frank, Schmid, Sallis, Chapman, & Saelens, 2005). Results from the Nurses' Health Study, a large prospective cohort study, found that urban sprawl was associated with body mass index (BMIs) and physical activity. A one standard deviation difference in the county sprawl index (indicating less sprawl) was associated with lower BMIs and about 25 additional minutes of physical activity per week for the women in more dense neighborhoods relative to similar women who lived in more sprawling neighborhoods (James et al., 2013).

Connectivity and infrastructure refer to the organization of streets and the ease of navigating a community as a pedestrian. Streets organized along a grid pattern are associated with increased walking (Boer, Zheng, Overton, Ridgeway, & Cohen, 2007). For adults with Alzheimer's related dementia, connectivity and infrastructure are even more critical. Dead-end streets, confusing pathways, and the absence of wayfinding information have been shown to increase anxiety and frustration for individuals diagnosed with Alzheimer's (Mooney & Nicell, 1992).

Additionally, overall aesthetics may play a role in the walkability of a community. Appealing design makes a neighborhood more walkable, and in turn, walkable neighborhoods are more appealing to potential residents (Giles-Corti et al., 2008; King et al., 2006).

A final key influence on overall walkability in a community is individual perception and social norms. Researchers have found that perceived walkability is a more important predictor of walking behavior than more objective measures (King et al., 2006). The presence of well-maintained sidewalks, reasonable vehicular traffic volume, and other facets of the built environment are recognized by the general public as factors that support walking and physical activity (Strach, Isaacs, & Greenwald, 2007).

The evidence is clear that walkable communities promote physical activity and increase walking behavior, and increased physical activity is associated with better mental health in older adults (Blumenthal et al., 1999). This is not the only linkage between walkability and mental health, however. By promoting interactions among neighbors and acquaintances, walkable neighborhoods foster the development of social capital. Residents of walkable, mixed use neighborhoods in Ireland were more socially engaged, more trusting of others, and more socially connected to their neighbors than their suburban, auto-dependent counterparts (Leyden, 2003).

Despite the importance of walkable neighborhoods, research suggests that seniors are not walking. In a large-scale national telephone survey, researchers found an overall increase in the proportion of Americans walking at least 30 minutes per day between 2001 and 2009 (Pucher, Buehler, Merom, & Bauman, 2011). For community-dwelling older adults, the proportion of adults over the age of 65 walking 30 or more minutes per

day decreased from 7.4% in 2001 to 6.0% in 2009.   In 2009, 45% of older adults

reported no walking trips of any kind during the preceding week.  Individuals living in

group quarters - a classification that would include assisted living communities - were

excluded from this study.  Despite this exclusion, it is apparent that older adults engage in

little active transit, and walk less than they used to.

For older adults, senior housing can either promote or inhibit the development of

social capital.   Housing design can serve to promote social interactions or further isolate

older adults.  Local zoning regulations encourage construction of nursing homes and

other senior housing on the periphery of a community, increasing the geographic

isolation of the residents (Cannuscio, Block, & Kawachi, 2003).

Measurement of Built Environment Quality

Independent assessment of neighborhood quality at the postal code unit was not

associated with meaningful variation in mental health symptoms (Thomas et al., 2007).

The authors noted that postal code boundaries may not reflect natural neighborhood

boundaries, but this work suggests that the impact of the built environment may be

limited at the neighborhood level.  They found a more significant association between

household-level characteristics, and where a specific home is situated within the context

of neighborhood resources to be more predictive of mental health symptoms.  This

suggests that the ideal unit of analysis for assessing neighborhood quality may be

narrower than previously understood.  Other researchers have also noted the limitations

of geographic classifications – like postal codes or census tracts – for defining

neighborhood boundaries, and assert that the immediate proximal environment may be

more influential on individual health (Yen, Michael, & Perdue, 2009).  Recognizing the importance of geographic scale for built environmental impacts, this dissertation defined community as the assisted living facility in which participants reside, and neighborhood as the block segment on which the facility is located.

Researchers at the University of Illinois at Chicago abstracted and evaluated more than 100 different measurement tools designed to assess the built environment (2009). From the identified instruments, those that did not include disability considerations and those for which psychometric evaluation data was not available were eliminated.  The remaining instruments were reviewed to determine if they were appropriate for an older population and could be administered through an observational audit.  Methods relying on resident interviews would not be well-suited to this dissertation (all other study variables were collected from participant interviews).

Through this review process, the Revised Senior Walking Environmental Assessment Tool (SWEAT-R) was determined to be the most promising and appropriate for the current study.  The original SWEAT instrument was developed to evaluate the effects of the built environment on physical activity – specifically, walking – among senior citizens in Portland, OR (Cunningham, Michael, Faraquhar, & Lapidus, 2005). The SWEAT instrument assesses four primary domains: functionality, including building conditions, sidewalk quality and street life; aesthetics; safety considerations, including pedestrian accommodations and traffic calming measures; and the presence of destinations, either directly or via transit stops.  More recently, the instrument was revised to make it easier and faster to use in the field.  The revised version, SWEAT-R, proved to have better inter-rater reliability than its predecessor while measuring the same

four domains (Michael et al., 2009). On the revised instrument, 88% of the items had good or excellent inter-rater reliability (defined as a Kappa score ≥ 0.6) during pilot testing with five trained observers. Intra-rater reliability was similarly high, with 75% of items having good or excellent reliability. Aesthetic items on the SWEAT-R had lower reliability, due in part to their subjective nature (Michael et al., 2009). However, the lack of aesthetic data collection was seen as a limitation of the other instruments reviewed. By increasing observer training, a subsequent study using the SWEAT-R instrument achieved even higher reliability (Chaudhury et al., 2011).

For this dissertation, the SWEAT-R instrument was used to assess the overall quality of the built environment for the micro-neighborhood in which the assisted living facility is sited, and a copy of this instrument is included in Appendix B. As previously noted, the SWEAT-R instrument gathers descriptive information on functionality, safety, aesthetics, and destinations. The micro-neighborhood in which the assisted living community is sited was scored based on representative indicators from each of these four domains.

For consistency across the locations, amenities offered within the assisted living community, such as a hair salon available only to community residents, were not included as part of the SWEAT-R site audit. Unfortunately, these services could not be consistently ascertained for communities which did not permit individual interviews. The exclusion of on-site amenities increases the comparability across the sites and the applicability of the SWEAT-R score to the surrounding neighborhood. However, to better reflect the built environment in which the study population lives, on-site amenities were reported separately for communities where interviews were conducted.

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<center>Mental Wellness</center>

Previously, it was noted that the World Health Organization defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" ("WHO Constitution," 1948). The definition of mental health has continued to evolve over the years. With the emergence of positive psychology, increased emphasis has been placed on mental well-being and happiness. While wellness and illness were initially viewed as two ends of a continuum, psychologists are moving away from this framework to view wellness as an independent construct. Mental wellness "refers to the degree to which one feels positive and enthusiastic about life. It includes the capacity to manage one's feelings and related behaviors, including the realistic assessment of one's limitations, development of autonomy, and ability to cope effectively with stress" (Manderscheid et al., 2010, p. 1). While mental wellness, rather than mental illness, is the construct to be measured in the current study, both will be explored in this literature review.

<center>Epidemiology</center>

Poor mental health represents a serious public health issue affecting the quality of life for millions of Americans. The 2011 National Survey on Drug Use and Health found that 19.6% of adults in the United States experienced mental illness in the previous year, including 5% who had a serious mental illness (Substance Abuse and Mental Health Services Administration, 2012). Based on data from this survey, researchers estimate

that 11.5 million adults in the United States experience serious mental illness each year, and a total of 45.6 million experience any mental illness (Substance Abuse and Mental Health Services Administration, 2012).

A more general measure of mental health is collected through the CDC's Behavioral Risk Factor Surveillance System (BRFSS). On the BRFSS, adults are asked to report the number of days in the preceding month when their mental health was "not good." Approximately one in ten (10.6%) respondents reported frequent mental distress, defined as more than 14 mentally unhealthy days in the past month (Centers for Disease Control and Prevention, 2009). In a nation of more than 300 million people, 10.6% represents a staggering number of affected individuals. The mean number of mentally unhealthy days per month was 3.6 for the general adult population (Centers for Disease Control and Prevention, 2009), suggesting that poor mental health is a problem that most people struggle with on occasion.

Researchers estimate that individuals with serious mental illness experience lost earnings in excess of $16,306 annually. Nationally, this represents costs in excess of $193.2 billion (Kessler et al., 2008). These societal costs (lost wages and decreased productivity) are above and beyond the direct costs of treatment. In 1997, the direct health care costs for mental health and substance abuse treatment in the United States were $85.3 billion (Mark et al., 2000). While these figures are dated and health care costs have continued to climb, they underscore the importance of mental illness as a public health issue.

Data from the annual National Health Interview Survey revealed that the prevalence of self-reported mental health disability in nonelderly adults has increased

since the late 1990s (Mojtabai, 2011).  This same study found that individuals with other chronic conditions were more likely to report that problems with depression, anxiety or emotional problems made it difficult for them to participate in their usual activities.  It is not known if a similar trend was observed among older adults.

Though less frequently measured, attributes of a positive state of mental health include coping with everyday stressors and making a meaningful and productive contribution to one's community (World Health Organization, 2003).  Public health efforts should look beyond mitigating mental health problems towards promoting this positive state of mental health, particularly as it relates to healthy aging.  The next section will focus specifically on mental health considerations for elderly populations.

Mental Health in Elderly Populations

It is important to consider the needs of the specific study population, that is, elderly residents of assisted living communities.  Unfortunately, most existing research has examined the needs and experiences of community-dwelling older adults or individuals living in nursing homes.  By definition, the physical health of assisted living residents is likely to fall somewhere between that of community-dwelling older adults and nursing home residents.  While it is not possible to pinpoint the mental health of assisted living residents on a similar continuum, studies of these populations can still inform the current work.

Older adults recognize the value of mental health on overall well-being.  A sample of older adults in Australia participated in a series of focus groups to elicit

perceptions of health (Giummarra, Haralambous, Moore, & Nankervis, 2007). The researchers found that the terms in which older adults define health are very much in accord with the WHO definition. The focus groups referenced the physical, mental and social aspects of health, and identified health as a positive state rather than the mere absence of disease. Interestingly, while older adults and health professionals had very similar understandings of health, they differed in strategies for health promotion and maintenance. Older adults placed responsibility for poor health on the individual, while the health professionals were more likely to cite social issues or failings of the care delivery system (Giummarra et al., 2007). This suggests that older adults may underestimate the impact of where they live and social capital on their health.

The Kentucky Health Issues Poll (KHIP) is a random digit dial telephone opinion poll that has been conducted annually since 2008 by the Institute for Policy Research at the University of Cincinnati. Each year, more than 1600 adults participate in the survey, including a sizable sample of cell phone users. While opinion polling has some limitations, KHIP provides insight into the local context for Kentucky and the Greater Louisville area. The perceived prevalence of depression is quite high in Kentucky. Half (50%) of Kentucky adults reported that "a family member or friend ever behaved in a way that made you think they had a serious problem with depression." However, just one in three older adults (34%) suspected that they knew someone who had struggled with depression (University of Cincinnati Institute for Policy Research, 2011).

While KHIP measured the perceived need for mental health services, other researchers have investigated the actual prevalence of mental health issues. The Diagnostic Interview Schedule is a survey instrument developed to measure the

prevalence of psychological disorders in the general population (Regier et al., 1984). In a large multi-state trial, the prevalence of mental disorders was generally lower for respondents over the age of 65 than for younger respondents (Regier et al., 1988). Although younger adults are more likely to be diagnosed with mental disorders such as clinical depression, older adults experience considerably higher rates of depressive symptoms. While falling short of the criteria for a clinical diagnosis, adults over the age of 65 are more likely to experience compromised mental health than younger adults (Hybels & Blazer, 2003).

A review of available literature suggests that between 3% and 26% of community-dwelling older adults experience significant depressive symptoms (Hybels & Blazer, 2003). This same study found that the prevalence of depressive symptoms is higher among hospitalized older adults (23%) and adults residing in nursing homes (16-30%). One can triangulate from these findings that older adults residing in assisted living communities would likely report rates of depressive symptoms somewhere between those of community-dwelling individuals and nursing home residents.

Another study looked at the experiences of individuals facing a chronic disease. Cancer survivors and a matched comparison group recorded a diary of stressful events in their everyday life. While the number of stressful life events was comparable for the cancer survivors and the comparison group, the cancer survivors were more likely to perceive the stressful events as more disruptive (Constanzo, Stawski, Ryff, Coe, & Almeida, 2012). Dealing with physical health challenges appears to compromise the ability to cope with other stressors. As many assisted living residents live with chronic disease, they may find stressful events similarly disruptive.

Given the high prevalence of depressive symptoms among older adults, it is imperative that this population be able to access mental health treatment and support services. A survey of nursing home administrators found that most skilled nursing facilities do provide access to mental health professionals. However, this access is intermittent. Seventy percent of nursing homes reported having a contracted mental health consultant visit the facility at least monthly. Only about half of the facilities provided at least weekly visits from the mental health professionals (Molinari, Hedgecock, Branch, Brown, & Hyer, 2009).

Even when mental health treatment services are available, Kentuckians may not know how to access them. The 2011 KHIP asked, "Suppose a family member or friend asked you for help finding services or treatment for depression. Would you know who to contact to help them find services or treatment?" About six in ten (62%) adults in Kentucky reported knowing how to access mental health treatment services (University of Cincinnati Institute for Policy Research, 2011). However, just 44% of those ages 65 and older knew where to obtain mental health treatment services. Of those who reported knowing where to obtain treatment services, less than half (46%) would contact a mental health provider or facility[4]. An additional 38% would contact some other health provider, and 15% would look to social services agencies, clergy, or some other source. The variety of settings where individuals would seek mental health treatment services underscores a need for an integrated system of care linking physical health, behavioral health and social service providers and mental health promoting environments.

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[4] This was an open-ended question. Mental health hospitals and clinics, psychiatrists, psychologists, and other mental health professionals were categorized as "mental health providers and facilities" in this analysis.

Untreated mental illness is an important concern for older adults, and may be of particular concern for racial and ethnic minority older adults. After adjusting for self-reported depressive symptoms and severity, African American older adults were less likely to be diagnosed as depressed than non-Hispanic whites. Among those who receive a diagnosis of depression, racial and ethnic minority older adults were significantly less likely to receive treatment for their depression than non-Hispanic whites (Akincigil et al., 2012).

Clearly mental well-being is a pressing public health issue for all adults, and particularly elderly residents of assisted living communities. The next section will explore the relationship between mental well-being and the independent variables for this study.

Measurement of Mental Well-Being

The final key construct to be assessed through the individual interviews is mental well-being, the dependent variable for this study. Numerous researchers have explored the impact of social capital on mental health. For example, the National Health Interview Study and the National Survey on Drug Use and Health both include questions about nervousness, depression and hopelessness, and data from these studies have been used in secondary analysis of social capital.

While there are a number of effective measures of mental illness, the goal of this study is to evaluate mental wellness – specifically, "the degree to which one feels positive and enthusiastic about life" (Manderscheid et al., 2010, p. 1). For this, the field of positive psychology is instructive. Ryff has done important work on mental well-

being with older adults.  She has identified six dimensions of well-being for healthy

aging: "positive relations with others, autonomy, environmental mastery, purpose in life,

personal growth, and self-acceptance" (Kwan, Love, Ryff, & Essex, 2003).  Typically,

the Ryff scales of psychological well-being are measured through diary keeping or

repeated interviews (Constanzo et al., 2012; Kling, Ryff, Love, & Essex, 2003; Kwan et

al., 2003).  While not suited to the procedures of the current study, the six dimensions

were important considerations and informed the measures selected for this dissertation.

The mental well-being instrument used for the present study was the Quality of

Life Inventory (QOLI), a validated measure of well-being and life satisfaction.  On the

QOLI, participants rate sixteen items on their importance and their satisfaction with that

item.  The result is a weighted assessment of the individual's overall satisfaction relative

to the aspects of their life that are perceived to matter most (Frisch, 1994; Frisch, Cornell,

Villanueva, & Retzlaff, 1992).  While not all of the items are likely to pertain to all

respondents, the self-weighting process limits the effect of irrelevant variables and the

QOLI instrument has been used successfully with previous studies of older adults

(Bourland et al., 2000; Roseman et al., 2011).  The QOLI incorporates many of the

dimensions of well-being identified by Ryff as important for healthy aging, including

personal relationships, purpose and self-acceptance.

Mental Health, Social Capital and the Built Environment

Connecting the Dots

Among community-dwelling older adults, living in a neighborhood with a large

proportion of older residents was associated with a decrease in reported depression

(Kubzansky et al., 2005). It is possible that the camaraderie of same-age peers in an assisted living environment also confers some benefits, but other issues diminish these benefits.

In a study of nursing home residents, observed engagement in activities was associated with depressive symptoms. As resident interest in observed activities increased, depressive symptoms decreased (Meeks, Young, & Looney, 2007). The association between interest and depression was stronger than the association between pleasure and depression. This suggests that it is more important for programmatic offerings at senior residence facilities to be engaging for residents, than to be "pleasurable" per se.

Due to the frequency of interactions, staff members at nursing homes and skilled nursing facilities are a key source of social interaction for residents, though this may not be viewed by staff members as a central function of their jobs. A study of depressed nursing home residents found that staff members engaged in meaningful social interaction with the residents just 10% of the time. However, when the staff members did engage, the residents were more likely to have a positive affect (Meeks & Looney, 2011). While assisted living facility residents are less reliant on staff for social interaction, staff engagement may have an important influence on social capital and mental health status for this population as well.

The transition from community-dwelling to residing at an assisted living facility is a potentially difficult experience for older adults. A series of interviews conducted by Aminzadeh and colleagues with persons with dementia suggests that moving to a residential care facility would constitute a stressful life event. Persons with dementia

viewed the residential care facility in a positive light, generally as a hospitable and helpful place. Despite these positive associations, they saw the transition as the beginning of a downward trend in their health and as the "end of an era" (Aminzadeh, Dalziel, Molnar, & Garcia, 2009).

The transition from living in the community to living at an assisted living facility is a significant and stressful life change, but older adults often confront other major changes at this time of their lives. The death of a spouse is likely to have a profound effect on health status, at least for a time. In a longitudinal study with a nationally representative sample of women, recently widowed women were somewhat more likely to be hospitalized than married women who did not experience such a loss (OR 1.38, 95% C.I. 1.12-1.69, $p<0.05$). Notably, social connectedness has a protective effect against these hospitalizations (Laditka & Laditka, 2003). This same study found that women who lacked social connectedness, as measured by phone contacts with friends and family, were much more likely to be hospitalized during the two years following the death of a spouse (OR 3.52, 95% C.I. 2.07-5.99, $p<0.05$).

Social capital and social connectedness are not perfect measures and are not always predictive of mental health outcomes. A Scandinavian study of community-dwelling adults ages 75 and older who received at-home nursing care examined psychological distress using the General Health Questionnaire (Thygesen, Saevareid, Lindstrom, & Engedal, 2009). Approximately one in ten adults in this sample experienced psychological distress, a smaller proportion than is typically observed. Perceived social support was not significantly correlated with psychological distress in this study.

Social capital is not the only influence on mental well-being for the study population. Other inherent traits and experiences will influence individual mental well-being. The Wisconsin Study of Community Relocation (WSCR) explored the experiences of older women before and after moving to a new location. While the WSCR study participants were not transitioning to an assisted living facility, any move is likely to be a disruptive life event for an older adult, therefore the work of the WSCR appears instructive to the current study. The WSCR found that self-enhancing evaluations, the idea that an individual will view him or herself favorably in comparison to others, have a positive impact on mental well-being for older adults moving to a new environment (Kwan et al., 2003). Personality traits (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness as measured by the NEO Five Factor Inventory) were predictive of depression and self esteem in WSCR participants before and after their move (Kling et al., 2003).

Clearly, further research is needed to understand the impact of social capital on mental health outcomes for elderly residents of assisted living communities.

In a study of self-rated health status in Chicago neighborhoods, social capital seemed to act as a buffer against the impact of a poor quality built environment (Browning & Cagney, 2002). Interestingly, the protective effect of higher educational attainment on self-rated health status was mediated by social capital. In neighborhoods with low levels of collective efficacy – the social capital measure used in this study – the protective effects of education were diminished.

