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Examining the Relationship Between Social Capital and the Built Environment: A Case Study in Measuring Community Sustainability

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Examining the Relationship Between Social Capital and the Built Environment: A Case
Study in Measuring Community Sustainability

BY

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DISSERTATION

Submitted to the University of New Hampshire

in Partial Fulfillment of

the Requirements for the Degree of

Doctor of Philosophy

in

Natural Resources and Environmental Studies

September, 2011

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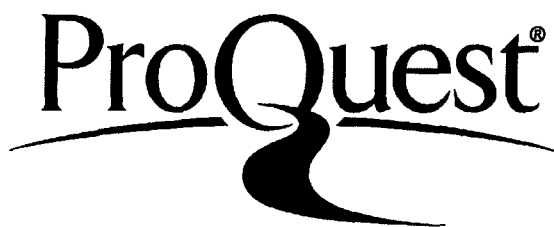
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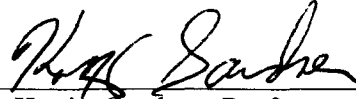
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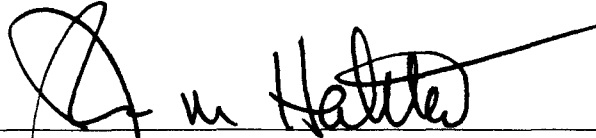


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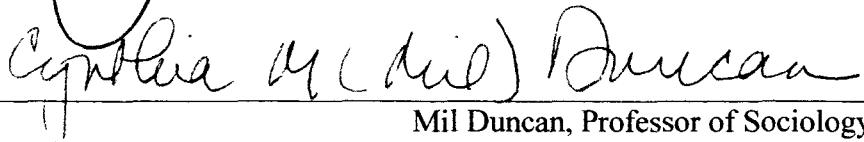
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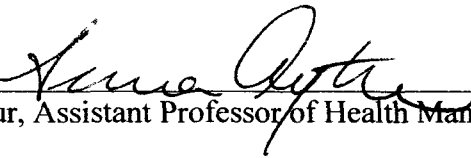
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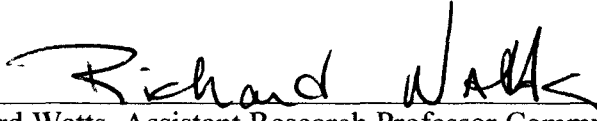
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Abstract

EXAMINING THE RELATIONSHIP BETWEEN SOCIAL CAPITAL AND THE BUILT ENVIRONMENT: A CASE STUDY IN MEASURING COMMUNITY SUSTAINABILITY

by

Shannon H. Rogers

University of New Hampshire, September, 2011

The concepts of sustainability and sustainable development are frequently described as having three main components, sometimes referred to as the three pillars or the triple bottom line: environmental, economic, and social. Because the origins of sustainability come from a desire to right environmental wrongs much consideration has been given to the environmental issues, especially how they interface with economic ones. Frequently mentioned but rarely examined, the social aspects of sustainability have been considered the weakest and least described pillar. This work explores the utility of social capital, the value of one's networks and connections, as a measure of sustainability. As an individual and group based concept, social capital is often thought of in the context of communities. Communities have both physical and social infrastructures and how we develop and use the land we live on has many implications for society. The idea that we would have more interactions with neighbors and fellow citizens if we lived in neighborhoods that promoted walking and were built on the human scale seems logical but there has been little evidence to suggest that a relationship between social capital and the built environment exists (Litman, 2010; Leyden, 2003; Kathlene & Wallick, 1999). Through a

case study approach this dissertation examines the relationship between social aspects of sustainability (specifically social capital) and the built environment. Residents living in neighborhoods of varying built form and thus varying levels of walkability in three communities in New Hampshire were surveyed about their levels of social capital and travel behaviors. Survey respondents were asked how many locations they could walk to within their neighborhood or community and these responses were used to develop a walkability index. Responses to questions about trust and community involvement were compiled into two indices that served as the key measures of social capital. Comparisons between the more walkable and less walkable neighborhoods show that levels of social capital are higher in more walkable neighborhoods, even after controlling for key demographic variables. The findings suggest that social capital and walkability may be potent measures of community sustainability and that communities might benefit from shaping the built environment in ways that promote destination walking.

INTRODUCTION

Sustainability can be conceptualized at many levels from individual products and their impacts on the environment and social systems, all the way to accounting for the value of the world's ecosystem services. For businesses, sustainability often means achieving a triple bottom line. "A sustainable corporation is one that creates profit for its shareholders while protecting the environment and improving the lives of those with who it interacts" (Savitz 2006, X). It is about doing well and doing good at the same time and a truly sustainable corporation would be one that improves the community in which it does business all while making a profit. Among many measures, this can take the form of life cycle assessment to analyze the environmental and social impacts of a product's development, use, and disposal. Corporate sustainability can also be measured by the way in which a corporation conducts its own operations, such as the type of building it is headquartered in or the alternative transportation and workplace flexibility options it provides for its employees.

Sustainability for a national, state, or municipal government can mean similar things but with a greater emphasis on providing for the needs of the public in a fiscally, socially, and environmentally responsible way. The public becomes the shareholder, in effect, and looks for an accountable and transparent use of their tax dollars. Specially, governments may seek to tabulate their greenhouse gas emissions and then reduce the emissions through energy efficiency in government owned buildings. A government's sustainability efforts can also serve as an example for its citizens through the purchase of

environmentally preferred office supplies and renewable energy to socially responsible investing of its employees' retirement funds.

Somewhere between corporations and governments lies the concept of sustainable communities. Communities are a natural starting point for measuring sustainability because they are a common physical and geopolitical organizing concept. We are all members of some type of community. Even in today's digital age, the physical environment still provides something that no computer screen or smartphone can emulate—tangible connections. “In general, for sociologists, community has traditionally designated a particular form of social organization based on small groups, such as neighbourhoods, the small town, or a spatially bounded locality” (Delanty 2003). Communities are often a mixture of public and private, government and business infrastructure and they are generally also residential locations. Communities striving to achieve sustainability goals have taken many forms but all attempt to address their social, environmental, and economic responsibilities through measurable and reportable outcomes.

The following dissertation research seeks to understand and measure important components of sustainable communities. To do that, we must first define the problem and then explore pertinent areas of literature. Because sustainable communities are an interdisciplinary and complex topic, there are many areas of relevant literature to consider. The subsequent problem description and literature review covers several key areas of research as they pertain to the notion of sustainable communities in general and the intersection of the built environment and social capital, in particular.

Problem Description: Sustainable Communities

We all know of places and communities that have a combination of physical, economic and social attributes that make us want to come back again and again. They can be large cities, small towns and everything in between. These places usually consist of walkable and safe streets, local businesses, thriving schools, economic opportunities, green spaces, and accessible transportation that connect the community with the rest of region. Place matters for many reasons, including its ability to influence our perspective on environmental issues and its impact on many of our most pressing societal issue (e.g. Hamilton et al., 2010; Gieryn, 2000). Within the context of sustainability, how do we measure important aspects of sustainable communities and compare them over time? I will examine the possible answers to a small slice of these very large, timely, and important questions. In order to understand the desire to measure sustainability at the community scale, we must first understand what has made our communities unsustainable. Sprawl, although often imprecisely defined (Lopez & Hynes, 2003), broadly refers to land use and development patterns that have spread out from an urban core or center into areas that were once rural and sparsely populated (Cornell, 2010). Sprawl has had many negative consequences for American and the sustainability of our communities. From the increase in resource use to the health impacts from air and water pollution, and the costs of delivering municipal services on a sprawling landscape there are many environmental impacts of a sprawling landscape (Johnson, 2001). However, sprawl has also had negative impacts on key social components of communities (e.g. Oldenberg, 1997). Lopez & Hynes (2003) provide a nice summary of the variety of negative impacts sprawl is often blamed for:

Sprawl has been proposed as a contributor to many American urban and environmental problems including inner-city abandonment, racial segregation, income inequality, destruction of open space, loss of farmland, excess energy use, overdependence on cars, high taxes, poor health, crime, destruction of community, water pollution, and air pollution (Burchell et al., 1998; Bullard, Johnson, and Torres, 2000; Jackson, 1985; Duany, Plater-Zyberk, and Speck, 2000; Kunstler, 1993; Popenoe, 1979; Heinlich and Andersen, 2001; Freeman, 2001).

The ordinary passerby traveling through a suburb might think that the sprawling landscape may have happened by accident or by market demand. Far from being an accident, scholars have shown that sprawl and suburbia were regulated and planned by those who had political and financial power and stood to become even more powerful. Equating the “free market with the status quo is a surprising premise, given the current massive interventions of municipal government in the land-use realm” (Levine, 2006, p. 175). Government regulations related to land use and development included the Federal Housing Administration’s (FHA) policies that favored white American’s buying single family homes. Guidelines for mortgage brokers of the FHA have been shown to encourage and promote racism through redlining and covenants (Brown et al., 2003). Even before the FHAs housing programs, Henry Ford, whose creation of the assembly line allowed the mass production of the automobile at a price affordable to many, allowed those who could afford a car more mobile and able to leave the city. Ford is often called one of the “chief designers of the urban, suburban, and rural American landscape”

(Register 2006, 89). Additionally, collusion by American oil and car businesses is well known to have led to the dismantling of trolley and street car systems in cities.

Because the political and financial motivations behind much of the land use decisions in the past did not always have the best interest of the average citizen in mind, there are many reasons to justify the consideration of social factors in design and planning of land use and community structure. The planning profession has long advocated for the involvement of citizens and stakeholders in community decision-making. Additionally, empirical research has found that when the social infrastructure is strong healthier communities result, whether that is from a public health perspective or community well-being perspective (Ewing & Kreutzer, 2006). Robert Putnam found that trusting communities have a measurable economic advantage and increased life expectancy (Putnam, 2000). Much of the work of New Urbanism and sustainable development is based on the idea that certain communities will foster greater social interactions.

“Through grids of streets, transportation choices, and the citing of buildings along sidewalks, New Urbanism brings destinations within reach and allows for frequent encounters between citizens, in sharp contrast to sprawl” (Congress for New Urbanism).

In his exposition on the importance of “third places” as locations where individuals can interact with diverse groups of people, Oldenburg observed the decline of such places.

“America does not rank well on the dimension of her informal public life and less well now than in the past. Increasingly, her citizens are encouraged to find their relaxation, entertainment, companionship, even safety, almost entirely within the privacy of homes that have become more a retreat from society than a connection to it” (Oldenburg 1997, xxix).

It is in this light that the following research was formulated. Thinking broadly about the concepts of sustainability, particularly the social aspects and how they might interact with the physical/environmental ones, this research attempts to:

1. Describe a means by which the social aspects of sustainability can be conceptualized, measured and eventually acted upon, particularly within the context of measuring sustainable communities.
2. Address the particular research question: does the built environment, as measured by perceived walkability at a neighborhood and community scale, impact social capital?

Dissertation Road Map

The following dissertation takes a “papers” approach to exploring the relationship between social capital and the built environment in which the majority of the text is dedicated to the presentation of papers prepared for and accepted (in one case) by academic journals. While this may be a nontraditional approach, a greater number of researchers are following this method in order to make their research findings more relevant and significant to the academic community. Additionally, it helps to focus the dissertation on the most significant and noteworthy findings. Although parts of the journal papers will be necessarily repetitive and in some cases, brief, the remaining parts of the dissertation will elaborate on background literature, methods, descriptive statistics about the sample, and conclusions. In order to present a suitably detailed dissertation, the following sections are included: introduction, background literature review, methods, descriptive statistics, three separate journal papers, conclusions, a reference list and an extensive set of appendices. The appendices include the IRB approval to conduct the research, notes from focus groups, the original survey with coding, and notes from a stakeholder workshop. Extensive survey data (four data tables for each city that includes

responses to demographic questions, walkability questions, social capital questions, and environmental attitudes/open ended questions) as well as pictures and neighborhood assessments, summary statistics for the total sample, Manchester summary statistics, and Portsmouth summary statistics), and maps with the survey neighborhoods highlighted along with demographic information are available by request in digital format.

Unique contribution of this work

While there is established literature in all areas that this dissertation draws upon, the unique contribution of the work is in the synthesis and combination of these research and practice areas implemented in novel ways under the umbrella of sustainability and through a community based research approach. Sustainability sciences are inherently interdisciplinary and require the contribution of many of the traditional disciplines as well as ideas and research that spans the boundaries of traditional academic disciplines (Clark & Dickson, 2003). Specifically, this work looks at the intersection of social sustainability and the built environment at the community scale as measured by the indicators of social capital and walkability. Social aspects of sustainability can encompass many different indicators and measures that vary in the appropriateness based on context and scale. Within the context of communities and at the human scale level emphasized in progressive planning literature, I argue that social capital is a powerful indicator of social sustainability. Likewise, in the same context and under the same scale, walkability is a useful indicator of the built environment and thus physical/environmental sustainability at the human scale and in community contexts. How we build and shape our physical environment has consequences for many aspects of our quality of life and I attempt to

contribute to the literature and practice of sustainable communities by providing an example of this connection through tangible, community based case study approach.

As described, I take a papers approach to the dissertation and each paper addresses specific aspects of the research and thus each makes its own, unique contribution to the literature. Paper one places the concepts of social capital and walkability within the Quality of Life literature through a descriptive look at the survey data. While walkability and social capital have been linked to quality of life separately in other texts, this paper is unique in its description of the link between walkability and social capital and suggests a stronger synergy that promotes increased quality of life. Paper two is the most technical of the three and employs various statistical procedures to examine the relationship between self-perceived walkability and various measures of social capital. Factor analysis is used to create two social capital indices, which are then compared to a walkability index through Students T-tests and multilevel modeling. Multilevel modeling is a relatively new statistical procedure and is utilized when data cluster and to some extent non-random. Because the survey method employed here was conducted at the neighborhood level and in neighborhoods that were chosen non-randomly, it was important to consider these cluster or multilevel effects. Very few studies have found a statistically significant link between social capital and self-perceived walkability and even fewer have employed multilevel modeling to more fully understand these relationships. The third and final paper attempts to place the overall theme of the dissertation within a theoretical context by exploring the topics of sustainability, social capital, and walkability. An argument is made for the strength of social capital as important measure of social sustainability, particularly within the context of sustainable

communities. Additionally, further analysis of the survey data is utilized to show the difference between social capital and walkability, this time with walkability broadened to the locations individuals “can” and actually “do” walk to in their communities. I was unable to find other published literature that connects the number of locations individuals actually “do” walk to and measures of social capital, so this is a unique contribution to that body of work. Additionally, social aspects of sustainability still remain fairly undefined and this dissertation attempts to add some clarity to that field as well.

CHAPTER ONE

BACKGROUND & LITERATURE REVIEW

Concepts of Sustainability & the Emergence of Sustainability Science

Sustainability is a topic of growing discourse as population increases and resources become scarcer. Recently it has become clear that the world is consuming resources more rapidly than before as evidenced by increasing energy and food prices. While it is a broad topic, sustainability “calls for policies and strategies that meet society’s present needs without compromising the ability of future generations to meet their own needs” (USEPA, 2010). Similarly, sustainable development is growth (physical, economic, and social) that meets the needs of the present without compromising the ability of future generations to meet their own needs (United Nations, 1987).

Sustainability has its origins in the United States in the creation of the National Environmental Policy Act (NEPA) in 1969, according to the U.S. Environmental Protection Agency. However, some might contend that sustainability has its roots in the early conservationists, such as Aldo Leopold. Either way, NEPA was one of the first holistic pieces of environmental legislation and was passed to "foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony and fulfill the social, economic and other requirements of present

and future generations" (EPA, 2011). A United Nations conference on the Human Environment held in 1972 in Stockholm, Sweden prompted the discussion of the growing conflict between global development and its impact on the environment. With the more developed countries emphasizing the need to protect the environment and the less developed countries voicing their concern that economic development might be stifled by environmental regulations, a compromise was found in the concept of sustainable development. In 1983 the United Nations facilitated the organization of an independent group, the World Commission on Environment and Development, to examine global environmental and development issues and to propose realistic solutions to the problems. In 1987 "Our Common Future," colloquially known as The Brundtland Report, defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (EPA, 2011). The United Nations held another global meeting in 1992 in Rio de Janeiro to discuss environmental and development issues. One result of the "Earth Summit" was an Agenda for the 21st Century (known as Agenda 21). Sustainability and its relationship to local communities is articulated in Chapter 28 of Agenda 21 (known as Local Agenda 21) as it recommends,

Local authorities construct, operate and maintain economic, social and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations, and ...as the level of government closest to the people, they play a vital role in educating, mobilizing and responding to the public to promote sustainable development (U.N. 1992).

The scale addressed in this dissertation is the local and community scale and thus follows the recommendations of Agenda 21.

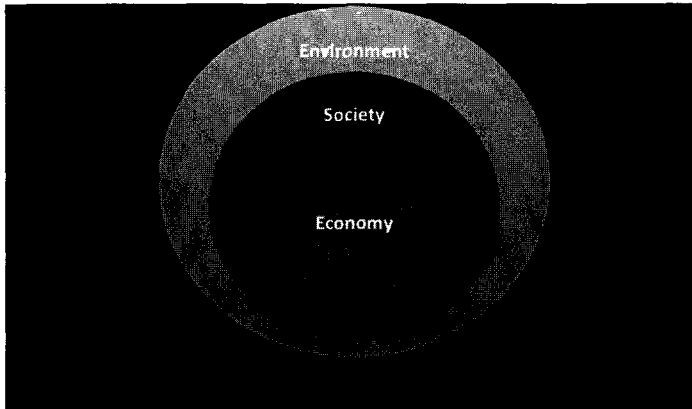


Figure 1. The three interconnected aspects of sustainability (figured based on Adams, 2006).

Sustainability is a holistic approach to considering human well-being and quality of life—including the economic, environmental, and social aspects of life. Sustainability movements “take as their point of departure a widely shared view that the challenge of sustainable development is the reconciliation of society’s development goals with the planet’s environmental limits over the long term” (Clark & Dickson, 2003, p. 8059). These movements are often “problem driven with the goal of creating and applying knowledge in support of decision making for sustainable development” (Clark & Dickson, 2003, p. 8059). The National Research Council coined the collective body of research and practice that is developing from these endeavors “sustainability science.”

As the concepts of sustainability and sustainable development and the emerging field of sustainability sciences became articulated, a large emphasis was placed on understanding the interactions between the natural and the economic worlds. Social aspects were often mentioned but rarely articulated and measured. The United Nations defines aspects of sustainability with the following environmental indicators: greenhouse

gas, ozone layer, air quality, deforestation, desertification, agriculture, biodiversity, toxic chemicals, non-renewable material, hazardous waste, and water use (Schneider, 2007). The following U.N. sustainability indicators can be considered social ones: poverty, gender equality, nutrition, child mortality, sanitation, health, education, housing, crime, population, and employment (Schneider, 2007). Human well-being is a key component to understanding measures of social sustainability. Terms such as quality of life, living standards, human development, welfare, life satisfaction, utility, and happiness are some other terms used interchangeably with well-being (UNEP et al., 2009). The Millennium Ecosystems Assessment defined human well-being as including “basic material for a good life, freedom and choice, health, good social relations, and security” (UNEP et al., 2009, p. 22).

Colantonio & Dixon (2009) break social sustainability into 10 dimensions and policy areas: demographic change (ageing, migration and mobility); education and skills; employment; health and safety; housing and environmental health; identity, sense of place and culture; participation, empowerment and access; social capital; social mixing and cohesion; and well being, happiness and quality of life. I will further discuss and address social sustainability through a case study approach.

Another component of social sustainability is the call for the inclusion and participation of multiple perspectives and individuals, including the public. There is a large volume of literature on public and stakeholder participation in environmental decision-making that can be extended to sustainability. While a full investigation of this literature is not appropriate here, it is important to mention its connection to social sustainability. “Indeed the very soul of [sustainable development] is that it is

participatory. It is not something that can be imposed by a small minority of technocrats or policy-makers from above” (Bell & Morse, 2003, p. 4). With this wide range of terms and definitions, summarized in Figure 2, one can understand why it is both important and challenging to discuss, measure and act to ensure social sustainability. I will further discuss and address social sustainability through a case study approach.

Social Aspects of Sustainability
poverty, gender equality, nutrition, child mortality, sanitation, health, education, housing, crime, population, employment, quality of life, living standards, human development, welfare, life satisfaction, utility, happiness, participatory decision making, social capital, capacity, identity, sense of place and culture, social cohesion, empowerment

Figure 2. Terms used to describe social sustainability

Regardless of the pillar of sustainability under examination, the concepts of scale and place are important components to any examination. In a seminal piece in *Science*, a collection of leading sustainability scholars laid out their vision of sustainability science and explained the importance of scale and locality by stating, “the regional character of much of what sustainability science is trying to explain means that relevant research will have to integrate the effects of key processes across the full range of scales from local to global” (Kates et al., 2001). Developing the appropriate scale of study for particular questions related to sustainability is a key step in conducting research that is focused on solving complex problems. Many problems will have drivers and consequences at various scales, from local to global, but each should have a particular scale that is appropriate to focus on and from which to radiate.

Human Scale and Sustainable Communities

As mentioned, scale is a key component of any research and practice related to sustainability science. Human scale is particularly important in the discussion of sustainable communities and is a key driver for the research discussed here. In the literature and in discussions about a sustainable society, there are certain terms that are iterated over and over again. “The rhetoric of sustainability talks of human-scale, mixed use and socially diverse neighbourhoods, providing residents with increased convenience and sense of locality, while at the same time reducing their ecological footprint” (Barton, 2000, p. 10). As is often the case, it seems to be easier to define sustainable communities by what they are not. Land use trends are one of the main components of communities that could be more sustainable:

The dispersal of population and activities and the centralization of services and facilities has led to a number of impacts on transport and the environment. Many of the impacts on transport have resulted in a vicious circle of decline in which land use changes have increased the need to travel and discouraged more sustainable modes (Stead, 2000, p. 32).

In *The Next American Metropolis: ecology, community, and the American dream*, Peter Calthorpe discusses how villages of the past were constructed on a human scale but since the advent of cars and the sprawling landscape that followed, our institutions have outgrown this scale (1993). Calthorpe takes an ecological approach to understanding social systems of communities and advocates for more human scaled and walkable ones. Human scale often refers to a perspective that is built around the locations one can travel to on foot, and thus the connection between human scale and walkability is a logical one.

In studying the intersection between the social and physical environments of communities and subsequently advocating for more walkable communities, Calthorpe could be considered an early sustainability scientist with a keen regard to the importance of scale.

Examples and definitions of sustainable communities focus on the importance of meeting the three pillars of sustainability as well as making decisions in a democratic manner. For example, the eco-municipality movement began in Sweden in the 1980s as local governments adopted sustainability principles and bottom-up, participatory approach for implementing these principles. “The work of the early eco-municipalities became the model for Agenda 21, the Guide for Local Sustainable Development that emerged from the 1992 Rio Summit – the U.N. World Conference on Sustainable Development” (<http://www.instituteforecomunicipalities.org/>). “At the 1992 Rio Summit, conference participants realized that the perfect scale for the creation of socially and ecologically sustainable role models in politics was the municipality level—close to people as it is. They consequently realized that the municipality holds the key to a sustainable world in its hand” (Foreward by Karl-Henrik Robert in James & Lahti, 2004, p. xiii).

Eco-municipalities are often based on the Natural Step framework. James and Lahti (2004) describe this framework they developed with their Swedish colleagues that identifies four conditions a sustainable society works to meet: 1. Avoiding systematically increasing concentrations of substances extracted from the Earth; 2. Avoiding systematically increasing concentrations of substances produced by society; 3. Avoiding degradation by physical means to nature; 4. Avoiding undermining the capacity of people

to meet their needs. With the Natural Step in mind, the American Planning Association (APA) adopted the following guidelines for communities that are working to be more sustainable:

1. Reduce dependence upon fossil fuels, and extracted underground metals and minerals;
2. Reduce dependence on chemicals and other manufactured substances that can accumulate in nature;
3. Reduce dependence on activities that harm life-sustaining ecosystems; and
4. Meet the hierarchy of present and future human needs fairly and efficiently.

As has been discussed, humans build and develop structures to improve our lives economically and socially, however the planning decisions we make and the resultant physical form of the environment can have negative impacts on ecosystem health, the economy, and our social fabric. This can make a profound impact on our ability to develop sustainably. Empirical evidence on sustainable communities and “eco-neighborhoods” shows that the reality we have on the ground now is not what people really want. “Visioning exercises...suggest that when asked about their ideal living environment, many people belie current lifestyles and conjure up an eco-conscious utopia” (Barton, 2000, p. 10). In describing the attributes of the visions, Barton goes on to say that they “are surprisingly persistent: an attractive and green neighbourhood which is safe, pollution-free and uncongested; a sense of local community and excellent access to friends and facilities both locally and regionally” (Barton 2000, 10). These are all examples of features that are designed and built with human scale in mind. The case study research that follows addresses some of these very issues.