The impact of the built environment on social capital and mental health is not merely a result of the environment itself, but also of the pairing of an individual with the

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right kind of environment for them. When an individual is mismatched with their environment, there is an increased chance that the individual will experience psychological distress. When an individual finds an environment for which they are well-suited, they may form place attachment (Sullivan & Chang, 2011).

Attractive, walkable spaces that are conducive to social interactions can foster the development of place attachment. Unplanned interactions – bumping into a friend or neighbor – and the spontaneous conversations that ensue appear to be equally as important as more formal social interactions. This may be why "third places" are so important to promoting social capital. The term "third place" refers to spaces outside of private homes (the first place) and work (the second place) that allow people to interact with their community, and may include cafes, parks, coffee shops, etc. (Sullivan & Chang, 2011).

Embedded in the concept of a "third place" is "place" and the qualities of the environment in which we live. "Place focuses our attention on lived experience and the deep meanings individuals attribute to a setting based on the social experiences and interactions that characterize and take place within it" (Glover & Parry, 2009, p. 98). Not unlike social capital, the conception of place is rooted in relationships.

Researchers have posited that for individuals facing serious health issues, the "second place" in their lives is a hospital or clinical setting (Glover & Parry, 2009). For assisted living residents who have left the workforce and are experiencing compromised physical health, health care may serve the role of a "second place." What is unique to assisted living is the intersection between the "first place," their room or other private

residential space at the facility, and the "third place," public spaces that foster

interactions with other residents.


## Glover/Parry Model

Researchers have proposed a number of pathways through which social capital

can positively impact health outcomes.  Higher social capital may confer increased access

to services, promote healthy social norms, or the benefit may stem from a psychosocial

process (Kawachi et al., 1999).  Extending back from this pathway linking social capital

with health, one can consider the origins of social capital.  The next section will describe

the role of the built environment in fostering social capital, by creating a sphere of

sociability (Glover & Parry, 2008).

Glover and Parry have developed a model articulating the influence of a "third

place" on health outcomes (2008).  The authors used purposive sampling to identify a

cohort of subjects able to reflect on a stressful life event, women who had experienced

infertility in this case.  Subsequent to the stressful life event, the subjects reported on the

development of new supportive relationships after their diagnosis.  The shared experience

of infertility provided a foundation for the women to develop friendships, which led to

increased social capital and improved coping with the stressful event.  The concept of

social capital is realized at the individual level in this model, and is analogous to social

connectedness as described in this dissertation.  The "sphere of sociability" is a unique

construct in this model, and represents the quasi-public places where friendships could

develop (Figure 3).  The subjects in this study formed new friendships with women who

shared their diagnosis, but this did not occur in a vacuum.  For the relationships to grow,

the women needed to come together in a space that was conducive to social interactions, and given time for their friendships to deepen.
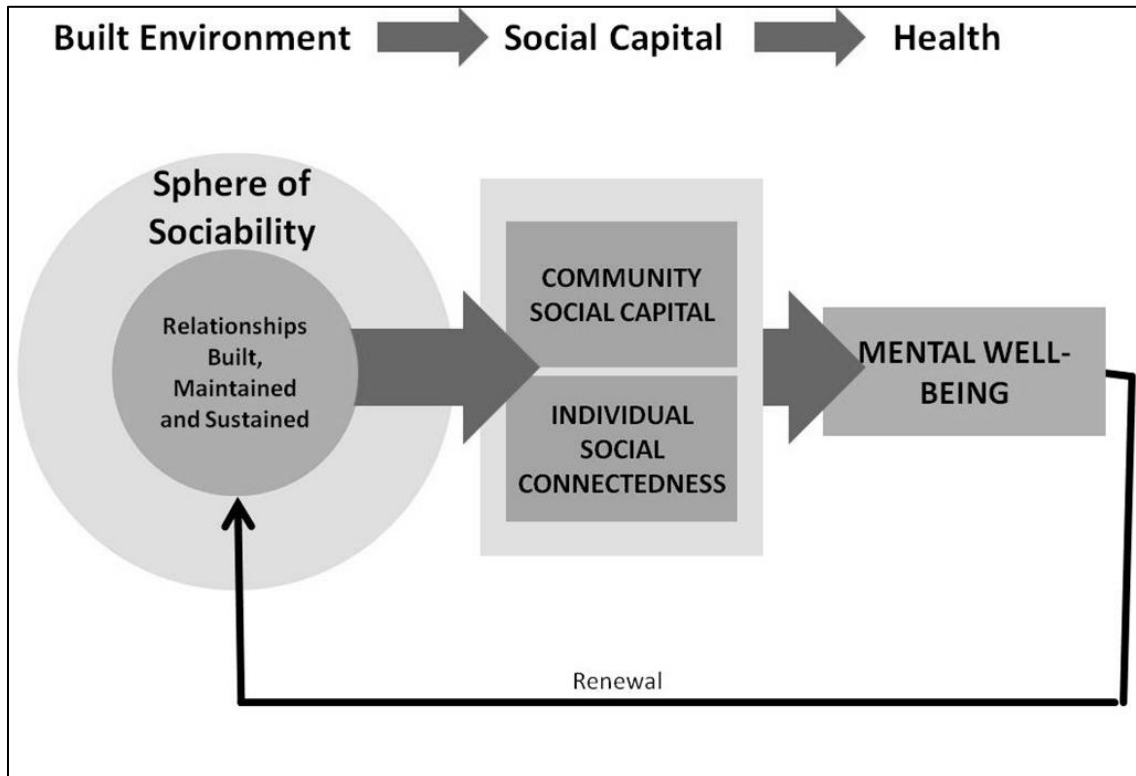


*Figure 3.* **Model of social capital formation and renewal, adapted from Glover and Parry (2008).**

By fostering relationships, the sphere of sociability effectively promotes social capital, which can be used to help the individual achieve his or her goals. Expressive and instrumental action are facilitated by social capital (Lin, 2001). Expressive action, as it is used in the Glover/Parry model, refers to emotional support and empathy that the subjects attained through these new relationships. Instrumental action pertains to informational resources, such as treatment recommendations and referrals. Obstructive action is a term coined by Glover and Parry, and reflects the potential negative consequences of social

capital. In the case of women experiencing infertility, this included the feeling of "falling behind" when one's friends were successful in becoming parents (Glover & Parry, 2008).

Gilda's Clubs, named in honor of the late Gilda Radner, are cancer support communities located throughout the United States and Canada. By design, Gilda's Club functions as a "third place" for cancer survivors and their families. Like assisted living communities, Gilda's Club is not truly a public space, but it creates opportunities for informal interactions with others in similar circumstances. A qualitative study at the Greater Toronto Gilda's Club suggests that this organization is highly successful at fostering social capital (Glover & Parry, 2009). Semi-structured interviews revealed that through both the design of the physical space and the programmatic offerings, Gilda's Club successfully creates a "sphere of sociability" where people want to be.

The Red Hat Society® is a leisure-based organization for older women. Much like Gilda's Club creates a sphere of sociability for cancer survivors, gatherings of the Red Hat Society® appear to create a sphere of sociability for older women. A web-based survey of Red Hat Society® members found that members achieved increased social support and social capital through their participation (Kerstetter, Yarnal, Son, Yen, & Baker, 2008).

The pathway implied by the Glover and Parry model is somewhat different than the buffering hypothesis presented by Browning and Cagney (2002). It is not clear from the literature if social capital has a mediating or moderating effect on built environment quality. While the current study design was guided by the Glover and Parry model, it was not sufficiently powered to do a pathways analysis. Further research will be necessary to fully explore the structure of the model.

Other Considerations and Potentially Confounding Issues

Self-Selection Bias

When comparing between assisted living communities that differ on a number of built environment factors, it is possible that fundamental differences between the sample populations determine their choice of residences.  While this possibility cannot be ruled out, it is unlikely that this decision stems from a conscious effort to seek the salutary health benefits of a positive built environment.

A nationally representative public opinion poll of 2,791 adults was conducted in late 2008 to early 2009, which assessed the perceived impact of a number of factors on health (Robert & Booske, 2011).  Most respondents (86%) thought that personal health practices had a very strong effect of health.  Fewer adults thought that factors related to the built environment had a strong impact on health and just 31% thought that "where a person lives" was very important.  These findings suggest that members of the general public have a limited understanding of the relationship between the built environment and health outcomes.  For this reason, self-selection bias is anticipated to have a minimal effect on the results of the proposed study.

Socioeconomic Status

As this section will demonstrate, socioeconomic factors, including income and educational attainment, are predictive of both physical and mental health outcomes for older adults.  The impact of socioeconomic status on mental health is a potentially confounding variable for the study population.  The impact of socioeconomic status on

physical health is also significant to this discussion because physical limitations determine which individuals need the services provided by an assisted living facility. While Medicare will provide older adults with coverage for skilled nursing care, the type of "custodial care" provided by an assisted living facility is not covered (Center for Medicare and Medicaid Services, n.d.). For this reason, assisted living facility residence is often a luxury item, and socioeconomic status may affect who is able to access these services.

As described in Chapter II, the Kentucky Health Issues Poll (KHIP) is an annual health opinion survey of Kentucky adults. The 2011 KHIP survey included a question about informal caregiving, which is one potential alternative to assisted living communities. Thirteen percent of respondents reported that they were "responsible for the care of a member of your family who is chronically ill or disabled and is no longer able to care for themselves." Informal caregiving was more common in rural parts of the state than in the three largest urban areas. For example, the rate of informal caregiving in Louisville and surrounding counties was just 8% (University of Cincinnati Institute for Policy Research, 2011). Income was also related to caregiving status. Respondents living below 200% of the Federal Poverty Guideline (FPG)[5] were twice as likely to serve as informal caregivers than those living about 200% FPG (18% vs. 8%). Lower rates of informal caregiving could reflect fewer individuals needing assistance in more affluent families. These results could also indicate that affluent families and those living in urban areas have increased access to assisted living communities.

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[5] In 2010, 200% of the Federal Poverty Guideline (FPG) corresponded to a household income of $44,100 for a family of four. Source: *Federal Register*, Vol. 75, No. 148, August 3, 2010, pp. 45628-45629.

A secondary analysis of data from the National Health and Nutrition  Examination Survey (NHANES III) assessed disparities in physical functioning among adults ages 60 and older (Louie & Ward, 2011).  This study addressed a weakness identified in previous works by adjusting the data for comorbid conditions.  The comorbid conditions addressed in the study included obesity, tobacco use, knee pain, dementia and a number of self-reported diseases.  Adults with less than a high school education (0-8 years) reported poorer functioning than those with some education after high school, after adjusting for disease burden.  Adjusting for disease burden, lower income individuals reported considerably poorer functioning than those who were more affluent.  After adjusting for disease burden, non-Hispanic Blacks and Mexican Americans reported similar levels of functioning (and fared better in some areas) than non-Hispanic Whites.  Controlling for comorbid conditions, poverty status is more strongly associated with functional limitations than education or ethnicity.

Because the costs of assisted living are significant and often not covered by Medicaid or Medicare, the socioeconomic status of residents at assisted living communities is anticipated to be somewhat more affluent and less heterogeneous than the general population.  However, due to the significant impact of socioeconomic status on health outcomes for older adults, the socioeconomic status of participants will be assessed.  Since study participants will no longer be part of the workforce, educational attainment will be used as a proxy measure of socioeconomic status for this population.

Cognitive Impairment

In a community-dwelling sample, an estimated 4.9% of adults over the age of 65 have severe cognitive impairment, and the prevalence of cognitive impairment increases with age (Hybels & Blazer, 2003). The prevalence is higher among institutionalized populations. Cognitive function may have an inverse relationship with neighborhood-level socioeconomic status (SES) for older women. Women ages 65 to 81 who lived in higher-SES neighborhoods had correspondingly higher cognitive function, however this association was weak, at best (Shih et al., 2011).

If present, cognitive impairment may impede participants' abilities to provide reliable information during the interview, and more critically, their ability to provide informed consent to participate in the research at all. For this reason, all participants were screened for cognitive impairment at the beginning of the study interview, immediately following the consent discussion.

The 16-item brief version of the Mini-Mental State Examination (MMSE-BV) was used to evaluate participant cognitive impairment (Folstein & Folstein, n.d.) for this purpose. To ensure that participants were able to answer the interview questions reliably, participants with MMSE-BV scores indicative of severe cognitive impairment were excluded from the study. The typical MMSE-BV score for an adult over the age of 65 with at least a ninth grade education was 14 (out of 16) or greater. For example, the mean score is 14.62 (*SD* 1.33) for 80-84 year olds who have completed 12-15 years of education (Folstein, Folstein, White, & Messer, 2010, p. 11). Because of the limited number of points available on the MMSE-BV, a single missed answer can dramatically change one's score. For this reason, the cut point for eligible scores on the MMSE-BV was selected to maximize the test's specificity and minimize the number of people

without cognitive impairment who were incorrectly screened out.  As a result, the

minimum score required for individuals to be eligible for this study was set at 10 out of

16 points, and individuals with scores less than or equal to 9 were excluded from the

study.  Previous studies determined that the cut point between 9 and 10 points on the

MMSE-BV had a specificity of 0.99 and a sensitivity of 0.41 for dementia, which

corresponded to 91.44% accurate classification of patients with dementia (Folstein et al.,

2010, p. 12).  Similarly, the cut point between 9 and 10 points had a specificity of 0.99

and sensitivity of 0.60 for Alzheimer's disease, which corresponded to 95.86% accurate

classification of patients with Alzheimer's disease (Folstein et al., 2010, p. 12).


## Conclusion

In conclusion, this chapter demonstrated the public health importance of mental

well-being for the general population, and residents of assisted living communities in

particular.  Social capital, social connectedness, and built environment quality were each

linked to health outcomes.  The Glover/Parry model describes how these concepts relate

to one another, where the quality of the built environment creates a sphere of sociability,

or a space in which social capital and social connectedness can form.  Social capital and

social connectedness, in turn, impact overall mental well-being.  The next chapter will

describe the study methodology that was used to explore the constructs from the

Glover/Parry model in the context of assisted living communities.

CHAPTER III

METHODOLOGY

As described in Chapter I, the primary study utilized a quantitative design to determine if built environment quality, community social capital and individual social connectedness were predictive of individual mental well-being. It employed a multi-level framework, and explored the influence of both individual-level (social connectedness) and community-level (social capital and built environment quality) factors on the dependent variable. Specifically, this study was designed to answer the following five research questions:

**Research Question 1:** Is an adapted version of a Resource Generator an appropriate instrument for measuring individual social connectedness among residents of assisted living communities in Greater Louisville?

**Research Question 2:** What are the mental health and social capital characteristics of assisted living residents in Greater Louisville?

**Research Question 3:** What are the characteristics of the built environment at assisted living communities in Greater Louisville?

**Research Question 4:** Is there a positive relationship between individual social connectedness and mental well-being for residents in assisted living communities in Greater Louisville? **Hypothesis:** Mental well-being will

be significantly positively associated with social connectedness in the

study population.

**Research Question 5:** What other factors are predictive of mental well-

being for assisted living facility residents in Greater Louisville?

**Hypothesis:** Mental well-being will be significantly positively associated

with social connectedness, social capital and built environment quality in

the study population.

This chapter details the specific methodology used to test the study hypotheses, including

the study participants and setting, the study apparatus, and the study procedures.


Participants and Setting

Study participants were elderly residents of assisted living communities in Greater

Louisville. Six assisted living communities were selected for the study based on

environmental variability and the willingness of the facility to authorize the study.

Securing permission from the facility staff proved to be one of the more difficult aspects

of the study. More than two dozen aging professionals and facility administrators were

contacted in order to obtain permission from the six participating communities. While

two communities cited corporate policies precluding on-site research, in most cases no

explanation was given for facility non-participation.

Individual interviews were scheduled with residents at each selected facility using

volunteer sampling. The research team invited subjects to participate by going door to

door, intercepting residents in common areas, distributing promotional materials and

snowball sampling. The subject recruitment procedure was negotiated with the staff at

each facility.  Exclusion criteria were age less than 65, difficulty communicating in spoken English, and severe cognitive impairment.

The target sample size was a minimum of 76 completed interviews, distributed roughly equally among the participating assisted living communities.  As will be described later in this chapter, this is the number of interviews needed for the proposed statistical procedures to demonstrate a medium effect size for the primary hypothesis (J. Cohen, 1992).

<div align="center">Apparatus</div>

The study included four measures, described in depth in Chapter II, corresponding to the constructs of built environment quality, community social capital, individual social connectedness and mental well-being.  Trained research assistants and I assessed built environment quality through site audits.  The research assistants and I also measured social capital, social connectedness and mental well-being through individual interviews. The instrumentation for the site audit and individual interview protocols will be detailed in the subsequent sections, and a synopsis of these measures is provided in Table 1. .

**Table 1**

*Description of Primary Study Variables*

| Construct | Instrument | Level | Description of Data |
|---|---|---|---|
| **Dependent Variable** | | | |
| Mental Well-Being (MH) | Quality of Life Inventory (QOLI) | Individual | Continuous measure; average of 16 items scored -6 to 6; reported as T score ranging from 0 to 77 |
| **Independent Variables** | | | |
| Social Connectedness (SCN) | Adapted Resource Generator (ARG) | Individual | Continuous measure; 17 items scored 0 to 3; total possible values ranging between 0 and 51[6] |
| Social Capital (SCP) | Collective Efficacy Scale (CES) | Community | Continuous measure; 7 items scored 1 to 5; total possible values ranging between 7 and 35 |
| Built Environment Quality (BE) | Revised Senior Walking Environmental Assessment Tool (SWEAT-R) | Community | Continuous measure; 20 items scored from 0 to 2; total possible values ranging between 0 and 40 |

[6] Total number of items on the Adapted Resource Generator reflects items eliminated during pilot testing.

Neighborhood Audit

Built environment quality was assessed by a site audit, conducted by trained research assistants and me. This site audit was supplemented by secondary data analysis of the assisted living community and the surrounding neighborhood (Appendix C). The secondary data collected included the size, costs and scope of services provided by the assisted living communities, and the social and demographic characteristics of the surrounding neighborhood. These data provide insight into the comparability of the study communities on factors beyond the quality of the built environment.

The site audit itself utilized the Revised Senior Walking Environment Assessment Tool (SWEAT-R) developed by Michael et al. (2009). The SWEAT-R instrument gathers descriptive information on four domains (functionality, safety, aesthetics, and destinations) on a given street segment. The SWEAT-R objectively measures the principles of Smart Growth (Smart Growth Network, n.d.), to generate the four sub-domains. The instrument was used to audit all street segments contained within the micro-neighborhood in which the assisted living community was sited.

Micro-neighborhoods were defined as all street segments contained within a 1/8th mile radius of an assisted living community. Highways, alleys, and street segments less than 50 feet in length were excluded from the study. To preserve the anonymity of the study communities, the micro-neighborhood surrounding the University of Louisville School of Public Health and Information Sciences is provided as an example (Figure 4). A 1/8th mile radius circle centered on the school's physical address is used to define the

boundaries of the micro-neighborhood. In this example, there are eleven eligible street segments contained within the micro-neighborhood. Alleys (Springer, Pin) and short segments (the segment of S. Jackson extending south of Broadway) would not be audited. The SWEAT-R instrument was used to describe the built environment for the micro-neighborhood surrounding each of twelve assisted living communities in the Greater Louisville area.

As previously noted, the SWEAT-R instrument gathers descriptive information on functionality, safety, aesthetics, and destinations. The micro-neighborhood in which the assisted living community is sited was scored based on five representative indicators from each of these four domains. For consistency across the locations, amenities offered within the assisted living community, such as a hair salon available only to community residents, were not included as part of the SWEAT-R site audit. The completed site audit using the SWEAT-R instrument yielded continuous, community-level data with a potential range of 0 to 40.
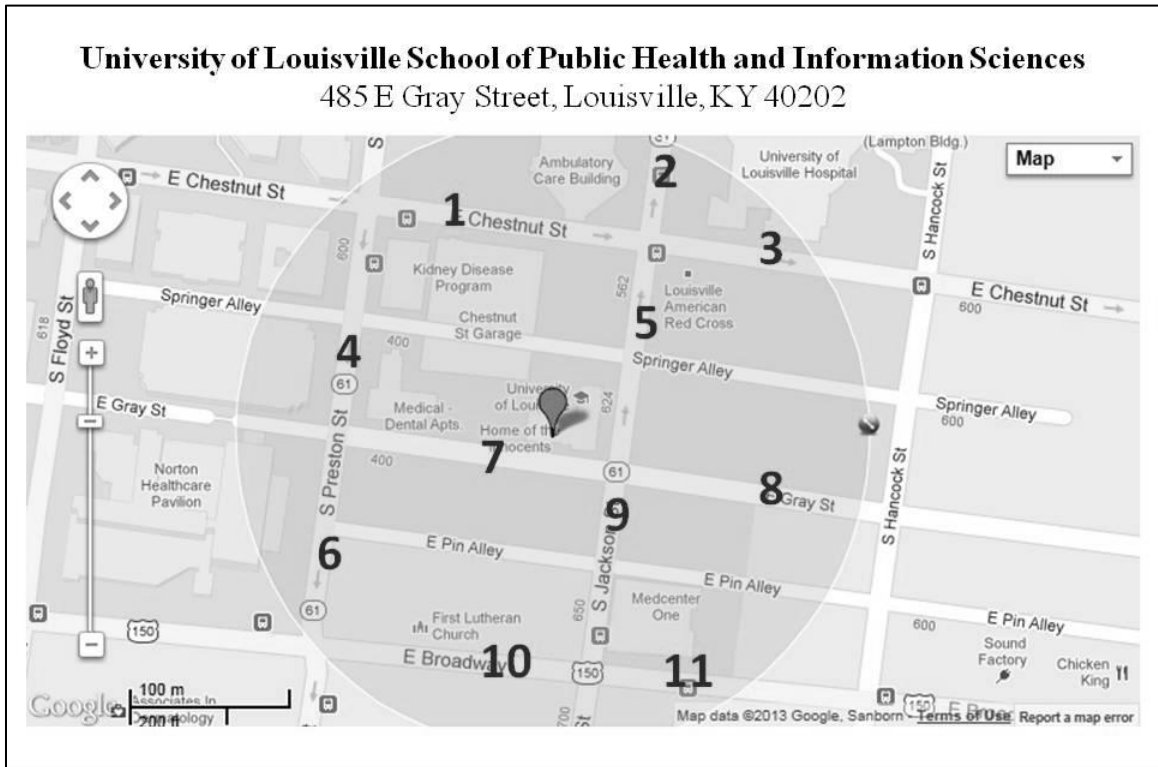
*Figure 4*. **Micro-neighborhood illustration for the University of Louisville School of Public Health and Information Sciences. The circle represents a 1/8 mile radius around the school's location. Eleven valid street segments are included in this radius.**

Individual Interviews

Other than the Neighborhood Audit described in the preceding section, the primary data collection method for this study was individual interviews with residents in assisted living communities. In addition to the primary study variables, participants were asked to provide basic demographic information as part of a preliminary Participant Survey (Appendix D), using questions from the Behavioral Risk Factor Surveillance

System (Centers for Disease Control and Prevention, 2011). The Participant Survey also incorporated the Instrumental Activities of Daily Living (IADL) Scale (Lawton & Brody, 1969) using interview questions adapted from Graf (2008). The IADL provides insight into the relative independence and physical health of the participants at each community. Markedly different scores on the IADL (which range from 0 to 8) would be a potential confounder if residents of certain facilities are in poorer overall health than the others.

The Participant Survey was also used to measure length of residence at the assisted living community. Individuals who have only recently moved to a community may still be coping with the transition experience and would have had less time to forge new relationships and social connections in the community. If this facility "exposure time" had been systematically different among the study communities, it would be a potential confounder.

The remaining components of the individual interviews measured the three key study variables: social capital, social connectedness, and mental well-being. Community social capital was measured using individual interviews. To reflect the study's operational definition of social capital as a community-level construct, the interview responses were subsequently aggregated together for each of the assisted living communities to create a single community score. The individual-level constructs of social connectedness and mental well-being were also measured using individual interviews, but these scores were maintained at the individual level and not aggregated.

Community-level social capital was measured using the Collective Efficacy Scale (CES) developed by Wen et al. (2005). Five items assessed social cohesion and two items assessed informal social control. Possible scores range from 5 to 35, and the

community mean was calculated from these values to create a single social capital score. This instrument produced continuous, community-level data for each of the six study sites.

Individual-level social connectedness was measured using an Adapted Resource Generator. This tool assessed the presence or absence of a given resource, as well as the strength of the respondent's relationship with the resource. Strength of relationship was valued by the proximity/anticipated frequency of contact: fellow residents were considered the strongest relationship (3 points), followed by people the respondent saw often (2 points), followed by people the respondent saw only occasionally (1 point). If the subject did not know anyone for a particular resource, that item was scored as 0. While assisted living community residents have frequent contact with building staff, because of the professional nature of these relationships, building staff identified as resources were also scored as 0. This instrument yielded continuous, individual-level data.

As noted in Chapter II, Lindenburg's work with Social Production Function (SPF) Theory, which serves as the foundation for the Resource Generator, was later adapted for healthy aging research (Steverink et al., 1998). For this reason, SPF Theory informed the adaptation of the Resource Generator for an elderly population (Appendix E). For example, Steverink et al. noted that the attainment of status diminished in importance once individuals left the workforce. For this reason, Resource Generator items pertaining to education and career advancement opportunities were omitted from the instrument developed for this study. According to Steverink et al., other instrumental goals from SPF are substituted to maintain well-being. So while goals pertaining to status may diminish in importance, other goals such as mental stimulation, affection and behavioral confirmation will be elevated as replacements (Steverink et al., 1998).

The final instrument included in the individual interviews was the Quality of Life Inventory (QOLI), a measure of mental well-being and life satisfaction. Participants rated sixteen items on their importance and their satisfaction with that item. The result was a weighted assessment of the individual's overall satisfaction relative to the aspects of their life that are perceived to matter most (Frisch et al., 1992). The QOLI incorporates many of the dimensions of well-being identified by Ryff (Kwan et al., 2003) as important for healthy aging, including personal relationships, purpose and self-acceptance. This instrument yielded continuous, individual-level data.

Procedure

The primary study utilized a quantitative design to determine if built environment quality, community social capital and individual social connectedness were predictive of individual mental well-being. The instrumentation used to measure each of these constructs was described in the preceding sections.

The first element of the study procedure was the environmental audit, using the SWEAT-R instrument discussed previously (Appendix B). The micro-neighborhoods surrounding twelve assisted living communities were audited and scored. The SWEAT-R tool was used to record characteristics of the built environment for the micro-neighborhood surrounding the assisted living community.

From the twelve audited communities, six assisted living communities in Louisville, Kentucky were recruited for study participation following approval of the proposed dissertation design and receipt of Institutional Review Board approval. While the built environment quality scores were intended to guide facility recruitment, a number

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of the assisted living facilities were reluctant to participate and refused consent.

Ultimately, the six sites were selected based on staff willingness to authorize the study.

Once permission was secured from pertinent staff and administrators at the assisted living

communities, individual interviews were scheduled at each study site. Interviews

continued to be scheduled until the minimum sample size threshold was met. The

process for recruiting subjects was negotiated with the staff of each community.

In addition to the environmental audit, conducting these individual interviews was

the other primary study procedure. The interviews were conducted by trained research

assistants and me. Participants were assigned a study ID number. To protect participant

confidentiality, names and other identifying details were not recorded on the survey

instruments. The only paper link between the participants' names and study ID numbers

is the informed consent documentation.

Immediately after completing their informed consent documentation, the brief

version of the Mini-Mental State Examination (MMSE-BV) was implemented to verify

that participant's cognitive health. MMSE-BV scores indicating severe cognitive

impairment would necessitate the participant's exclusion from the study (score $\leq 10$).

The primary study commenced with the Participant Survey (Appendix D). The

remaining measures – the Collective Efficacy Scale (Appendix A), Adapted Resource

Generator (Appendix E), and the Quality of Life Inventory – were administered in a

random order to mitigate any effects of question ordering.

Including the screening questions and demographics, there were 93 questions in

the complete interview protocol, not including the ARG pilot test. Given the volume of

questions included in the protocol, participant fatigue was a concern. To mitigate fatigue,

all questions were read and all responses recorded by the interviewer. Randomizing the order of questions limited the potential impact of missing data on a single study variable. It was hoped that by providing explicit instructions and repeating a small number of response scales throughout most of the interview protocol, that individual interviews would be completed in full by most participants.

Statistical Analysis

Upon completion of data collection, SPSS 21 ("IBM SPSS Statistics," 2012) was used to generate descriptive statistics and preliminary analyses of all study variables, as well as test the primary research hypotheses. All planned analyses were based on the assumption that the study data would be normally distributed, and these assumptions were tested.

Preliminary Statistical Analysis

**Research Question 1:** Is an adapted version of a Resource Generator an appropriate instrument for measuring individual social connectedness among residents of assisted living communities in Greater Louisville?

As previously noted, Steverink's work with SPF Theory and older adults (1998) guided the initial adaptation of the original Resource Generator (Van der Gaag & Snijders, 2005) for the study population. The resulting instrument, the Adapted Resource Generator, was further refined in consultation with individuals who have professional expertise in geriatric health and service placement for elders, and family members of assisted living residents who have personal experience with the study population. Because the Adapted Resource Generator represents a

significant modification from existing instruments, it was also pilot tested with the initial study participants.

To verify the utility of the Adapted Resource Generator, a subset of participants were asked to evaluate the importance of the proposed resources in their lives and to recommend other potential resources for inclusion. For simplicity, the same scale was used to evaluate importance as was used on the Quality of Life Inventory (not at all important, important, extremely important). Resources that were not viewed as important by the majority of participants were retained on the survey instrument for all interviews but were excluded from final statistical analysis. Similarly, participant-suggested resources viewed as "important" or "extremely important" by the majority of the initial respondents would be added to the final instrument and final data analysis. The pilot test apparatus (detailed in Appendix F) was administered at several of the study sites.

**Research Question 2:** What are the mental health and social capital characteristics of assisted living residents in Greater Louisville?

Descriptive statistics were produced to answer research question 2. The mean and standard deviation of the two continuous individual-level study variables, the Adapted Resource Generator and the Quality of Life Inventory, were reported for the full study population and each assisted living community. Additionally, the mean and standard deviation of the community-level Collective Efficacy Scale was reported for each assisted living community.

**Research Question 3:** What are the characteristics of the built environment at assisted living communities in Greater Louisville?

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For each street segment, the SWEAT-R instrument assessed 165 separate variables. For scoring purposes, five representative indicators were evaluated for each of the four domains measured by the instrument: functionality, safety, aesthetics and destinations. Functionality was scored based on the average number of benches per segment, the percentage of segments with a continuous (corner to corner) sidewalk on at least one side of the street, the percentage of sidewalks that were in good condition, the percentage of segments where the slope was flat or gentle, and the percentage of segments with a buffer zone separating pedestrians on the sidewalk from traffic on at least one side of the street. Safety was scored based on the average number of streetlights per street segment, the percentage of segments with only one or two lanes of traffic, the percentage of intended pedestrian crossings that were marked, the percentage of intended pedestrian crossings with signage to calm traffic or alert drivers, and the percentage of pedestrian crossings that had curb cuts or ramps on both sides of the crossing. Aesthetics were scored based on the average number of trees per segment, the percentage of segments that were free of litter, graffiti and broken glass, the percentage of yards that were well-maintained, the percentage of buildings that were in good condition, and the percentage of public spaces that were of high quality. The final domain, destinations, was scored based on four dichotomous measures: the presence or absence of gathering places, retail outlets, health care services and transit stops. The final indicator for the destinations domain was the number of distinct land uses available in the micro-neighborhood from a list of 38 possible categories.

<u>Primary Statistical Analysis</u>

**Research Question 4:**  Is there a positive relationship between individual social connectedness and mental well-being for residents in assisted living communities in Greater Louisville?  **Hypothesis:** Mental well-being will be significantly positively associated with social connectedness in the study population.

This research question pertains to the relationship between social connectedness and mental well-being for elderly residents of assisted living communities.  Is social connectedness, as measured by the Adapted Resource Generator, associated with mental well-being, as measured by the Quality of Life Inventory?  I hypothesized that mental well-being would be positively associated with social connectedness, and this relationship would have a medium effect size ($r \approx 0.30$).

A simple regression analysis was used to test the hypothesis that there is a linear relationship between mental well-being and social connectedness that can be described by the following equation:

$$\mathbf{MH = \alpha + \beta_{SCN}SCN}$$

where the dependent variable, MH, is the mental health measurement from the Quality of Life Inventory, $\alpha$ is the y-intercept for the equation, SCN is the participant's social connectedness score and $\beta_{SCN}$ is the regression coefficient.  Simple linear regression was used to determine the magnitude and significance of the relationship.

**Research Question 5:** What factors are predictive of mental well-being for assisted living facility residents in Greater Louisville?  **Hypothesis:** Mental well-being will be

significantly positively associated with social connectedness, social capital and built environment quality in the study population.

This final research question incorporates community social capital and built environment quality into the equation. I hypothesized that this combined model would be more predictive of mental well-being than the simple linear relationship described by the previous equation. A multiple linear regression analysis was used to test the hypothesis that there is a linear relationship between individual mental well-being and the participant's built environment, community social capital and personal social connectedness. This relationship can be described by the following equation:

$$\textbf{MH} = \boldsymbol{\alpha} + \boldsymbol{\beta_{BE}}\textbf{BE} + \boldsymbol{\beta_{SCP}}\textbf{SCP} + \boldsymbol{\beta_{SCN}}\textbf{SCN}$$

where the dependent variable, MH, is the mental health measurement from the Quality of Life Inventory, $\alpha$ is the y-intercept for the equation, SCN is the participant's social connectedness score and $\beta_{SCN}$ is the regression coefficient as in the first equation. This model incorporates two additional independent variables: BE, the built environment quality measure determined from the SWEAT-R instrument, and SCP, the community social capital score determined from the Collective Efficacy Scale. Each of these variables have corresponding regression coefficients: $\beta_{BE}$ and $\beta_{SCP}$, respectively. Multiple linear regression was used to determine the magnitude and significance of the relationship between the independent variables and the dependent variable.

In addition to verifying the test assumptions necessary for a regression analysis, the planned analysis involves assumptions about the instrumentation. The CES was selected as the community-level social capital instrument because of its alignment with Putnam's conception of social capital and the community-level focus used by the

instrument's developers. However, the CES gathers information from individuals which is then aggregated to the community-level, and numerous researchers cited in the literature review of this dissertation have reported individual-level results from the CES. In light of this, the discriminative validity of the individual and community-level measures were evaluated.

The sample size calculations for this study were based on a multiple linear regression with three independent variables, as described above. Setting $\alpha = 0.05$ and power $= 0.80$, I estimated that 76 participant interviews were needed in order to accurately detect a medium effect size (J. Cohen, 1992). These standard values correspond to 5% chance of a Type I error, incorrectly rejecting the null hypothesis or identifying a relationship where there is none, and a 20% chance of a Type II error, incorrectly failing to reject the null hypothesis or failing to detect a relationship between the independent and dependent variables.

CHAPTER IV

RESULTS

This study employed a quantitative design to determine of built environment quantity, community social capital and individual social connectedness were predictive of individual mental well-being. It employed a multi-level framework, and explored the influence of both individual-level (social connectedness) and community-level (social capital and built environment quality) factors on the dependent variable. As noted in previous chapters, this study was designed to answer the following five research questions:

**Research Question 1:** Is an adapted version of a Resource Generator an appropriate instrument for measuring individual social connectedness among residents of assisted living communities in Greater Louisville?

**Research Question 2:** What are the mental health and social capital characteristics of assisted living residents in Greater Louisville?

**Research Question 3:** What are the characteristics of the built environment at assisted living communities in Greater Louisville?

**Research Question 4:** Is there a positive relationship between individual social connectedness and mental well-being for residents in assisted living communities in Greater Louisville? **Hypothesis:** Mental well-being will

be significantly positively associated with social connectedness in the

study population.

**Research Question 5:** What other factors are predictive of mental well-

being for assisted living facility residents in Greater Louisville?

**Hypothesis:** Mental well-being will be significantly positively associated

with social connectedness, social capital and built environment quality in

the study population.

Whereas the preceding chapter detailed the study design and planned methodology, this

chapter describes the study as executed and the specific results of the ensuing statistical

analysis for each research question. The implications of these findings will be discussed

in greater detail in the subsequent chapter.


Participant Demographics

Based on the planned statistical analyses, it was estimated that 76 participant

interviews were needed in order to test the study hypotheses. In order to achieve this

number of interviews, 92 individuals agreed to take part in this study and were taken

through the informed consent process (Figure 5). To ensure that participants were able to

answer the interview questions reliably and give informed consent, participants with

MMSE-BV scores indicative of severe cognitive impairment were excluded from the

study. As noted in the preceding chapter, the minimum score required for individuals to

be eligible for this study was set at 10 out of 16 points, and individuals with scores less

than or equal to 9 were excluded from the study. Of those who agreed to participate, 14

individuals were determined to be ineligible based on their scores on the MMSE-BV and

no additional data was collected from these individuals.  Two individuals younger than

age 65 were taken through the consent process and completed the MMSE-BV, however

the interview was terminated once their age was determined on the participant survey

(Appendix D).  The other exclusion criteria for the study was difficulty communicating in

spoken English.  This was informally ascertained by the interviewer prior to the consent

process and no individuals were subsequently excluded from the study based on

communication difficulty.  Ultimately, 76 participants were interviewed for the study.
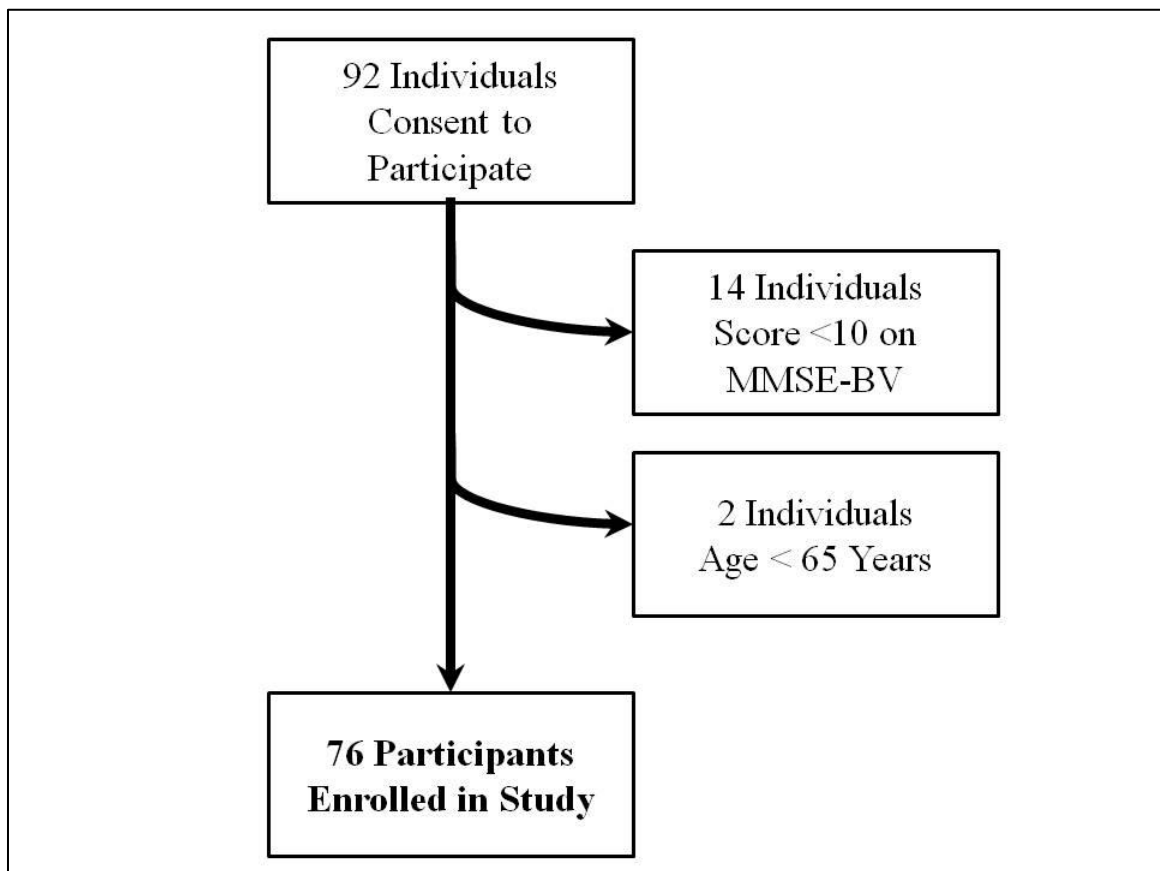


*Figure 5.*  **Participant flow through the enrollment process.**

Among those who were enrolled in the study, not all individuals completed the entire interview. Due to the length of the interview protocol, participant fatigue was a concern. In practice, fatigue was not a barrier to completion for most subjects, and many found ways to extend the 20 minute interview into a 60 minute chat. When a subject did not complete the entire interview protocol, it was typically because they had another appointment or commitment and had run out of time.