Social Capital and Sustainability

While the environmental and economic aspects of sustainability have been studied and methods have been proposed to quantify them, the question of how to define and measure social aspects of sustainability still remains quite relevant and unanswered (Lehtonen, 2004). There are many reasons to justify the consideration of social factors in design and planning of land use and community structure. The planning profession has long advocated for the involvement of citizens and stakeholders in community decision-making (e.g. NRC, 1996; Freyfogle, 2003). Additionally, empirical research has found that when the social infrastructure is strong, healthier communities result, whether that is from a public health perspective or community well-being perspective (Ewing & Kreutzer, 2006). Robert Putnam found that trusting communities have a measurable economic advantage and increased life expectancy (2000). However, much of American land use policies and development since the 1950s has not included social factors (Bullard et al., 2000; Duany et al., 2000; Lopez & Hynes, 2003).

In understanding sustainable communities, the concept of social capital is potentially very useful. Social capital, as defined by Harvard political scientist Robert Putnam, is “the collective value of all ‘social networks’ [who people know] and the inclinations that arise from these networks to do things for each other [‘norms of reciprocity’] (Saguaro Seminar, 2010). Recently popularized by Putnam’s book, *Bowling Alone*, that chronicled the decline in civic engagement in America, the term is something many scholars in the past have talked about more broadly.

Field (2003) suggests that the theory of social capital is very straightforward. “Its central thesis can be summed up in two words: relationships matter” (Field, 2003, p.1).

Field outlines three pioneers of the term social capital and the individual contributions each one made to the development of the concept. He credits Pierre Bourdieu and James Coleman, in addition to Robert Putnam, for providing the most significant contributions to the development of the concept. Bourdieu was interested in the questions of access to resources and power. Coleman focused on how individuals might use capital to pursue their own interests. He was interested in how marginalized groups could benefit from social capital as a resource, which can be considered an economic approach to the term. Coleman said, "social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: they all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure" (Field quoting Coleman, 1994, p. 302). Because of his standing as a prominent scholar in sociology, Coleman's work provided creditability to the term (Field, 2003, 20-21).

Putman was concerned with civic engagement and how this created social infrastructure and well-being (Field, 2003, p. 13) and is the most contemporary social capital scholar and his work has inspired the creation of the Saguaro Seminar at Harvard University, which has collected national data on social capital and provided many resources for scholars and practitioners.

Glaeser et al. (2002) provide a nice explanation of the understanding of social capital within economics:

Economists understand the role that repeated social interaction plays in solving free rider problems and reducing opportunism e.g., Greif (1993). The literature on repeated games (Abreu, 1988; Fudenberg and Maskin, 1986; Kreps et al., 1982) explains why cooperation becomes easier when individuals expect to interact more often in the future. Social connection can substitute for missing, or expensive, legal structures in facilitating investment and other financial

transactions (Arrow, 1972) (p. F437).

Social capital has evolved out of the theories and application of human capital. Coleman (1988) extended his views from the concept of human capital and examined the importance of social capital in promoting the development of human capital. This is an important extension as human capital has a more extensive literature and history than social capital. Human capital, the skills and knowledge individuals possess, has been articulated as an economic concept (Schultz, 1961). In fact, Schultz (1961) made the argument that much of our consumption was really investment in human capital and thus began a major shift in thinking of capital as more than physical equipment and machinery and arguably, laid the foundation for thinking of less tangible concepts such as knowledge and skills (in human capital) and networks, norms, and trust (in social capital) as measurable components of an economy that have real value.

The majority of literature on social capital is related to its measurement. It is important to measure social capital for many reasons. The Saguaro Seminar gives three of the most significant reasons for measuring social capital. Making an often-intangible concept more tangible is one of the reasons. By attempting to measure social capital, scholars are developing language and metrics with which to talk about, discuss, and compare the activities that they do which may build social capital. Another reason for measurement has to do with the performance driven nature of today's world. By measuring social capital investments, more social capital can be made through community building projects that demonstrate results. The third reason for measurement importance is that of learning how to build more social capital. There are many human interactions that create social capital so measuring it will allow researchers to determine

which interactions are the most effective for creating social capital (Saguaro Seminar, 2010).

There are a number of methods for measuring social capital and these are evolving as more and more researchers contribute to the field. Instruments from the social sciences disciplines have been applied to the measurement of social capital, including surveys, interviews, and focus groups. Within these methods both quantitative and qualitative information is elicited. Robert Putnam's Saguaro Seminar at Harvard University has worked diligently since the publication of *Bowling Alone* in 2000, to articulate ways to measure social capital. As a follow-up to his book, Putman and his researchers administered the Social Capital Benchmark survey, which surveyed approximately 30,000 people, in 40 communities across 29 states in America. The extensive phone survey asked individual respondents questions about the 11 facets of social capital, which cover trust (social and inter-racial), diversity of friendships, political participation (conventional and protest), civic leadership and associational involvement, informal socializing, giving and volunteering, faith-based engagement, and equality of civic engagement across the community (www.ksg.harvard.edu/saguaro/communitysurvey/). In 2006 the Social Capital Community Survey was administered as a follow-up to the 2000 survey by returning to 11 of the original 40 communities and adding 11 different ones.

The World Bank has done extensive work on developing methods and indices for measuring social capital. Specifically, the Social Capital Thematic Group within the World Bank has two tools for assessing social capital: Social Capital Assessment Tool (SOCAT) and the Social Capital Integrated Questionnaire (SOCAPIQ)

(<http://web.worldbank.org>). SOCAT is an instrument designed to collect information about social capital at the household and community organizational levels. It is both a quantitative and qualitative tool and includes a community profile and asset mapping, a community questionnaire, a household questionnaire, an organizational interview guide, and an organizational profile score sheet. The Integrated Questionnaire for the Measurement of Social Capital (SOCAPIQ) is a tool that aims to generate quantitative data on various dimensions of social capital. The tool functions as part of a larger household survey (such as the Living Standards Measurement Survey or a household income/expenditure survey). SOCAPIQ considers six dimensions of social capital: groups & networks; trust and solidarity; collective action and cooperation; information and communication; social cohesion and inclusion; empowerment and political action (<http://web.worldbank.org>).

Like other forms of capital, social capital can be useful for achieving community goals. In fact, Emery & Flora (2006) describe a community capitals framework that includes seven different types of capitals—natural, cultural, human, social, political, financial, and built. In defining the social capital component of the framework they see it as reflecting “the connections among people and organizations or the social ‘glue’ to make things positive or negative happen.” In general, there are two types of social capital, bridging and bonding. “Bonding capital refers to those close redundant ties that build community cohesion. Bridging social capital involves loose ties that bridge among organizations and communities” (Emery & Flora, 2006).

Social capital is important to sustainability for a number of reasons and connections between sustainability and social capital are emerging. This dissertation seeks to add to

this growing body of literature and to show that the relationships between social capital and the built environment have important implications for sustainability. Woolcock (1998) examines the relationship between social capital and economic development as it relates to collective action around societal problems. He states “social capital’s greatest merit...is that it provides a credible point of entry for sociopolitical issues into a comprehensive multi- and interdisciplinary approach to some of the most pressing issues of our time” (188). His summary provides excellent justification for using social capital as a measure of sustainable communities as sustainability challenges are complex and interdisciplinary and span social and political boundaries.

Social capital fosters greater awareness of the ways fates are linked, helps information flow through social networks to educate, and improves our lives psychologically and biologically. It can also inspire collective action around common goals (Abers, 1998; Agnitsch et. al, 2006) and lead to the dissemination of information about sustainability (Pretty & Smith, 2004; Tsai, 2008). Insight can also be taken from studies that have examined social capital and the natural environment (Pretty & Smith, 2004) and social capital and collective action (Abers, 1998, Agnitch et. al, 2006). When it comes to the conservation of biodiversity, social capital can be used to disseminate new information on how to preserve natural resources through the use of networks and levels of trust among those in the networks. Pretty (2003) has shown that social capital can be a catalyst for collaboration around natural resource management and collective action that promotes sustainable development. He states “Where social capital is high in formalized groups, people have the confidence to invest in collective activities, knowing that others will do so too. Some 0.4 to 0.5 million groups have been established since the early

1990s for watershed, forest, irrigation, pest, wildlife, fishery, and microfinance management” (2003). In community development related research and practice, social capital and sustainable development are being seen as logical links. Lew Feldstein of the New Hampshire Charitable Foundation and co-chair of the Saguaro Seminar, with Putnam, advocates for viewing the world through a social capital lens. "We need to look at front porches as crime fighting tools, treat picnics as public health efforts and see choral groups as occasions of democracy. We will become a better place when assessing social capital impact becomes a standard part of decision-making" (BetterTogether.org). Additionally, practitioners in the planning and environmental fields are beginning to advocate for using social capital to address environmental challenges. For example, the Climate Leadership Initiative at the University of Oregon, has a Social Capital Project and its recent publication suggests utilizing social capital to address communication and behavior related to climate change issues (Pike et al., 2010).

When we discuss sustainability, the term resiliency is often mentioned as well. Resiliency is also enhanced by social capital as it allows citizens to depend upon one another and to resolve collective problems more easily (Putnam, 2000). According to the Resilience Alliance, the foremost scholarly society for ecosystem resilience, the term “resilience” can be defined as “...the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes” (<http://www.resalliance.org/>). This concept can be extended to the interaction between ecological and social systems. Several studies have examined the role of social capital in facilitating more resilient communities and organizations. Specifically, Airriessa et al. (2008) demonstrated how neighborhoods with higher levels of social

capital regrouped more quickly than those with lower levels after Hurricane Katrina.

Brondizio et al. (2009) and Miller & Buys (2008) found that social capital played a key role in protecting ecosystems and environmental education engagement strategies, respectively.

While researchers have identified many positive aspects of social capital, there are negative ones too. For example, the Taliban and the Mob can be characterized as having high levels of bonding social capital but it is clear that their use of this community capital was not for the greater good (Field, 2003). As with any concept that receives a lot of attention in the literature, social capital has its fair share of critics who believe that it may not be the panacea for social ills or the all encompassing conceptual framework for levels of community engagement (Prakash & Per, 2004; Portes & Landolt, 1996). Some social capital critics question the utility of a concept that seems so malleable that it can be applied to every subject matter in whatever manner the research sees fit. I attempt to avoid these criticisms by clearly stating the specific aspects of social capital being measured as well as through the utilization of credible and well vetted survey questions.

The Built Environment, Walkability, and Third Places

As discussed in the problem statement, sprawl and the pattern of land use in America has contributed to the unsustainability of our communities. Sprawling land patterns have visible impacts on the physical environment but this work is further motivated by the possible impact these changes in the built environment have on social fabric. Since the 1950s there has been a movement out of the inner cities in America, toward a suburban existence. Famous urban geographer Lewis Mumford once stated that, “Suburbia is a collective effective effort to lead a private life” (Putnam, 2000). In leading

this private life, many Americans have come to live in a triangular pattern where individuals must travel to different locations, usually a number of miles in between, from home to work to shopping and other activities. Even within a subset of the sustainability movement, green building, consideration for transportation to more sustainable buildings has sometimes been neglected (e.g. Wilson & Navaro, 2007).

The built environment can be described and measured in many ways and this work uses walkability as a key measure of the built environment. Walkability refers to the human scale of the land use and the ease with which individuals can navigate an area on foot. According to The Walkable and Livable Communities Institute “Walkable communities are thriving, livable, sustainable places that give their residents safe transportation choices and improved quality of life...” (<http://www.walkable.org/>). In the active living literature, walkability is seen as a measure of objective neighborhood characteristics that influence an individual’s ability to walk (Du Toit et al., 2007). This can include the proximity of destinations and whether one can walk to those destinations from his/her home (Leyden, 2003; Owen et al., 2004). Geographic information is often used in a mapping tool to determine the number of locations, such as businesses and public places, are within a certain radius. Walk Score is a popular online mapping tool that allows individuals to enter an address and determine how walkable the location is as it displays the number of locations within a short distance (www.walkscore.org). While this is a powerful and important tool for individuals, businesses, and real estate professional, such “objective” ways of measuring walkability have several key downfalls. These downfalls will be examined more in the papers that follow but they can include the often lack of more subjective variables of individuals’ perceptions related to the

suitability of an area for walking, which can include safety, life and health circumstances, weather, and aspects of the built environment that are not available in digital map format.

Oldenberg (1989) explains the many benefits afforded citizens of communities with strong third places. His work, *The Good Great Place*, defines third places as not work and not home but rather community infrastructure and local businesses that provide areas for individuals to gather (e.g. bars, cafes, coffee shops, barber shops, etc.). From Paris's street cafes to Berlin's beer gardens, Oldenberg shows that European countries have a rich history of informal, community space in which individuals can interact and share a sense of belonging. He argues that individuals who have access to and utilize such spaces enjoy companionship, friendship, and other mental health benefits. In contrast, America's suburban neighborhoods lack such spaces and thus the benefits they offer (Oldenberg, 1989). As will be displayed further, the concept of third places plays an important role in testing the hypothesis I examine in this dissertation through the solicitation of self-perceived walkability, as measured by an index of "third places" to which individuals can or cannot walk from their homes.

A number of scholars have examined motivations for various types of transportation mode choices, including walkability (Cervero & Kockelman, 1997). While I do not examine the particular drivers of walkability in this research because the focus of the work is more on the interactions between walkability and social capital, it is important to briefly summarize this topic area in order to provide context to the research question and design. Three main characteristics of the built environment have been shown to influence travel demand: density, diversity, and design. In their examination of the San Francisco Bay Area, Cervero & Kockelman (1997) found that density, land use

diversity and pedestrian-oriented designs generally reduce trip rates and encourage non-auto travel, which includes walking. The relationships effects they found were marginal but statistically significant. This work and others (e.g. Ewing et al., 2001) supports the ideas of New Urbanism and sustainable communities in their advocacy that creating pedestrian and transit oriented (instead of automobile oriented) development can influence an individual to make transportation choices that are more affordable, environmentally friendly, and potentially more socially beneficial.

Past studies focus on the built environment and its affect on car travel but few examine walking and the built environment. This could be because of the lack of data available on a detailed scale. Cervero & Duncan (2003) found that certain non-traditional aspects of the built environment, such as topography, darkness, and weather influenced an individual's decision to walk.

For many reasons, the public health community is interested in the design of communities and land use choices. In 2002 a group of doctors and public health practitioners gathered to address the issue of community design, land use, and public health. The results of their workshop included a research agenda for areas of potential study including environmental pollution, obesity, and social capital, among others (Dannenberg et al. 2003). Pollution from the many cars that are on the road traveling inefficiently between locations in suburbia can cause health issues. Walkability of a community and physical activity has been shown to be related to, and are in large part due to, the design of neighborhoods. This is especially important in light of the obesity epidemic in America. While this is not a major focus of the research presented here, it is important to note that the breadth of their research agenda indicates the profound effect

the built environment can have on many aspects of human life and the lack of existing literature to guide policy action. Since the announcement of this research agenda, there have been many studies of the impact of the built environment on physical health that have advocated the importance of walkability. However, few empirical case studies that describe the relationship between social capital and the built environment are being conducted.

Existing Literature Linking Social Capital and the Built Environment

When examined in this capacity the communities Americans have built in the last 50 years have not sufficiently met the four conditions and other important defining factors of a sustainable community. This discontinuity in how we live leads to larger consumption of resources and greater production of pollution, which affects a community's environmental sustainability. At the same time, it can be hypothesized that a community that is disconnected physically will also become disconnected socially. Discontinuity can be implied to mean lower social connections and thus a lower stock of social capital. Researchers have explored the idea of social capital and the built environment but there are only a few studies that attempt to quantify the "social capital" within a community and the built environment setting (Talen, 1999; Sander, 2002; Leyden, 2003). The following section describes some of the studies that compared measures of social capital with aspects of the built environment.

As suburbs became more popular in the 1950s and 60s, some inner cities faced great problems from growing poverty which affected the social conditions of city residents. "Increasing intractable poverty and its many troubling consequences—single-parent families, reliance on welfare, substance abuse—devastated urban communities,

dangerously stressing the networks, norms, and trust by which minority residents of the core had lived” (Lopez and Stack, 2001 p. 37). Networks, norms, and trust are a key part of the definition of social capital. Putnam found that social capital works through existing states and markets, not in place of them. “Studies of urban change also make it clear that the social capital that works through states and markets is not race-neutral”(Lopez and Stack 2001, 37). Therefore, it can be assumed that without the proper institutions, minority residents were at a disadvantage in terms of their access to the networks that provide assistance and support.

Jane Jacobs published the *Death and Life of Great American Cities* in 1961 as a commentary on current city planning and design methods. Using New York City as a model, her work is considered the first real observation and statement on the built environment and “social capital,” with the term in quotes because she didn’t refer to it explicitly but mentioned many of the characteristics of the definition. Her lessons demonstrate the importance of diversity in space, uses, and individuals in the level of social capital in neighborhoods. “In our American cities we need all kinds of diversity, intricately mingled in mutual support. We need this so city life can work decently and constructively and so that people can sustain (and further develop) their society and civilization (241). Jacobs details the four specific generators of diversity as being primary mixed uses, the need for small city blocks, the need for aged buildings, and the need for concentration.

Robert Putnam quantified various contributions of the decline in civic disengagement in the last 35 years and concluded that sprawl was one of the major contributors. This solidified the intuitive connection between social capital and sprawl.

Putnam and other researchers have observed that commuters spend large amounts of time in their cars, postulating that this is time that could be spent interacting with family, friends, or neighbors. Each additional ten minutes spent behind the wheel daily is correlated with a ten-percent reduction in all types of civic involvement, including volunteering, participating in public meetings and attending religious services (Putnam, 2000). In addition, commuters have work-based networks that compete with place-based networks (i.e. networks in the community in which they live). Non-commuting residents have fewer competing affiliations and are more likely to participate in the community where they live. Putnam has found that, aside from education level, commuting time is the strongest demographic predictor of civic involvement.

Araya et. al (2006) investigated the association between social capital, the built environment, and mental health in South Wales, United Kingdom. Researchers examined this relationship through a questionnaire that measured trust, social participation, social control and the built environment and included questions from the General Health Questionnaire (which is a commonly used survey asking respondents about their psychological well-being over the last seven days) (Araya et al., 2006, p. 3075). Over 1,000 individuals completed the survey and the results indicated that some measures of social capital were related to mental health. However, there was little support for a relationship between social capital and the built environment, what the authors refer to as “the contextual nature of social capital.” In the discussion of their results, the authors suggest “people may find it hard to circumscribe their answers to issues, such as trust, to specific geographic boundaries” (Araya et al. 2006, 3081). In other words, the physical environment of an individual may not match up with their social environment.

As part of a community master planning process officials in the town of Candia, New Hampshire, USA took into consideration the impact of the expansion of a major interstate highway. To evaluate the impact of the highway expansion on their community, three important infrastructures were considered: the green, the built, and the social infrastructure (Saguaro Seminar, 2009). Officials employed a social capital survey and mapping process. The mapping aspect is a unique component that asked residents of Candia to indicate where they interacted with one another in both formal and informal settings. Geographic information systems (GIS) were used to map out where the centers of social infrastructure were in the town and presumably where social capital had been built. Results of the mapping process revealed that there were indeed centers of interaction in the town (officials had previously assumed that there was no real town center) and that the social infrastructure was something to consider in planning processes and worthy of protection (Sagurao Seminar, 2009).

Another example of social capital and built environment case studies comes from Rajasthan, India, the largest state in India. Rajasthan participated in a seven-year watershed conservation and development program sponsored by the World Bank and the Indian Government (Krishna & Uphoff, 1999). Researchers collected information about the relationship between social capital and development outcomes from 2,397 individual interviews and 64 focus groups that came from the 64 villages that participated in the study. The broad objective was to determine if social capital, a concept that is popular in development literature, could be measured and validated in the field. Results from the study indicated that villages with high social capital overwhelmingly had better outcomes related to conservation and development on the watershed level, which included

collective decision-making that resulted in protected soil and water in a catchment area (Krishna & Uphoff, 1999). Researchers found that some traditional measures of social capital were not applicable to the Indian Villages and had to create more culturally appropriate ones (Krishna & Uphoff, 1999), which is a lesson to researchers to keep cultural diversity in mind when investigating social capital. While this study did not explicitly examine the relationships between social capital and the built environment, development is often related to the building of physical infrastructure and thus it provides some useful precedent.

The case studies described above indicate that there is work being done on determining the relationship between the built environment and the social infrastructure of a community. Each study provides an example of methods and research approaches to use in order to understand if social capital can be built and measured. Some approaches to development, such as Smart Growth, infilling, and walkable cities and towns, may offer improvements in social and economic capital as compared to sprawling development patterns (Ewing & McCann, 2003; Leyden, 2003; Li, K. et al., 2007). Attempts have been made to understand relationships between social capital and development patterns (Litman, 2007; World Bank, 2005). However, there are few empirical case studies of social capital on the same scale as the built environment—on the ground at the neighborhood level and in a possible causal relationship where the physical environment influences social capital instead of social capital influencing the shape of physical development. In the former relationship, social capital is considered a desirable outcome in and of its self instead of a means by which to achieve further outcomes.

Research has shown that if individuals live in an area that is compact and has mixed uses within walking distance than they will be more likely to walk to destinations in their community (e.g. Frank & Pivo, 1994). In walking to these destinations, it is also more likely that they may see other individuals in the community and interact with them. This interaction can lead to collective action around a community issue, the building of trust among neighbors and institutions, and just increased awareness of the fact that others are nearby in times of need. These ideas are the basis behind the hypothesis that social capital is related to the design of the built environment. By studying the built environment in Galway, Ireland, researchers were able to show that walkable neighborhoods had more social capital than suburban ones (Leyden, 2003). Key measures in this research included primary data collection from three different community types based on form (compact, less compact, least compact). Self reported data on the ability to walk to locations within a community was the basis for a walkability index. Responses to several key social capital questions (about trust and civic participation) formed the social capital index (Leyden, 2003). Leyden's study, while it may be lacking in clearly defined measures of the built environment, is one of the few empirical case studies that examines the relationship between the built environment and social capital.

Freeman (2001) and Yang (2008) both used secondary data analysis to assess the relationship between residential density and various social measures of neighborhoods. Freeman (2001) found that residential density was unrelated to the formation of neighborhood social ties. Yang (2008) showed that density and mixed land use were associated with higher levels of neighborhood satisfaction in one of her case study cities

(Portland, OR) but that they were associated with lower levels of satisfaction in the other city (Charlotte, NC). The fact that these researchers and many others used variables such as residential density and land use types indicates their importance as accepted measures of the built environment. The social measures they use are limited because they rely on only one question from national-level surveys. Yang (2008) uses the responses of one question in the American Housing Survey that relates to rating ones neighborhood as a place to live for her dependent variable of neighborhood satisfaction. Freeman's (2001) dependent variable comes from the Multi City Survey of Urban Inequality. The variable is the responses to the question of whom individuals turn to, outside of their household, to discuss important matters and whether that individual lives in their neighborhood.

Collaborative Nature of Research & Hypothesis

Because sustainability is multifaceted, impacts to community sustainability cannot be evaluated from just the social or the physical perspective. The research described here was part of a larger collaborative endeavor of engineers and social scientists. Other members of the Environmental Research Group at the University of New Hampshire studied sustainability from the community perspective as well but were looking at the physical measures of land use and development including services and transportation options, mixed use, and infrastructure. The specific contribution of this dissertation to the larger research project was examining the human dimensions of the built environment in a community.

The main hypothesis that governed the work is as follows:

- The built environment influences the development of social capital, an important measure of sustainability, in a community and this influence can be measured and characterized.

CHAPTER TWO

METHODS

The research described here employed a multi-method approach to understanding the relationship between social capital and the built environment. The triangle in Figure 1 represents the steps completed to get to the large survey tool, which was the key data collection method.

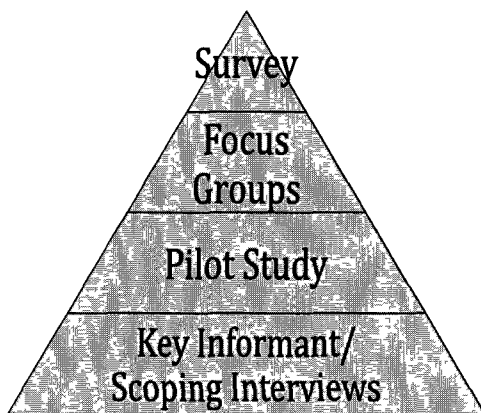


Figure 1. Research methods used

Communities are a logical unit of analysis for understanding the interaction between these two infrastructures. Delanty (2003) tries to flesh out the many definitions of community to give a modern perspective of the concept. “The increasing individualism of modern society has been accompanied by an enduring nostalgia for the idea of community as a source of security and belonging in an increasingly insecure world, and in recent years, as an alternative to the state as a basis for politics” (Introduction to

Delanty's book). While the modern definition of community has certainly expanded due to technology and a more mobile lifestyle that incorporates both physical and virtual connections, there is still seems to be a strong tie to local geography and bounded definitions of a community. This research focused on two cities and one town in the state of New Hampshire. Studying the town/city and the neighborhoods within these towns and cities is particularly well suited for New Hampshire because of the state's focus on local decisions and policy making (<http://www.nhcivicalliance.org/>).

Selecting towns in New Hampshire also allowed the project team to focus on differences between the communities based on the given metrics, and, for the most part, eliminate confounders having to do with differences in climate, culture, geography, and other factors that would arise between regions. Additionally, the expertise of the project team and their networks, including pre-established collaborations with local and state planners, allowed for a thorough case study. Although criteria may change slightly from place to place, the general method will be useful in developing strategies for regions outside of New Hampshire also. Finally, this cross sectional case study procedure created an important database that could be used in future, longitudinal studies.

Case Study & Community Based Approach

After informal meetings and discussions with key stakeholders, such as community and regional planners and decision makers and a land developer, a pilot study was conducted. The pilot study took place in Durham, New Hampshire during the Spring of 2008 with limited resources and a stated purpose of simply testing surveying techniques for measuring social capital and the built environment on the neighborhood scale and looking for initial interesting patterns. Two neighborhoods of varying built

form were selected. Faculty neighborhood, the denser neighborhood, abuts Mill Plaza, the main shopping center in the town. This is the only neighborhood with clearly defined boundaries in Durham that is close to the center of downtown. In contrast, the Longmarsh neighborhood was chosen as a second study site because of its relatively newer construction, more sprawling design, and greater distance from the center of town, and thus greater distance from most social resources, such as the library, shopping, schools, and churches.

A main goal of the pilot study was to test the survey instrument and to see if there was a relationship between neighborhood level characteristics of the built environment and individuals' social capital. Because Robert Putnam and the Saguaro Seminar at Harvard University (Saguaro Seminar, 2009)¹ have developed a respected and often used survey tool and because a great deal of data from the use of this tool are available for comparison, we utilized the Saguaro Seminar's social capital short form as a starting point to build our survey. Along with social capital, the transportation behavior of individuals in the two neighborhoods was of interest and a series of questions on transportation were added. Survey is located in Appendix C.

After the survey was reviewed and revised based on comments from colleagues and experts, it was administered via telephone to 50 randomly selected residents from Faculty neighborhood and to all 50 residents of the Longmarsh community. As there were so few homes in the Longmarsh community, researchers decided to include them all to increase the sample size. All individuals were contacted via telephone and attempts were made to conduct the survey over the phone unless individuals refused the survey,

¹ The Saguaro Seminar is an initiative of Harvard University and was funded by Robert Putnam after the publication of his book on civic engagement in America- *Bowling Alone*. The short form social capital survey can be found at <http://www.hks.harvard.edu/saguaro/>

requested written copies or did not respond to a request for a telephone survey after three attempts to reach them by telephone. If individuals did not respond after three attempts, a paper version of the survey was mailed to them. The overall response rate for the survey was 50%, with approximately equal response rates in each neighborhood.

Applying the Methods at a Larger Scale

The pilot study (results discussed in more depth in the first journal paper) motivated a larger study in a number of ways. The results, while from a small sample, suggested that a relationship might exist between walkability and social capital at the neighborhood scale. Because the pilot study only surveyed a small group of residents in two neighborhoods, researchers expanded the study to look at a greater number of neighborhoods within two different municipalities. Additionally, the method of administering the survey, as well as some of the questions on the survey, were modified based on the results of the pilot study and the advice of municipal officials and community leaders. Two municipalities in the state of New Hampshire, Portsmouth and Manchester, were chosen because of their variety of neighborhood types and social, economic, and cultural diversity.

Selection of Communities

Manchester - Manchester is New Hampshire's largest city with over 100,000 residents. It is also the most diverse population, mostly due to its role as the State's Refugee Resettlement Area. Over 76 languages are spoken in Manchester schools. Additionally, Manchester offers a diversity of neighborhood types, from sprawling suburban to older, more compact neighborhoods close to the inner city. It also had a strong commitment to economic development and social equity. The associate director of the regional planning

commission in the I-93 corridor (where Manchester is located) expressed the desire and willingness to work with researchers to determine how to better measure sustainability, especially the social components of sustainability, in the communities under the commission's jurisdiction and at a regional level (Kerrie Diers, personal communication, 2008).

Portsmouth, NH -Portsmouth is a city of approximately 22,000 residents located in the Seacoast area of New Hampshire. A port city that has been a key part of the Northern New England economy since colonial times, Portsmouth is also a fairly progressive community. The city has a history of active and engaged individuals coming together to address pressing local and national issues. Recently, in November of 2007, Portsmouth became the first eco-municipality on the East Coast of the United States (Peter Britz, personal communication, 2008). This designation means that the city has committed to following the American Planning Association's four sustainability objectives: reduce dependence on fossil fuels, underground metals, and minerals; reduce dependence upon synthetic chemicals and other unnatural substances; reduce encroachment upon nature; meet human needs fairly and efficiently. This systems approach to creating sustainable communities is used widely in Europe, particularly in Sweden where the concept originated (<http://www.instituteforecomunicipalities.org/ecomunic.htm>). While Portsmouth has begun to work toward the objectives of being an eco-municipality, it is still attempting to define and measure its goals toward sustainability. In a conversation with the city's sustainability coordinator, he expressed his need for assistance in measuring sustainability at the municipal level. As a result, he agreed to participate in

the proposed research. This partnership allowed first hand access to the problem and question of measuring sustainability at the municipal level.

Two focus groups, one in each municipality, were conducted with local and regional planners and decision makers in order to understand their perspectives on sustainability as well as what neighborhoods they might suggest research focus upon when looking for a variety of built form as well as socio-economic diversity. See Appendix B for a summary and main themes discussed in the focus groups.

Ten neighborhoods were chosen in each of the cities (Manchester and Portsmouth) and 100 residents were randomly selected in each of the neighborhoods to receive a survey. While the pilot study featured a phone survey, it was determined that this method of survey delivery was too time intensive for a much larger study of 2,000 people. Therefore, a drop off and mail back survey was created (with the option of submitting answers online instead of paper if residents preferred). Dillman (2000) was used as a guideline for survey design and implementation. The survey instrument with coding is available in Appendix D, while data for the full sample and Portsmouth and Manchester subsets is available on CD. Maps of the cities with the neighborhoods highlighted as well as summary demographic information are also available CD. While surveying in each of the 20 neighborhoods, researchers took a number of photographs and made observations about the physical and social environment. These assessments are available in the digital format.

Community based participatory research (O'Fallon & Derry, 2002) was used as a guiding framework for much of this dissertation research. This began with the formulation of a relevant and timely research question that many practitioners articulated

needed answering, which was refined through key informant interviews. As described, a pilot study then laid the groundwork for testing research methods. Lessons learned from the pilot study were used to inform a larger study, along with two focus groups (one in each municipality). The focus groups contained municipal officials, community decision makers, and other representatives from local interests. In the results interpretation and dissemination process the same community members and other involved stakeholders were invited to the “Sustainable New Hampshire” Workshop in September of 2010 to not only hear about the results but to offer their opinions, interpretations, and suggestions for future research and collaborations. To bring the results to an even broader audience, a “road show” presentation was created and has been shared with the Manchester Health Department and the Portsmouth Sustainable Practices Committee. More presentations and discussions are anticipated.

CHAPTER THREE

DESCRIPTIVE STATISTICS & SUMMARY OF THE SAMPLE

While the individual papers in this dissertation include some summary data and statistical analysis collected in this research process, they lack a comprehensive review of the data. This section, in addition to the extensive appendices, is meant to provide an overview of some of the summary data and the interesting cross tabulations that compare the dependent variables with demographic independent variables from the full-scale study survey. Additionally, it details the survey questions used to establish independent and dependent variables as well as how the variables for the more sophisticated models were chosen.

Based on the hypothesis the dissertation addresses, the key independent variable was a walkability index that resulted from the survey question that asked respondents to indicate all of the locations (provided in a list) that they could walk to in their community. This type of index was successfully used by Leyden (2003) and was modified to fit the type of communities and neighborhoods surveyed in this research. It is found as question 3 in the paper survey, which is replicated in Figure 2. The full survey is located in Appendix D. The highest an individual could score on the walkability index was 13, as there were 13 different options for locations respondents felt they “could walk to.” Respondents were given the opportunity to indicate an “other” location to which they can walk that helped researchers determine if important

community infrastructure had been missed. However, there was not enough consistency in responses to warrant adding another point to the index. Survey respondents were also asked to indicate whether they actually do walk to the certain locations they indicated they “can” walk to in their community. This specific component of research was most focused on where the infrastructure was located in a community and whether it was within a walking distance, not whether individuals actually do walk to the locations. While there are many variables that might determine whether an individual can and actually does walk to a location in his/her community, such as distance to location, health, safety, and time constraints, it was determined that the “can walk” would provide a better assessment of the location of “third places” and key social infrastructure. This determination came from the notion that individuals would indicate their self-perceived walkability as well as the existence of locations where they could congregate and possibly build social capital, even if they didn’t regularly walk to those places. Additionally, a number of survey respondents seemed to miss understand the intent of the “do walk” question, which was further motivation for focusing on the “can walk” question. Tools such as WalkScore, the online walkability assessor, attempt to determine how walkable a neighborhood is but are based on objective, geographic information and do not take perceived walkability into account.

Location	I Can walk to:	I Do walk to:
Post office		
Restaurant		
Coffee Shop/Café		
Shopping Center		
Church		
School		
Library/Bookstore		
Home of a friend		
Grocery Store		
Bar/Pub		
Community/Recreation Center		
Convenience Store		
Natural Area/Open Space/Park		
None of the above, it is hard to get anywhere without a car		
Other, please specify _____		

Figure 1. Survey question used as the basis for the walkability index

There are a number of dependent variables that were taken from the social capital questions. The following general trust question and the answers were used to create the variable “gentrust.”

Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people? (Circle one choice)

People can be trusted

You can't be too careful

Depends

Don't know

Please indicate the level of trust you have for the groups listed in the first column. Check just one box for each group.

	Trust them a lot	Trust them some	Trust them only a little	Trust them not at all	Don't know
People in your neighborhood					
Police in your community					
People who work in the stores where you shop					
People of racial/ethnic background that differs from your own					
National Government					
Local Government					

Responses to the trust questions above, along with the “gentrust” response were used to create a trust index (the process of creating this index is explained below). Community involvement is another common measure of social capital and Putnam’s social capital short form suggested a variety of such questions based on common community activities that had already been tested for validity in the Social Capital Benchmark Survey. Survey respondents were asked to indicated whether they had participated in the following activities:

Please check *yes* or *no* to indicate whether you have done the activities detailed in the box below in the last 12 months. If you can, please approximate the number of times you did each activity in the last 12 months.

	Yes	No	Approximate number of times in last 12 months
Worked on a community project			
Donated blood			
Attended any public meeting in which there was a discussion of town or school affairs			
Attended a political meeting or rally			
Attended any club or organizational meeting (not including meetings for work)			
Had friends over to your home			
Been in the home of a friend of a different race or ethnicity or had them in your home			
Been in the home of someone of a different neighborhood or had them in your home			
Been in the home of someone you consider to be a community leader or had one in your home			
Volunteered			
Meet friends outside of the home			

The donating blood question may raise some concerns but aside from being suggested by Putnam and the Saguaro Seminar, other research has found strong connections between community volunteerism and donating blood (Alessandrini, 2007). Responses to the community involvement (yes/no) questions were also compiled into an index. The number of times individuals participated in a community project was not used as a key

independent variable because more than half of the respondents did not fill in this response. Additionally, it was more difficult to aggregate those responses into an index.

Factor analysis was used to create both of the indices (Kline, 1994). For the community involvement index, as indicated by the shading component matrix in Table 1, eight of the 11 questions loaded on one factor with a Cronbach’s Alpha score of 0.7591. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. A "high" value of alpha is often used (along with substantive arguments and possibly other statistical measures) as evidence that the items measure an underlying (or latent) construct” (<http://www.ats.ucla.edu/stat/spss/faq/alpha.html>). Thus these eight questions were used to create the “community index” where an affirmative response to each one yielded one point and then totaled to create an index. Indices are commonly used when evaluating social capital (Putnam 2000).

Component Matrix^a

	Component		
	1	2	3
Have you: Worked on a community project	.670	-.217	.050
Have you: Donated blood	.430	-.067	.232
Have you: Attended any public meeting in which there was a discussion of town or school affairs	.646	-.187	-.118
Have you: Attended a political meeting or rally	.597	-.187	.053
Have you: Attended any club or organizational meeting (not including meetings for work)	.684	-.235	.047
Have you: Had friends over to your home	.373	.725	-.018

Have you: Been in the home of a friend of a different race or ethnicity or had them in your home	.488	.347	-.068
Have you: Been in the home of someone of a different neighborhood or had them in your home	.460	.664	.024
Have you: Been in the home of someone you consider to be a community leader or had one in your home	.585	-.103	.151
Have you: Volunteered	.686	-.157	-.017
Have you: Met friends outside of the home	-.178	.062	.950

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Table 1. Factor Analysis on Community Involvement Questions

A similar process was used to determine the components of the trust index. As displayed in Table 2, a factor analysis of some of the trust questions in the survey shows most of them loading onto one similar factor (as shown with shading). Because the amount of loading was very similar between factor one and two for the question regarding general trust of people, all of the responses to the questions were included in the trust index. To create the trust index one point was allocated if respondents indicated they trusted the entity (i.e. police) “a lot” or “some.” For the generally speaking question, one point was allocated if respondents responded “most could be trusted.”

Component Matrix^a

	Component	
	1	2
Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?	.392	.429
Trust: People in your neighborhood	.527	.457
Trust: Police in your community	.596	-.090
Trust: People who work in the stores where you shop	.684	.297
Trust: People of racial/ethnic background that differs from your own	.628	.327
Trust: National Government	.749	-.545
Trust: Local Government	.795	-.447

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Table 2 . Factor Analysis on Trust Questions

Descriptive statistics along with correlation analysis and basic regression analysis were used to determine which independent variables should be tested in more sophisticated analysis (explained in further detail in subsequent sections of this dissertation.) Key demographic variables were determined to be education level, income level and religious participation. To illustrate these comparisons, the graphs in this section are meant to show interesting cross tabulations between education level, income level and some of the key dependent variables. Although it is important to note that this sample of data had a much higher level of education than the average population of New Hampshire, the following crosstabs are meant to show that despite the skewed education levels, varying behaviors are still seen for those with a higher level of education. For example, those

with higher education are more likely to participate in their community as well as have higher levels of trust, which are key indicators of social capital.

Overall, individuals who have earned higher levels of education were more likely to participate in a community project in the last year as well as indicate that they have volunteered in the last year (Figures 2 & 3).

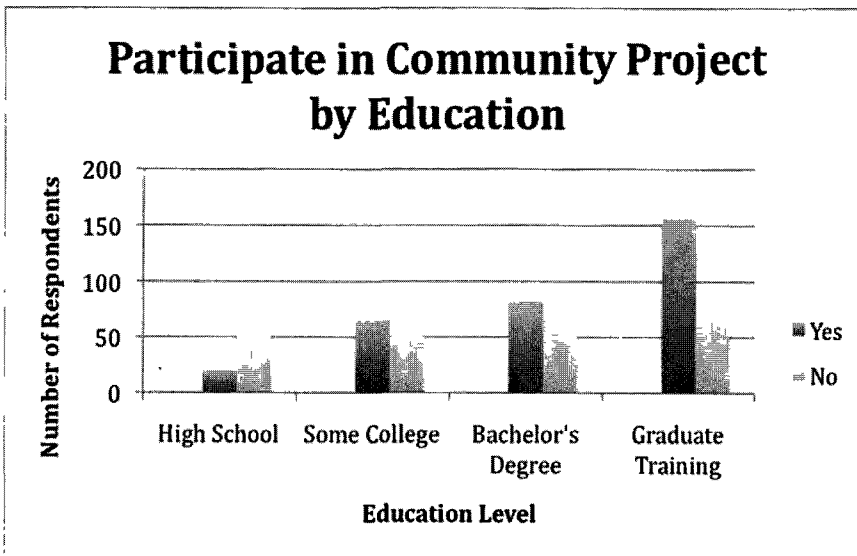


Figure 2. Respondents with higher levels of education are more likely to say yes to participating in a community project.

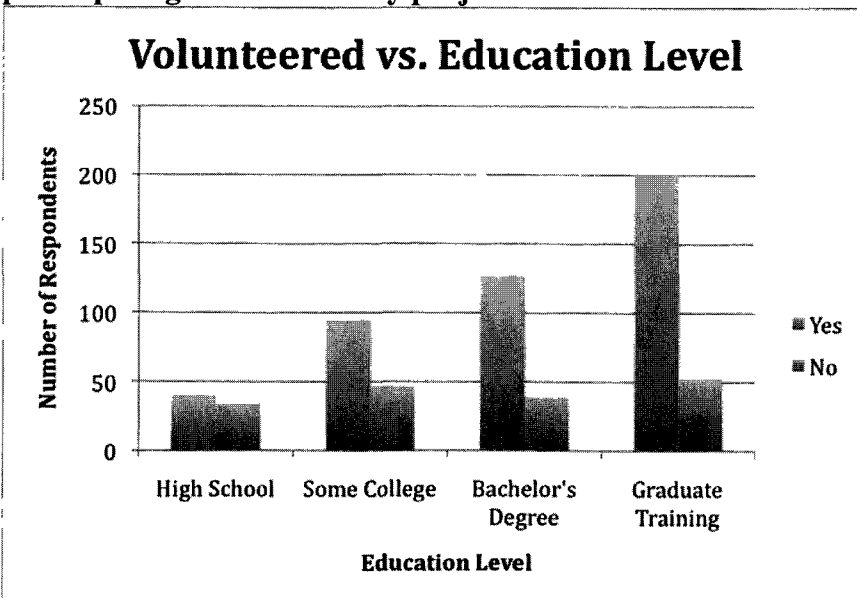


Figure 3. Volunteered in the last year vs. education level

Additionally, those that indicated generally trusting others were also more likely to be highly educated (Figure 4).

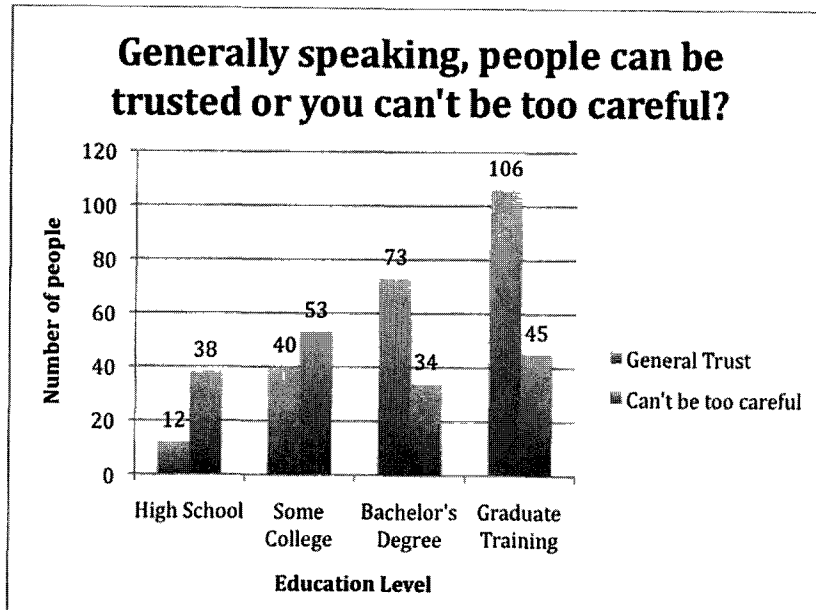


Figure 4. Respondents with higher education levels are more likely to say that they generally trust others.

Other measures of trust, which are encapsulated in the trust index, were also higher for those with higher levels of education (Figure 5).

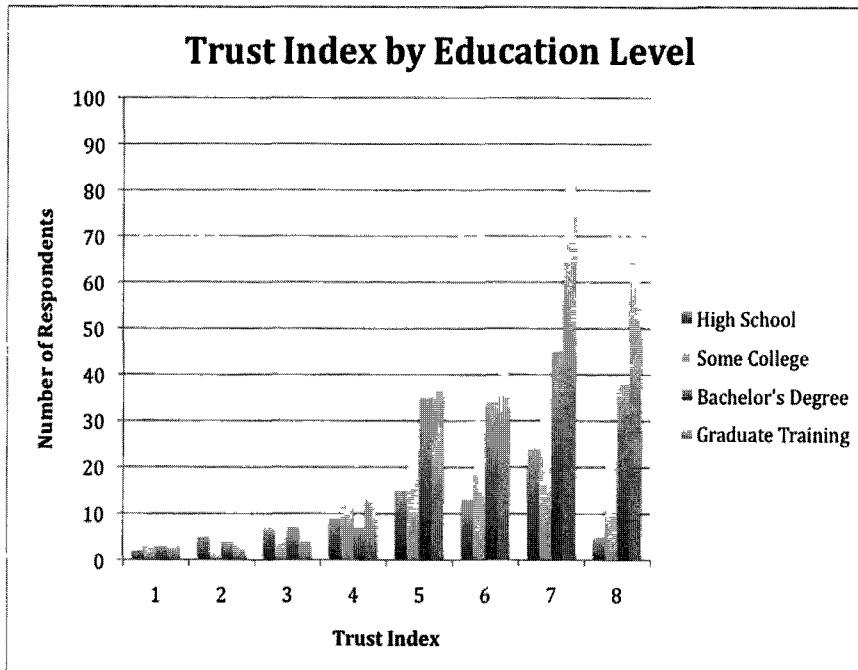


Figure 5. Trust index by education level

Income also seems to be a demographic variable that has an impact on levels of social capital in this sample. Those with higher incomes are more likely to indicate participating in a community project in the last year. A similar yet less poignant pattern is seen with volunteering and income levels (Figures 6 & 7).

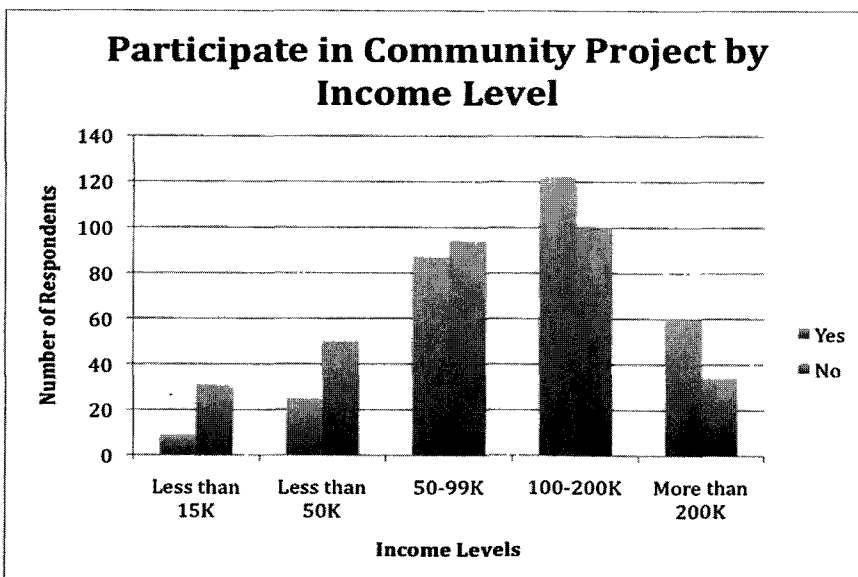


Figure 6. Respondents with higher incomes are more likely to indicate participating in a community project in the last year.