In general, if the participant did not complete one of the instruments, that variable was coded as missing data for that individual. The exception to this process was the social capital score (CES), which was calculated at the community level from the individual data. If at least 75% of the respondents for a community completed the CES scale, an average was calculated for the assisted living facility. This aggregate CES value was assigned to all community residents, whether or not they completed the instrument themselves.

Descriptive statistics were produced for the 76 study participants as a group (

Table 2).  The age of respondents ranged from 65 to 97 years with a mean of 82.7 years

(*SD* = 8.6).  The majority of subjects were female (80%) and non-Hispanic white (75%).

Due to the limited number of subjects of Hispanic ethnicity and the small number of

individuals who identified as a race other than white, race and ethnicity were combined

into a single, dichotomous variable.  One in four respondents were included in this

aggregate non-white and/or Hispanic category (25%).  When asked about their marital

status, the majority of subjects indicated they were widowed (67%), and the second most

frequent response category was divorced (22%).  Most respondents had completed high

school (83%), including 29% who were college graduates.

In addition to general demographics, study participants were asked several

questions relating to their health.  When asked to describe their overall health status, 72%

reported they were in good or better health, including 8% who described their health

status as "excellent."  Just 28% described their overall health status as fair or poor.  As

described in Chapter II, Lawton and Brody's IADL scale measures 8 instrumental

activities of daily living: capacities relating to communication, shopping, food

preparation, housekeeping, laundry, transportation, medication management and financial

management (1969).  Study subjects represented the full range of possible IADL scores

from 0 to 8 with a mean score of 4.3 (*SD* = 2.2).  As previously noted, cognitive

impairment was assessed using the MMSE-BV and individuals scoring less than 10 were

excluded from the study.  Of those whose scores fell within the eligible range, the mean

score was 13.5 (*SD* = 1.9).

**Table 2**

*Demographic and Health Characteristics of Study Participants (N=76)*

|  | Frequency | Percent |
|---|---|---|
| Age |  |  |
| 65 - 74 years | 15 | 20.3% |
| 75 - 84 years | 21 | 28.4% |
| 85 - 94 years | 33 | 44.6% |
| 95 years and older | 5 | 6.8% |
| Gender |  |  |
| Female | 61 | 80.3% |
| Male | 15 | 19.7% |
| Race / Ethnicity |  |  |
| White, Non-Hispanic | 57 | 75.0% |
| Non-White and/or Hispanic | 19 | 25.0% |
| Marital Status |  |  |
| Married | 1 | 1.3% |
| Widowed | 51 | 67.1% |
| Divorced | 17 | 22.4% |
| Never Married | 7 | 9.2% |
| Educational Attainment |  |  |
| High school graduate | 63 | 82.9% |
| Did not complete high school | 13 | 17.1% |
| Years of Residence |  |  |
| Less than 1.0 | 16 | 21.3% |
| 1.0 - 5.0 | 37 | 49.3% |
| More than 5.0 | 22 | 29.3% |
| General Health Status |  |  |
| Fair or poor | 21 | 27.6% |
| Good or better | 55 | 72.4% |
| Instrumental Activities of Daily Living |  |  |
| 0 - 3 | 21 | 28.0% |
| 4 - 5 | 28 | 37.3% |
| 6 - 8 | 26 | 34.7% |
| Cognitive Impairment (MMSE-BV) |  |  |
| 10 - 13 | 35 | 46.1% |
| 14 - 16 | 40 | 52.6% |

Because the planned analysis involved two community-level variables (social capital and built environment quality), it was important to consider the general characteristics of each assisted living community, as well as the demographics characteristics of each facility's residents. To achieve the enrollment target of 76 participants, residents of six different assisted living communities were interviewed for this study. Details about the assisted living communities were captured through a Facility Profile (Appendix C) and are detailed in Table 3.

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**Table 3**

*Assisted Living Facility and Neighborhood Characteristics*

| | Assisted Living Community | | | | | |
|---|---|---|---|---|---|---|
| | **A** | **B** | **C** | **D** | **E** | **F** |
| **Facility Details** | | | | | | |
| Total Capacity | 266 | 205 | 203 | 183 | 203 | 79 |
| Assisted Living Capacity | 127 | 40 | *not avail* | 40 | 63 | 79 |
| Independent Living Available | Yes | Yes | Yes | Yes | Yes | Yes |
| Rehabilitation Available | Yes | No | No | Yes | Yes | Yes |
| Skilled Nursing Care Available | Yes | No | Yes | Yes | Yes | Yes |
| Memory Care Available | Yes | Yes | No | Yes | Yes | No |
| Subsidized Cost Structure | No | No | No | Yes | Yes | No |
| **Facility Amenities** | | | | | | |
| Dining Hall / Restaurant | Yes | Yes | Yes | Yes | Yes | Yes |
| In-Room Kitchen | No | No | Yes | Yes | Yes | Yes |
| Hair Salon / Barber | Yes | Yes | Yes | Yes | Yes | Yes |
| Fitness Center | Yes | Yes | Yes | Yes | Yes | Yes |
| Pets Allowed | No | No | Yes | Yes | Yes | No |
| Computer Lab / Wi-Fi | Yes | Yes | Yes | Yes | Yes | Yes |
| **Zip Code Level Demographics** | | | | | | |
| Median Household Income | $57,513 | $61,263 | $15,809 | $15,809 | $15,809 | $80,538 |
| Percent Non-White | 14.5% | 15.9% | 68.1% | 68.1% | 68.1% | 20.7% |
| Percent High School Graduates | 95.4% | 95.9% | 70.2% | 70.2% | 70.2% | 96.9% |

Note: Zip Code Level Demographics from 2011 American Community Survey 5-Year Estimates

Overall, the six assisted living communities included in this study had many similarities. Each location offered various types of housing to meet the needs of older adults along a continuum of care. All six communities offered independent living residences in addition to the assisted living apartments on the campus where the study participants resided. Five communities provided skilled nursing services for residents needing additional care and four of the six communities offered memory care housing for residents with advanced dementia or Alzheimer's disease. In general, older adults included in the study would have the option of making the assisted living community their permanent home regardless of their future health care needs, although they may have to move to a new apartment or new building within a complex to access the different levels of care.

In addition to the levels of care provided, there was considerable overlap in the amenities provided by the different assisted living communities. All six communities provided on-site dining services, fitness centers, beauty parlors and salon services, and access to computer labs and the internet. Apartments at four of the six communities included kitchens or kitchenettes, so residents would have the option of preparing their own meals or snacks. One notable difference among the properties was the ability to keep pets - only three of the communities allowed residents to bring their dogs or cats with them.

The socioeconomic characteristics of the surrounding neighborhood was an area where the communities differed. Three of the six communities (C, D, and E) were located within a single, low-income zip code. The median household income was about $15,800 for this zip code and just 70% of adults over the age of 25 had graduated from

high school or completed their GED. These three facilities were also located in a very diverse neighborhood, and the majority (68%) of residents in this zip code were non-white (U.S. Census Bureau, 2007-2011). The other three assisted living communities (A, B and F) were located in more affluent, more educated zip codes where residents were predominantly non-Hispanic white. Two of the assisted living communities located in the lower-income zip code (D and E) offered subsidies through the U.S. Department of Housing and Urban Development to help defray costs for lower income residents. Residents at the remaining four sites paid market rates for their rooms, typically in excess of $5000 per month.

To further explore community-level differences which could potentially impact the primary study analysis, demographic characteristics were calculated for each of the six assisted living communities (Table 4). Statistical tests were used to explore community-level differences, however the small sample size led to a violation of the tests' assumptions. These results should be interpreted with caution.

The mean age of the study participants ranged from 76.7 years to 90.1 years across the facilities. An ANOVA was statistically significant: $F(5, 68) = 6.08, p < 0.001$ indicating that mean age does differ by community of residence. The proportion of respondents who were male ranged from 0 to 50%. Gender and community of residence are independent: $\chi^2(5, N = 76) = 9.53, p = 0.09$. The proportion of respondents who were non-white ranged from 0% to 45%, but race/ethnicity was not associated with community of residence: $\chi^2(5, N = 76) = 9.71, p = 0.084$. The proportion of respondents who listed their marital status as widowed ranged from 40% to 100%. In this instance the results were statistically significant: $\chi^2(15, N = 76) = 25.04, p = 0.049$. This suggests that

marital status and community of residence are not independent. The proportion of respondents who were high school graduates ranged from 67% to 100% across the facilities, but these differences were not statistically significant: $\chi^2(5, N = 76) = 8.20$, $p = 0.146$. This indicates a failure to reject the null hypothesis that educational attainment and community of residence are independent. The length of time that respondents had lived in a given assisted living facility did vary significantly across the sites. The mean length of stay ranged from less than one year to more than 6 years. In this case, an ANOVA was statistically significant: $F(5, 69) = 5.26$, $p < 0.001$ indicating that mean length of stay does differ by community of residence. In sum, while the communities were demographically similar overall, residents did differ by age, marital status and length of stay.

In addition to the demographic characteristics listed above, the six communities were compared according to their health characteristics. The proportion of residents who classified their overall health status as good or better (good, very good, or excellent health) ranged from 0% to 100%, and a Pearson's chi-square test was statistically significant: $\chi^2(5, N = 76) = 13.52$, $p = 0.019$ indicating that overall health status and community of residence are not independent. Mean scores on Lawton and Brody's IADL scale ranged from 2.1 to 5.7 and an ANOVA was statistically significant: $F(5, 69) = 11.79$, $p < 0.001$. This indicates that ability to perform various activities daily living does differ by community of residence. The final health characteristic was cognitive impairment, and mean scores on the MMSE-BV instrument ranged from 11.8 to 14.3 and an ANOVA was statistically significant: $F(5, 69) = 3.62$, $p = 0.006$. This indicates that levels of cognitive impairment differ by community of residence.

While the communities were demographically similar, participants did differ significantly in each of the three health measures according to the community where they lived. In general, residents of communities A, B and C reported better overall health, but scored lower on the IADL scale and MMSE-BV. Residents of communities D, E, and F were less likely to describe their overall health as good, very good, or excellent, but they were able to perform more of the instrumental activities of daily living and less cognitive impairment.

Table 4

*Demographic and Health Characteristics of Assisted Living Communities*

| | Assisted Living Community | | | | | |
|---|---|---|---|---|---|---|
| | **A** | **B** | **C** | **D** | **E** | **F** |
| **Number of Participants** | 14 | 9 | 9 | 22 | 20 | 2 |
| **Demographics** | | | | | | |
| Age: mean and (*SD*) | 90.1 (4.0) | 83.1 (9.0) | 85.4 (8.6) | 81.7 (7.8) | 76.7 (7.5) | 88.5 (6.4) |
| Gender: % male | 0% | 33.3% | 11.1% | 13.6% | 35.0% | 50.0% |
| Race / Ethnicity: % non-white | 7.1% | 11.1% | 11.1% | 31.8% | 45.0% | 0% |
| Marital Status: % widowed | 100% | 88.9% | 55.6% | 63.6% | 40.0% | 100% |
| Educational Attainment: % high school graduate | 100% | 66.7% | 100% | 77.3% | 75.0% | 100% |
| Years of Residence: mean and (*SD*) | 1.3 (0.8) | 0.8 (0.8) | 5.1 (3.6) | 6.3 (4.8) | 4.4 (3.8) | 1.7 (0.5) |
| **Health Status** | | | | | | |
| General Health Status: % good | 85.7% | 88.9% | 100% | 63.6% | 60.0% | 0% |
| Instrumental Activities of Daily Living: mean and (*SD*) | 2.6 (1.3) | 2.9 (1.8) | 2.1 (1.2) | 5.6 (1.7) | 5.7 (2.0) | 4.5 (2.0) |
| Cognitive Impairment (MMSE-BV): mean and (*SD*) | 13.1 (1.8) | 12.6 (2.3) | 11.8 (1.7) | 14.3 (2.0) | 14.1 (1.1) | 14.0 (2.0) |

**Research Question 1:** Is an adapted version of a Resource Generator an appropriate

instrument for measuring individual social connectedness among residents of assisted

living communities in Greater Louisville?


Because of the significant modifications made to Van der Gaag and Snijders' original

instrument, twenty-two participants were asked additional questions about the Adapted Resource

Generator instrument. For this pilot test of the Adapted Resource Generator, participants were

asked to evaluate the importance of the proposed resources in their lives and their perceived

importance for their peers. Specifically, respondents were asked: "Our goal is to learn about the

types of relationships that are important for people who live in communities like this one. While

not all resources will be important for you personally, in general, for residents of assisted living

communities like (community name), do you think it is not at all important, important, or

extremely important to know someone who...." This question was the lead-in for participants to

rate each of the twenty-one items on the Adapted Resource Generator.

The percentage of respondents who indicated that a resource was "important" or

"extremely important" (Table 5) determined which items were included in the final data analysis.

For example, 95.5% of the pilot test respondents said that knowing *someone who can give you a*

*ride to an appointment, someone who can give you legal advice, and someone who can give you*

*advice if you have a conflict with a family member* was important. The majority of respondents

viewed these types of resources as important, so they were retained in the final data analysis.

Conversely, less than half of the pilot test subjects said that it was important to know

*someone who can speak and write a foreign language* (32%), *someone who can discuss with you*

*what political party to vote for* (41%), *someone who is active in a political party* (46%), *or*

*someone who can give advice on using a computer* (46%).  These items, which were viewed as

unimportant by the majority of respondents, were excluded from the analysis of the Adapted

Resource Generator data.

**Table 5**

*Adapted Resource Generator Pilot Test Results (N = 22)*

| Is it important to know someone who...? | Percent Important or Extremely Important |
|---|---|
| Can give you a ride to an appointment | 95.5% |
| Can give you legal advice | 95.5% |
| Can give you advice if you have conflicts with family members | 95.5% |
| You can visit socially | 90.9% |
| Can help you do your taxes | 86.4% |
| Can help looking for information on a medical issue | 86.4% |
| Is knowledgeable about financial matters | 81.8% |
| You can talk to regarding important matters | 81.8% |
| Can help with small jobs around the house | 81.8% |
| Could lend you a small amount of money (a few dollars) if you needed it | 77.3% |
| Shares your views on religion or spirituality | 77.3% |
| Can help with moving | 77.3% |
| Is well-read or has knowledge of literature | 72.7% |
| Is handy repairing household equipment | 68.2% |
| Can play a musical instrument | 59.1% |
| Could lend you a large sum of money (more than $500) if you needed it | 54.5% |
| Keeps a spare key to your house | 54.5% |
| *Can give advice on using a computer* | *45.5%* |
| *Is active in a political party* | *45.5%* |
| *Can discuss with you what political party to vote for* | *40.9%* |
| *Can speak and write a foreign language* | *31.8%* |

In addition to assessing the importance of the resources listed in the Adapted Resource Generator, respondents were asked if they had any other personal relationships or connections that should have been included on the instrument. Most participants did not identify any additional resources. Three participants named additional resources for possible inclusion: a priest or member of the clergy, a physician, and a friend on another floor of their building. As none of the recommendations were repeated by more than one respondent, no additional items were added to the Adapted Resource Generator instrument.

In addition to the survey items eliminated based on feedback from the pilot study participants, reliability analysis was used to evaluate the seventeen remaining ARG variables for internal consistency. As noted in Chapter III, on the primary instrument (rather than the pilot test) the specific resources were scored using an ordinal scale from 0 to 3 based on reported frequency of social contact. Cronbach's alpha was 0.74 for the seventeen item version of the ARG, indicating an acceptable degree of correlation between the variables included on the instrument. Further reduction of the number of items on the ARG instrument would not produce a higher value for $\alpha$, so all 17 items were retained in the analysis.

**Research Question 2:** What are the mental health and social capital characteristics of assisted living residents in Greater Louisville?

Mental health and social capital characteristics were evaluated with two individual-level measures and one community-level measure. Mental well-being was assessed at the individual level with the QOLI instrument. Social connectedness was also evaluated at the individual level with the ARG instrument. Social capital was measured at the community-level using aggregated data from the individual responses to the CES instrument. These characteristics are detailed in Table 6 and described below.

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The QOLI instrument has a potential scoring range from -6.0 to 6.0. Due to the narrow range of QOLI scores typically observed, QOLI raw scores were re-coded as T scores for reporting and analysis in this dissertation. In the general population, T scores between 58 and 77 are classified as "high" quality of life and correspond to the 81st to 99th percentile of respondents. Scores between 43 and 58 are classified as "average" quality of life and correspond to the 21st to 80th percentile of respondents. Scores between 37 and 43 are classified as "low" quality of life and correspond to the 11th to 20th percentile of respondents. Finally, scores between 0 and 37 are classified as "very low" quality of life and correspond to the 1st to 10th percentile (Frisch, 1994). When using the T scores, the anticipated mean for the total population is equal to 50. For the study population, QOLI T scores ranged from 25 to 74, and the mean was 54.7 ($SD =$ 10.9). While somewhat higher than the overall population, the mean T Score for the study population falls in the range for the "average" quality of life classification. QOLI scores could be calculated for 68 of the study participants.

Based on the 17 included items, ARG scores had a potential scoring range of 0 to 51, with increasing scores representing increased frequency of contact with an increasing number of potential resources. Seventy individuals completed the ARG and the observed score range was between 1 and 44 points. The mean social connectedness score for the study population was 21.6 ($SD = 7.6$) suggesting that respondents had limited contact with their connections.

For social capital, 73 individuals completed the CES instrument. Potential scores on the CES ranged from 7 to 35, but the observed range from respondents was between

16 and 34 points. Considering the study population as representative of the elderly

population in Greater Louisville, the mean CES score was 25.9 ($SD = 4.8$).


**Table 6**

*Mean and (SD) Mental Health and Social Capital Characteristics for Assisted Living*

*Residents in Greater Louisville*

|  | Louisville Assisted Living Communities |
|---|---|
| Mental Well-Being (QOLI) T Scores<br>   Possible Range: 0 - 77 | 54.7 (10.9) |
| Social Connectedness (ARG)<br>   Possible Range: 0 - 51 | 21.6 (7.6) |
| Social Capital (CES)<br>   Possible Range: 7 - 35 | 25.9 (4.8) |


In addition to the characteristics of the study population as a whole, descriptive

statistics were produced for the individual assisted living communities (Table 7). Due to

the small sample size at each location, the assumptions for an analysis of variance were

violated. As such, potential differences across the communities could not be identified.

Mean mental well-being scores were calculated for each of the six study

communities, and the average QOLI scores ranged from 51.4 to 59.0. Social

connectedness scores were averaged for each of the study communities and mean ARG

scores ranged from 19.1 to 25.0.

Community-level social capital scores were also calculated. As noted previously

in this chapter, because the community-level CES score would be used beyond this

descriptive discussion for the primary study analysis, CES scores were only calculated

for communities where at least 75% of the subjects provided CES data.  Because of the

limited number of participants recruited at community F, a mean CES score was not

calculated for this community.  Mean CES scores for the remaining communities ranged

from 23.3 to 28.1.

**Table 7**

*Mean and (SD) Mental Health and Social Capital Characteristics for Specific Assisted*

*Living Communities*

| | **Assisted Living Community** | | | | | |
|---|---|---|---|---|---|---|
| | **A** | **B** | **C** | **D** | **E** | **F** |
| Number of Participants | 14 | 9 | 9 | 22 | 20 | 2 |
| Mental Well-Being (QOLI) Possible Range: 0 - 77 | 54.9 (7.2) | 55.4 (18.5) | 51.4 (9.1) | 56.3 (12.0) | 53.5 (9.6) | 59.0 (--) |
| Social Connectedness (ARG) Possible Range: 0 - 51 | 22.2 (6.8) | 22.6 (6.3) | 19.1 (9.5) | 23.4 (6.4) | 19.8 (9.0) | 25.0 (--) |
| Social Capital (CES) Possible Range: 7 - 35 | 28.1 (3.8) | 26.5 (5.8) | 23.3 (5.3) | 26.8 (4.2) | 24.6 (4.8) | --- |

Because mental well-being was the dependent variable for the two primary study

hypotheses to be tested, it was important to consider other factors that may have

influenced mental well-being in the study population.  Pearson's correlation test was used

to identify other continuous demographic and health characteristics that may have been

potential confounders for mental well-being.  Similarly, Spearman's rank order

correlation test was used for ordinal characteristics.  QOLI T scores were not

significantly correlated with age, $r(64) = 0.03$, $p = 0.801$; educational attainment, $r_s(66) =$

0.05, $p = 0.693$; years of residence, $r(65) = 0.04$, $p = 0.745$; general health status, $r_s(66) =$

-0.04, $p = 0.762$; instrumental activities of daily living, $r(65) = 0.19$, $p = 0.124$; or

cognitive impairment, $r(66) = 0.19$, $p = 0.216$.