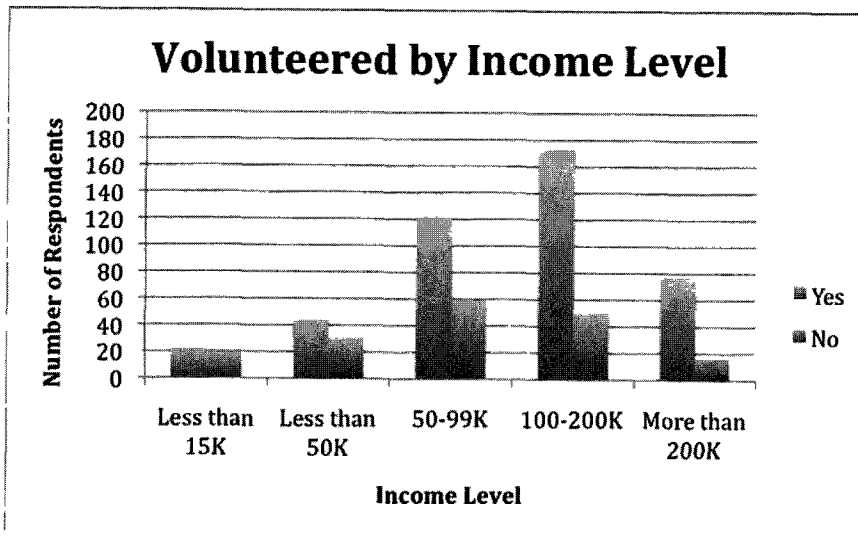


Figure 7. Respondents with higher incomes are more likely to indicate volunteering in the last year.

General trust and income also have a pattern in which those with higher incomes are more likely to trust people in general (Figure 8).

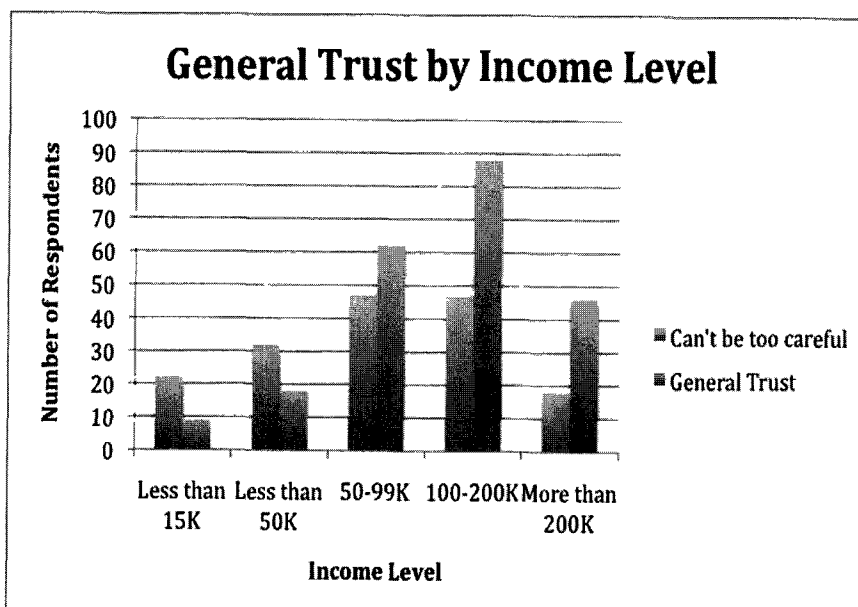


Figure 8. General trust responses by income level.

Commute time (in minutes) was not determined to have a significant impact on the key dependent variables. In some ways, this finding was a bit surprising. One of Putnam's key findings was that with increased commute time people were less likely to participate

in community activities (2000). However, when considered in more detail and in the specific context of the actual study, it is less surprising. Putnam's sample was nationwide and included secondary data analysis of large survey sets. The survey conducted for this research was focused on primary data collected at very specific scales. In each community (Manchester and Portsmouth) as well as in each subset of the data (i.e. more walkable vs. less walkable communities) the average commute time was approximately 20 minutes with a low standard deviation and with the overwhelming majority of individuals commuting by car. This is not out of the ordinary for the types of communities investigated because of their size and location in the state. Additionally, there are solid reasons for why commute time may not be as strong an indicator of civic engagement. These include the fact that some forms of commuting, such as solo car commuting, may be faster than taking public transit, which is itself a form of transit that has more opportunities for interaction with other individuals (Williamson, 2002).

CHAPTER FOUR

PAPER ONE

Examining Walkability and Social Capital as Indicators of Quality of Life at the Municipal and Neighborhood Scale²

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Abstract: Walkability has been linked to quality of life in many ways. Health related benefits of physical exercise, the accessibility and access benefits of being able to walk to obtain some of your daily needs, or the mental health and social benefits of reduced isolation are a few of the many positive impacts on quality of life that can result from a walkable neighborhood. In the age of increasing energy costs and climate considerations, the ability to walk to important locations is a key component of sustainable communities.

While the health and environmental implications of walkable communities are being

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extensively studied, the social benefits have not been investigated as broadly. Social capital is a measure of an individual's or group's networks, personal connections, and involvement. Like economic and human capital, social capital is considered to have important values to both individuals and communities. Through a case study approach this article argues that the generation and maintenance of social capital is another important component of quality of life that may be facilitated by living in a walkable community. Residents living in neighborhoods of varying built form and thus varying levels of walkability in three communities in New Hampshire were surveyed about their levels of social capital and travel behaviors. Comparisons between the more walkable and less walkable neighborhoods show that levels of social capital are higher in more walkable neighborhoods.

Introduction

One way to measure quality of life is by assessing the gap between what is hoped for by humanity and what is experienced by humanity (Nussbaum & Sen 1993). Quality of life is subjective; it is within the eye of the beholder taking on a variety of different scales from individual to community to region. Examples of quality of life include a community infrastructure that is accessible to all and supports the gathering of residents, healthy ecosystems that provide the region with valuable resources such as clean water and scenic vistas, and communities or regions that support the sense of place cherished by residents.

Research can play an important role in understanding how individuals and groups of individuals work towards narrowing that gap between the quality of life expected and quality of life experienced. Our research looks at how social capital is used to narrow

that gap. Links between social capital and quality of life in various settings, while not abundant, have been established in the literature. Requena (2003) details the relationship between social capital and satisfaction in the work place, which he calls workplace quality of life. Research has suggested that individuals learn to trust one another each other in communities where we get a chance to meet each other (Lund 2003). Social connections can increase the resiliency of a neighborhood in a myriad of ways, from providing a source of emotional support when needed to loaning a shovel or an egg. Day to day life can be enriched (Gowen 2009) and resilience may be increased to face both acute disasters, such as earthquakes (Norris 2008), or longer-term problems, such as climate change (Adger 2003).

Quality of life indicators and measurements of community sustainability are closely related and mutually relevant (Sirgy et al. 2006). Examining indicators of urban quality of life, whether they are objective or subjective, is a topic of interest in the quality of life literature (McCrea et al. 2006). Walkability and the importance of third places (informal gathering places that are not home nor work) have been linked to components of social capital and quality of life (Frank 2009, Oldenberg 1999). Economic well-being is often included with quality of life indicators. Communities with higher levels of social capital have been found to do better economically (Putnam 2000). Halstead & Deller (1997) examined how community infrastructure impacts economic development in communities and found that it was quality of life that influenced individual companies more than physical infrastructure such as roads and bridges. Quality of life and social capital are often discussed in similar circles but the two are rarely examined together.

The land use design and physical infrastructure of neighborhoods and regions provide the conduits for individuals to meet each other, theoretically increasing social capital (Jarema et al. 2009). A neighborhood that provides residents with easy access to municipal infrastructure such as post offices, town parks and playgrounds, coffee shops, restaurants, barbershops and club meeting venues will theoretically have high values of social capital. We argue that communities are more resilient if they have the capacity to utilize social capital and access to physical infrastructure that supports the interaction of residents. Thus, social capital has the potential to be utilized in a manner that increases the community or regions' quality of life, narrowing that gap between what is expected and experienced. Figure 1 details the logic behind the hypothesis that the level of walkability at the neighborhood scale can influence social capital levels.

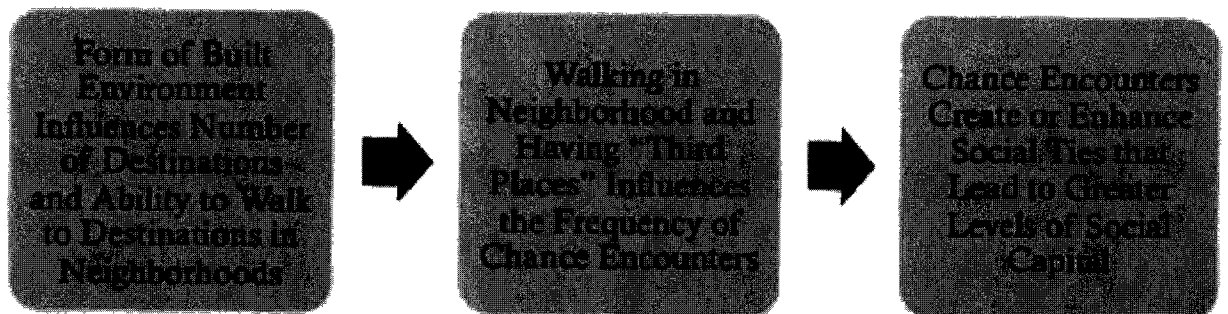


Figure 1. Logic behind the possible link between walkability and social capital.

We selected the neighborhood scale as our primary lens based on previous studies suggesting this scale is important for determining factors which influence transportation

(Krizek 2003) as well as social capital levels (Leyden 2003). Additionally, in the walkability literature the importance of understanding human scale is greatly emphasized (e.g. Frumkin et al. 2004). This article details a research process created to examine the hypothesis that there is a relationship between walkability and social capital (and thus quality of life) at the neighborhood scale. To address this question, a two-step mixed methods case study approach was utilized. The first step was a pilot study designed to test the methods, survey questions, and to look for initial relationships. The second step was influenced by the results of the pilot study and carried out at a larger scale.

Defining & Measuring Social Capital

Social capital is defined as the "...features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions" (Putnam 1993, p. 167). James Coleman, one of the leading social capital scholars, explains social capital as being defined by its function. He states, "It is not a single entity but a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors—whether persons or corporate actors—within the structure" (1988, p. 98). Like other forms of capital, social capital can be useful for achieving community goals. In fact, Emery & Flora (2006) describe a community capital framework that includes seven different types of capital—natural, cultural, human, social, political, financial, and built. In defining the social capital component of the framework they see it as reflecting connections among people and groups or the social adhesive that can influence positive or negative outcomes.

There are a number of methods for measuring social capital and these are evolving as more and more researchers contribute to the field. Instruments from the social sciences disciplines have been applied to the measurement of social capital, including surveys, interviews, and focus groups. Within these methods both quantitative and qualitative information is elicited. Robert Putnam's Saguaro Seminar at Harvard University has worked diligently since the publication of *Bowling Alone* in 2000, to articulate ways to measure social capital. As a follow-up to his book, Putman and his researchers administered the Social Capital Benchmark survey, which surveyed approximately 30,000 people, in 40 communities across 29 states in America. The extensive phone survey asked individual respondents questions about 11 facets of social capital, which cover trust (social and inter-racial), diversity of friendships, political participation (conventional and protest), civic leadership and associational involvement, informal socializing, giving and volunteering, faith-based engagement, and equality of civic engagement across the community (www.ksg.harvard.edu/saguaro/communitysurvey/). In 2006 the Social Capital Community Survey was administered as a follow-up to the 2000 survey by returning to 11 of the original 40 communities and adding 11 different ones.

The World Bank has done extensive work on developing methods and indices for measuring social capital. Specifically, the Social Capital Thematic Group within the World Bank has two tools for assessing social capital: Social Capital Assessment Tool (SOCAT) and the Social Capital Integrated Questionnaire (SOCAPIQ) (<http://web.worldbank.org>). SOCAT is an instrument designed to collect information about social capital at the household and community organizational levels. It is both a

quantitative and qualitative tool and includes a community profile and asset mapping, a community questionnaire, a household questionnaire, an organizational interview guide, and an organizational profile score sheet. The second tool is more quantitative and can be added to existing household questionnaires. While the World Bank has also created a more quantitative social capital tool, its tools have been more frequently implemented at the community scale as part of a development project in which large amounts of qualitative data are gathered.

Pilot Study

The pilot study took place in Durham, New Hampshire during the Spring of 2008. With limited resources and a stated purpose of simply testing surveying techniques and looking for initial interesting patterns, two neighborhoods of varying built form were selected. Faculty neighborhood, the more dense neighborhood, abuts Mill Plaza, the main shopping center in the town. This is the only neighborhood with clearly defined boundaries in Durham that is close to the center of downtown. In contrast, the Longmarsh neighborhood was chosen as a second study site because of its relatively newer construction, more sprawling design, and greater distance from the center of town, and thus greater distance from most social resources, such as the library, shopping, schools, and churches.

A main goal of the pilot study was to test the survey instrument and to see if there was a relationship between neighborhood level characteristics of the built environment and individuals' social capital. As mentioned above, social capital has several well renowned scholars, notably Robert Putnam is one of them. Because Robert Putnam and

the Saguaro Seminar at Harvard University (Saguaro Seminar, 2009)³ have developed a respected and often used survey tool and because a great deal of data from the use of this tool are available for comparison, we utilized the Saguaro Seminar's social capital short form as a starting point to build our survey. Along with social capital, the transportation behavior of individuals in the two neighborhoods was of interest and a series of questions on transportation were added. (Researchers are happy to share the survey tool upon request).

After the survey was reviewed and revised based on comments from colleagues and experts, it was administered via telephone to 50 randomly selected residents from Faculty neighborhood and to all 50 residents of the Longmarsh community. As there were so few homes in the Longmarsh community, researchers decided to include them all to increase the sample size. All individuals were contacted via telephone and attempts were made to conduct the survey over the phone unless individuals refused the survey, requested written copies or did not respond to a request for a telephone survey after three attempts to reach them by telephone. If individuals did not respond after three attempts, a paper version of the survey was mailed to them. The overall response rate for the survey was 50%, with approximately equal response rates in each neighborhood. Table 1 summarizes some of the survey's findings.

³ The Saguaro Seminar is an initiative of Harvard University and was funded by Robert Putnam after the publication of his book on civic engagement in America- *Bowling Alone*. The short form social capital survey can be found at <http://www.hks.harvard.edu/saguaro/>

Characteristic	Faculty (n=25)	Longmarsh (n=23)
<i>Demographics</i>		
Age (mean)	61	51
Very or Moderately Conservative	28%	39%
Very or Moderately Liberal	64%	35%
Very happy	48%	52%
Excellent health	40%	39%
Religious services almost every week or more often	24%	39%
<i>Neighborhood Physical Perceptions</i>		
How many destinations within walking distance? (out of 11 options)	9.9	3.3
How many minutes are you willing to walk to reach a destination?	23 min	21 min
<i>Travel Behaviors</i>		
Walk every day or several times a week	84%	13%
Walk once a year or never	0%	48%
Bike every day or several times a week	40%	4%
Bike once a year or never	40%	44%
Residents who commute to work	57%	65%
Of those who commute, % going by car	62%	100%
<i>Social Capital Metrics</i>		
Reported trusting neighbors "A lot" (p=0.8)	80%	76%
Ave num of times on a community project last year (p=0.4)	9.0	14.0
Ave num of times friends at your home last year p=(0.3)	24.2	17.3
Ave num of times volunteered last year (p=0.4)	22.8	31.7
Ave num of times attended club meeting last year (p=0.6)	24.2	18.0
Agree that TV is my main form of entertainment	24%	40%

Table 1: Summary of Survey Results

Strong differences in transportation behaviors, especially in the frequency of walking to destinations in the community were found. Respondents in Faculty neighborhood reported walking to destinations in their community (not for health purposes) more frequently than Longmarsh residents. This is likely due to the fact that Faculty neighborhood is closer to destinations in the town of Durham (such as a post office, food market, restaurant, etc.)

Survey respondents were asked which destinations they felt were within walking distance including the home of a friend, open space, shopping center, restaurant, church, etc. Of the list of eleven potential destinations, Faculty neighborhood respondents reported being able to walk to almost 10 of the locations on average (std dev 1.2), while Longmarsh residents reported an average of only 3.3 of the locations within walking distance (std dev 3.1). Longmarsh residents most often reported being able to walk to the home of a friend (87%) and to open space (100%), while 100% of Faculty Neighborhood residents reported being able to walk to the post office, library and shopping. There are bars and restaurants between Faculty Neighborhood and the post office, but while 100% of residents reported being able to walk to the post office, only 92% reported being able to walk to a bar and 96% to a restaurant. This may reflect personal preferences as to where respondents want to walk or do actually walk, rather than where they can walk.

Civic engagement and levels of trust are among the typical measures of social capital (Prakash 2004; Putnam 2000). Survey respondents in both neighborhoods had relatively high levels of trust for those in their community and the local government and police. Moderate levels of trust were stated for the national government and there were no differences between the trust levels of the two neighborhoods. Individuals responding

to the survey in both neighborhoods had similar volunteering habits in the last 12 months. They also had similar levels of participation in other civic and neighborly activities questions. Faculty neighborhood had slightly higher levels of trust for their neighbors than those in Longmarsh. Residents in Longmarsh reported having friends over to their home or being in the home of a friend an average of 17 times in the last 12 months. Faculty neighborhood reported having friends over about 24 times in the last year (or twice per month). While not statistically significant, all of these differences are in the direction we would expect if the hypothesis that more walkable neighborhoods foster greater levels of social capital. Additionally, more individuals in Longmarsh reported that television was their main form of entertainment (40%) than Faculty neighborhood (24%). While not a primary indicator of social capital, this question can be used to tell a broader story of community engagement.

Demographics

Respondents from Faculty were an average of 60 years old, which was significantly more than the average age of 50 years old for Longmarsh residents ($p=0.004$). Aside from age, the respondents were very similar in other demographic areas, including income and education (Authors can provide additional detail of survey results upon request). These demographic similarities can also be quite interesting, in that these neighborhoods really do differ in their transportation behaviors and some social capital results. The socio-demographics being relatively similar between the neighborhoods acts as a rough control for these measures and the observed differences in behavior can be even more instructive.

Self Selection

Self-selection certainly could play a part in the reported outcomes from this survey. Open-ended questions were included in the survey to gauge why residents chose to live where they did and if they had any specific comments that might assist our research. A noticeable difference exists between the two neighborhoods in their responses to their reasons for deciding to live in the area that they currently live. The majority of respondents in Faculty neighborhood indicated that they chose the area because of proximity to services, work and community life (such as University activities). Residents of Longmarsh more often reported “proximity to open space” as a reason for moving to the neighborhood.

Applying the Methods at a Larger Scale

The pilot study motivated a larger study in a number of ways. The results, while from a small sample, suggested that a relationship might exist between walkability and social capital and thus quality of life, at the neighborhood scale. Because the pilot study only surveyed a small group of residents in two neighborhoods, researchers expanded the study to look at a greater number of neighborhoods within two different municipalities. Additionally, the method of administering the survey, as well as some of the questions on the survey, were modified based on the results of the pilot study and the advice of municipal officials and community leaders. Two municipalities in the state of New Hampshire, Portsmouth and Manchester, were chosen because of their variety of neighborhood types and social, economic, and cultural diversity. Again with the help of municipal officials and neighborhood leaders, 10 neighborhoods were chosen in each of the cities and 100 residents were randomly selected in each of the neighborhoods to

receive a survey. While the pilot study featured a phone survey, it was determined that this method of survey delivery was too time intensive for a much larger study of 2,000 people. Therefore, a drop off and mail back survey was created (with the option of submitting answers online instead of paper if residents preferred). Dillman (2000) was used as a guideline for survey design and implementation. The authors are happy to share the survey instrument upon request.

Results

After one hand delivery and one follow up reminder postcard, 35% of original surveys were returned. This yielded nearly 700 total responses. With the large number of responses there were several perspectives from which to view the data. Table 2 compares the responses to a number of survey questions between more walkable and less walkable neighborhoods. As in the pilot study, respondents were asked to indicate the number of locations they could walk to in their community out of a list of 13 locations (two locations were added from the pilot survey). The mean and median response for the whole sample was seven locations and thus those responses indicating seven locations or more were designated as “more walkable neighborhoods” and those with less than 7 were designated as “less walkable neighborhoods.” Once the responses were divided into these two types of perceived neighborhoods, social capital and demographic responses were compared.

Characteristic	More Walkable (n=380)	Less Walkable (n=314)
Demographics		
Average Age	50	54
Very or moderately conservative	22%	33%
Very or moderately liberal	47%	32%
Very Happy	33%	25%
Excellent Health	27%	21%
Average Income Range	\$62,500-\$87,500	\$62,500-\$87,500
Average Education Level	Bachelor's Degree	Bachelor's Degree
Attend Religious Services almost every week or more often	24%	27%
Neighborhood Physical Perceptions		
Average number of places can walk to (out of 13 options)	10	3
How many minutes are you willing to walk to a destination?	21	19
Travel Behavior		
Walk every day or several times per week	55%	23%
Bike every day or several times per week	11%	5%
Residents who commute to work	71%	67%
Of those who commute, % going by car	89%	95%
Social Capital Metrics		
People can be trusted* (p=0.000)	41%	27%
Reported trusting neighbors a lot* (p=0.000)	52%	41%
Participate in a community project in last year* (p=0.0021)	55%	43%
Have friends at your home in last year* (p=0.0039)	95%	91%
Volunteered in last year* (p=0.0239)	75%	67%
Attended club meeting in last year* (p=0.0185)	67%	58%
Agree that TV is my main form of entertainment	37%	47%

*Indicates significance at the 0.05 level

Table 2. Summary of comparison results for more walkable and less walkable neighborhoods

Stata and Excel were used to examine descriptive statistics and comparison of means (on social capital indicators). As can be seen from the percentage comparisons, the more walkable neighborhoods score better on every measure of social capital than the less

walkable neighborhoods. Individuals in more walkable neighborhoods have higher levels of trust and community involvement, whether that is working on a community project, attending a club meeting, volunteering, or simply having friends to one's home. Interestingly, residents in the more walkable neighborhoods indicated having excellent health and happiness more frequently than the less walkable neighborhoods. The p-values for the t-tests done to compare means are noted in Table 2 and meant as an illustration of the differences between the two samples. In general, t-tests assume that the samples are from the population and are normally distributed. Because this cannot always be assumed, the nonparametric version of a t-test for unpaired samples is the Wilcoxon Mann Whitney rank sum test and researchers performed these tests on the data as well. The results for the trust indicators were the same with both tests. Indicators of community involvement (community project, friends to home, volunteering, and attending club meeting) produced slightly different, less powerful results with the rank sum test. However, the t-test results remain in Table 2 because this test is considered more robust as it considers the distribution of the data and the rank sum test does not. Additionally, the statistical analysis is not the main focus of the paper and is meant as a complement to the main goal of looking for relationships between walkability and social capital.

Another way to analyze the data is to compare several neighborhoods to one another as was done in the pilot study. Table 3 compares a more suburban, less walkable neighborhood to a more mixed use, walkable neighborhood (both in Manchester). The same procedure was repeated for two neighborhoods of varying built form in Portsmouth. The descriptive and statistical analysis completed on this data was the same as in those

Characteristic	Bodwell (Manchester, NH) Walkability =2.3	Southside St. Anthony (Manchester, NH) Walkability=7.4	Sherburne (Portsmouth, NH) Walkability=2	Islington (Portsmouth, NH) Walkability=10
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completed in the more and less walkable comparisons in Table 2. Additionally, because the comparisons are only being made between neighborhoods within the same municipalities, there is less question about whether the samples come from the same population.

<i>Demographics</i>				
Average Age	42	54	53	43
Very or moderately conservative	43%	42%	28%	12%
Very or moderately liberal	17%	29%	35%	58%
Very Happy	25%	27%	20%	36%
Excellent Health	22%	22%	16%	21%
Attend Religious Services almost every week or more often	13%	36%	16%	12%
Average Income Level	\$87,500	\$62,500	\$62,500	\$62,500
Average Education Level	Bachelor's	Associates	Bachelor's	Bachelor's/Some Grad
<i>Neighborhood Physical Perceptions</i>				
How many destinations you can walk to	2.3	7.4	2	10
How many minutes are you willing to walk to a destination?	19	21	22	17
<i>Travel Behaviors</i>				
Walk every day or several times per week	16%	23%	9%	79%
Walk once a year or never	52%	20%	49%	3%
Bike every day or several times per week	10%	0%	7%	24%
Bike once per year or never	74%	88%	63%	55%
Residents who commute to work	90%	65%	67%	76%
Of those who commute, % going by car	100%	97%	97%	88%
<i>Social Capital Metrics</i>				
Agree most people can be trusted	42% (p=0.4)	29%	26%	52%* (p=0.01)
Reported trusting neighbors a lot	43%	53% (p=0.17)	43% (p=0.4664)	36%
Participate in a community project in last 12 months	32%	50% (p=0.14)	35%	67%* (p=0.01)
Have friends at your home last year	100% (p=0.09)	91%	91%	97% (p=0.3)
Volunteer last year	56%	80% (p=0.04)	64%	76% (p=0.3)
Attended club meeting last year	50%	62% (p=0.09)	55%	82%* (p=0.013)
Agree that TV is my main form of entertainment	38%	56%	62%	30%

*Indicates significance at the 0.05 level. Manchester neighborhoods are shaded simply to separate them from Portsmouth neighborhoods

Table 3. Comparisons of Example Neighborhoods in both Manchester and Portsmouth

While more subtle, there are still noticeable differences between the more walkable and less walkable neighborhoods in both municipalities. In the case of the two Manchester neighborhoods, the more walkable neighborhood (Southside St. Anthony) scored higher on one measure of trust (trusting neighbors) and three measures of community involvement (community project, volunteering, and club meeting) than the less walkable neighborhood (Bodwell). In Portsmouth, the more walkable neighborhood (Islington Street) scored higher on the general trust question and four of the community involvement measures (community project, volunteering, friends over to your home, and club meeting) than less walkable neighborhood (Sherburne).

Readers may be interested in how the overall samples from Portsmouth and Manchester compare to one another regardless of the individual neighborhood walkability scores.

Table 4 provides this comparison.

Characteristic	Portsmouth	Manchester
Demographics		
Average Age	51	53
Very or moderately conservative	21%	35%
Very or moderately liberal	49%	30%
Very Happy	31%	29%
Excellent Health	24%	25%
Average Income Range	\$62,500	\$62,500
Average Education Level	Bachelor's Degree	Bachelor's Degree
Attend Religious Services almost every week or more often	22%	29%
Neighborhood Physical Perceptions		
Destinations you can walk to	7.5	5.8
How many minutes are you willing to walk to a destination?	20	20
Travel Behavior		
Walk every day or several times per week	49%	32%
Bike every day or several times per week	13%	3%
Residents who commute to work	67%	71%
Of those who commute, % going by car	89%	93%
Social Capital Metrics		
Agree people can generally be trusted	40%	29%
Reported trusting neighbors a lot	48%	46%
Participate in a community project in last 12 months	54%	45%
Have friends at your home last year	95%	91%
Volunteer last year	75%	68%
Attended club meeting last year	68%	57%
Agree that TV is my main form of entertainment	38%	46%

Table 4. Portsmouth and Manchester summary results

Self Selection and Other Possible Confounders

It would be naïve to say that the data presented here is proof that walkability impacts social capital at the neighborhood scale. The authors recognize that, as in the pilot study, there are a number of possible confounders. Again, individuals who enjoy walking may choose to live in more walkable neighborhoods. Demographic

characteristics such as education, age, and income are likely involved in the relationship between walkability and social capital. Other factors such as family size and weather may also play interesting roles in one's perception of walkability in their neighborhood. However, correlations of data points show the possibility of a relationship between samples and are a starting point for more in-depth study. Additionally, the correlations between walkability and measures of social capital in this study provide further evidence for the consideration of social capital as a key component of quality of life.

Discussion

The ability to comfortably walk to locations of need and importance in one's home neighborhood and quality of life have been linked by researchers, practitioners, and homeowners. The research presented here suggests that there is another component of the equation linking walkability to quality of life and that is social capital. Analysis of a survey of neighborhoods of varying built form revealed strong correlations between the number of locations one could walk to and indicators of social capital. Just like economic and human capital, social capital can bring benefits to those who possess it, such as reduced isolation, career enhancement connections, neighborhood safety, to name a few. It is these benefits that may enhance an individual's quality of life. Walkability enhances social capital by providing the means and locations for individual to connect, share information, and interact with those that they might not otherwise meet.

Results from both steps of the research suggest interesting relationships between walkability and social capital that should be further considered and investigated by quality of life researchers and practitioners. As suggested by the inaugural issue of this journal (Michalos et al. 2006) the work presented here may be useful to community

planners and decision makers. In addition to incorporating key stakeholders in our neighborhood selection process, we have also begun to provide our results and interpretations to planners, economic and community development officials, and neighborhood leaders in both of the municipalities as they help address community needs. While it is just a start, the data analyzed here shows a relationship between the built environment and social capital may exist. We argue the importance of social capital as a component in the link between walkability and quality of life and invite further investigation into this area of research. Neighborhood walkability has broad implications for health, sustainability, and many other components of quality of life. Social capital deserves a place in this discussion as do measures for enhancing this vital form of capital in communities.

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CHAPTER FIVE

PAPER TWO

Does the built environment impact social capital? An examination self-perceived walkability and measures of social capital at the neighborhood scale*

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Abstract

Walkability and social capital are important measures of sustainable communities. Through a community based case study, the following article examines the relationship between select measures of social capital and self-perceived walkability. Descriptive statistics demonstrated that higher levels of social capital existed in more walkable communities. More sophisticated analysis further supported this association. A community index was created from responses to questions about participating in civic engagement activities such as donating blood, attending a committee meeting or public hearing, interacting with individuals in various neighborhoods, and contributing to a

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community project. A trust index was also created with answers to survey questions about general trust and trust of neighbors and other members of communities. Multi-level models demonstrated that higher levels of walkability were associated with higher levels of participation in community activities, even after controlling for socio-demographic factors. Demographics such as education, income, and religious service attendance were also found to be positively associated with the community index, which aligns with other studies of social capital (Putnam, 2000). Similar patterns were found for the trust index where higher levels of walkability were positively associated with positive responses to a variety of trust questions.

Keywords: social capital, walkability, sustainable communities, CBPR, multilevel modeling

Introduction

Decisions about land use have far-reaching implications for society and the environment; land use decisions affect development patterns, impact water quality in surface waters, dictate transportation behaviors, influence transportation infrastructure and have been shown to influence certain physical health attributes (Frank & Pivo, 1994; Berrigan & Mckinno, 2008; Wilson & Navarro, 2007). Transportation mode choice by individuals has a number of important consequences such as air pollution generation, green house gas emissions, and roadway and transit infrastructure requirements (financial, land area, etc.). Health benefits and environmental impacts of neighborhood walkability have been topics of recent research endeavors and offer opportunities for policy interventions (Aytur et al., 2007; Ewing et al., 2007). Whether the built environment has social impacts or influences society in some measureable way are

questions that have been less well explored, however. The hypothesis governing this work is that individuals would have more interactions with neighbors and fellow citizens when living and working in neighborhoods that promote walking and are built on the human scale. There has been little evidence to suggest that a relationship between measures of social outcomes and the built environment exists (Leyden, 2003; Kathlene & Wallick, 1999). This paper examines the relationship between the built environment (specifically measurements and perceptions about how walkable they are) and social capital (trust and civic engagement).

The built environment can be described and measured in many ways and this study uses walkability as a key measure of the built environment. Walkability refers to the human scale of the land use and the ease with which individuals can navigate an area on foot. According to The Walkable and Livable Communities Institute “Walkable communities are thriving, livable, sustainable places that give their residents safe transportation choices and improved quality of life...” (<http://www.walkable.org/>). In the active living literature, walkability is seen as a measure of objective neighborhood characteristics that influence an individual’s ability to walk (Du Toit et al., 2007). This can include the proximity of destinations and whether one can walk to those destinations from his/her home (Leyden, 2003; Owen et al., 2004). When discussed in some circles, enhanced social interactions and thus social capital that might result from walkable communities seem to be taken as a given (Sander, 2002; Congress for New Urbanism). Increasing social capital has been a goal of planning movements such as new urbanism (Calthorpe, 1993) and smart growth (Nelson and Dawkins, 2004)) which emphasize walkable communities. However, the connection between the two has been challenging

to measure and research relating the two concepts has been mixed: some studies find a strong correlation between social capital in the built environment (Leyden, 2003), while others find a weaker connection (Yang, 2008; Talen 1999) or no relationship (Freeman, 2001). This study attempts to make a unique contribution to existing social capital literature by assessing individuals' perceptions of walkability and gauging their responses to social capital questions of trust and civic engagement.

In the literature and in discussions about a sustainable society, there are certain terms that are consistently reiterated. "The rhetoric of sustainability talks of human-scale, mixed use and socially diverse neighbourhoods, providing residents with increased convenience and sense of locality, while at the same time reducing their ecological footprint" (Barton, 2000, p.10). Since the 1950s there has been a movement out of the inner cities in America, toward a suburban existence. This rapid change in land use and way of life was dictated by powerful forces that stood to benefit from the transition and did not consider the other consequences of such action. Famous urban geographer Lewis Mumford once stated that, "Suburbia is a collective effective effort to lead a private life" (Putnam, 2000). In leading this private life, many Americans have come to live in a triangular pattern where individuals must travel to different locations, usually a number of miles in between, from home to work to shopping and other activities. This discontinuity in how we live leads to larger consumption of resources and greater production of pollution, which affects a community's environmental sustainability (Ewing et al., 2007). At the same time, it can be hypothesized that a community that is disconnected physically will also become disconnected socially (Wood et al., 2007,

Freeman 2001). Discontinuity can be implied to mean fewer social connections and thus a lower stock of social capital.

It has been shown that individuals who live in an area that is compact and has mixed uses within walking distance will be more likely to walk to destinations (if they are able to) in their community (e.g. Frank & Pivo, 1994). In walking to these destinations, it is also more likely that they may see other individuals in the community and interact with them. This interaction can lead to collective action around a community issue, the building of trust among neighbors and institutions, and increased awareness of the fact that others are nearby in times of need. These ideas are the basis behind the hypothesis that social capital is related to the design of the built environment. In one of the few empirical studies on social capital and walkability, researchers were able to show that walkable neighborhoods in Galway, Ireland had more social capital than suburban ones (Leyden, 2003). Key measures in Leyden's work included primary data collection from three different community types based on form (compact, less compact, least compact). Self reported data on the ability to walk to locations within a community was the basis for a walkability index. Responses to several key social capital questions (about trust and civic participation) formed the social capital index (Leyden, 2003). Freeman (2001) and Yang (2008) both used secondary data analysis to assess the relationship between residential density and various social measures of neighborhoods. Freeman (2001) found that residential density was unrelated to the formation of neighborhood social ties. Yang (2008) showed that density and mixed land use were associated with higher levels of neighborhood satisfaction in one of her case study cities (Portland, OR) but that they were associated with lower levels of satisfaction in the other city (Charlotte,

NC). The fact that these researchers and many others used variables such as residential density and land use types indicates the importance of these as accepted measures of the built environment. The social measures they used leave more room for interpretation. Yang (2008) used the responses of one question in the American Housing Survey that relates to rating ones neighborhood as a place to live for the dependent variable of neighborhood satisfaction. Freeman's (2001) dependent variable comes from the Multi City Survey of Urban Inequality. The variable is the response to the question of whom individuals turn to, outside of their household, to discuss important matters and whether that individual lives in their neighborhood. In order to more specifically focus on social capital and its relationship to walkability, this paper uses well-established measures and definitions of social capital.

Social Capital

To understand the relationship between social capital and the built environment we must first define and discuss the term social capital. Social capital is defined as the "...features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions" (Field, 2003, p. 31). Robert Putnam popularized the term with his book *Bowling Alone*. He summarizes social capital as the collective value of all social networks [who you know] and the inclinations that arise from these networks to do things for each other ["norms of reciprocity"] (Putnam & Feldstein, 2004). James Coleman, one of the leading social capital scholars, explains social capital as being defined by its function. He states, "It is not a single entity but a variety of different entities, with two elements in common: they all consist of some

aspect of social structures, and they facilitate certain actions of actors—whether persons or corporate actors—within the structure” (1988, S95). Like other forms of capital, social capital can be useful for achieving community goals. In fact, Emery & Flora (2006) describe a community capital framework that includes seven different types of capital—natural, cultural, human, social, political, financial, and built. In defining the social capital component of the framework they see it as reflecting “the connections among people and organizations or the social ‘glue’ to make things positive or negative happen.”

Much of the recent data on social capital in America has been collected through survey tools (e.g. Social Capital Community Benchmark Survey of 2000; Social Capital Community Survey of 2006) and secondary data analysis of existing datasets (i.e. DDB Life Style dataset; the Roper Social and Political Trends dataset)¹. The World Bank has done extensive work on developing methods and indices for measuring social capital. Specifically, the Social Capital Thematic Group within the World Bank has two tools for assessing social capital: Social Capital Assessment Tool (SOCAT) and the Social Capital Integrated Questionnaire (SOCAPIQ) (<http://web.worldbank.org>). SOCAT is an instrument designed to collect information about social capital at the household and community organizational levels. It is both a quantitative and qualitative tool and includes a community profile and asset mapping, a community questionnaire, a household questionnaire, an organizational interview guide, and an organizational profile score sheet. The Integrated Questionnaire for the Measurement of Social Capital (SOCAPIQ) is a tool that aims to generate quantitative data on various dimensions of social capital. The tool functions as part of a larger household survey (such as the Living

Standards Measurement Survey or a household income/expenditure survey). SOCAPIQ considers six dimensions of social capital: groups & networks; trust and solidarity; collective action and cooperation; information and communication; social cohesion and inclusion; empowerment and political action (<http://web.worldbank.org>).

The majority of social capital research has focused on civic engagement in communities and individual actions that provide evidence of strong social ties and networks for mutual benefit. Fewer studies have examined the relationship between the built environment and social capital.

Methods

In order to examine the hypothesis that the built environment can impact social capital, a comparative case study approach was utilized. Two municipalities in the state of New Hampshire were selected because of their variety in neighborhood form, demographics, and cultural and social resources. Interviews and focus groups were held with municipal and regional planning, economic, and environmental officials as well as community leaders to learn about the cities and their neighborhoods. This mixed methods approach (Schifferdecker, K. and V. Reed, 2009) and community based participatory research approach (CBPR) assisted researchers in determining which neighborhoods to investigate and how to refine some of the survey questions that would be asked in the neighborhoods. A brief description of the two municipalities follows.

Manchester, New Hampshire – Manchester is New Hampshire’s largest and most racially diverse municipality. With over 100,000 residents, Manchester has a mix of

traditional downtown neighborhoods as well as suburban areas, which provided a variety of built forms to choose from. One of New Hampshire's main routes, I-93, has been in the planning stages for a widening project for several years. Interstate-93 is a main commuting corridor that connects Northern New England with the Greater Boston Metropolitan Region. The proposed widening will most certainly have many impacts upon the communities through which I-93 runs including the city of Manchester. Communities along the I-93 corridor were also oversampled during the Social Capital survey 2006 so there is a rich data set reflecting existing social capital in these communities, although not at the neighborhood scale that this project addresses.

Portsmouth, NH -Portsmouth is a city of approximately 22,000 residents located in the Seacoast area of New Hampshire. A port city that has been a key part of the Northern New England economy since colonial times, Portsmouth is also a progressive community. The city has a history of active and engaged individuals coming together to address pressing local and national issues. Recently, in November of 2007, Portsmouth became the first eco-municipality on the East Coast of the United States (Peter Britz, 2008). This designation means that the city has committed to following the American Planning Association's four sustainability objectives: reduce dependence on fossil fuels, underground metals, and minerals; reduce dependence upon synthetic chemicals and other unnatural substances; reduce encroachment upon nature; meet human needs fairly and efficiently. This systems approach to creating sustainable communities is used widely in Europe, particularly in Sweden where the concept originated (<http://www.instituteforecomunicipalities.org/ecomunic.htm>).

Selecting towns in New Hampshire allowed the project team to focus on differences between the communities based on the given metrics, and, for the most part, eliminate confounders having to do with differences in climate, culture, geography, and other factors that would arise between regions. Additionally, the expertise of the project team and their networks, including pre-established collaborations with local and state planners was utilized.

Neighborhoods within the municipalities were selected to provide a wide range of built form and socio-demographic characteristics (10 unique neighborhoods in each municipality). During the summer of 2009 researchers implemented a drop off and mail back/web reply survey (Dilman, 2000; Steele et al., 2001) to 100 randomly selected residents in each of the 20 neighborhoods across the two municipalities for a total of 2,000 residents. The survey asked a number of questions regarding transportation behavior, social capital indicators, and other topics. The online option for response was administered using Survey Monkey. For the purposes of this paper the questions regarding walkability and social capital are the most relevant and the responses are analyzed in the results section. Social capital questions were taken from Harvard University's Saguaro Seminar and their social capital short form survey, developed by Robert Putnam (<http://www.hks.harvard.edu/saguaro/index.htm>). To measure the dependent variable of social capital, survey respondents were asked to indicate their levels of **trust** for various groups, such as neighbors, police, store workers, and individuals. They were also asked about whether or not they participated in the following community activities, which were compiled into an index:

Working on a community project/volunteering

Donating Blood

Attending a public meeting

Attending a political meeting or rally

Attending a club or organizational meeting

Visiting the home of someone of a different neighborhood

Visiting the home of a community leader

A walkability index was created based on the responses to the question in Figure 1.

Location	I can walk to	Location	I can walk to
Post Office		Home of friend	
Restaurant		Grocery Store	
Coffee Shop/cafe		Bar/Pub	
Shopping Center		Community/ Rec Center	
Church		Convenience store	
School		Natural Area/open space/park	
Library/book store			

Figure 1. Walkability Survey Question

Analysis & Results

The resident survey produced an overall response rate of 35% and yielded almost 698 usable responses in total. A response rate of 35% is in line with similar survey

response rates reported in the literature (Hager, 2003; Kaplowitz, 2004) and is higher than typical public opinion polls (Antal et al., 2005). Initial analysis of the relationships between social capital and walkability were conducted using factor analysis. SPSS's gradpack software and STATA 9 were used on two sets of the social capital questions in order to develop appropriate indices. Table 1 demonstrates the factor analysis used on the community involvement questions. As indicated by the shading, eight of the 11 questions loaded on one factor with a Cronbach's Alpha score of 0.7591. Cronbach's alpha is a measure of how closely related a set of items are as a group. A "high" value of alpha often serves as evidence that the items measure an underlying pattern. Thus, these eight questions were used to create the "community index" where an affirmative response to each one yielded one point and then was totaled to create an index. Indices are commonly used when evaluating social capital (Putnam, 2000).

Component Matrix^a

	Component		
	1	2	3
Have you: Worked on a community project	.670	-.217	.050
Have you: Donated blood	.430	-.067	.232
Have you: Attended any public meeting in which there was a discussion of town or school affairs	.646	-.187	-.118
Have you: Attended a political meeting or rally	.597	-.187	.053
Have you: Attended any club or organizational meeting (not including meetings for work)	.684	-.235	.047
Have you: Had friends over to your home	.373	.725	-.018
Have you: Been in the home of a friend of a different race or ethnicity or had them in your home	.488	.347	-.068
Have you: Been in the home of someone of a different neighborhood or had them in your home	.460	.664	.024
Have you: Been in the home of someone you consider to be a community leader or had one in your home	.585	-.103	.151
Have you: Volunteered	.686	-.157	-.017
Have you: Met friends outside of the home	-.178	.062	.950

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Table 1. Factor Analysis on Community Involvement Questions

A similar process was used to determine the components of the trust index. As displayed in Table 2 a factor analysis of the trust questions showed that most loaded onto one factor

(as shown with shading). Because the amount of loading was very similar between factor one and two for the question regarding general trust of people, this question was included in the trust index along with the other questions. To create the trust index, one point was allocated if respondents indicated they trusted the entity (i.e. police) “a lot” or “some.” For the “generally speaking” question, one point was allocated if respondents responded “most could be trusted.” Cronbach’s alpha for this index was 0.68.

Component Matrix^a

	Component	
	1	2
Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?	.392	.429
Trust: People in your neighborhood	.527	.457
Trust: Police in your community	.596	-.090
Trust: People who work in the stores where you shop	.684	.297
Trust: People of racial/ethnic background that differs from your own	.628	.327
Trust: National Government	.749	-.545
Trust: Local Government	.795	-.447

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Table 2. Factor Analysis on Trust Questions

The creation of the walkability index allowed researchers to divide the neighborhoods into “more walkable” and “less walkable” based on the self-reported responses of where individuals perceived being able to walk to in their community. Leyden (2003) used a similar procedure and it provides several advantages over an expert imposed score of walkability. Each respondent is able to indicate their own perceptions of walkability

(which may differ from person to person based on specific location in the neighborhood, health, tolerance for walking distance and other factors). Because there were a total of 13 locations on the question in Figure 1, 13 was the maximum score on the walkability index (“other” responses were not included because they were not listed as an option for all respondents). To compare more walkable with less walkable neighborhoods, the responses were split based on a walkability score of seven (the median score). All survey responses that indicated an ability to walk to seven or more locations were characterized as “more walkable.” All those below seven were considered “less walkable.” A sensitivity analysis was conducted to determine if splitting the sample on the median was robust. The analysis confirmed that the median and not just seven locations, was a sound manner in which to split the data from this case study. Regression analysis indicated that for each increase in the level of the walkability index, the community index increased by 0.1 and the trust index increased by 0.07. Both of the community and trust index coefficients were statistically significant.

Table 3 summarizes differences between respondents in the two types of neighborhoods. Statistics for the total sample were also included as a comparison.

Statistic	Total Sample Total N=698	More Walkable Neighborhoods Total N=380	Less Walkable Neighborhoods Total N=314
Average number of places “can” walk to	7	10	3
Walking is very convenient in your neighborhood	74%	80%	66%
Cycling is very convenient in your neighborhood	49%	52%	46%
Public transit is very convenient in your neighborhood	20%	27%	12%
Walk at least several times per week to get to places in your	41%	55%	23%

community			
Ride a bike to get places in your community at least several times per week	9%	11%	5%
People can be trusted	35%	41%	27%
Trust people in your neighborhood a lot	47%	52%	41%
Trust police in your community a lot	56%	59%	51%
Very interested in politics and national affairs	44%	47%	40%
Agree that global warming is something people can control	76%	79%	72%
Agree that you look for ways to save energy in your daily life	89%	89%	90%
Agree that your choice of daily transportation contributes to global warming	66%	71%	62%
Worked on a community project in the last year	50%	55%	43%
Attended a public meeting in the last year	47%	50%	44%
Volunteered in the last year	72%	75%	67%
Had friends over to your home in the last year	93%	95%	91%
Average Community Index	4/8	4.3/8	3.6/8
Conservative social and political outlook	27%	22%	33%
Liberal social and political outlook	40%	47%	32%
Attend religious services almost every week	25%	24%	27%
Contribute at least \$100 in past year to charity	70%	75%	67%
% reporting that they are happy	91	91	93
% reporting that they have at least very good health	66	70	61
Agree that television is my primary form of entertainment	41%	37%	47%
Own the place where you live	80%	76%	84%
Break down of gender of respondents	Male=36% Female=64%	Male=37% Female 63%	Male=36% Female=64%
Average age of respondents	52 years	50 years	54 years

Average years lived in current location	14	16	16
Average education	Bachelor Degree	Bachelor Degree	Bachelor Degree
Average Income Level	\$62,500	\$62,500	\$62,500

Table 3. Summary of Survey Responses for More Walkable vs. Less Walkable Neighborhoods

Comparison of means utilizing a Student’s t-test was conducted to statistically compare some of the key factors being investigated (Table 4). Both social capital indices were significantly higher in the more walkable neighborhoods. Additionally, the walkability index was significantly higher in the more walkable neighborhoods than in the less walkable neighborhoods.