**Research Question 3:** What are the characteristics of the built environment at assisted

living communities in Greater Louisville?


Characteristics of the built environment were assessed using the SWEAT-R

instrument for the micro-neighborhoods surrounding twelve assisted living facilities in

Greater Louisville. As noted in Chapter III, the SWEAT-R instrument assessed 165

separate variables for each street segment located within a micro-neighborhood.  Because

all of the assisted living facilities were located in Greater Louisville, they were all guided

by *Cornerstone 2020*, the city's comprehensive plan for neighborhood design and zoning

(Louisville and Jefferson County Planning Commission, 2000).  As such, there was no

variability observed for 30% of the variables tracked by the SWEAT-R instrument across

the 84 segments included in the 12 micro-communities.  Including these items in the

dataset would be useful for comparing Louisville facilities with other regions, but were

not meaningful for the current analysis. Therefore, five representative indicators were

evaluated for each of the four domains measured by the instrument: functionality, safety,

aesthetics and destinations.  Each of these representative indicators was scored 0, 1, or 2

points based on the range of possible values for constrained variables (e.g. the percentage

of street segments with a gentle slope could range from 0 to 100%) or the range of

observed values for unconstrained variables (e.g. the maximum number of trees observed

per street segment was 19).  The complete scoring model is detailed in Appendix G and the underlying data is presented in Appendix H.

Based on this model, each of twelve assisted living communities were scored on 20 indicators of built environment quality (Appendix G) and the overall built environment quality was classified as high, medium, or low for the micro-neighborhood. Of the twelve communities, 2 were located in micro-neighborhoods classified as low quality, 7 were in medium quality micro-neighborhoods, and 3 were in high quality micro-neighborhoods (Table 8).  This distribution suggests that this scoring model is an effective way to quantify the diversity of built environment quality surrounding Louisville assisted living communities.

It should be noted that these built environment scores were intended to guide recruitment of assisted living communities.  Although there is considerable variability in built environment quality at Louisville assisted living communities, I was unsuccessful at obtaining permission to conduct individual interviews at any of the sites scoring in the "low" range.  Consequently, the six sites in which addition data were collected did not differ much in terms of built environment quality - all six were of high or medium quality.

**Table 8**

*Built Environment Quality Scores for Selected Louisville Assisted Living Facilities*

| | Assisted Living Community | | | | | | | | | | | |
| | Sites for Individual Interviews | | | | | | | | | | | |
| | A | B | C | D | E | F | G | H | J | K | L | M |
| **Functionality** | | | | | | | | | | | | |
| Benches (number per segment) | 1 | 0 | 1 | 2 | 2 | 1 | 2 | 1 | 0 | 0 | 2 | 1 |
| Sidewalk Continuity (%) | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| Sidewalk Condition (% good) | 2 | 2 | 1 | 0 | 0 | 2 | 2 | 2 | 2 | 1 | 0 | 1 |
| Slope (% gentle) | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 2 | 0 | 1 | 2 |
| Buffer Zone (%) | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 |
| **Safety** | | | | | | | | | | | | |
| Streetlights (number per segment) | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| Lanes of Traffic (% 1 or 2 lanes) | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 0 | 2 | 2 |
| Marked Crossings (%) | 0 | 0 | 2 | 2 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| Crossings Signage (%) | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 0 | 2 | 0 | 2 |
| Ramps and Curb Cuts (%) | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 0 | 2 | 0 | 2 |
| **Aesthetics** | | | | | | | | | | | | |
| Trees (number per segment) | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 2 | 1 |
| Yard Maintenance (% well-maintained) | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Building Condition (% well-maintained) | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Litter (% with no litter) | 2 | 2 | 1 | 0 | 1 | 2 | 2 | 2 | 2 | 0 | 0 | 2 |
| Public Spaces (% high quality) | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| **Destinations** | | | | | | | | | | | | |
| Gathering Places (yes/no) | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| Retail (yes/no) | 2 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| Health Care (yes/no) | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Transit (yes/no) | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Land Use (number of unique land uses) | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 2 |
| **Total** | | | | | | | | | | | | |
| Score | 31 | 21 | 31 | 29 | 32 | 18 | 19 | 24 | 14 | 16 | 14 | 29 |
| Classification | HIGH | MED | HIGH | MED | HIGH | MED | MED | MED | LOW | MED | LOW | MED |

Domain
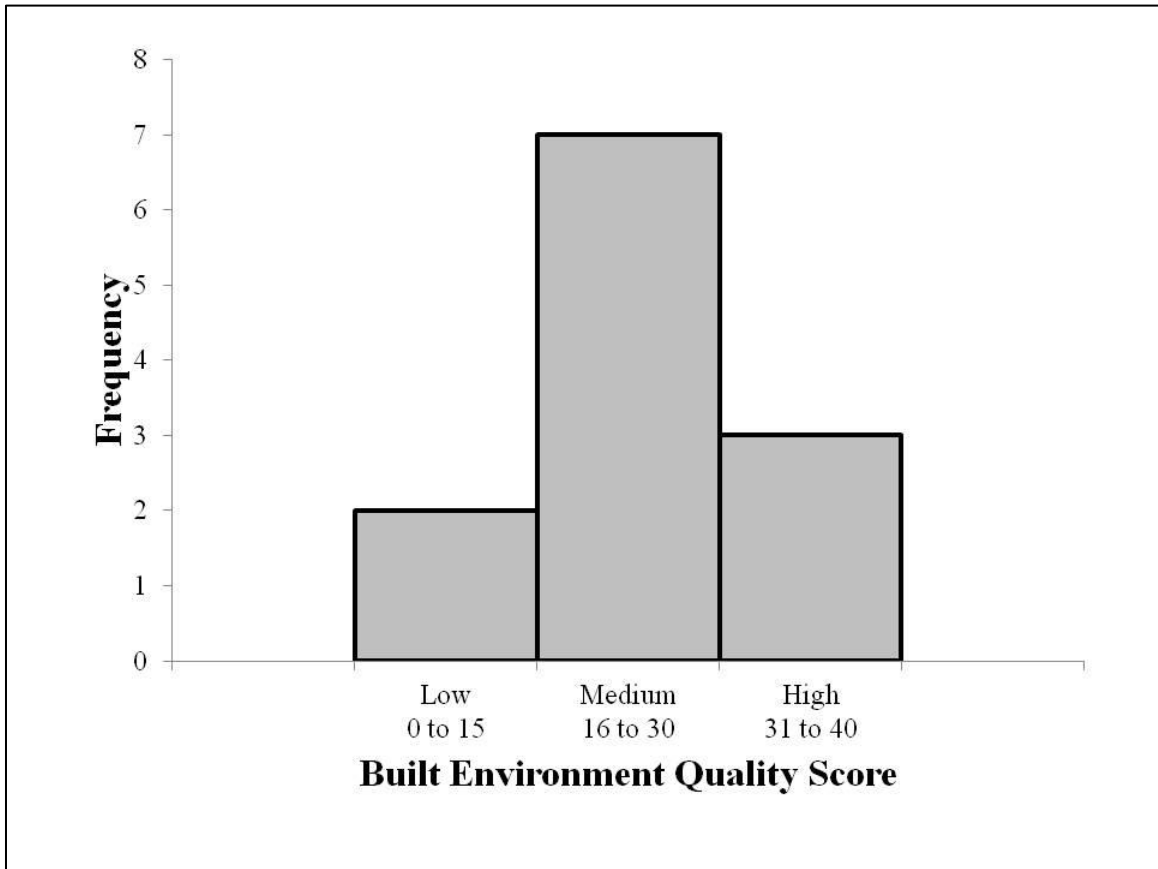
*Figure 6.* **Distribution of Built Environment Quality scores in Greater Louisville.**

Primary Statistical Analysis

**Research Question 4:** Is there a positive relationship between individual social

connectedness and mental well-being for residents in assisted living communities in

Greater Louisville? **Hypothesis:** Mental well-being will be significantly positively

associated with social connectedness in the study population.

The fourth research question identified for this study pertains to the relationship

between social connectedness and mental well-being for elderly residents of assisted

living communities. Is social connectedness, as measured by the Adapted Resource Generator, associated with mental well-being, as measured by the Quality of Life Inventory? As noted in the previous chapter, I hypothesized that mental well-being would be positively associated with social connectedness, and this relationship would have a medium effect size.

A simple regression analysis was used to test the hypothesis that there is a linear relationship between mental well-being and social connectedness that can be described by the following equation:

$$\textbf{MH} = \boldsymbol{\alpha} + \boldsymbol{\beta}_{\textbf{SCN}}\textbf{SCN}$$

where the dependent variable, MH, is the mental health measurement from the Quality of Life Inventory, $\alpha$ is the y-intercept for the equation, SCN is the participant's social connectedness score from the Adapted Resource Generator and $\beta_{SCN}$ is the regression coefficient. The null hypothesis for this analysis is that the slope of the line which best describes the relationship between MH and SCN is equal to zero.

Figure 7 plots the data used in this analysis. In this figure, mental well-being is measured along the y-axis using T scores from the QOLI, and social connectedness is measured along the x-axis using ARG scores. The association between the independent variable (social connectedness) and the dependent variable (mental well-being) is statistically significant and social connectedness explained about 15% of the variance in mental well-being for the study population: $\beta = 0.381$; $R^2 = 0.15$, $F(1, 63) = 10.73$, $p = 0.002$. As increased social connectedness is positively associated with increased mental well-being, the null-hypothesis for this research question is rejected.
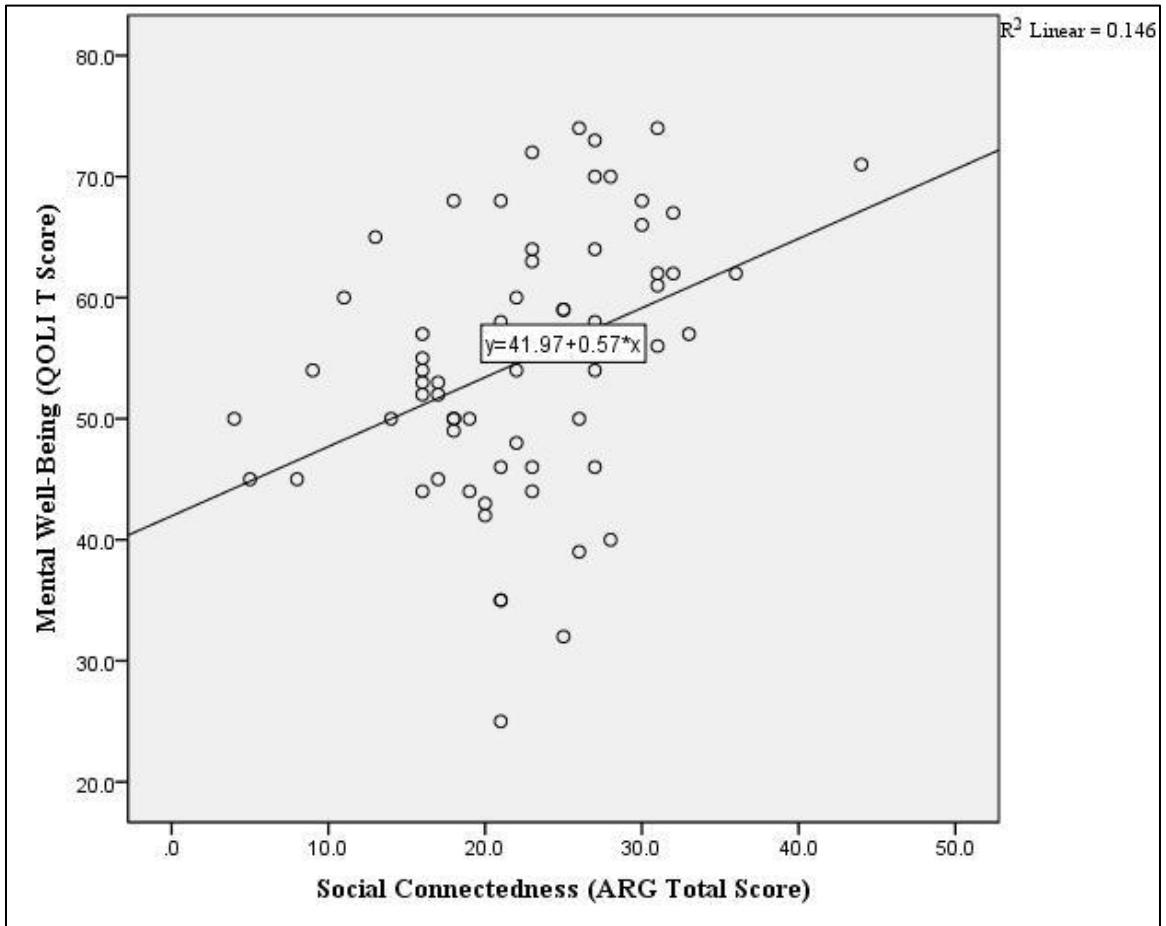
*Figure 7.* **Plot of mental well-being and social connectedness.**

The validity of linear regression relies on a number of assumptions that must be verified for any dataset. The scatter plot illustrated in Figure 7 demonstrates that there is the necessary linear relationship. An evaluation of Cook's distance did not yield any values greater than 1, so outliers are not a limitation for this analysis. A plot of the residuals confirmed homoscedasticity in the dataset, so the amount of variability in QOLI scores was about the same regardless of the ARG score, and a histogram indicated these

residuals were normally distributed. A challenge emerged with the final test assumption: the assumption of independent observations. The Durbin-Watson test statistic (d = 1.43) fell slightly short of the lower critical value for the test ($d_L$ = 1.57, N = 65, k = 1). This test indicates that the residuals in this model may be positively autocorrelated with one another, and therefore not independent. As such, the results of this regression should be interpreted with caution.

**Research Question 5:** What other factors are predictive of mental well-being for assisted living facility residents in Greater Louisville? **Hypothesis:** Mental well-being will be significantly positively associated with social connectedness, social capital and built environment quality in the study population.

The fifth and final research question was posed to expand on the preceding research question and incorporate community social capital and built environment quality into the model. A multiple linear regression analysis was used to test the hypothesis that there is a linear relationship between individual mental well-being and the participant's built environment, community social capital and personal social connectedness. This relationship could be described by the following equation:

$$MH = \alpha + \beta_{BE}BE + \beta_{SCP}SCP + \beta_{SCN}SCN$$

where the dependent variable, MH, is the mental health measurement from the Quality of Life Inventory, $\alpha$ is the y-intercept for the equation, SCN is the participant's social connectedness score and $\beta_{SCN}$ is the regression coefficient as in the preceding research question. This model incorporates two additional independent variables: BE, the built

environment quality measure determined from the SWEAT-R instrument, and SCP, the community social capital score determined from the Collective Efficacy Scale. Each of these variables have corresponding regression coefficients: $\beta_{BE}$ and $\beta_{SCP}$, respectively.

I hypothesized that this combined model would be more predictive of mental well-being than the simple linear relationship described by the previous equation. The null hypothesis for this analysis is that the regression coefficients for BE, SCP, and SCN are jointly zero and there would be no multiple regression effect.

As with the preceding model, the association between the independent variables and the dependent variable (mental well-being) is statistically significant: $R^2 = 0.15$, $F(3, 60) = 3.51$ $p = 0.021$. However, this model does not represent an improvement over the model proposed by research question four. The beta weights for built environment quality $\{\beta = 0.02, t(60) = 0.18, p = 0.857\}$ and community-level social capital $\{\beta = 0.07, t(60) = 0.58, p = 0.562\}$ are very small and non-significant, indicating that these variables do not contribute meaningfully to the model. Only individual-level social connectedness was predictive of mental well-being in the model: $\beta = 0.37$, $t(60) = 3.05$, $p = 0.003$. This regression coefficient is effectively the same as what was found when social connectedness was the only factor in the model, indicating the simple linear regression is a better model.

As with the previous research question, the assumptions implicit in a multiple regression analysis must be evaluated. Again, the evaluation of Cook's distance did not yield any values greater than 1, so outliers are not a limitation for this analysis. In this case, the Durbin-Watson statistic (1.95) exceeded the upper critical value for the test ($d_U = 1.534$, N = 65, k = 3), supporting the assumption that the residuals are independent.

As noted in Chapter IV, this model assumes that community-level CES scores have discriminative validity and measure a construct that is distinct from ARG scores.  At the community-level, there was very little variability in CES scores across the six assisted living communities in the study (Table 7).  Although there was no association between ARG scores and community-level CES scores, there was a significant association between ARG scores and the individual-level CES scores that were used to produce the community-level scores.  For ARG and individual-level CES scores (iCES), $r(66) =$ 0.381, $p = 0.001$.  Given the precedent in the literature for using CES scores at either the individual or community level, iCES seemed to warrant analysis.

Although the planned analysis did not show the anticipated effect, this study did yield additional findings.  To better understand the factors that predict mental well-being for the study population, additional analyses were performed.  In the next iteration of the model, the built environment quality score was removed as a covariate.  As noted earlier in this chapter, there was limited variability in the built environment scores for the six assisted living communities which agreed to take part in this study.  All six communities scored in the medium or high range for built environment quality.  Instead of using the built environment quality score as a covariate, community ID was included as a fixed factor categorical variable.  By recognizing that the respondents share a common place of residence, this fixed factor may act as a proxy variable for built environment quality, although it should be noted that it may also reflect other differences between the six communities.

The other adaptation to the model was to replace the community-level social capital scores with iCES, the individual survey results from which the community score

was calculated. A general linear model was constructed with community ID included as a fixed factor, and individual-level social connectedness and individual-level social capital included as covariates, to predict the dependent variable of mental well-being.

The $F$ test was significant: $F(7, 56) = 3.00$, $p = 0.01$), indicating the null hypothesis that mental well-being was independent of the factors included in this model should be rejected. Overall, this revised model produced a larger coefficient of determination than the previous analysis, $R^2 = 0.27$, indicating that this model explains 27% of variation in mental well-being for the study population. Within this model, it is evident that individual-level social capital is an important predictor of mental well-being, more so than social connectedness. For individual social capital, $\beta = 0.42$; $F(1, 56) = 8.79$, $p = 0.004$, indicating that mental well-being is not independent of individual-level social capital, and social capital variability within communities is an important variable.

For individual social connectedness, $\beta = 0.22$; $F(1, 56) = 2.47$, $p = 0.122$, indicating the relationship between social connectedness and mental well-being is not statistically significant. Including individual-level social capital in the model actually diminishes the apparent relationship between social connectedness and mental well-being. Marginally, social connectedness is not as important to mental well-being as individual-level social capital.

Notably, the fixed factor variable of community ID was not a meaningful addition to this model. The null hypothesis that mental well-being is independent of community of residence is not rejected: $F(5, 56) = 0.08$, $p = 0.995$.

CHAPTER V

DISCUSSION

As previously noted, this dissertation employed a quantitative design to answer

five research questions:

**Research Question 1:** Is an adapted version of a Resource Generator an

appropriate instrument for measuring individual social connectedness

among residents of assisted living communities in Greater Louisville?

**Research Question 2:** What are the mental health and social capital

characteristics of assisted living residents in Greater Louisville?

**Research Question 3:** What are the characteristics of the built

environment at assisted living communities in Greater Louisville?

**Research Question 4:** Is there a positive relationship between individual

social connectedness and mental well-being for residents in assisted living

communities in Greater Louisville? **Hypothesis:** Mental well-being will

be significantly positively associated with social connectedness in the

study population.

**Research Question 5:** What other factors are predictive of mental well-

being for assisted living facility residents in Greater Louisville?

**Hypothesis:** Mental well-being will be significantly positively associated

with social connectedness, social capital and built environment quality in

the study population.

This chapter will elaborate on the findings for each of these research questions in turn. This will be followed by a discussion of the broader implications and limitations of this study and recommendations for further research.

## Study Findings

**Research Question 1:** Is an adapted version of a Resource Generator an appropriate instrument for measuring individual social connectedness among residents of assisted living communities in Greater Louisville?

Resource generators are a fairly new approach to measuring social connectedness, but these new instruments align well with Bourdieu's conception of social connectedness (1986) as the construct was operationalized for this study. The original resource generator developed by Van der Gaag and Snijders (2004) was intended for community-dwelling adults across the age spectrum in the Netherlands. Currently, researchers have developed a resource generator for the U.S. population (Foster, 2011), but the instrument evaluation findings and psychometric properties have not yet been peer-reviewed. For the purposes of the current study, it was necessary to develop a new instrument for American older adults: the Adapted Resource Generator.

Based on the results of this study, the Adapted Resource Generator was an appropriate instrument for measuring social connectedness with assisted living residents. The items in the instrument were well correlated with each other, suggesting that they do relate to the same underlying construct of social connectedness. To verify the utility of

the Adapted Resource Generator, a subset of participants were asked to evaluate the importance of the resources listed on the instrument and to recommend other potential resources for inclusion. This pilot test indicated that the majority of the items included on the instrument were perceived to be important by the study population. When asked to propose additional types of resources, only three respondents offered suggestions.

Notably, each of the proposed additions to the Adapted Resource Generator could have been contained within an existing resource category: a priest or member of the clergy (*someone who shares your views on religion or spirituality*), a physician (*someone who can help looking for information on a medical issue*), and a friend on another floor of their building (*someone you can visit socially*). While the items included on the Adapted Resource Generator had good reliability and face validity, further research on the instrument and its psychometric properties is warranted.

**Research Question 2:** What are the mental health and social capital characteristics of assisted living residents in Greater Louisville?

Overall, the assisted living residents surveyed reported positive mental well-being on the Quality of Life Inventory. By definition, the mean QOLI standardized score for the general population is 50. The mean QOLI T score for the study population was nearly 55, indicating a slightly higher level of mental well-being than is typical.

Social connectedness was measured using the Adapted Resource Generator. The mean score was just shy of 26 out of a possible 51 points. Because resources were scored based on their frequency of contact, other residents of the assisted living facility who

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could act as a resource for the subject had the most potential to contribute to the overall score. The relatively low mean ARG score reflects a tendency of the subjects to rely on people who lived outside of the assisted living community for favors. Although this was not formally tracked in the data, anecdotally, respondents seemed to look to their adult children most often for resources or favors.

Community social capital, as measured by the CES, was fairly high for the study population. The mean score was nearly 26 points out of a potential range of 7 to 35. This indicates that respondents tended to agree with the positive variables and disagree with the negative variables about the assisted living community where they lived. Overall, respondents perceived high levels of trust and reciprocity in their communities.

Notably, these three variables revealed considerable homogeneity in the study sample. The six assisted living communities that participated were generally very similar demographically, but they also presented considerable similarities for the primary study variables. For example, there were no statistical differences across the six communities in mental well-being. Further, there were no statistical differences in social connectedness or social capital. As will be discussed in the limitations section, this homogeneity created challenges for the subsequent hypothesis testing.

**Research Question 3:** What are the characteristics of the built environment at assisted living communities in Greater Louisville?

To address the third research question, this study used an existing instrument (Michael et al.'s SWEAT-R) and a modified protocol to evaluate the built environment

surrounding twelve assisted living communities.  Rather than evaluating a random

sampling of street segments in a larger region, the study protocol for this dissertation

called for an exhaustive sampling of all street segments within a micro-neighborhood.

Scoring these micro-neighborhoods across 20 domains revealed considerable variability

in built environment quality across different facilities.

Of the twelve communities evaluated using the SWEAT-R environmental audit

protocol, 2 scored in the low range, 7 scored in the medium range, and 3 scored in the

high range.  I attempted to recruit study sites from across the scoring range, however the

six communities which granted permission for the individual interviews were all in the

medium or high scoring ranges.

**Research Question 4:**  Is there a positive relationship between individual social

connectedness and mental well-being for residents in assisted living communities in

Greater Louisville?  **Hypothesis:** Mental well-being will be significantly positively

associated with social connectedness in the study population.

The fourth research question presented the first hypothesis tested by this

dissertation: I hypothesized that mental well-being would be significantly positively

associated with social connectedness in the study population and this hypothesis was

supported.  While the assumptions of regression analysis were not strictly met, higher

levels of social connectedness supported improved mental well-being.  For older adults in

assisted living communities, the people they know who can provide them with resources

or favors increase that person's happiness and enhance their mental well-being - at least to some degree.

**Research Question 5:** What other factors are predictive of mental well-being for assisted living facility residents in Greater Louisville? **Hypothesis:** Mental well-being will be significantly positively associated with social connectedness, social capital and built environment quality in the study population.

The fifth and final research question addressed by this dissertation built upon the previous hypothesis to ask "what other factors are predictive of mental well-being for assisted living facility residents in Greater Louisville?" I hypothesized that mental well-being would be significantly positively associated with social connectedness, social capital and built environment quality in the study population. Ultimately, this analysis did not prove fruitful due to the lack of variability in the observed values for community-level social capital and built environment quality.

Further exploration of the data revealed that social capital was a more informative variable at the individual, rather than community, level. The artificial delineation created between social connectedness and social capital for the purposes of this dissertation was not entirely successful, as the two variables were significantly associated with one another.

The regression model was revised to include social capital at the individual level. Although built environment quality did not emerge as a meaningful variable for predicting mental well-being, taken together, social connectedness and social capital

explain about 27% of the variance in mental well-being.  In addition to the resources they may know, increasing perceptions of community trust and reciprocity are associated with increased mental well-being for older adults in assisted living communities.

Limitations

Generally speaking, this study included two types of limitations: those that were planned and those that emerged in the execution of the study protocol.  The planned limitations were detailed in Chapter I.

As previously noted, the study was delimited to residents of six selected assisted living communities located in Louisville, Kentucky.  For inclusion in the study, authorized representatives of the assisted living community staff needed to consent to the facility's participation and individual participants had to volunteer for the study and consent to be interviewed.  Exclusion criteria for individuals were age less than 65, difficulty communicating in spoken English, and severe cognitive impairment.  In general, the delimitations were planned limitations that would impede the generalizability of the study findings to communities beyond Louisville.  The requirement for staff authorization in order to conduct individual interviews at a given location emerged as a more significant limitation than was anticipated.  Due to the difficulty in recruiting study sites, I was unable to secure a range of built environment quality scores.

Due to the difficulty in recruiting sites, the study also enrolled residents from smaller communities than anticipated.  While each of the study communities was a large facility, the continuum of care available meant that fewer of the residents received assisted living or personal care services.  In order to reach the enrollment target of 76

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subjects, the study was expanded from four sites to six.  The limited number of

participants per facility precluded a definitive comparison of the communities'

demographic and health characteristics.

Additionally, the study participants were identified through volunteer sampling.

Because participants were not randomly selected, they may not be representative of the

general population of assisted living residents in Louisville and self-selection bias is a

concern.  It cannot be known if the residents who agreed to participate in the study

differed from their neighbors who declined to participate in important ways.  Moreover, a

substantial number of volunteers were unable to complete the study due to severe

cognitive impairment. As such, the final study sample was comprised of only those

individuals who were well enough and motivated enough to complete the lengthy

interview protocol without compensation.

Additionally, study results were based on self-reported data obtained during in-

person interviews.  Generally speaking, the proposed instrumentation had been validated

previously and found to be reliable with older adults.  However, not all of the measures

had been used with an assisted living population in the past, and the psychometric

properties for older adults living independently or those in nursing homes may not be the

same for assisted living residents.  The primary independent variable, social

connectedness, was measured using an adaptation of an existing instrument, in order to

tailor the instrument to the study population.  As a result of this modification, the

psychometric properties for this measure are unknown.

A final limitation was the sample size.  Several of the study participants provided

incomplete data, which brought the effective sample size below the target of 76 subjects.

The study was powered to detect a moderate effect size using multiple regression with three independent variables. The participants exhibited more homogeneity than was anticipated. Both the demographics characteristics and the study variables were very similar across the study communities. Given the number of participating communities and the observed effect size, the study was likely underpowered and would have benefited from additional subject recruitment. Additional participants would have increased the potential for the study design to detect more modest differences.

The small sample size problem was exacerbated in the analysis of individual social capital scores because a number of respondents had missing data. The issue of missing data was obscured in the community-level CES scores since that figure was an average of available observations. It is possible that the regression model using social connectedness and individual social capital improved upon the model of social connectedness alone due to the omission of specific cases. While this scenario is unlikely, data from additional subjects is needed to rule it out.


Conclusions

Overall, this study provides evidence that increased social connectedness and social capital are associated with improved mental well-being for older adults in assisted living communities. Social capital was a more meaningful construct at the individual, rather than community, level for this population. Prior to this study, the literature suggested that social capital and social connectedness had a protective effect against adverse health outcomes, and increased social capital and social connectedness were associated with decreased rates of mental illness and depression. This study suggests that

the effect of social capital and social connectedness on health has implications for health

promotion, as these factors are associated with a decrease in illness and a corresponding

increase in mental wellness.

Built environment quality did not produce the anticipated effect for the study

population. The built environment quality for the micro-neighborhood in which the

assisted living facility was located was independent of the levels of mental well-being

reported by the facility's residents. Because the built environment quality scores for the

participating facilities were quite similar, this study is more likely to have failed to detect

an existing relationship between mental well-being and the built environment.

<p style="text-align:center"><u>Future Directions</u></p>

Other researchers have addressed the need to increase clarity around the definition

of social capital, and this study was no exception (Kawachi et al., 2010; McKenzie &

Harpham, 2006). For this dissertation, the concept of social capital was subdivided as an

individual-level concept (called "social connectedness") and a community-level concept

(called "social capital"), to reflect the interpretations of different researchers. As a field,

social capital researchers need to improve the clarity of their definitions and

instrumentation for measuring different facets of the construct. Further testing of the

psychometric properties of the Adapted Resource Generator could aid in this effort.

Further, this study warrants replication and expansion to achieve a more robust

sample size. Increasing the number of communities and participants would provide

increased clarity to the relationship between mental well-being and social capital and

social connectedness. As understanding of the roles of these factors with regards to

<p style="text-align:center">117</p>

mental health increases, researchers can also explore ways to intervene with assisted living residents to impact social capital and social connectedness.

Although built environment quality did not emerge as a meaningful variable in this study, the literature makes it clear that where we live does matter to our health. The method used for evaluating the built environment in this dissertation warrants further exploration. The variability observed among the twelve assisted living communities makes it clear that not all environments are created equal, and several do a poor job of addressing the needs of older adults. Satariano et al. (2012) noted that that the public health consequences of impaired mobility include a decline in access to services, social contacts, and participation in civic life, along with an increase in adverse health outcomes. The authors advocate for an integrated mobility agenda focusing on walking, driving, and other forms of mobility for aging populations and a more comprehensive approach to aging research and health policy (Satariano et al., 2012). The method for evaluating the built environment in this dissertation could be replicated with other micro-communities surrounding senior-oriented spaces to advance this research agenda. While there is merit to making all communities more accessible to the needs of older adults, when a space is designated for senior-oriented services, like an assisted living facility, senior center or other land use, those spaces should work for older adults. The micro-neighborhood approach makes it possible to pinpoint the areas surrounding these senior-oriented spaces, which arguably should be the top priority for any policy interventions.

Given the prior evidence of the impact of the built environment on health, the variability in built environment quality could reflect a health disparity. The U.S. Health and Human Services Secretary's Advisory Committee for *Healthy People 2020* drafted an

operational definition for the term "health disparities." According to the Committee, health disparities are "systematic, plausibly avoidable health differences adversely affecting socially disadvantaged groups; they may reflect social disadvantage, but causality need not be established" (Braveman et al., 2011). In this regard, healthy aging is a social justice issue and further research is needed to provider more equitable opportunities for healthy aging to all older adults.

The largest birth cohort in the history of the United States is getting older, making health aging a more pressing issue than ever. Mental well-being is a critical facet of health status. We must ensure that older adults are able to maintain not only their physical and cognitive health, but also their mental well-being. Social capital and social connectedness are important contributors to mental well-being. Assisted living communities should endeavor to support social capital for their residents, by helping them maintain their pre-existing community ties as well as forge new relationships. Activities and programming at assisted living communities should be designed to enhance social capital for residents.

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APPENDICES

## Appendix A: Collective Efficacy Scale

Instructions: The next set of questions asks about your neighborhood.  By neighborhood,

I mean (name of assisted living facility).

|  | **Strongly Agree** | **Somewhat Agree** | **Neither Agree Nor Disagree** | **Somewhat Disagree** | **Strongly Disagree** |
|---|---|---|---|---|---|
| People around here are willing to help their neighbors. | 5 | 4 | 3 | 2 | 1 |
| This is a close-knit neighborhood. | 5 | 4 | 3 | 2 | 1 |
| People in this neighborhood can be trusted. | 5 | 4 | 3 | 2 | 1 |
| People in this neighborhood generally don't get along with each other. | 1 | 2 | 3 | 4 | 5 |
| People in this neighborhood don't share the same values. | 1 | 2 | 3 | 4 | 5 |
| You can count on adults in this neighborhood to watch out that children are safe and don't get in trouble. | 5 | 4 | 3 | 2 | 1 |
| People in this neighborhood would intervene if a fight broke out in front of their house. | 5 | 4 | 3 | 2 | 1 |

| | | |
|---|---|---|
| **Observer ID** | | |
| **Date (mm/dd/yy)** | | |
| **Community ID** | | |
| **Start Time** | | |
| **Temperature (°F)** | | |
| **Is it raining?** | yes=1; no=2 | |
| Answer questions 1-5 at the NW corner of the segment | | |
| **NW Corner of Segment** | | |
| 1a. Is there an **intended NW** crossing area for pedestrians? | 1 | yes=1; no=2 |
| 1b. Is the crossing area marked? (i.e. painted lines, zebra striping, and different road surfaces/paving) | 2 | yes=1; no=2 <br> NA (no intended crossing)=99 |
| 2. Determine whether any of these **traffic/pedestrian signals and systems** are provided.  Mark all that apply | | |
| Traffic signal | 3 | yes=1; no=2 <br> NA (no intended crossing)=99 |
| Stop sign | 4 | yes=1; no=2 <br> NA (no intended crossing)=99 |
| Yield sign | 5 | yes=1; no=2 <br> NA (no intended crossing)=99 |
| Pedestrian crossing sign | 6 | yes=1; no=2 <br> NA (no intended crossing)=99 |
| Pedestrian <u>activated</u> signal | 7 | yes=1; no=2 <br> NA (no intended crossing)=99 |
| Pedestrian signal (<u>not</u> activated by pedestrian) | 8 | yes=1; no=2 <br> NA (no intended crossing)=99 |
| Pedestrian overpass/underpass/bridge | 9 | yes=1; no=2 <br> NA (no intended crossing)=99 |
| 3. Time **traffic signal** (Green) or **pedestrian signal** (walk) | 10 | Seconds; <br> NA (no signal)=9898; <br> NA (no intended crossing)=9999 |
| 4a. Does this end of the segment have **ramps or curb cuts**? | 11 | One side=1; <br> Both sides=2; <br> None=3; |

| | | | |
|---|---|---|---|
| | | NA (no sidewalk/curb)=98 | |
| 4b. Determine whether the following **curb cut features** are present. | | | |
| Grooves or bumps | 12 | yes=1; no=2 NA (no curb cuts)=98 | |
| Color contrast with ground surface | 13 | yes=1; no=2 NA (no curb cuts)=98 | |
| Material contrast with ground surface | 14 | yes=1; no=2 NA (no curb cuts)=98 | |
| Broad apron curb cuts | 15 | yes=1; no=2 NA (no curb cuts)=98 | |
| 5. measured <u>maximum</u> **curb height** at this segment end. | 16 | Inches; NA (curb cuts/no sidewalk)=98 | |
| Answer questions 6-10 at the mid-segment crossing area. | | | |
| **Mid-Block Crossing Area** | | | |
| 6a. Is there an **intended** mid-block crossing area for pedestrians? | 17 | yes=1; no=2 | |
| 6b. Is the crossing area marked? (i.e. painted lines, zebra striping, and different road surfaces/paving) | 18 | yes=1; no=2 NA (no intended crossing)=99 | |
| 7. What type of **traffic/pedestrian signal(s)/system(s)** is/are provided? Mark all that apply. | | | |
| Traffic signal | 19 | yes=1; no=2 NA (no intended crossing)=99 | |
| Stop sign | 20 | yes=1; no=2 NA (no intended crossing)=99 | |
| Yield sign | 21 | yes=1; no=2 NA (no intended crossing)=99 | |
| Pedestrian crossing sign | 22 | yes=1; no=2 NA (no intended crossing)=99 | |
| Pedestrian <u>activated</u> signal | 23 | yes=1; no=2 NA (no intended crossing)=99 | |
| Pedestrian signal (<u>not</u> activated by pedestrian) | 24 | yes=1; no=2 NA (no intended crossing)=99 | |
| Pedestrian overpass/underpass/bridge | 25 | yes=1; no=2 NA (no intended crossing)=99 | |
| 8. Time **traffic signal** (Green) or **pedestrian signal** (walk) | 26 | Seconds; NA (no signal)=9898; NA (no intended | |

140

| | | | |
|---|---|---|---|
| | | crossing)=9999 | |
| 9a. Does the crossing area have **ramps or curb cuts**? | 27 | One side=1; Both sides=2; None=3; NA (no sidewalk/curb)=98 | |
| 9b. Determine whether the following **curb cut features** are present. | | | |
| Grooves or bumps | 28 | yes=1; no=2 NA (no curb cuts)=98 | |
| Color contrast with ground surface | 29 | yes=1; no=2 NA (no curb cuts)=98 | |
| Material contrast with ground surface | 30 | yes=1; no=2 NA (no curb cuts)=98 | |
| Broad apron curb cuts | 31 | yes=1; no=2 NA (no curb cuts)=98 | |
| 10. Measured <u>maximum</u> **curb height** at this segment end. | 32 | Inches; NA (curb cuts/no sidewalk)=98 | |
| Answer questions 11-15 at the SE corner of the segment. | | | |
| **SE Corner of Segment** | | | |
| 11a. Is there an **intended** SE crossing area for pedestrians? | 33 | yes=1; no=2 | |
| 11b. Is the crossing area marked? (i.e. painted lines, zebra striping, and different road surfaces/paving) | 34 | yes=1; no=2 NA (no intended crossing)=99 | |
| 12. What type of **traffic/pedestrian signal(s)/system(s)** is/are provided? Mark all that apply. | | | |
| Traffic signal | 35 | yes=1; no=2 NA (no intended crossing)=99 | |
| Stop sign | 36 | yes=1; no=2 NA (no intended crossing)=99 | |
| Yield sign | 37 | yes=1; no=2 NA (no intended crossing)=99 | |
| Pedestrian crossing sign | 38 | yes=1; no=2 NA (no intended crossing)=99 | |
| Pedestrian <u>activated</u> signal | 39 | yes=1; no=2 NA (no intended crossing)=99 | |
| Pedestrian signal (<u>not</u> activated by pedestrian) | 40 | yes=1; no=2 NA (no intended crossing)=99 | |
| Pedestrian overpass/underpass/bridge | 41 | yes=1; no=2 | |

| | | NA (no intended crossing)=99 | |
|---|---|---|---|
| 13. Time **traffic signal** (Green) or **pedestrian signal** (walk) | 42 | Seconds; NA (no signal)=9898; NA (no intended crossing)=9999 | |
| 14a. Does the crossing area have **ramps or curb cuts**? | 43 | One side=1; Both sides=2; None=3; NA (no sidewalk/curb)=98 | |
| 14b. Determine whether the following **curb cut features** are present. | | | |
| Grooves or bumps | 44 | yes=1; no=2 NA (no curb cuts)=98 | |
| Color contrast with ground surface | 45 | yes=1; no=2 NA (no curb cuts)=98 | |
| Material contrast with ground surface | 46 | yes=1; no=2 NA (no curb cuts)=98 | |
| Broad apron curb cuts | 47 | yes=1; no=2 NA (no curb cuts)=98 | |
| 15. Measured <u>maximum</u> **curb height** at this segment end. | 48 | Inches; NA (curb cuts/no sidewalk)=98 | |
| Answer questions 16-53 while walking along segment. | | | |
| **Buffer Area** | | | |
| 16a. Is there a **buffer zone** between sidewalk and street? (e.g. landscaped strip, trees, benches, etc.) | 49 | 1 side=1; 2 sides=2; no sides=3 NA (no sidewalk)=98 | |
| 16b. Measured <u>maximum</u> **buffer zone width** on segment. | 50 | Inches; NA (no buffer zone)=9898 | |
| 17a. Count **mature trees** in the buffer zone and/or on median (if present). | 51 | Count | |
| 17b. Are all **mature trees** on **one side** of the segment? | 52 | yes=1; no=2; NA (no trees)=98 | |
| **Land Uses/Buildings** | | | |
| 18. Mark the type of **land uses** present on this segment. | | | |
| **Residential** | | | |
| Single family home – detached | 53 | yes=1; no=2 | |
| Single family home/duplex – attached (2 or | 54 | yes=1; no=2 | |