<i>Results of t-tests</i>	Walkable neighborhoods mean (n)	Less Walkable neighborhoods mean (n)	t-value	p-value
Trust Index	5.28 (382)	4.80 (311)	3.83	0.0001
Community Index	4.3 (380)	3.6 (313)	4.18	<0.0001
Walkability Index	9.96 (379)	2.88 (312)	45.8	<0.0001

Table 4. Results of Student’s T-Tests

Additionally, because the data sampling plan included neighborhoods, the data analysis should consider the impact of cluster effects. This allows for dependence among the responses observed for units belonging to the same cluster (in this case, belonging to the same neighborhood). Clustered data is also considered to be multilevel in nature and therefore the analysis should also be multileveled (Luke 2004). The first step in evaluating data for a multilevel model is creating a null regression model for the mean of the dependent variable with no explanatory variable:

$$\text{Communityindex}_{ij} = B_o + U_{oj} + e_{ij}$$

Where, B_o =overall mean of y, which stands for community index, (across all groups);

U_{oj} =group level residual (the difference between group j’s mean and the overall mean);

and e_{ij} =the difference between the y-value for the ith individual and the individual’s

group mean. Total variance is partitioned into two components: the between-group variance based on departures of group means from the overall mean and the within-group, between-individual variance based on individual departures from group means. This is known as the variance partition coefficient or the intra-class correlation coefficient (ICC) (Luke, 2004). The ICC for the community index model was calculated at 6%, which means that six percent of the variance in the mean of community index is due to neighborhood effects. While small, this amount is still considered large enough to warrant a multilevel examination of relationships between community index and walkability.

$$\text{Community index}_{ij} = B_0 + B_1(\text{walkability})_{ij} + B_2(\text{income})_{ij} + B_3(\text{education})_{ij} + B_4(\text{Religious Attendance})_{ij} + U_{oj} + e_{ij}$$

Dependent Variable: Community Index	Coefficient	Standard Error	Z	P>z	95% Conf. Interval
Independent Variables:					
Walkability	0.106322	0.0233048	4.56	0.000	0.0606455-0.1519985
Income	0.1503689	0.044399	3.39	0.001	0.0633484-0.2373894
Education	0.2633574	0.0537972	4.90	0.000	0.1579168-0.3687981
Religious Attendance	-0.1104259	0.0537972	-2.55	0.011	-0.1954257— 0.0254262
Constant (intercept)	1.518012	0.981466	3.81	0.000	0.737659-2.298365
Random effects parameters	Estimate				
Neighborhood Number: Identity (constant)	0.2814277	0.1383008			0.1074149-0.737342
Var(Residual)	2.153561	0.0617453			2.03588-2.278044

LR test vs. linear regression: $\chi^2(01) = 1.81$ Prob $\geq \chi^2 = 0.0890$

Table 5. Output from multilevel regression analysis for community index dependent variable

In figure 2, a model with the community index as a dependent variable and walkability as an independent variable along with demographic explanatory variables of income,

education, and religious attendance was created. These results show that there is an association between walkability and the community index as well as education, income, and religious service attendance levels. It is important to note that the coefficient for religious service attendance is negative because of the way the survey question was constructed. A lower response indicated higher attendance and thus we see higher community participation with more attendance at religious services.

A similar model was created and examined for the trust index. One more explanatory variable, years lived in current location, was added to the model because it was found to have some influence on the trust index. Religious attendance was removed from the model because it was not significant at the 0.05 alpha level. .

$$\text{Trustindex}_{ij} = B_0 + B_1(\text{walkabilitycan})_{ij} + B_2(\text{income})_{ij} + B_3(\text{education})_{ij} + B_4(\text{yrsinhouse})_{ij} + U_{0j} + e_{ij}$$

Dependent Variable: Community Index	Coefficient	Standard Error	Z	P>z	95% Conf. Interval
Independent Variables:					
Walkability	0.0514358	0.0178941	2.87	0.004	0.016364-0.0865077
Income	0.0341945	0.0325206	1.05	0.293	-0.0295446-0.0979336
Education	0.1731352	0.0384003	4.51	0.000	0.0978721-0.2483984
Years in home	0.0135215	0.0044315	3.08	0.002	0.004836-0.0222071
Constant (intercept)	3.431603	0.2693603	12.74	0.000	2.903667-3.95954
Random effects parameters					
Neighborhood Number: Identity constant	0.3681177	0.1120416			0.2027272-.6684384
Var(Residual)	1.514276	0.0439553			1.43053-1.602924

LR test vs. linear regression: $\text{chibar2}(01) = 7.99$ Prob $\geq \text{chibar2} = 0.0023$

Table 6. Results of multilevel regression model for trust index

The results of this analysis show that walkability as well as education and years lived in current location were associated with the trust index. In this case, income was not

statistically significant.

Discussion

The results suggest that there are positive associations between walkability and aspects of social capital in the sample of respondents from two municipalities in New Hampshire. Descriptive statistics demonstrated that higher levels of social capital existed in more walkable communities. More sophisticated multi-level models further supported this association. A community index was created from responses to questions about participating in civic engagement activities such as donating blood, attending a committee meeting or public hearing, interacting with individuals in various neighborhoods, and contributing to a community project. When comparing this index to the self perceived walkability index in a multilevel model we found that higher levels of walkability were associated with higher levels of participating in community activities. Demographics such as education, income, and religious service attendance were also found to be positively associated with the community index, which is in line with other studies of social capital (Putnam 2000). Similar patterns were found for the trust index where higher levels of walkability were positively associated with positive responses to a variety of trust questions. Income and religious activity were not significantly associated with the trust index, but years lived in home were.

Limitations

When dealing with survey data, it is often important to discuss response bias—the bias that comes from only certain people choosing to answer and return the survey.

Additionally, non-response bias can cause non-response error that results from not being

able to survey people who were given the survey but did not return it. Increasing the response rate of a survey helps to eliminate non-response bias (Barclay et al. 2002). Researchers, while on a limited budget, worked to increase the response rate in this survey by including a follow-up reminder postcard for all households that did not return the survey in a certain timeframe. Additionally, a raffle was used to entice individuals to return the survey.

Comparing demographic statistics of the survey sample to publically available data on the communities studied is one way to address response bias (Barclay et al. 2002). Table 5 compares key Census demographics to data from the survey sample for both Portsmouth and Manchester.

	Average household size	Bachelor degree or higher	Household Income	Family Income	Male	Female	% White	Age (median)
Manchester (sample)	2.7	58%	\$87,500 (median midpoint)		32%	68%	96%	52
Manchester (Census)	2.4	25%	\$52,906 (median)	\$63,202 (median)	50%	50%	89%	35
Portsmouth (sample)	2.3	68%	\$62,500 (median midpoint)		39%	61%	94%	51
Portsmouth (Census)	2.1	50%	\$62,395 (median)	\$80,820 (median)	49%	51%	91%	38

Table 7. Survey sample demographics compared to Census demographic data

Compared to Census data, the survey sample in both Portsmouth and Manchester is more highly educated, more female, older, and earns higher incomes. The research presented here should be considered within this demographic context

Self-selection is another potential bias that may influence the findings of research related to community design and social implications. In survey research, self-selection can refer to individuals choosing to answer a survey because they feel strongly one way or another. It can also be influenced by researchers as they choose the sample to be

surveyed (Heckman, 1979) and in this case, sample selection was partially non-random because researchers, after consultation with municipal officials and neighborhood leaders, selected the study neighborhoods to represent a variety of built forms. Then, households within those neighborhoods were randomly selected using Excel's random number generator feature. Self-selection can also refer to an individual's preference for walking and how that might influence their ability to walk and presumably where they live (i.e. buying a home in a neighborhood that is more walkable if one prefers to walk). A recent review of the active travel literature found that "both self-selection and the built environment have a role in active travel" (Robert Wood Johnson Foundation, 2009). Even with self-selection bias, the question remains of whether key social outcomes are correlated with the self-selection bias (i.e. those who value walking and so choose to live in walkable neighborhoods also are more trusting or tend to be more engaged civically).

Broader Implications

Walking can have profound implications for a number of aspects of our lives. This paper provided an example of how the built environment, and specifically measures of walkability, may be influencing individual's levels of social capital. Land use design and physical infrastructure of neighborhoods and regions may provide the conduits for individuals to meet each other, theoretically influencing social capital. A neighborhood that provides residents with easy access to municipal infrastructure such as post offices, town parks and playgrounds, coffee shops, restaurants, barbershops and club meeting venues will theoretically have higher values of social capital. Social capital is a complex concept and it can be influenced by many factors. This research showed that the physical

built environment, measured by the degree of walkability, can be one important factor. We argue that communities may be more sustainable if their physical infrastructure supports the interaction of residents and promotes positive social capital, along with the capacity to utilize it.

The New Urbanist movement (Calthorpe, 1993) and the work of many land use professionals have advocated for the consideration of social factors and quality of life in development decisions. Their recommendations often include designing communities that have mixed uses with housing options for varying income levels. Walkable, livable communities initiatives offer a possible solution; however challenges remain, such as providing truly affordable and energy efficient housing. The history of suburbanization in America has demonstrated the consequences of failing to consider social capital, and social infrastructure more generally, in our land use planning and urban development.

In urban planning, consideration of social issues has historical roots in the Civil Rights era (Davidoff, 1965). Similarly, the environmental justice movement within public health prompted the consideration of social justices with respect to disproportionate exposures and burdens associated with race or social class (Wing et al., 1992). Advocacy planning (Krumholz 1982) and communicative action (Healy, 1996) provide theoretical frameworks that underscore the importance of public participation as a means of planning communities to meet the needs of "at risk" groups (Berke, 2002). However, the literature suggests that social issues are rarely considered in transportation planning decisions, and that transportation planning boards frequently lack representation from low income and non-white residents(Sanchez and Wolf, 2005).

For many reasons, the public health community is interested in the design of communities and land use choices. In 2002 a group of doctors and public health practitioners gathered to address the issue of community design, land use, active living, and public health. The results of their workshop included a research agenda for areas of potential study including environmental pollution, obesity, and social capital, among others (Dannenberg et al., 2003). Walkability of a community and physical activity have been shown to be related and are influenced by the design of neighborhoods. This is especially important in light of the obesity epidemic in America (Huang et al., 2009). The breadth of the research agenda indicates the profound effect the built environment can have on many aspects of human life and the lack of existing literature to guide policy action. Despite the challenges ahead, a great opportunity presents itself to think more holistically about how we create sustainable communities.

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CHAPTER SIX

PAPER THREE

Social capital and communities: measuring the third pillar of sustainability

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Abstract: The concepts of sustainability and sustainable development are frequently described as having three main components, sometimes referred to as the three pillars or the triple bottom line: environmental, economic, and social. Because the origins of sustainability come from a desire to correct environmental wrongs, much consideration has been given to the environmental issues, especially how they interface with economic ones. Frequently mentioned but rarely examined, the social aspects of sustainability have been considered the weakest and least described pillar. This paper takes a theoretical look at the social aspects of sustainability and offers social capital as one measure of social sustainability. Theory is complemented by a case study in which social capital was used to measure the social-environmental interface of communities. The positive correlation between aspects of the built environment, specifically walkability, and social capital suggests that community planners and decision makers as well as sustainable development scholars should consider including social capital as a measure of social sustainability.

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Introduction-What is Sustainability?

Sustainability has its origins in the United States in the creation of the National Environmental Policy Act (NEPA) in 1969, although some would argue that it harkens back to the days of early conservationists such as Aldo Leopold. NEPA was passed to "foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony and fulfill the social, economic and other requirements of present and future generations" (EPA, 2011). A United Nations conference on the Human Environment held in 1972 in Stockholm, Sweden prompted the discussion of the growing conflict between global development and its impact on the environment. With the more developed countries emphasizing the need to protect the environment and the less developed countries voicing their concern that economic development might be stifled by environmental regulations, a compromise was found in the concept of sustainable development. In 1983 the United Nations facilitated the organization of an independent group, the World Commission on Environment and Development, to examine global environmental and development issues and to propose realistic solutions to the problems. In 1987 "Our Common Future," colloquially known as the Brundtland Report, defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (EPA, 2011). The United Nations held another global meeting in 1992

in Rio de Janeiro to discuss environmental and development issues. One result of the “Earth Summit” was an Agenda for the 21st Century (known as Agenda 21).

Sustainability and its relationship to local communities is articulated in Chapter 28 of Agenda 21 (known as Local Agenda 21) as it recommends,

Local authorities construct, operate and maintain economic, social and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations, and ...as the level of government closest to the people, they play a vital role in educating, mobilizing and responding to the public to promote sustainable development (U.N. 1992).

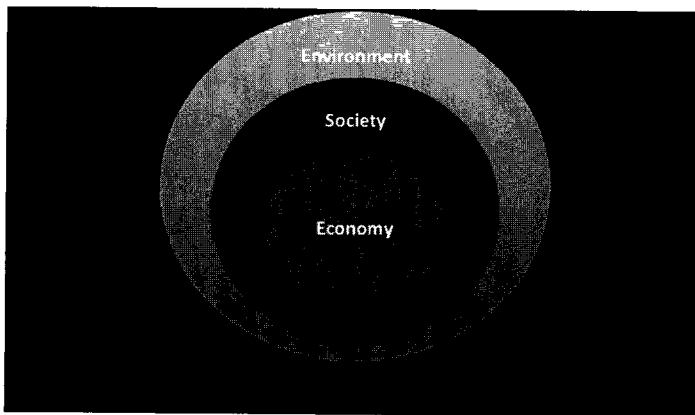


Figure 1. The three interconnected aspects of sustainability (figure based on Adams 2006).

Sustainability has become a more relevant and popular concept in many fields and it is receiving validation in the scientific community. In 2003 the National Research Council presented what it called an emerging research program of sustainability sciences.

“Sustainability science focuses on the dynamic interactions between nature and society” (Clark & Dickson, 2003, p. 8059). Those articulating the science of sustainability are just as aware of the multifaceted nature of the science and how it requires the incorporation of disciplines that cover social, environmental, and economic factors. “Sustainability

science is not yet an autonomous field or discipline, but rather a vibrant arena that is bringing together scholarship and practice, global and local perspectives from north and south, and disciplines across the natural and social sciences, engineering, and medicine” (Clark & Dickson, 2003, p. 8059).

How have the social aspects of sustainability been defined?

As the concepts of sustainability and sustainable development and the emerging field of sustainability sciences became articulated, a large emphasis was placed on understanding the interactions between the natural and the economic worlds. Social aspects were often mentioned but rarely articulated and measured. The United Nations defines aspects of sustainability with the following environmental indicators: greenhouse gas, ozone layer, air quality, deforestation, desertification, agriculture, biodiversity, toxic chemicals, non-renewable material, hazardous waste, and water use (Schneider, 2007). The following U.N. sustainability indicators can be considered social ones: poverty, gender equality, nutrition, child mortality, sanitation, health, education, housing, crime, population, and employment (Schneider, 2007). Human well-being is a key component to understanding measures of social sustainability. Terms such as quality of life, living standards, human development, welfare, life satisfaction, utility, and happiness are some other terms used interchangeably with well-being (UNEP et al., 2009). The Millennium Ecosystems Assessment defined human well-being as including “basic material for a good life, freedom and choice, health, good social relations, and security” (UNEP et al., 2009, p. 22).

Colantonio & Dixon (2009) break social sustainability into 10 dimensions and policy areas: demographic change (ageing, migration and mobility); education and skills;

employment; health and safety; housing and environmental health; identity, sense of place and culture; participation, empowerment and access; social capital; social mixing and cohesion; and well being, happiness and quality of life.

Another component of social sustainability is the call for the inclusion and participation of multiple perspectives and individuals, including the public. There is a large volume of literature on public and stakeholder participation in environmental decision-making that can be extended to sustainability. While a full investigation of this literature is not appropriate here, it is important to mention its connection to social sustainability. “Indeed the very soul of [sustainable development] is that it is participatory. It is not something that can be imposed by a small minority of technocrats or policy-makers from above” (Bell & Morse 2003, 4). With this wide range of terms and definitions, summarized in Figure 2, one can understand why it is both important and challenging to discuss, measure and act to ensure social sustainability.

<p style="text-align: center;">Social Aspects of Sustainability <i>poverty, gender equality, nutrition, child mortality, sanitation, health, education, housing, crime, population, employment, quality of life, living standards, human development, welfare, life satisfaction, utility, happiness, participatory decision making, social capital, capacity, identity, sense of place and culture, social cohesion, empowerment</i></p>
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Figure 2. Terms used to describe social sustainability

Why is it important to consider and measure social aspects? What has been missing in the literature?

While social aspects of sustainability appear to be broad, relevant and far-reaching, it is this breadth that has contributed to the challenge of defining and measuring them for inclusion in the larger picture of sustainability. "...It can be argued that the essence of sustainable development lies precisely at the interfaces and trade-offs between the often conflicting objectives of economic and social development, and environmental protection" (Lehtonen, 2004, p. 200). Lehtonen (2004) makes one of the few theoretical examinations of the social aspects of sustainability, specifically the environmental-social interface of sustainable development. In his paper, Lehtonen argues for the importance of further examining this interface and compares two approaches to measuring social sustainability: the concept of social capital and the capability approach.

The central premise of social capital is that social networks have value. Social capital refers to the collective value of all "social networks" [who people know] and the inclinations that arise from these networks to do things for each other ["norms of reciprocity"] (Saguaro Seminar, 2009). The individual capabilities approach was highlighted by Nobel Prize Economist, Amartya Sen, and it advocates that "policies should not focus on collective outcomes such as the distribution of income, but rather on building individual capabilities, and ensuring that people have the freedom to convert economic wealth into outcomes they desire" (Lehtonen, 2004, p. 199). With this freedom it is theorized that people will improve their social conditions.

The Organisation for Economic Cooperation and Development (OECD) Council of Ministers' made a call for integrating the environmental-social interface into the OECD Environmental Performance Reviews. In line with its Environmental Outlook and Environmental Strategy, OECD has been extending its analysis of environmental-

social linkages. This extension comes from looking for ways to complement its work on environmental-economic linkages as OECD seeks to find a better balance of the three aspects of sustainability. Examples of their current analysis projects in this areas include: Distributional effects of environmental polices; environment & employment; and environment & health (www.oecd.org/). The OECD recognizes that environmental changes are linked to social changes and can affect human health and quality of life and thus states that, “social conditions and outcomes need to be reviewed when designing and implementing environmental management activities and policies” (www.oecd.org/).

Social capital as one important measure of social sustainability

Social capital has been defined as the “...features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions” (Putnam 1993, p. 167). James Coleman, one of the leading social capital scholars, explains social capital as being defined by its function. He states, “It is not a single entity but a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors—whether persons or corporate actors—within the structure” (1988, p. 98). Like other forms of capital, social capital can be useful for achieving community goals. In fact, Emery & Flora (2006) describe a community capital framework that includes seven different types of capital—natural, cultural, human, social, political, financial, and built. In defining the social capital component of the framework, they describe it as reflecting connections among people and groups or the social adhesive that can influence positive or negative outcomes. It is important to note that social capital is not always a positive

concept as groups such as the Mafia and the Klu Klux Klan have been said to have high levels of certain types of social capital (Fukuyama, 2001).

There are a number of methods for measuring social capital and these are evolving as more and more researchers contribute to the field. Instruments from the social sciences disciplines have been applied to the measurement of social capital, including surveys, interviews, and focus groups. Within these methods both quantitative and qualitative information is elicited. Robert Putnam's Saguaro Seminar at Harvard University has worked diligently since the publication of *Bowling Alone* in 2000, to articulate ways to measure social capital. As a follow-up to his book, Putman and his researchers administered the Social Capital Benchmark survey, which surveyed approximately 30,000 people, in 40 communities across 29 states in America. The extensive phone survey asked individual respondents questions about 11 facets of social capital, which cover trust (social and inter-racial), diversity of friendships, political participation (conventional and protest), civic leadership and associational involvement, informal socializing, giving and volunteering, faith-based engagement, and equality of civic engagement across the community (www.ksg.harvard.edu/saguaro/communitysurvey/). In 2006 the Social Capital Community Survey was administered as a follow-up to the 2000 survey by returning to 11 of the original 40 communities and adding 11 different ones.

Scholarly research has been conducted to show that desired environmental and sustainability outcomes can be linked to social capital (i.e. Adger et al. 2005; Airriessa et al. 2008). Social capital has been shown to be useful in many situations, such as collective action around environmental issues, to name one example (Pretty & Smith

2004). Additionally, practitioners in the planning and environmental fields are beginning to advocate for using social capital to address environmental challenges. For example, the Climate Leadership Initiative at the University of Oregon has a Social Capital Project and its recent publication suggests utilizing social capital to address communication and behavior related to climate change issues (Pike et al., 2010).

Social capital can be considered a key component of a resilient community. According to the Resilience Alliance, the foremost scholarly society for ecosystem resilience, the term “resilience” can be defined as “...the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes” (<http://www.resalliance.org/>). This concept can be extended to the interaction between ecological and social systems. Several studies have examined the role of social capital in facilitating more resilient communities and organizations. Brondizio et al. (2009) and Miller & Buys (2008) found that social capital played a key role in protecting ecosystems and environmental education engagement strategies, respectively. These efforts suggest that social capital may be able to address many important issues and thus be a desirable goal/outcome in and of itself.

Connections between social capital and environmental issues and thus sustainable development are understood and valued by several international organizations. The World Bank has done extensive work on developing methods and indices for measuring social capital related to sustainability. Specifically, the Social Capital Thematic Group within the World Bank has two tools for assessing social capital: Social Capital Assessment Tool (SOCAT) and the Social Capital Integrated Questionnaire (SOCAPIQ) (<http://web.worldbank.org>). The OECD states that, “human and social capital is essential

for developing and promoting adequate responses to environmental challenges” (OECD B). While it has been used by the World Bank for development related measurement and in many sectors of society, social capital has only recently and in a limited manner, been applied to sustainability issues (Agnitsch et al., 2006; Pretty & Smith, 2004). Portes and Landolt (1996) point out “social capital has a downside in that strong, long standing civic groups may stifle macroeconomic growth by securing a disproportionate share of national resources or inhibiting individual economic advancement by placing heavy personal obligations on members that prevent them from participating in broader social networks” (quoted in Woolcock, 1998, p.158).

The following case study demonstrates how social capital can be included as a measure of sustainable communities.

Case study: how can social capital be used as measure of sustainable communities?

How we build and move about our communities and neighborhoods is a key component of sustainability. Features of the built environment, specifically the number of locations one can and does walk to from his or her home, influence how people move about their neighborhoods and communities. Transportation decisions impact aspects of environmental sustainability, including air pollution, energy use, and greenhouse gas emissions that contribute to climate change. Being able to walk to various locations instead of driving or taking other mechanized transportation greatly reduces energy use and pollution. Additionally, if individuals are able to walk to locations where one can interact and communicate with other community members, this presence of “third places” and the action of walking to them may subsequently influence social capital levels.

Social capital is usually investigated as an independent variable that is important because of its ability to influence desired outcomes. As mentioned previously, there is established literature on the desired environmental and sustainability outcomes linked to social capital. A slightly different approach was used in the following case study that treated social capital as a desired outcome in and of itself. From this stems the argument that social capital can and should be an indicator/measure of a sustainable community and thus one of the ways of measuring the social aspects of sustainability within the context of the built environment.

In order to begin to measure sustainability and look for ways to promote resilience in communities, including social aspects, a community-based approach was employed that drew on many of the principles of Community Based Participatory Research (O'Fallon & Derry, 2002). The Cities of Portsmouth and Manchester, New Hampshire were chosen because of their commitment to sustainability and the existence of a variety of built forms. The research process involved interviews and focus groups with key informants, municipal decision makers, and neighborhood leaders that focused on trying to understand how these groups think about and measure sustainability. These discussions were also useful in learning about the two municipalities and their specific neighborhoods. This local knowledge assisted researchers in determining how neighborhoods varied in built form (i.e. urban/mixed use neighborhoods; suburban/less dense neighborhoods) and in socio-demographic characteristics, and subsequently which areas to investigate. Data from the focus groups and interviews along with extensive literature review helped to determine which questions to include on a door-to-door household survey. The main independent variables of self-perceived walkability were

measured by the answers to the survey questions in Table 1. One variable demonstrated the number of locations individuals *can* walk to in their community, while the other measured the number of locations survey respondents actually *do* walk to.

Location	I can/do walk to	Location	I can/do walk to
Post Office		Home of friend	
Restaurant		Grocery Store	
Coffee Shop/cafe		Bar/Pub	
Shopping Center		Community/ Rec Center	
Church		Convenience store	
School		Natural Area/open space/park	
Library/book store			

Table 1. Walkability Index Questions

Robert Putnam’s social capital short form survey (available at www.hks.harvard.edu/saguaro/pdfs/socialcapitalshortform.pdf) was used as a guide to determine salient questions by which to measure the dependent variable of social capital. Specifically, survey respondents were asked to indicate their levels of **trust** for various groups and individuals. They were also asked about their frequency of participating in

the community activities, which were compiled into an index:

- Working on a community project**
- Volunteering**
- Donating blood**
- Attending a public meeting**
- Attending a political meeting or rally**
- Attending a club or organizational meeting**
- Visiting the home of someone of a different neighborhood**
- Visiting the home of a community leader**

Figure 3. Community activities used to create community index

A response rate of approximately 35% yielded nearly 700 returned surveys and provided a rich data set to examine the relationship between walkability and social capital. As shown in Table 1, survey respondents were asked to indicate which locations they *can* and *do* walk to within their community. These responses were used to create a self reported walkability score for each respondent and then used to determine if an individual lived within a “more walkable” or a “less walkable” neighborhood with the split between the two types of neighborhoods being *seven* locations for “can” walk and *three* locations for “do” walk based on the respective medians of these questions in the complete data set.