| | | | |
|---|---|---|---|
| more units) | | | |
| Low-rise multi-family housing (less than 5 stories) | 55 | yes=1; no=2 | |
| High-rise multi-family housing (5 or more stories) | 56 | yes=1; no=2 | |
| Mobile homes | 57 | yes=1; no=2 | |
| Residential, other | 58 | yes=1; no=2 | |
| **Recreational/Leisure/Fitness** | | | |
| Gym/fitness center (also includes yoga/pilates studios, etc.) | 59 | yes=1; no=2 | |
| Movie theater/rental | 60 | yes=1; no=2 | |
| Recreational, other | 61 | yes=1; no=2 | |
| **Public/Civic Building** | | | |
| School, college, or university | 62 | yes=1; no=2 | |
| Community center or library | 63 | yes=1; no=2 | |
| Museum, auditorium, concert hall, theater | 64 | yes=1; no=2 | |
| Post office | 65 | yes=1; no=2 | |
| Police station, courthouse, Department of Motor Vehicles | 66 | yes=1; no=2 | |
| Public building, other | 67 | yes=1; no=2 | |
| **Institutional** | | | |
| Religious institution | 68 | yes=1; no=2 | |
| Hospital | 69 | yes=1; no=2 | |
| Institutional, other | 70 | yes=1; no=2 | |
| **Commercial** | | | |
| Restaurants | 71 | yes=1; no=2 | |
| Grocery store/convenience store | 72 | yes=1; no=2 | |
| Retail stores | 73 | yes=1; no=2 | |
| Bank/financial service | 74 | yes=1; no=2 | |
| Pharmacy/Drug Store | 75 | yes=1; no=2 | |
| Hotel/hospitality | 76 | yes=1; no=2 | |
| Car dealership | 77 | yes=1; no=2 | |
| Gas/service station | 78 | yes=1; no=2 | |
| Commercial, other | 79 | yes=1; no=2 | |
| **Office/Service** | | | |
| Offices | 80 | yes=1; no=2 | |
| Health clinics, medical facilities, medical offices (not hospitals) | 81 | yes=1; no=2 | |
| Beauty/barber shop, nail salon | 82 | yes=1; no=2 | |
| Service facilities (i.e. insurance offices, | 83 | yes=1; no=2 | |

| | | | |
|---|---|---|---|
| funeral homes, dry cleaners, Laundromats) | | | |
| Offices/service, other | 84 | yes=1; no=2 | |
| **Industrial/manufacturing** | 85 | yes=1; no=2 | |
| **Other** | | | |
| Harbor/marina/boat launch | 86 | yes=1; no=2 | |
| Undeveloped land | 87 | yes=1; no=2 | |
| Agricultural land, ranch, farming | 88 | yes=1; no=2 | |
| Nature feature (i.e. beach, river, lake, forest) | 89 | yes=1; no=2 | |
| Parking lot | 90 | yes=1; no=2 | |
| Other | 91 | yes=1; no=2 | |
| 19. What is the predominant **building height**? | 92 | No predominant height=1; 1-2 stories=2; 3-4 stories=3; 5 or more=4; NA (no buildings)=98 | |
| 20. Do the buildings in this segment contain **vertical mixed-use**? | 93 | yes=1; no=2; NA (no buildings > 1 story)=98 | |
| 21. Are there signs signifying that buildings on this segment are **senior oriented**? | | | |
| Senior housing (e.g. independent living, assisted living, retirement home) | 94 | yes=1; no=2; NA (no buildings)=98 | |
| Senior activities (e.g. senior centers, adult day care) | 95 | yes=1; no=2; NA (no buildings)=98 | |
| 22. Determine whether any of the following **gathering places** are on this segment. | | | |
| Restaurants | 96 | yes=1; no=2 | |
| Coffee shops | 97 | yes=1; no=2 | |
| Bar/brewery | 98 | yes=1; no=2 | |
| Libraries/bookstores | 99 | yes=1; no=2 | |
| "corner" store | 100 | yes=1; no=2 | |
| Art galleries, museums, theaters | 101 | yes=1; no=2 | |
| Farmers market | 102 | yes=1; no=2 | |
| 23. Determine whether any of these distinctive retail types are present (focusing on the form of the building) | | | |
| Big box shops (includes super stores or warehouse stores | 103 | yes=1; no=2 | |
| Shopping mall | 104 | yes=1; no=2 | |
| Outdoor mall | 105 | yes=1; no=2 | |

| | | | |
|---|---|---|---|
| Strip mall/row of shops | 106 | yes=1; no=2 | |
| Drive-thru | 107 | yes=1; no=2 | |
| **Public Space** | | | |
| 24. Mark the types of **public space** present on this segment. | | | |
| Plaza/square/courtyard | 108 | yes=1; no=2 | |
| Public garden | 109 | yes=1; no=2 | |
| Park/playground | 110 | yes=1; no=2 | |
| Outdoor fitness/recreation area (i.e. playing field, walking trails) | 111 | yes=1; no=2 | |
| Public space, other (not benches) | 112 | yes=1; no=2 | |
| 25a. How many **benches** (i.e. public, and/or transit benches) are present for the public to rest on? | 113 | Count | |
| 25b. Do any of the benches on this segment have the following features? | | | |
| Back support | 114 | yes=1; no=2; NA (no benches)=98 | |
| Armrest | 115 | yes=1; no=2; NA (no benches)=98 | |
| Covered seating | 116 | yes=1; no=2; NA (no benches)=98 | |
| Color contrast with ground surface | 117 | yes=1; no=2; NA (no benches)=98 | |
| Clean | 118 | yes=1; no=2; NA (no benches)=98 | |
| Undamaged | 119 | yes=1; no=2; NA (no benches)=98 | |
| 26. Determine the quality of **public spaces** on this segment | 120 | Low quality=1; Neutral=2; High quality=3; NA (no public space)=98 | |
| **Sidewalks** | | | |
| 27. Are sidewalks **present**? | 121 | 1 side=1; 2 sides=2; no sides=3 | |
| 28. Are sidewalks **continuous**? | 122 | 1 side=1; 2 sides=2; no sides=3; NA (no sidewalks)=98 | |
| 29. Sidewalk material (check all that are present) | | | |

| | | | |
|---|---|---|---|
| Concrete/asphalt | 123 | yes=1; no=2; NA (no sidewalks)=98 | |
| Brick/tile | 124 | yes=1; no=2; NA (no sidewalks)=98 | |
| Dirt/gravel/grass/lawn | 125 | yes=1; no=2; NA (no sidewalks)=98 | |
| Other | 126 | yes=1; no=2; NA (no sidewalks)=98 | |
| 30a. What is the **condition** of the sidewalk? | 127 | poor=1; moderate=2; good=3; NA (no sidewalks)=98 | |
| 30b. Is any portion of the sidewalk **under repair**? | 128 | yes=1; no=2; NA (no sidewalks)=98 | |
| 31. Are there sidewalk **obstructions** blocking pedestrian pathways? | 129 | yes=1; no=2; NA (no sidewalks)=98 | |
| 32. Determine how much of the sidewalk is covered by these features that provide protection from sun, rain, and/or snow. | | | |
| Arcades | 130 | some/most covered=1; no/little covered=2; NA (no sidewalk)=98 | |
| Awnings | 131 | some/most covered=1; no/little covered=2; NA (no sidewalk)=98 | |
| Other | 132 | some/most covered=1; no/little covered=2; NA (no sidewalk)=98 | |
| 33. Measured <u>minimum</u> **sidewalk width** on segment. | 133 | < 4 feet=1; 4-6 feet=2; > 6 feet=3; NA (no sidewalks)=98 | |
| 34. What is the **slope** of this segment? | 134 | flat/gentle=1; moderate=2; steep=3 | |
| **Street Characteristics** | | | |
| 35. How many **lanes** of traffic are on this segment? | 135 | 1 lane=1; 2 lanes=2; 3 lanes=3; 4 or more lanes=4 | |

| | | | |
|---|---|---|---|
| 36. Is this a **one-way** or two-way street? | 136 | one-way=1; two-way=2 | |
| 37. **Street material** (check all that are present) | | | |
| Concrete/asphalt | 137 | yes=1; no=2 | |
| Brick/tile | 138 | yes=1; no=2 | |
| Dirt/gravel/grass/lawn | 139 | yes=1; no=2 | |
| Other | 140 | yes=1; no=2 | |
| 38a. What is the **condition** of the street? | 141 | poor=1; moderate=2; good=3; | |
| 38b. Is any portion of the street **under repair**? | 142 | yes=1; no=2 | |
| 39. Is there a designated bike lane in the street? | 143 | yes=1; no=2 | |
| 40. Are there any **traffic-calming measures** on the segment? | | | |
| Traffic circle | 144 | yes=1; no=2 | |
| Median | 145 | yes=1; no=2 | |
| Speed bumps/humps | 146 | yes=1; no=2 | |
| Marked crosswalk | 147 | yes=1; no=2 | |
| Sidewalk extensions | 148 | yes=1; no=2 | |
| Signs for pedestrians/children/etc (e.g. pedestrian crossing sign, playground sign) | 149 | yes=1; no=2 | |
| Signs for school speed zone (e.g. school speed 20 when children present) | 150 | yes=1; no=2 | |
| Signs for traffic activity (e.g. stop ahead, bikes on roadway) | 151 | yes=1; no=2 | |
| Other | 152 | yes=1; no=2 | |
| 41. Does this segment end in a **cul-de-sac** or **dead-end**? | 153 | no=1; yes, without pedestrian thruway=2; yes, with pedestrian thruway=3 | |
| **Street Life** | | | |
| 42. Count **streetlights** on the segment. | 154 | Count | |
| 43. Is there a **transit stop** present on the segment? | 155 | yes=1; no=2 | |
| 44. Does the **transit stop** have a **light**? | 156 | yes=1; no=2 NA (no transit stop)=98 | |
| 45. How many residential buildings on this segment have **front porches**? (porches you | 157 | few/none=1; some=2; all/most=3; | |

| | | | |
|---|---|---|---|
| can sit on) | | NA (no residential buildings)=98 | |
| 46. Are there **outdoor dining areas** (e.g. cafes, outdoor tables at coffee shops or plazas, etc.) located on or open to the street? | 158 | yes=1; no=2 | |
| 47. Are there publicly accessible **restrooms/washrooms** on the segment? | 159 | yes=1; no=2 | |
| 48. Is there **parking** for the general public anywhere on the segment? | 160 | yes=1; no=2 | |
| **Maintenance** | | | |
| 49. How many **buildings** on this segment are in **good condition**? | 161 | few/none=1; some=2; all/most=3; NA (no buildings)=98 | |
| 50. How many buildings on this segment have **windows with bars**? | 162 | few/none=1; some=2; all/most=3; NA (no buildings)=98 | |
| 51. How many **yards** on this segment are **well-maintained**? | 163 | few/none=1; some=2; all/most=3; NA (no buildings)=98 | |
| 52. Is there **litter, graffiti, broken glass**, etc. on the segment? | 164 | Yes, dominant feature=1; Yes, but not dominant feature=2; None or almost none=3 | |
| 53. Are there **abandoned buildings or** lots on this segment? | 165 | none=1; few=2; some/a lot=3 | |
| **End time** | | | |
| **Difficulty** | | very easy=1; easy=2; average=3; difficult=4; very difficult=5 | |
| **NOTES** | | | |

Appendix C: Assisted Living Facility Profile

| **Facility Provided Data** | |
|---:|---|
| Facility ID: | |
| Facility Name: | |
| Address: | |
| Zip Code: | |
| Contact Name: | |
| Phone: | |
| Capacity (Beds): | |
| Cost Structure: | |
| Continuing Care: | |
| Computer Lab/Wi-fi: | |
| **Secondary Data[7] for Zip Code** | |
| Median Income: | |
| Educational Attainment: | |
| Percent Nonwhite: | |

---

[7] Source: American Community Survey

| | Community ID: | | | | |
|---|---|---|---|---|---|
| | Date: | | | | |
| | Start Time: | | | End Time: | |
| | Participant ID: | | | | |
| | Gender: | 1 | Male | 2 | Female |
| | | | | | |
| | Informed Consent: | | (check if completed) | | |
| | | | | | |
| | MMSE-BV Score: | | (discontinue interview if MMSE-BV ≤ 10) | | |
| | | | | | |
| 1. | What is your age? | | (record years) | | |
| 2. | Are you Hispanic or Latino? | | | | |
| | | 1 | Yes | | |
| | | 2 | No | | |
| | | 7 | Don't know / not sure | | |
| | | 9 | Refused | | |
| 3. | Which one or more of the following would you say is your race? | | | | |
| | | 1 | White | | |
| | | 2 | Black or African American | | |
| | | 3 | Asian | | |
| | | 4 | Native Hawaiian or Other Pacific Islander | | |
| | | 5 | American Indian or Alaska Native | | |
| | | 6 | Other (specify) | | |
| | | 7 | Don't know / not sure | | |
| | | 9 | Refused | | |
| 4. | Are you… | | | | |
| | | 1 | Married | | |
| | | 2 | Divorced | | |
| | | 3 | Widowed | | |
| | | 4 | Separated | | |

| | | 5 | Never married |
|---|---|---|---|
| | | 6 | A member of an unmarried couple |
| | | 9 | Refused |
| **5.** | **What is the highest grade or year of school you completed?** | | |
| | (do not read) | 1 | Never attended school or only attended kindergarten |
| | | 2 | Grades 1 through 8 (elementary) |
| | | 3 | Grades 9 through 11 (some high school) |
| | | 4 | Grade 12 or GED (high school graduate) |
| | | 5 | College 1 year to 3 years (Some college or technical school) |
| | | 6 | College 4 years or more (college graduate) |
| | | 9 | Refused |
| **6.** | **In general, would you say that your health is…** | | |
| | | 1 | Excellent |
| | | 2 | Very Good |
| | | 3 | Good |
| | | 4 | Fair |
| | | 5 | Poor |
| | | 7 | Don't know / not sure |
| | | 9 | Refused |
| **7.** | **Do you call friends or family on the phone, or receive calls from them?** | | |
| | | 1 | Operates telephone on own initiative; looks up and dials numbers, etc. |
| | | 1 | Dials a few well known numbers. |
| | | 1 | Answers telephone but does not make calls. |
| | | 0 | Does not use telephone at all. |
| **8.** | **How do you shop for large items, like clothes, sheets or towels?** | | |
| | | 1 | Takes care of all shopping needs independently. |
| | | 0 | Shops independently for small purchases. |
| | | 0 | Needs to be accompanied on any shopping trip. |
| | | 0 | Completely unable to shop. |
| **9.** | **Do you ever cook your own meals? What do you like to prepare?** | | |
| | | 1 | Plans, prepares and serves adequate meals independently. |

| | | 0 | Prepares adequate meals if supplied with ingredients. |
|---|---|---|---|
| | | 0 | Heats, serves and prepares meals or prepares meals but does not maintain adequate diet. |
| | | 0 | Needs to have meals prepared and served. |
| **10.** | **Do you have anyone who helps you with household chores, like cleaning the bathroom or vacuuming?** | | |
| | | 1 | Maintains house alone or with occasional assistance (e.g. "heavy work domestic help"). |
| | | 1 | Performs light daily tasks such as dishwashing, bedmaking. |
| | | 1 | Performs light daily tasks but cannot maintain acceptable level of cleanliness. |
| | | 1 | Needs help with all home maintenance tasks. |
| | | 0 | Does not participate in any housekeeping tasks. |
| **11.** | **What about laundry, do you do it by yourself?** | | |
| | | 1 | Does all personal laundry completely. |
| | | 1 | Launders small items; rinses stockings, etc. |
| | | 0 | All laundry must be done by others. |
| **12.** | **How do you get to your doctor's office?  Do you take a bus or taxi, or do you drive?** | | |
| | | 1 | Travels independently on public transportation or drives own car. |
| | | 1 | Arranges own travel via taxi, but does not otherwise use public transportation. |
| | | 1 | Travels on public transportation when accompanied by another. |
| | | 0 | Travel limited to taxi or automobile with assistance of another. |
| | | 0 | Does not travel at all. |
| **13.** | **When you need to take medications, do you take them by yourself or do you have help with it?** | | |
| | | 1 | Is responsible for taking medications in correct dosages at correct times. |
| | | 0 | Take responsibility if medication is prepared in advance |

| | | | |
|---|---|---|---|
| | | | in separate dosage. |
| | | 0 | Is not capable of dispensing own medication. |
| **14.** | **Do you pay your own bills, write checks yourself, go to the bank, or does someone help you with that?** | | |
| | | 1 | Manages financial matters independently (budgets, write checks, pays rent, bills, goes to bank), collects and keeps track of income. |
| | | 1 | Manages day-to-day purchases, etc. |
| | | 0 | Incapable of handling money. |
| **15.** | **When did you move to (community name)?** | | |
| | | | Enter date of move -or- |
| | | | Years of residence |

Questions 1 – 6: Behavioral Risk Factor Surveillance System

Questions 7 – 14: Instrumental Activities of Daily Living Scale from Lawton & Brody
(1969); question phrasing from Graf (2008)

Do you know anyone who… (Is this person a fellow community resident[8], a friend or family member you see often, someone you see rarely?)

| Proposed Scale: | Someone Who Lives Here | Someone Who Works Here | Someone You See Often | Someone You See Rarely |
|---|---|---|---|---|
| | 3 points | 0 points | 2 points | 1 point |
| Can give you a ride to an appointment? | | | | |
| Is handy repairing household equipment? | | | | |
| Can speak and write a foreign language? | | | | |
| Can give advice on using a computer? | | | | |
| Can play a musical instrument? | | | | |
| Is well-read or has knowledge of literature? | | | | |
| Is active in a political party? | | | | |
| Can give legal advice? | | | | |
| Is knowledgeable about financial matters? | | | | |
| Can help you do your taxes? | | | | |
| Can give you advice if you have conflicts with family members? | | | | |
| Can help when moving? | | | | |
| Can help with small jobs around the house? | | | | |
| Can help looking for information on a medical issue? | | | | |
| Could lend you a large sum of money (more than $500) if you needed it? | | | | |
| Could lend you a small amount of money (a few dollars) if you needed it? | | | | |
| Can discuss with you what political party to vote for? | | | | |
| You can talk to regarding important matters? | | | | |
| Can visit socially? | | | | |
| Keeps a spare key to your house? | | | | |
| Shares similar spiritual beliefs? | | | | |
| Would exercise or be physically active with you? | | | | |

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[8] The original scale used family member as the closest relationship, followed by friend and acquaintance.

## Appendix F: Adapted Resource Generator Pilot Test

Our goal is to learn about the types of relationships that are important for people who live in communities like this one.  While not all resources will be important for you personally, in general, for residents of assisted living communities like (community name), do you think it is not at all important, important, or extremely important to know someone who can…

| Proposed Scale: | Not at all important | Important | Extremely important |
|---|---|---|---|
| Can give you a ride to an appointment? | | | |
| Is handy repairing household equipment? | | | |
| Can speak and write a foreign language? | | | |
| Can give advice on using a computer? | | | |
| Can play a musical instrument? | | | |
| Is well-read or has knowledge of literature? | | | |
| Is active in a political party? | | | |
| Can give legal advice? | | | |
| Is knowledgeable about financial matters? | | | |
| Can help you do your taxes? | | | |
| Can give you advice if you have conflicts with family members? | | | |
| Can help when moving? | | | |
| Can help with small jobs around the house? | | | |
| Can help looking for information on a medical issue? | | | |
| Could lend you a large sum of money (more than $500) if you needed it? | | | |
| Could lend you a small amount of money (a few dollars) if you needed it? | | | |
| Can discuss with you what political party to vote for? | | | |
| You can talk to regarding important matters? | | | |
| Can visit socially? | | | |
| Keeps a spare key to your house? | | | |
| Shares similar spiritual beliefs? | | | |

Are there any other personal relationships or connections that I should have asked you about? For you personally, do you think that it is not at all important, important or extremely important to know someone who can (suggested resource)? If I had asked you, do you know someone who can (suggested resource)? Are they a fellow resident, someone who doesn't live here but that you see often, or someone you see only rarely?

|  | Not important | Important | Extremely important |
|---|---|---|---|
|  | Fellow Resident | Someone You See Often | Someone You See Rarely |
|  | Not important | Important | Extremely important |
|  | Fellow Resident | Someone You See Often | Someone You See Rarely |
|  | Not important | Important | Extremely important |
|  | Fellow Resident | Someone You See Often | Someone You See Rarely |

Another person I spoke with suggested that (suggested resource) would be important. What do you think?

|  | Not important | Important | Extremely important |
|---|---|---|---|
|  | Fellow Resident | Someone You See Often | Someone You See Rarely |
|  | Not important | Important | Extremely important |
|  | Fellow Resident | Someone You See Often | Someone You See Rarely |
|  | Not important | Important | Extremely important |
|  | Fellow Resident | Someone You See Often | Someone You See Rarely |
|  | Not important | Important | Extremely important |
|  | Fellow Resident | Someone You See Often | Someone You See Rarely |

Appendix G: Built Environment Quality Scoring Model

| Domain | Range | Low (0 points) | Medium (1 point) | High (2 points) |
|---|---|---|---|---|
| **Functionality** | | | | |
| Benches (number per segment) | 0 to 1 (observed) | 0 | >0 to <0.5 | 0.5 or more |
| Sidewalk Continuity (percent) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| Sidewalk Condition (percent good) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| Slope (percent gentle) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| Buffer Zone (percent) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| **Safety** | | | | |
| Streetlights (number per segment) | 0 to 5.5 (observed) | 0 to <2 | 2 to <4 | 4 or more |
| Lanes of Traffic (percent 1 or 2 lanes) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| Marked Crossings (percent) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| Crossing Signage (percent) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| Ramps and Curb Cuts (percent) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| **Aesthetics** | | | | |
| Trees (number per segment) | 0 to 19 (observed) | 0 to <5 | 5 to <10 | 10 or more |
| Yard Maintenance (percent well-maintained) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| Building Condition (percent well-maintained) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| Litter (percent with no litter) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| Public Spaces (percent high quality) | 0 to 100 | 0 to <33 | 33 to <66 | 66 to 100 |
| **Destinations** | | | | |
| Gathering Places | Dichotomous | No | | Yes |
| Retail | Dichotomous | No | | Yes |
| Health Care | Dichotomous | No | | Yes |
| Transit | Dichotomous | No | | Yes |
| Land Use | 1 to 38 | 1 to 4 | 5 to 9 | 10 to 38 |
| **Total** | | **0 to 15 points** | **16 to 30 points** | **31 to 40 points** |

## Appendix H: Built Environment Quality Data

| Domain | | Assisted Living Community | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | Sites for Individual Interviews | | | | | | | | | | | |
| | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **J** | **K** | **L** | **M** | |
| Number of Segments | 9 | 3 | 10 | 8 | 9 | 10 | 8 | 6 | 4 | 4 | 2 | 12 | |
| Number of Crossings | 8 | 4 | 8 | 10 | 10 | 6 | 4 | 4 | 0 | 5 | 0 | 5 | |
| **Functionality** | | | | | | | | | | | | | |
| Benches (number per segment) | 0.2 | 0 | 0.3 | 0.8 | 0.8 | 0.2 | 0.8 | 0.2 | 0 | 0 | 1.0 | 0.2 | |
| Sidewalk Continuity (%) | 55.6 | 66.7 | 100 | 62.5 | 55.6 | 50.0 | 62.5 | 50.0 | 25.0 | 50.0 | 50.0 | 45.0 | |
| Sidewalk Condition (% good) | 66.7 | 66.7 | 40.0 | 12.5 | 11.1 | 70.0 | 87.5 | 66.7 | 75.0 | 50.0 | 0 | 63.6 | |
| Slope (% gentle) | 100 | 100 | 100 | 100 | 100 | 70.0 | 12.5 | 83.3 | 100 | 25.0 | 50.0 | 100 | |
| Buffer Zone (%) | 66.7 | 100 | 100 | 100 | 100 | 50.0 | 50.0 | 66.7 | 50.0 | 50.0 | 50.0 | 63.6 | |
| **Safety** | | | | | | | | | | | | | |
| Streetlights (number per segment) | 3.3 | 3.3 | 5.5 | 3.1 | 3.0 | 1.9 | 1.9 | 2.8 | 3.5 | 0 | 1.0 | 3.0 | |
| Lanes of Traffic (% 1 or 2 lanes) | 77.8 | 33.3 | 100 | 75.0 | 77.8 | 50.0 | 62.5 | 83.3 | 50 | 0 | 100 | 90.9 | |
| Marked Crossings (%) | 0 | 0 | 100 | 90.0 | 100 | 0 | 50.0 | 100 | 0 | 0 | 0 | 0 | |
| Crossings Signage (%) | 87.5 | 50.0 | 100 | 90.0 | 100 | 50.0 | 75.0 | 50.0 | - | 100 | - | 100 | |
| Ramps and Curb Cuts (%) | 100 | 100 | 100 | 80.0 | 80.0 | 100 | 50.0 | 100 | - | 100 | - | 100 | |
| **Aesthetics** | | | | | | | | | | | | | |
| Trees (number per segment) | 1.1 | 0.7 | 11.1 | 5.5 | 5.8 | 0.4 | 4.9 | 13.3 | 8.8 | 2.5 | 19.0 | 8.4 | |
| Yard Maintenance (% well-maintained) | 100 | 66.7 | 20.0 | 87.5 | 88.9 | 100 | 80.0 | 100 | 100 | 100 | 100 | 100 | |
| Building Condition (% well-maintained) | 100 | 66.7 | 10.0 | 87.5 | 88.9 | 100 | 100 | 100 | 100 | 100 | 100 | 81.8 | |
| Litter (% with no litter) | 100 | 100 | 60.0 | 28.0 | 33.3 | 90.0 | 87.5 | 100 | 75.0 | 25.0 | 0 | 100 | |
| Public Spaces (% high quality) | 16.7 | 33.3 | 0 | 0 | 0 | 0 | 37.5 | 20.0 | 0 | 0 | 0 | 33.3 | |
| **Destinations** | | | | | | | | | | | | | |
| Gathering Places (yes/no) | Yes | No | Yes | Yes | Yes | No | No | No | No | Yes | No | No | |
| Retail (yes/no) | Yes | No | Yes | No | Yes | No | No | No | No | Yes | No | Yes | |
| Health Care (yes/no) | Yes | No | Yes | Yes | Yes | No | No | No | No | No | No | Yes | |
| Transit (yes/no) | Yes | No | Yes | Yes | Yes | No | No | No | No | No | No | Yes | |
| Land Use (number of unique land uses) | 12 | 7 | 15 | 14 | 17 | 5 | 6 | 4 | 4 | 7 | 5 | 12 | |

CURRICULUM VITAE

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## Education

**PhD Candidate**
**August 2013**
University of Louisville, Louisville, KY
School of Public Health and Information Sciences

concentration: Health Promotion and Behavioral Sciences
honors: Graduate Teaching Academy, Faculty Favorite Award Nominee

dissertation: *Predicting Mental Well-Being in Assisted Living Communities: The Roles of Social Capital and the Built Environment*

**Master of Public Health**
**January 2002**
Boston University, Boston, MA
School of Public Health

concentrations: Social & Behavioral Sciences; Epidemiology & Biostatistics

**Bachelor of Science**
**April 2000**
University of Michigan, Ann Arbor, MI
College of Literature, Science, & the Arts

concentrations: Biology; Women's Studies
honors: Undergraduate Research Opportunities Program; University of Michigan Biological Station

*Senior Program Officer*        **2011 - 2013**
**Foundation for a Healthy Kentucky,** Louisville, KY
*Health Research Coordinator*        **2008 - 2011**
**Kentucky State Data Center,** University of Louisville, Louisville, KY

Direct the Foundation's data collection, analysis and dissemination efforts, including the Kentucky Health Facts website, the annual Kentucky Health Issues Poll and Kentucky Parent Survey. Managed $1.2 million grant portfolio for the Foundation's multi-year *Local Data for Local Action* initiative supporting community needs assessments and development of sustainable place-based health promotion strategies. Co-developed and served as the primary author of a successfully-funded $2 million grant proposal to the Corporation for National and Community Service Social Innovation Fund. (Position initially contracted through University of Louisville)

*Cancer Control Specialist*        **2003 – 2008**
**Kentucky Cancer Program,** University of Louisville, Louisville, KY

Coordinated the development, delivery and evaluation of continuing education programs utilizing self-study, lecture-based and standardized patient training formats. Disseminated availability and outcomes of KCP professional and community education programs through peer-reviewed journal articles, state and national conference presentations, organization newsletters and biennial report. Organized training programs and provide ongoing assistance to local businesses implementing smoke-free workplace policies. Facilitated tobacco cessation support groups and other community education programs.

*Associate Director of Program Services*        **2002-2003**
**March of Dimes Greater Kentucky Chapter,** Louisville, KY

Supported implementation of organizational mission throughout state of Kentucky, coordinated continuing education efforts for health professionals, monitored local and national grants, promoted chapter mission and activities in local media, recruited and trained volunteers.

*Outreach/Educator- Salem Teen Exchange Program*        **2001**
**North Shore Community Health, Inc.,** Salem, MA

Designed and conducted pilot year evaluation of adolescent pregnancy prevention program for young men. Incorporated youth development and asset building strategies into existing program framework. Created training manual for peer

educators.  Co-authored poster presentation for MCSBHC annual conference, networked with other agencies, generated interest and knowledge about the program within the community.


***Research Assistant*** **1998**
**University of Michigan Women's Health Program,** Ann Arbor, MI

Designed an informational website and recruited volunteers for the Michigan Women's Health Volunteer Registry, a resource for medical researchers seeking human subjects.


***Research Assistant*** **1997**
**Wayne State University College of Nursing,** Detroit, MI

Used medical records to assess study eligibility, conducted recruitment and follow-up interviews with participants in "Health Promotion of the Pregnant Adolescent" research study undertaken jointly by the University of Michigan School of Public Health and the Wayne State University College of Nursing.


## Teaching Experience

**Graduate Teaching Assistant**
University of Louisville School of Public Health and Information Sciences

PHPB 604: Health Decision and Risk Analysis Fall 2011
PHPB 704: Psycho-Social Foundations of Health Decision Making Summer 2011


**Guest Lecturer**
University of Louisville

*Public Health and the Affordable Care Act* 2013
School of Public Health and Information Sciences

*Treatment of Tobacco Use and Dependence* 2004-2008
College of Education and Human Development
School of Dentistry
School of Medicine

## Peer-Reviewed Publications

Studts J.L., Flynn S.M., Dill, T.C., Ridner S.L., Worth C.T., **Walsh S.E.,** & Sorrell C.L. (2010). Nurse practitioners' knowledge, attitudes, and clinical practices regarding treatment of tobacco use and dependence. *Journal for Nurse Practitioners*, 6(3):212-219.

**Walsh S.E.**, Singleton J.A., Worth C.T., Krugler J., Moore R., Wesley G.C., & Mitchell C.K. (2007). Tobacco cessation counseling training with standardized patients. *Journal of Dental Education*, 71:1171-1178.

## Additional Publications

**Walsh, S.E.,** & Nesbitt, L.S. (in press). Changing the context: Promoting wellness through systems and policy change. In R.J. Esterhay, L.S. Nesbitt, J.H. Taylor, & J.M. Bohn (Eds.), *Population health: Management, policy and technology, First edition*. Virginia Beach, VA: Convergent Publishing.

**Walsh S.E.**, Christian W.J., & Hopenhayn C.M. (2012). *Place matters: Health disparities in the Commonwealth, a report on the Delta and Appalachian regions of Kentucky*. Louisville, KY: Foundation for a Healthy Kentucky.

**Walsh S.E.** (2012). *Start where you are: Reflections on the Foundation for a Healthy Kentucky's Local Data for Local Action Initiative* (Issue Brief No. 1). Louisville, KY: Foundation for a Healthy Kentucky.

Howard J., Richerson J., Cooper P.J., & **Walsh S.E.** (2005). Louisville & Jefferson County Partnership in Cancer Control. *Louisville Medicine,* 53:211-213.

**Walsh S.E.**, Sams G., & Redmond J. (Eds.). (2005). *Kentucky Cancer Program 2002-2004 Biennial Report*. Louisville, KY: Kentucky Cancer Program.

## Presentations at National/International Meetings

**Walsh S.E.,** Chubinski J., & Rademacher E. (2013, June 23). *Public opinions regarding Advanced Dental Hygiene Practitioners in a high-need state.* Poster presented at the AcademyHealth Annual Research Meeting, Baltimore, MD.

**Walsh S.E.,** Chubinski J., & Rademacher E. (2013, June 22). *Public opinions regarding Advanced Dental Hygiene Practitioners in a high-need state.* Paper presented at the AcademyHealth Health Workforce Interest Group Meeting, Baltimore, MD. **Best Poster Abstract Award**

**Walsh S.E.,** Chubinski J., Vargas M., & Rademacher E. (2011, November 1). *Reflecting the community: Demographic variations in landline and cell-only households for a statewide telephone survey.* Paper presented at the American Public Health Association 139th Annual Meeting and Exposition, Washington, DC.

Chubinski J., Gasper C., & **Walsh S.E.** (2011, March 3). *Knowledge Is power: Using data to inspire action and improve community knowledge.* Paper presented at the Grantmakers in Health Annual Meeting on Health Philanthropy, Los Angeles, CA.

**Walsh S.E.**, Worth C.T., & Temple-Jennings P.D. (2007, August 15) *After the ordinance: Working with employers to improve cessation services.* Poster presented at the 2007 CDC Cancer Conference, Atlanta, GA.

**Walsh S.E.**, Temple-Jennings P.D., & Sorrell C.L. (2007, August 14). *Pig races and PSA tests: A model partnership to increase access to screening.* Poster presented at the 2007 CDC Cancer Conference, Atlanta, GA.

Worth C.T., **Walsh S.E.**, Sorrell C.L., & Studts J.L. (2006, July 14). *A tobacco treatment self-study CE program for KY nurse practitioners: What was learned and retained?* Poster presented at the 13th World Conference on Tobacco or Health, Washington, DC.

Worth C.T., **Walsh S.E.**, Sorrell C.L., & Studts J.L. (2006, July 14). *Dentist knowledge and practice changes at one year follow-up from treating tobacco use self study CE program.* Poster presented at the 13th World Conference on Tobacco or Health, Washington, DC.

**Walsh S.E.**, Worth C.T., Krugler J., & Mitchell C.K. (2006, July 10). *Results from a standardized patient instruction pilot program for tobacco education with medical and dental residents and students.* Paper presented at the UICC World Cancer Congress 2006, Washington, DC.

**Walsh S.E.**, Worth C.T., Sorrell C.L., & Studts J.L. (2006, July 10). *Change in knowledge among KY dental hygienists completing tobacco self-study CE program.* Poster presented at the UICC World Cancer Congress 2006, Washington, DC.

**Walsh S.E.**, Worth C.T., Sorrell C.L., & Studts J.L. (2006, July 10). *Cervical cancer screening and diagnostic protocols self-study CE program: Which primary care providers improved most?* Poster presented at the UICC World Cancer Congress 2006, Washington, DC.

**Walsh S.E.**, Worth C.T., Sorrell C.L., & Studts J.L. (2005, September 16). *Physician vs. midlevel clinician response to treating tobacco use CE program.*

Paper presented at the American Association for Cancer Education 39th Annual Meeting, Cincinnati, OH.

**Walsh S.E.**, Worth C.T., Krugler J., & Mitchell C. (2005, September 16). *Use of standardized patient instruction for tobacco education with medical and dental residents and students.* Paper presented at the American Association for Cancer Education 39th Annual Meeting, Cincinnati, OH.

Worth C.T., **Walsh S.E.**, Studts J.L., Thomas S.D., & Sorrell C.L. (2005, September 16). *Treating tobacco use: A CE program for dental professionals in the number one tobacco state.* Paper presented at the American Association for Cancer Education 39th Annual Meeting, Cincinnati, OH.

Worth C.T., Studts J.L., **Walsh S.E.,** & Sorrell C.L. (2005, May 6). *Treating tobacco use CE program phase II: NPs, PAs and hygienists vs. Drs.* Paper presented at the National Conference on Tobacco or Health, Chicago, IL.

## Additional Selected Conference/Meeting Presentations

**Walsh S.E.** (2012, December 10). *The Affordable Care Act and public health.* Paper presented at The Future of Kentucky's Public Health System Forum, Frankfort, KY.

**Walsh S.E.** (2012, May 16). *Health data: Where to find it. How to use it.* Webinar presented at Health for a Change: Ignite-Unite-Act, Louisville, KY. Available at: http://healthy-ky.org/presentations-reports/videos?page=1. Accessed May 28, 2013.

**Walsh S.E.**, Chubinski J., Siameh S., & Kanotra S. (2012, March 28). *Public opinions about the built environment and ensuing behaviors in Kentucky: Comparing findings from the Kentucky Health Issues Poll and Behavioral Risk Factor Surveillance System.* Paper presented at the 64th Annual Kentucky Public Health Association Conference, Louisville, KY.

Harris J., Rowland C., Barnard S., Flener J., Trowbridge S., & **Walsh S.E.** (2011, March 9). *Local Data for Local Action: Community mobilization panel discussion.* Paper presented at the 63rd Annual Kentucky Public Health Association Conference, Louisville, KY.

**Walsh S.E.** (2008, October 9). *Demographic changes and Kentucky's workforce.* Paper presented at the 24th Annual Kentucky Society for Human Resource Management Conference, Louisville, KY.

Scott D.A. & **Walsh S.E.** (2008, January 8). *The role of the dental professional in smoking cessation.* Paper presented at the Southern Indiana Dental Association Meeting, Louisville, KY.

**Walsh S.E.** (2007, November 12). *Helping patients and employees quit tobacco: Tools you can use.* Paper presented at the Lake Cumberland Cancer Conference, Somerset, KY.

Worth C.T. & **Walsh S.E.** (2007, April 25). *Basic intervention strategies for treating tobacco use and dependence.* Paper presented at the Women and Tobacco: Consequences and Solutions Conference, Lexington, KY.

**Walsh S.E.**, Nall M., Cooper P.J., Worth C.T., Seger R., & Bradford V. (2006, May 17). *Reaching never and rarely screened women.* Paper presented at the Kentucky Women's Cancer Screening Program Annual Cancer Coalition Training, Lexington, KY.

**Walsh S.E.** (2004, November 7). *Treating tobacco use and dependence: The physician assistant's role.* Paper presented at the Kentucky Academy of Physician Assistants 28th Annual CME Symposium, Lexington, KY.

Rafferty J. & **Walsh S.E.** (2002, September 19). *Community health education through the media: A folic acid case study.* Paper presented at the 45th Annual Kentucky Maternal and Child Health Conference, Louisville, KY.

Hayes J., Tossi E.R., **Walsh S.E.**, et al. (2011, June 4). *T/X Teen Exchange Program results.* Poster presented at the Massachusetts Coalition of School Based Health Centers Conference, Brandeis University, MA.

## Certification

**Certified Health Education Specialist**                     **2003 - present**
National Commission for Health Education Credentialing, Inc., Whitehall, PA

**Certified Tobacco Treatment Specialist**                     **2008 - 2010**
Mayo Clinic Nicotine Dependence Center, Rochester, MN

## Professional Service and Memberships

| | |
|---|---|
| American Public Health Association | 2001-present |
| Annual Meeting CE Evaluator, 2012 | |
| Kentucky Public Health Association | 2002-present |
| Kentucky Rural Health Association | 2010-present |
| Kentucky BRFSS Data Users Group | 2008-present |
| Kentucky School Health Data Team | 2008-present |

Kentucky Safety and Prevention Alignment Network          2008-present
Jefferson County Smoke-Free Coalition          2003-present
      Steering Committee – Professional Education Chair, 2006-2008
      Professional Education Task Group, 2003-2008
Kentucky ACTION          2008-2010
Association for the Treatment of Tobacco Use and Dependence          2006-2008
American Association for Cancer Education          2005-2008
Kentucky Perinatal Association          2002-2003
Kentucky Folic Acid Partnership – Community Committee          2002-2003
Kentucky Maternal & Child Health Conference Committee          2002-2003