There are many ways to cut the data and Table 2 displays several of those. The first two columns compare the more walkable and less walkable neighborhoods based on the

responses to the “can” walk to question. The next two columns compare more and less walkable neighborhoods based on responses to the “do” walk to question. Leyden (2003) detailed a similar “can walk to” walkability index but the “do” walk index along with the division of neighborhoods based on self perceived walkability rather than researcher designated neighborhood types, is a unique approach to understanding these relationships. The descriptive data here indicate that social capital measures are higher in the more walkable neighborhoods, whether individuals can or actually do walk to these locations. This also includes higher levels of happiness and health as well as lowering levels of television watching.

Responses to the social capital questions for both types of walkability are similar with a slightly higher response for social capital questions in the “can” walk section. This difference might be explained by the fact that “can walk” could indicate the presence of so called “third places” or community infrastructure where individuals may be able to interact even if they do not arrive there on foot. Demographic data is also included to add to the explanation for the differences, however, demographics are fairly similar across the groups leading to a stronger correlation between walkability and social capital. Summary statistics for many survey questions are displayed in Table 2 and the results of students t-tests are shown in table 3. T-tests are used to demonstrate that again, in both cases of “can” and “do” walk, the more walkable neighborhoods have higher levels of social capital (statistically significant) than the less walkable neighborhoods.

Statistic	More Walkable CAN N=380	Less Walkable CAN N=314	More Walkable DO N=387	Less Walkable DO N=307
Average number of places "can" or "do" walk to	10	3	6	1
Walking is very convenient in your neighborhood	80%	66%	78%	68%
Indicating that they walk at least several times per week to get to places in their community	55%	23%	62%	14%
People can be trusted	41%	27%	41%	26%
Trust people in your neighborhood a lot	52%	41%	47%	47%
Trust police in your community a lot	59%	51%	57%	54%
Worked on a community project in the last year	55%	43%	54%	44%
Attended a public meeting in the last year	50%	44%	50%	45%
Volunteered in the last year	75%	67%	77%	64%
Average community index	4.3/8	3.6/8	4.3/8	3.5/8
Conservative social and political outlook	22%	33%	23%	33%
Liberal social and political outlook	47%	32%	45%	33%
Attend religious services almost every week	24%	27%	21%	30%
Contribute at least \$100 in past year to charity	75%	67%	71%	71%
% reporting that they are happy	91	93	92	90
% reporting that they have at least very good health	70	61	70	60
Agree that television is my primary form of entertainment	37%	47%	34	51%
Break down of sex of respondents	M=37% F=63%	M=36% F=64%	M=36% F=64%	M=36% F=64%
Average age of respondents	50 years	54 years	50	55
Average education	Bachelor's	Bachelor's	Bachelor's	Bachelor's
Average Income Level	\$62,500- \$87,500	\$62,500- \$87,500	\$62,500- \$87,500	\$62,500- \$87,500

Table 2. Summary Statistics

<i>Results of t-tests</i>	Walkable neighborhoods CAN mean (n)	Less Walkable neighborhoods CAN mean (n)	p-value	Walkable neighborhoods DO mean (n)	Less Walkable neighborhoods DO mean (n)	p-value
Trust Index	5.3 (382)	4.8 (311)	0.0001	5.2 (388)	4.8 (305)	0.0013
Community Index	4.3 (380)	3.6 (313)	<0.0001	4.3 (390)	3.5 (307)	<0.0001
Walkability Index	9.9 (379)	2.9 (312)	<0.0001	6.3 (387)	0.8	<0.0001

Table 3. Results of t-tests comparing more and less walkable neighborhoods

The data collected in this case study show that respondents have the ability to walk to many more locations than they actually do (in more walkable neighborhoods the average can walk response is almost 10 locations and the average do walk response is 6.3). There are many possible personal and infrastructure related reasons for this difference.

Researchers were able to glean from several survey questions that factors such as health, time commitments, children, and weather all influence an individuals decision to walk to a location in their neighborhood or community. Survey respondents were directly asked to indicate what might be done in their neighborhood to make them more likely to walk.

A word count analysis was conducted on the responses to this question and the results are displayed in figure 4. Sidewalks, safety and lighting were the most frequently mentioned built environment terms that could be improved to encourage more walking.

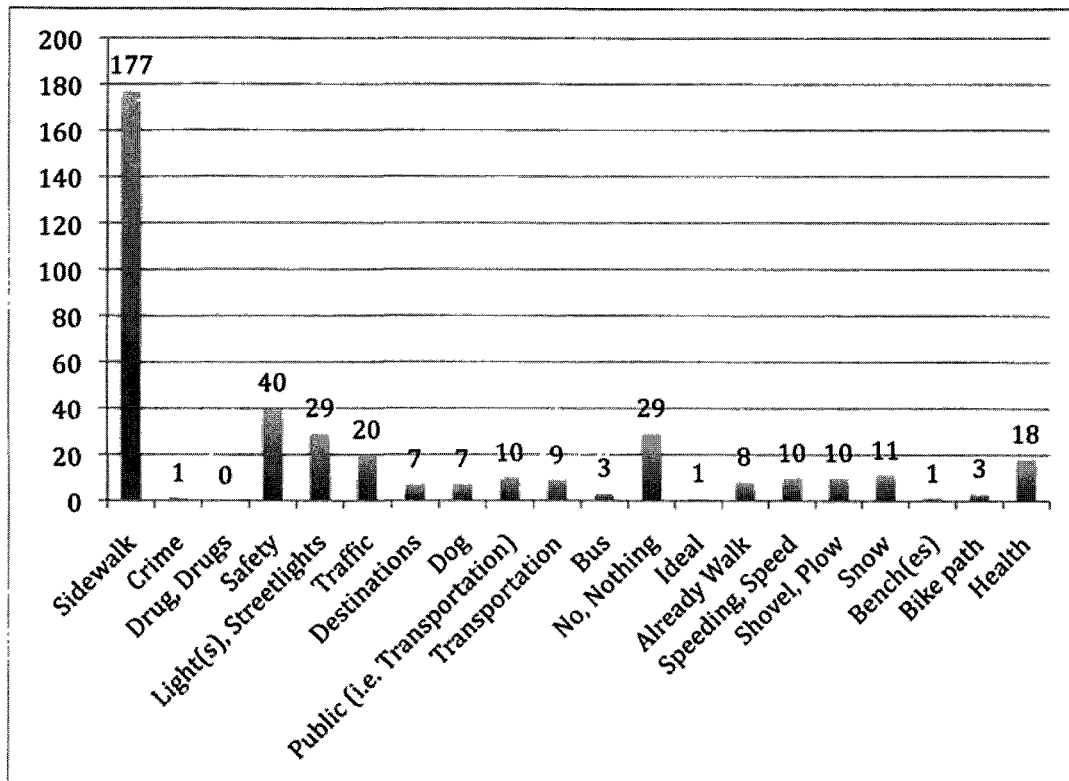


Figure 4. Word Count for Answers to the Survey Question: *Are there things that could be done to make you more likely to walk in neighborhood?*

Solutions: Policy Suggestions

Overall, this case provides a methodology for how social capital may be incorporated into measuring and reporting community sustainability efforts. Additionally, it provides evidence of connections between human functioning in society and their local neighborhood/community environment. This, along with the accompanying theory, offers a tangible example of how community planners and decision makers might measure and evaluate social capital as part of their sustainability efforts. More broadly, the case study supports the importance of incorporating social aspects into sustainable development work. The history and theory presented here suggest that social conditions are a key component of sustainability but are often excluded or glossed over in practice because of their complexity and ambiguity. Social

capital, with its established literature and measurement methods, helps provide some clarity. With the many positive benefits of social capital, it can be argued that increasing levels of this dynamic form of capital can help individuals and communities become more sustainable and resilient.

Therefore, if it is determined that social capital is a desired component of a community, how might the infrastructure, both physical and social, be retrofitted or designed to enhance social capital? This is a practical question that begs for a solution. LEED-ND, the newly minted Leadership in Energy and Environmental Design for Neighborhood Development provides one suggestion for actual, physical development. Credit 9 of the Neighborhood Pattern and Design component of the rating system is titled "Access to Civic and Public Spaces" and mentions social capital as an important outcome resulting from having Civic and Public Spaces. While the credit is only worth one point among many other options, it is a starting place. The intent of the credit is "to improve physical and mental health and social capital by providing a variety of open spaces close to work and home to facilitate social networking, civic engagement, physical activity and time spent outdoors" (Congress for the New Urbanism et al., 2009 p. 67). The credit's specific requirements are to "locate and/or design the project such that a civic or passive use space, such as a square, park, paseo, or plaza at least 1/6 acre in an area lies within 1/4 mile walk distance of 90% of planned and existing dwelling units and nonresidential building entrances (Congress for the New Urbanism et al. 2009, 67).

An additional rating method community planners and decision makers might be utilizing in the near future is another newly created index for sustainable communities: The ICLEI STAR Community Index. ICLEI, which stands for International Council for

Local Environmental Initiatives, is most commonly known by its abbreviated purpose: Local Governments for Sustainability. In October of 2010, ICLEI USA released “STAR Community Index: Sustainability Goals and Guiding Principles.” The Index will be officially launched in 2011 but the guidelines indicate many areas in which social capital could be measured. STAR’s sustainability goals fall under “environment” “economy” and “society.” Recommendations such as interconnected land use and design for people emphasize the importance of creating or enhancing landscapes so that they “promote active living and access to vital services including employment, education, and healthy food” in “human-scale built environments that provide comfort safety, accessibility and are pleasing to human inhabitants” (ICLEI, 2010, p. 14).

It can be argued that physical infrastructure would need to be complimented with initiatives to promote social infrastructure. Social capital scholar Michael Woolcock suggests that there are certain conditions under which the creation of social infrastructure and the social capital that could result from it are better facilitated:

Bottom-up development typically functions in and through social relations among people with common neighborhood, ethnic, religious, or familial ties (i.e., those with high endowments of social integration). As such, integration constitutes an important source of social capital, enabling participants to provide one another with a range of services and resources ranging from job referrals, gardening equipment, and kitchen supplies to property surveillance, commuter transport, and child minding. The more intensive the social ties and generalized trust within a given community, the higher its ‘endowment’ of (this form of) social capital (Woolcock 1998, 171).

The form of social capital Woolcock refers to is called “bonding” or “strong ties”. As he suggests, there are benefits to this type of social capital such as the type of interactions that might take place within a family or close-knit neighborhood. There are also downsides to too much bonding social capital as it may come at the expense of

“bridging” or “weak ties,” which scholars have shown to be important for individuals personal and professional development (Granovetter ,1973).

As mentioned earlier, the World Bank has done extensive research in measuring social capital. The motivation here is the idea that the ability to assess a community’s social capital prior to a development initiative would help to determine if the initiative would be successful. Additionally, assessing social capital after an initiative has been put in place allows the World Bank to measure success. In places like Albania, Sierra Leone, and the Philippines social capital is being used to evaluate communities’ readiness for participatory decision-making and community driven development (CDD).

Social capital can also have positive impacts on decision making related to environmental issues. Much of the literature related to community sustainability focuses on stakeholder and public participation to promote positive change (e.g. Adger, 2003; Kettle, 2006). Thus, positive social capital in a community enhances such participation and creates decision-making situations that were more favorably received by the community and ideally, lead to decisions that have positive social and environmental outcomes.

Walkability, measured in this case directly from the perception of survey respondents, was shown to be associated with certain measures of social capital and thus the logical link for developers of new communities as well as those retrofitting older ones would be to focus on creating a more walkable community. This can be achieved through physical infrastructure improvements such as mixed-use development in which housing, business, retail, open space and municipal facilities are all located in an interconnected layout. Coupled with proper sidewalks and safety considerations such as

lighting and slower traffic speeds, mixed use development will not only provide a variety of places for individuals to walk to and interact in but also the means by which to travel on foot. It is hypothesized that at these variety of places, including civic ones, individuals will have the opportunity to interact in ways they wouldn't normally if they resided in area with more segregated land use. Through these interactions, social ties can be enhanced leading towards greater levels of social capital and the associated positive social outcomes.

While social capital is by no means a panacea for sustainable development issues, it may offer one measurable way for community planners and decision makers to assess the social aspects of sustainability. When considered in tandem with the built environment, specifically walkability, this theory and case study also offers actions that can be taken to alter the physical and social infrastructure of a community to make it more conducive to building social capital.

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CHAPTER SEVEN

CONCLUSIONS

Bringing it all together

No matter how the data is cut, grouped, and summarized in this dissertation, the relationship between social capital and walkability at the neighborhood scale remains. Even after controlling for important demographic variables such as income, religious service attendance and education and considering cluster effects, there is still a significant interaction between measures of social capital and walkability, with greater social capital following greater walkability in both individuals and neighborhoods. Whether the shape of communities affects the intangible social infrastructure and if this can be measured by social capital is the question the research sought to answer. Standing alone, this work will contribute to the literature on social capital and the built environment by providing an empirical case study based on primary data collection at a human scale. National endeavors to measure social capital, such as the 2000 and 2006 surveys by Robert Putnam's Saguaro Seminar at Harvard have set a powerful precedent for social capital scholars. However, they are only able to tell the story of social capital at the state level. Walkability begins when an individual steps outside his or her front door. Therefore, the neighborhood scale is far more appropriate for examining the connection between

walkability and social capital. This research contributed to a finer scale of understanding local determinants of levels of social capital.

As part of the larger research project, the research described here also addresses the issues of measuring sustainability in communities and the utility of social capital as a measure of social sustainability. Measuring complex interactions is crucial to building the next generation of communities and to reshaping the current infrastructure in order to offer a high quality of life that is sustainable and resilient.

The first journal article addresses walkability and social capital as important components of quality of life. The ability to comfortably walk to locations of need and importance in one's home neighborhood and quality of life have been linked by researchers, practitioners, and homeowners. The research presented in this article suggests that there is another component of the equation linking walkability to quality of life and that is social capital. Analysis of a survey of neighborhoods of varying built form revealed strong correlations between the number of locations one could walk to and indicators of social capital. Just like economic and human capital, social capital can bring benefits to those who possess it, such as reduced isolation, career enhancement connections, and neighborhood safety, to name a few. It is these benefits that may enhance an individual's quality of life. Walkability enhances social capital by providing the means and locations for individuals to connect, share information, and interact with those that they might not otherwise meet.

The second article takes a more in depth look at the data through the use of multilevel regression analysis. The results presented here suggest that there are positive associations between walkability and aspects of social capital in the sample of

respondents from two municipalities in New Hampshire. Descriptive statistics demonstrated that higher levels of social capital existed in more walkable communities. More sophisticated analysis further supported this association. A community index was created from responses to questions about participating in civic engagement activities such as donating blood, attending a committee meeting or public hearing, interacting with individuals in various neighborhoods, and contributing to a community project. When comparing this index to the self perceived walkability index in a multilevel model, higher levels of walkability are associated with higher levels of participating in community activities. Demographics such as education, religious service attendance, and income were also found to be positively associated with the community index, which is in line with other studies of social capital (Putnam, 2000). Similar patterns were found for the trust index where higher levels of walkability were positively associated with positive responses to a variety of trust questions. This suggests that socioeconomic as well as socio-demographic factors along with other environmental ones (such as walkability) have a complex affect on an individual's social capital.

The third and final article addresses the more theoretical underpinnings of the research conducted. Sustainability and sustainable development are frequently described as having three main components, sometimes referred to as the three pillars or the triple bottom line: environmental, economic, and social. The social aspects of sustainability have been considered the weakest and least described pillar and this paper examines this pillar and social capital is offered as one measure of social sustainability. Theory is complemented by a case study in which social capital was used to measure the social-environmental interface of sustainable communities. The positive correlation between

aspects of the built environment, specifically if individuals can and do walk to locations in their neighborhood and social capital suggests that community planners and decision makers as well as sustainable development scholars should consider the concept as an important measure of social sustainability. Specifically, considering the importance of citing third places within walking distance of residential components of communities can lead to enhanced social capital through the spontaneous interactions that occur among individuals who are not part of intimate family or friend networks. Informal and formal gathering places such as coffee shops, restaurants, churches, libraries, community centers, etc., provide the physical means in which to connect with other community members one might not interact with otherwise. The bridging social capital that results from these connections can provide important benefits to those who are able to obtain it, including access to information as well as mental health benefits from reduced isolation.

All three papers focus on a self-perceived walkability index and this is important for many reasons. Much of previous work in this field, aside from Leyden (2003) has used researcher-defined walkability and is often determined through objective measures such as mapping and “birds-eye” measurements that can be compared to large data sets. The research conducted for this dissertation was designed to be community based and “on the ground” at a human scale that is often missed when utilizing secondary data. While neighborhoods were initially selected by researchers to include a variety of built forms and the selection process included local knowledge from citizen stakeholders, barriers to walking vary from person to person and are not always obvious. The process detailed here, although time and resource intensive when conducted at a large scale, allowed for individuals to determine if their neighborhood was walkable or not and thus

if it allowed for the creation and enhancement of social capital. The results suggest the importance of localized and targeted research for communities seeking to make their physical and social infrastructures more sustainable and resilient. Additionally, the research methods presented here, especially the emphasis on self-perceived walkability, offer a reproducible, flexible framework that other groups can use to examine and measure an important component of sustainability in their communities.

Policy Recommendations and Suggestions for Future Research

The cross sectional, community based case study presented in this dissertation looked at one moment in time through a survey instrument and found associations between measures of social capital and the built environment (as indicated by self perceived walkability). From the findings presented in the dissertation and the feedback received from public presentations of the research, it is clear that walkability and social aspects of sustainability, particularly social capital, are on the minds and agendas of many community decision makers. While infrastructure alterations can often be costly, communities may do well to consider enhancing walkability in their future planning decisions. This could include mixed use design that emphasizes the integration of housing, businesses, and civic infrastructure, such as schools, libraries, and community centers. As discussed in the dissertation, third places, locations that are neither home nor work, may play a key role in enhancing walkability and social capital as they provide destinations to walk to as well as locations within which to interact with other individuals in the community. Additionally, focusing on maintaining sidewalks and pedestrian ways

that are safe, well lit, and free of snow and ice during the winter could be another policy recommendation.

Further research on this topic could include an intervention study in which a change is made in the built environment (i.e. the establishment of new sidewalks or the addition of a third place in a neighborhood in this study). This would allow for before and after comparison and researchers may be able to determine if an intervention in the built environment influenced other measures of sustainability, such as social capital. Additionally, it may be beneficial to conduct in-depth personal interviews with individuals who answered the survey in order to determine their motivations for walking and if they feel that their ability to walk in their neighborhood has influenced their levels of social capital. An interview study would be both time and resource intensive but would complement the survey by providing the rich, personal context that is often missed in a large survey effort.

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Appendix A IRB Approval

University of New Hampshire

Research Conduct and Compliance Services, Office of Sponsored Research
Service Building, 51 College Road, Durham, NH 03824-3585
Fax: 603-862-3564

24-Jan-2008

Gardner, Kevin
Civil Engineering Dept
Environmental Technology Building
Durham, NH 03824

IRB #: 4155

Study: Evaluating Social Capital & the Built Environment Pilot Study

Approval Date: 24-Jan-2008

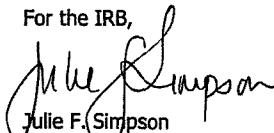
The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study as Exempt as described in Title 45, Code of Federal Regulations (CFR), Part 46, Subsection 101(b). Approval is granted to conduct your study as described in your protocol.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, *Responsibilities of Directors of Research Studies Involving Human Subjects*. (This document is also available at <http://www.unh.edu/osr/compliance/irb.html>.) Please read this document carefully before commencing your work involving human subjects.

Upon completion of your study, please complete the enclosed pink Exempt Study Final Report form and return it to this office along with a report of your findings.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,



Julie F. Simpson
Manager

cc: File
Rogers, Shannon

Appendix B

Focus Group Questions and Summaries of Portsmouth & Manchester Focus Groups

Definitions & Metrics

- How is your community defining sustainability?
- What indicators and/or metrics are you using to measure your progress on sustainability issues?
- How were these indicators/metrics selected?
- Are there measures of the built environment that you use to determine sustainability?
- How are you defining success in regards to your progress on sustainability issues?
- What tools do you use to implement sustainable planning initiatives?

Resources & Information

- What is your main constraint or limiting factor to implement the principles of smart growth and sustainable development?
- What is the most beneficial resource you have for implementing these principles?
- Where do you get your most useful information and who are your key informants?
- Are there any key groups that we should contact to discuss issues in your community related toSustainability? Transportation? Social capital? Public health? Neighborhood action?

Social Capital

- Have you heard of social capital? (If “no”, we’ll provide the definition)
- Does social capital fit into the work you do? How?
- Is social capital part of your definition of sustainability?
- How would you define the social component of sustainability?

Implementation & Interactions

- What would you need to be able to implement your principles of sustainability better?
- How do you interact with the planning board?
- What is the most effective format for you, as practitioners, to receive the results of research so that it can be implemented effectively?

Case Study Neighborhoods

- Would you say that there are specific neighborhoods in your community that are developed in a more desirable way, from the standpoint of sustainability?
 - If so, what makes them desirable? Where are they?
- Would you say that there are specific neighborhoods in your community that are developed in a less desirable way, from the standpoint of sustainability?
 - If so, what makes them less desirable? Where are they?
- Would you say that there are specific neighborhoods in your community that have higher levels of social capital (or civic engagement/involvement)? What specifically has indicated to you that they have high social capital? Where are these neighborhoods?

- Would you say that there are specific neighborhoods in your community that have lower levels of social capital? What specifically has indicated to you that they have low social capital? Where are these neighborhoods?
- In the neighborhoods you have mentioned so far, where are the locations that people would gather to meet, talk, and socialize?
- Who might we talk to determine the delineation of specific neighborhoods in community X?

Transportation and Public Health

- Is your community “bike friendly”? “Walk friendly”?
- Are there neighborhoods that are less or more so? What factors figure into making a neighborhood more or less bike/walk friendly in your community?
- Is your community physically active?
- Where do residents go to be physically active?
- Are there neighborhoods that have less access to physical activity?
- What are the major health issues in your community?
- Do you think these might relate to aspects of the built environment in your community? How?

Social Capital and the Built Environment
Focus Group – Portsmouth
24 February 2009, Tuesday – 330 Gregg Hall

In attendance:

Eric Steltzer, Scott Bogle, Shannon Rogers, Peter Britz, Kevin Gardner, Bert Cohen, Cyndy Carlson

Introductions

Background – how do you measure sustainability? Need to include engineering metrics with social metrics. Existing studies look at secondary data sources, different scales. We want to look at empirical case studies at neighborhood level.

1. Metrics – are there measures of the built environment that you use to determine sustainability?

Access to transit, % of pop that lives within ¼ to ½ mile of transit. Although this is difficult in NH.

Miles of bikeway, number of sidewalks, proximity to commercial areas, distance from home to commercial areas.

LEED ND uses number of intersections per square mile, measures density. And measures of design. Density alone is not enough.

The League of American Bicyclists compares miles of bikeway to miles of arterial streets. I can send this information to Shannon.

There is also the number of nodes and node design.

As an eco-municipality, Portsmouth defines sustainability related to the global system using “The Natural Step,” but here, we are looking on the ground to see how it is actually done. Natural step gives us global framework, big system. Most people every day think more on the level of bike, nodes, pounds of co2, etc. We give an article in our sustainability class from D.Meadows that describes indicators. There are low hanging fruit that are easiest to measure, but the real measure of whether a town is sustainable is the social connections & networks we are building. The fact that I met Scott last week at Flatbread with my son, and now we are meeting again... that is just as important as a bike path. The network of people is important. You build the trust of people. As hard times come, the neighborhoods and the solutions will be largely built upon social networks.

How do you use it, where does it fit in, how does it motivate others.

Based on the Kennedy school survey, the Charitable Foundation collected data in the I-93 corridor. If we used this in our survey, it would allow comparability between national data & our data.

There is a movie “Escape from suburbia” that might have relevance in metric selection Also, might look into the redevelopment of Stapleton, Colorado.

2. What are the main constraints to implementation?

Political will, at the local level here in NH. Need to have someone on board, etc. to keep bringing this up. Planning boards don't have that voice to weigh against conservation & developer voices.

In a developed area you can only get incremental changes. Need political will and a little space. A lot of what we get is redevelopment. Developers come in with BAU, developers need a push to do things the right way in the regulatory arena and at neighborhood level. Redoing zoning ordinances is important. i.e. to require stormwater infiltration. Need to be able to demonstrate cost savings.

2/3 of development in 2050 hasn't been built yet. With a suitably long vision, maybe we can do it right the next time around.

You can't just look at single parcel, need to look at broader aspects of sustainability. Sustainability is interaction of all the parcels. It is in the timing, getting redevelopment in sync.

There may be key points in the transportation corridor, etc. a key piece in the long term framework. It is hard to look at the long term perspective. Question is not asked: how is this a sustainable project? How does it relate to the longer term vision?

Need an accurate read as to what is happening on the planet. What are the real implications of energy descent... "Transition Handbook"... match peak oil & climate change as a system will have impact on energy.

Safe routes to school & getting kids to walk to school. People are concerned about child abduction. Gets at the issue of trust in neighbors & others, or maybe people in neighborhood willing to take turns to walk with kids to school. Getting kids walking to school trains future adults in the habit of walking. Parents learn to cooperate within neighborhood, but may still be unsure what is happening between their neighborhood and the school. Also there may be time constraints with the parents, as Robert Putnum suggested regarding commute times.

Make up of neighborhoods is important. In an area with a lot of renters, neighborhood composition changes more frequently. It is hard to reach out to the neighbors. The best area might have a mixture of affordability, rent/own, different age groups, etc.

The 5 year plan for Portsmouth to reenergize democracy. Sustainability plan needs a large magnitude in a short time frame. We want 400 or 500 people involved. Use interactive media with the process as it is developing. Action research project built around the master plan so that people involved are getting information, at the same time that the research that comes out is already being used. Dynamic complexity requires more than linear thinking.

3. What specific neighborhoods are more/less sustainable?

Can't find the data for the map of neighborhoods, although it is hanging on the wall in Portsmouth. Portsmouth is interesting because of waterfront neighborhoods have higher density, but are more affluent. Residents may spend a lot on houses, but might have lower interaction. They seem to fight more and complain more about each other. In neighborhoods on the other side of the spectrum, the lowest income residents are renters and might have lower social capital. The mid-range neighborhoods might get together more.

Downtown, Lincoln and South Street areas vs. pleasant point has less social capital.

Woodlands are farther apart, need to drive everywhere (Hartford & gamester loop, 2 acre lots).

Dondero neighborhood homes are closer together than in the Woodlands.

Suggest to look at the zoning map & overlay parcels with house value. Maybe look at house value per zone, for instance.

North Mill Pond area is active (between I bypass & pond). PSI study circles are going there. That community has discussion of a community garden, potluck suppers, book study on sustainability, some residents are 'back to the land' type people. Another measure might be food security – what is a town's ability to be resilient in food & energy supply. Resilience along all dimensions, food, energy, etc. Barn raising & solar hot water – how are we getting projects going for those people who are interested. How do people who care network?

I like the area to north of South Street. It has trees, yards, sidewalks, easy access to cemetery, library & parks. The cemetery has recreation uses. This area is good from outsider's perspective.

That is also a historic area. That is the way they built neighborhoods back then. It may be a good example of 'if you build it, will it happen?'

4. Transportation & Public Health –

We could get health info from united way. Portsmouth seems to be more physically active than many communities. Richards Ave seems to be as active as any on seacoast. Biggest turnout for bike to work week is in Portsmouth. But turnouts are pretty low everywhere.

There is not a lot going on in neighborhood action groups. Issue dependent – only come out if there is something going on.

Sustainability Fair might be a way to bring in groups. There are 22 neighborhoods in city, looking for something to grasp. People after their kids have left & people before they have kids are the most active. People who have kids are trying to survive. There are different avenues to reach different groups.

We are looking at the social capital of a community around the sustainability issue, but there are other social capital outlets that are a sign of sustainability. i.e. how parents interact with school, sports, farmers market. They are participating with sustainability, but they don't know it. Dog parks.

Portsmouth Herald Building – can it be changed into a year round farmers market? Can Gary Hirshberg do a restaurant there? Maybe also include a green house... storage for root crops... people are thinking like that. All of us are feeling that the ground is shifting under us. Need real resilient communities. How secure are people feeling about their ability to maintain their quality of life.

Social capital around schools, or level of school volunteerism as a level of social capital, might be a good measure. Are schools already gathering that info? United way volunteer action center also keeps track of volunteers on seacoast.

Also might try to measure cooperative efforts – ie. Moms put together a child care group. Ask "Do you do anything cooperatively? Shovel, child care, etc.?"

The Stay Warm Initiative got volunteers to visit low income individuals to check that they are prepared for cold weather. To winterize the home, but also build connection

between neighbors. Ask “Does this individual have family around them?” When times are troubled, who can help each other? Another measure might be longevity – how long have they been in the community. i.e. southie=South Boston.

The Natural Step suggests we start where we want to be & back cast to now. How can we accelerate the rate of change towards where we want to be. In the process, the means and the end are one. Action research – do it, engage. Be generative & productive. To get political will you need community demand. To get community demand you need social capital. It is an iterative structure.

It is hard to think about how to package this in a way that planners can understand/use. I went with a group to tour towns in Sweden. When a tour from the states arrives to see the community, people see themselves in a different light. We could introduce the interesting idea of social capital and say, “and we want to include you.” We also might consider mapping social capital networks – and thinking about how to get the information out.

We could start the map with the PSI.

Since we need to connect whole community with the 5 year plan. Let individuals see selves as part of a map.

Key Quotations

In regards to metrics of the built environment that are used to measure sustainability, Scott: “Percentage of your community that is living within a quarter mile of a transit stop...Portsmouth and Manchester have better transit than the rest of the state.”

Eric: “how far away are homes to commercial areas.”

Peter: LEED-ND uses the number of intersections per square mile. “I always think of density.”

Mileage of bikeway to miles archway. League of American Bikers

Number of nodes

“Our community being an eco-municipality is defining sustainability by how well we are meeting the four systems conditions of the natural step.” “The natural step gives us the global framework...we are fortunate to have that in the City as our global framework.”

Donella Meadows indicators

“As I look at sustainability now, I think the real measure of whether a town will be sustainable I look at the social networks and social connectors we are building...that’s a little bit harder to wrap our minds around.”

“Whats coming to fruition is a network of people...you build up the trust and so far...as hard times come, which they will, the neighborhoods and the solutions we come to will be largely built on the social networks which I think are going to be the bedrock of sustainability.” “How to use it, where does it fit in, and how does it motivate others?”

Redevelopment of Stapleton –encourage people to have that interaction on the front of the home.

Political will—at the local level. “here in NH it is all about local rule...you need to have at least one person on the board of selectman to continue bringing up this issues...there are too many planning boards that don’t have that voice at the table.” Weighing this against other

“Can only get incremental change if things are already built.”

“Redevelopment

“innovative land use can add a lot of things but redoing the zoning ordinance can do a lot of things.” “If you can demonstrate cost savings as part of these things.”

“if you start to look at the broader aspects of sustainability...the interaction of all the parcels”

“key locations”

“how is this a sustainable project...what if they were just asked that simple question?”

No one is asking this on planning boards.

“social capital or lack there of as a constraint.” Safe Routes to School

Make up of neighborhood—mixture of affordability, age groups

Action research

“Dynamic complexity can’t be dealt with linear thinking.”

Density of houses

Pleasant point, downtown South Street

Woodlands—2 acre lots

Northmill Pond—community gardens

Food security and resilience

Barn raising solar hot water

Historic district?—Neighborhoods by Little Harbor School, Richards Ave

United Way Needs Assessment-

22 Neighborhoods

Parents with kids. “They might be participating in sustainability without even knowing it.”

Year round farmer’s market possibility—food security

School volunteerism

Volunteer—winterizing homes—checking in with people to make sure they are ok.

“When times are troubling, who can help us the most?” Longevity

In Natural Step, start where you want to be and move backwards in terms of indicators

“the means and the ends are one”

Notes from Manchester Focus Group

Tuesday, 24 March 2009 @ UNH Manchester Campus

Attendees: Carolyn Russell (NHDES), Regina Flynn (NHDHHS), Sam Maranto, (Planning), Meena Gyawali (Economic Development), Nicole Rodler (Weed and Seed Program within Health Dept), Shannon Rogers (UNH), Cyndy Carlson (UNH)

Definition of Sustainability

Master Plan in Manchester will have definition of sustainability. City Depts have had informal discussion about the topic. Older urban core—preserve existing urban structure. Sustainability is interaction between economic and environment. Focusing on looking at neighborhoods. Walking routes, bike routes. Taking a hit because of financial conditions. Address sustainability in economic development work and recreation plan. Energy STAR in housing program.

Manchester will be applying for Federal neighborhood stabilization money, which may then be used to purchase/resell vacant & foreclosed properties.¹ The time-horizon for completion of stability projects is about 2-years. Our project may be suitable to collect baseline data, and a follow up survey might show how the stabilization project was able to impact the neighborhood. Could be a good partnership opportunity with city.

Land use planning—dense housing, walkable, sidewalks, mixed housing, transit ridership
Mixed use—office space, housing,

Zoning was not allowing mixed use; this was especially a concern in historic/downtown area. So last year changed zoning to allow mixed use in the “B1” zone. Downtown area does not have a minimum parking requirement. “Let the market take care of parking.” Millyard is a good example of mixed use.

Measures of Sustainability

Amount of involvement in neighborhoods of police and health department, holistic approach. Bringing groups together. Density in neighborhoods Dec. 2007-present. Since Dec 2007, the city has developed “dashboard indicators”. Health department project. All depts work together. Participation of watch groups—bottom up involvement of everyone.

Other measures include: Number of new jobs, vacancy rates, lead paint program (number of de-lead residences), vacant store fronts filled, buy in from participants. 56 watch groups at the neighborhood levels.

Amount of green space, access to healthy grocery stores, density.

Walkable communities, safe routes to school. Time of travel, modes of transportation.

Green space related to levels of crimes.

Planning has divided the city into 25 neighborhoods

Neighborhood stabilization to get green space→ the planning of new green space has to consider capital cost and loss of tax revenue, as well as the future maintenance costs by the Parks & Recreation Dept.

Urban gardens (“Enright” is the third community garden in the city). Food deserts—small neighborhood grocery stores don’t carry much produce. Bus routes and timing.

¹ More information at:

<http://www.nashuatelegraph.com/apps/pbcs.dll/article?AID=2009303259931>

Manchester is a refugee resettlement area—culturally significant food may not be available; residents may not be familiar with common local produce. UNH has partnered with urban garden program to address some of these issues, and mentor garden creation. Massabesic Audubon Center buses students from after school programs to a community garden. Also, “master gardeners” could be better integrated into city & garden programs. WIC-food package is changing. More healthy options, more things WIC allowances can be used for. Smaller vendors will have to offer better foods to keep up with the program. This could also increase access to healthy options for people who don’t use WIC. Farmers markets take WIC. Farmers Market held every Thursday in Manchester in summer.

Senior commodity supplemental food program.

Limiting Factors to Implementing Sustainability

Staff capacity is limiting factor. Public perception—parking takes priority, which requires education. We are still in car centered society—here in Manchester buses are seen as for old people, crazy people, poor people.

Costs and codes limiting factors (88 codes). Safe Routes to school program could be a positive. Drainage & ADA requirements might limit what can be done.

Silo Perspective in the past, but now city depts are working together more. Federal funds (resources). Have to meet mandate of funds.

Education is necessary for elected officials. Continue discussion with them.

Always good to collect data, during project. Hard to build data elements into projects.

The health dept has collected a lot of data in projects in the past.

Weed and Seed has many of the same questions as for our survey, have data available back to 2000.

Quality of life metrics include measurements of income. Manchester is getting poorer.

Diversity. Attracting new businesses that are catering to the new immigrant population that is moving in. Econ development dept helping to get the Bosnian, etc. population to open up new businesses, but need to help them understand regulations, business plans, etc. Need to help the new businesses to sustain themselves.

New citizen assimilation—non-profit organizations. Address the needs of the immigrants. Help to understand our system – i.e. if the tenant continues to throw trash out the window onto the sidewalk, it may not be the absentee landlord’s fault, there may be cultural issues that need to be addressed, education about proper waste management, etc.

80 languages in the public schools. Needs for translators. Organization that certifies translators. Medical, legal, ethical interpretation to use instead of using family. Family members without medical/legal training may complicate difficulties in communication between patient and doctor/police. “Southern NH Area Health Communication Program.” Afterschool programs—One is called “Bring it.”

Tapping into the elders of community. Multicultural center—preserving older heritage.

Residents fear the change that is happening, as new immigrant populations come in.

Bridge the gap of perception to reality. New immigrants may have fear of institutions; this fear may be especially common in the refugee population & with formerly persecuted people.

Federal Neighborhood Stabilizations—15 million dollars potentially slated for Manchester. Change neighborhoods. Use landscape architects to look at green space, neighborhoods, porches so that are opportunities to meet neighbors. Purchase vacant or run down properties & convert to open space.

Social Capital/Neighborhood Selection

Ice storm – how much can neighbors rely on each other during an emergency, or a prolonged black out, etc. such as in the December 2008 ice storm.

In apartment building maybe more social capital than in a suburban neighborhood

How often do you see your neighbors. Part of that is the built environment—use the same services, come across people on the sidewalk, see them from porches.

Opportunity to socialize to get to know people.

East side of Manchester tends to have more social capital, west side less.

Other factors include: Population-demography, income level, rental vs. homeownership?

Activity level of renters, whether landlord is active.

Density—everyone is in your face downtown. Too much density can be bad. It depends also on the capacity & quality of the housing stock. For instance, in some neighborhoods a formerly one family home was converted to apartments, and then the attic and basement were also converted with families living there. The ability to reap benefits expected from increased density (social capital, public transport, walkability, etc.) really depends on the capacity of the infrastructure to handle the density.

Higher vacancy rate—up to 10%. Challenge of tax revenue lost.

Concept of space is an issue in diverse neighborhoods. Cultural differences, people have different ideas of what is “enough” space. Diversity as social capital.

Tipping point on density. A point where the infrastructure can’t handle more people.

Higher income neighborhoods

Combination of other factors—density, income, cultural areas

West Side of the City—traditional French residents are not as accepting of the new residents. The children of the French residents, although they may have moved out of the house, can also be vocal about what is going on in their old neighborhoods.

In compact/dense housing—no storage for bicycles, fighting over parking, no backyard.

House may have more rental units that it can sustain. There may not be any yard or common space to get out of each other’s way. This leads to conflict.

How much common space is available, how that common space is used. On the west side, kids can play in the alleys behind their houses, because alleys are only used for slow speed driving to a parking space. But on the east side, the alleys are used for high speed cut throughs to get around traffic lights, so kids can not use that space for play.

Rimman Heights neighborhood—lots of friction. Like in the movie “Gran Torino.”

Children have moved out. How we define success in society—suburban house with big lawn, better than parents. Quality of life is being redefined, maybe it should include connection to the neighborhood. In Rimman Heights, although the neighborhood has a poor reputation, the neighborhood watch group is trying to take that back. Very proud of their neighborhood and of their watch group, i.e. named it “Rimman Heights” almost defiantly, even though that is a name with a poor reputation.

Econ development dept has considered a media campaign about neighborhood change.

Remind people of the history of the neighborhoods, and that there has been a succession

of different immigrant groups coming to Manchester. Each group wants to close the gate after them, but an educational campaign might help with understanding new groups.

[NOTE: We asked those present to identify Watch groups that might be interesting to study. These will be marked below with (wg)]

(wg) Orange to Pearl Street

Planning physical and social measures.

(wg) Kelly Street (west side)...very involved group, supportive of local businesses and each other, new ownership.

East side—inner city, transient populations. Further out—single family homes, more involved with schools and kids. One meeting attendee used to live on Smyth Road as a child, and used to walk to school, but now families no longer consider that route walkable.

Involvement in a neighborhood has to do with how they connect themselves—parent teacher groups might be strong in some areas. Tie into other residents' groups in that area.

→Look at transient properties, apartments on Rt. 1 (in Portsmouth).

Types of social interactions in cultural groups—make sure social capital questions are diverse enough to capture the different forms of social capital. Informal connections are also important.

Low-income individuals, working two jobs find it difficult to make the time to be involved.

Less grass routes efforts in Manchester, a lot of hand holding seems necessary. Business Association. A community project is considered just one more thing to add to do list.

More support is needed. Barriers can be high.

Finding the ones to maintain the project is difficult, but important to any project's sustainability.

(wg) Somerville Street neighborhood—35 people in neighborhood group. Borderline neighborhood—mixed use.

(wg) Piscataquog neighborhood—behind West High and including Bass Island

Older core and newer development within the city may show differences.

Walking to school—speed and volume of traffic is a factor in perception of safety.

Portsmouth might not really be that walkable, other than for the tourists. Apartments on Rt. 1 and Lafayette Road might be examples of that; it is dense, but you can't walk.

(wg) Brownstones on Elm Street, and the neighborhood group on Brook Street—people walk everywhere but not connected.

Walkability

A large part of Manchester is walkable, but not walker-friendly. People don't maintain their sidewalks. Seasonality is an issue. Hydrants not plowed out—adopt a hydrant program seeks to address this. People wait for the city to act, rather than doing it themselves. Biking groups are trying to convert railbeds to trails. Many people with DUI convictions become “commuter bikers.” No public transit for third shift, so they also bike.

City is actively trying to make sure the sidewalks are getting fixed and connected. Urban core is more walkable. Potential of connecting neighborhoods through bike lanes.

East/West North/South bike paths are a vision of the city.

Bikeability and walkability surveys have been completed.

Condition of sidewalks is really important too. Congestion makes it less safe for pedestrians. Socially, is walking and biking accepted. Perceptions of biking (i.e. just for people with DUI). Car culture—walking/biking are not social norm. Status symbol of car.

Safety—lighting, people complain that street lights aren't present, but then complain that the lights shine in their house. A motion-detector light on a resident's front porch might solve this, but people want the city to solve it for them.

Aging community has different transit needs. Do people really use the bus?

Year round vs. seasonal issues. Issues with dogs—loose, dog fouling.

Communities that are new and on the outskirts of the city don't want sidewalk in front of their home. Don't want people walking in front of their home. For example, the new developments near Hackett Hill.

Perceptions of walking—how far are you willing to walk? You will walk from Filenes to Best Buy in the mall, but not down the street. Fear of crime. Sense of security, what you are used to, how far you perceive as “walkable” in different venues.

School sidewalk program—tried to focus on upgrading sidewalks by schools. This program has largely gone by the wayside.

What are the major health issues in Manchester?— Health dept has data on these issues.

Greenspace, places for recreation are necessary. How are green spaces designed for all ages. Redesign of space.

Community gardens have been targeted to specific neighborhoods to deter prostitution, to get more residents outside. Lights on parks with shields on top of the lights reduce waste light for environmental reasons. Enright is the third community garden.

Porch lights—with motion detectors are a possible solution for folks who think that there is not enough light on their street.

Secondary data analysis opportunities – the Health Dept has data collected through different programs over the years. They also have GIS coverages of some of the data that might be of interest to us.

Survey translation issues – as so many different languages are spoken in Manchester, translating the survey may be difficult/necessary.

Manchester Sustainable Access Project. Residents felt. Link to census track.

Delineation issues – the neighborhood watch boundaries do not coincide with the planning department's designation of neighborhoods. The city would like us to consider the boundaries of census tracts when we make our delineations, but then again, neither the watch or the planning neighborhoods do; both may cross census tract boundaries.

Specific Quotations:

Master plan will be out in April

“Because we have such an older urban core in the city, sometimes our definition of sustainability is a little different...we are trying to preserve the existing urban structures we have, to preserve the housing units... a lot of our work is focusing on the neighborhoods in the urban core.”

City's definition of sustainability is interaction “economic development, the environment, and the people.” “Downturn in economy is making it harder.” There is a cost to it as well

Addresses sustainability in most activities. Energy Star in rehabilitation work

“From a landuse pattern, we have what people are trying to achieve...matter of maintaining and upgrading.”

Public transit is an issue—ridership is down, subsidies are decreasing, costs to maintain have gone up

Mixed use development as sustainable

“a lot of our zoning was not allowing what we envisioned the city to be” Last changed a lot of zoning to allow more mixed use. Downtown core does not have a minimum parking requirement.

holistic approach to planning, “recognize that all we need to work together. Bottom up

“number of new jobs, number of vacancies rates, de-leading”

Started with 15 watch groups now up to 56

Access to healthy foods

24-25 neighborhoods—econ development department

walkable communities—distance to locations—health department

green space related to reduction of crime

taking away property taxes by adding green space, extra land for parks and rec to take care of

food deserts

lack of culturally significant foods—Pine Street, community garden culturally significant

“staff capacity and financial resources” are major limiting factors

“public perception”

“still a car oriented culture—until we strengthen our public transit system...[here the perception is that public transit is for poor people, old people, and crazy people...that perception has to change.”

“federal funds are very siloed...they have these specific indicators to meet”

When people start thinking outside their silo, that is an indicator

Data is so important

Mayor and Alderman system

“if you go back 25 years, Manchester is getting poorer.” Quality of life is a part of sustainability.

Some of the refugees who open new businesses--They don't know how to reach out beyond their population

Over 80 languages in the schools—translation needs

15 million dollars to change neighborhoods

porches out front, people meet their neighbors, like it was 50 years ago

how much

Social capital...“how often do you see your neighbor? Do you speak the same language.

Part of that is the built environment. Do you come across people on the sidewalks, do you go to the same hairdressers, are there porches on apts. In suburbia drive into garages, don't even go into the front door. Are there opportunities to get to know each other.”

East side, stronger social capital. West side, sits back and watches, don't like the changes as much. Historic population, population, density.

“Activity level of landlords” can affect the social capital. Whos renting and whos owning.

“A lot of it is the density...some streets everyone is in your face.” “No backyards, no greenspace...you open the door and you fall in the street.” This affects social capital too. Pocket parks, little spaces people can walk and take their kids outside
Opportunity with higher vacancy rate~10% can selectively get rid of some of the buildings but also lose some of the revenue.
“refuges have different concepts of space than Americans.” Garbage, etc. Community leader
Combination of density, cultural, income, creates friction as opposed to the density itself
No storage for bikes, no backyard, arguing over parking...tipping point.
“Frictions of new comers worse in West Side and East Side”
Media campaign “it is an evolution”
“we define success as the suburban house with the big lawn and you want to do better than your parents.” But see systems changes going on, “people saying why geez, I would rather just be home in 10 minutes.” “Maybe this whole quality of life I bought into “is suburbia really all it is cracked up to be?”
“Planning is physical and social and economic”
“Portsmouth has a grass routes effort but in our city it takes a lot of [government] time and effort”
traffic volume is an issue for walking—speed and volume
in Portsmouth “it looks good on paper...but there are a lot of issues there as well.”
“They walk everywhere but are not really connected.”
Might have infrastructure for walking and biking but it is not friendly
Maintaining sidewalks as an indicator of social capital (this came up in Portsmouth)
“the residents very much rely on city services”

Appendix C
Pilot study survey instrument

Hello, I'm _____ and I'm calling from the Environmental Research Group at the University of New Hampshire. We are conducting an important survey about transportation, the environment, trust, interpersonal connections, and community in Northern New England. The first part of our research is a pilot study focused on two neighborhoods in Durham, NH and your neighborhood is one of them. Because our sample size is so small, your participation would be very helpful. If you are willing to assist our research, I have some questions to ask that will take 10-15 minutes to answer. You are free to skip any questions you may not wish to answer. All of your responses will be anonymous. Would you be willing to help with this important research by participating in the survey? If this is not a good time for you to participate in the survey, would there be a better time for me to contact you?

MESSAGE TO LEAVE ON ANSWERING MACHINE: Hello, I'm _____ and I'm calling from the Environmental Research Group at the University of New Hampshire. We are conducting an important survey about transportation, the environment, trust, interpersonal connections, and community in Northern New England. The first part of our research is a pilot study focused on two neighborhoods in Durham, NH and your neighborhood is one of them. Because our sample size is so small, your participation would be very helpful. If you are willing to assist our research please call me back at your convenience at _____.

1. GENDER: (IF NECESSARY SAY: I am recording that you are a male or /female.)

- 1 Male
- 2 Female

2. What year were you born?
(If this is after 1990, ask to speak to parent or other adult)

3. How long have you lived in your current location?

Our first set of questions are meant to get a sense of how you interact with the natural and built environment around your neighborhood.

4. How would you describe the environment that you live in, rural, urban, suburban or something else?

- 1 Rural
- 2 Urban
- 3 Suburban
- 8 Don't know

9 Refused

5. When it comes to transportation, what type of community would you say you live in, walking friendly, cycling friendly, both walking and cycling friendly, or neither?

- 1 Walking
- 2 Cycling
- 3 Walking & Cycling
- 4 Not conducive to walking or cycling
- 8 Don't know
- 9 Refused

6. Please indicate all of the things that you can walk to in your community (READ ALOUD)

- 1 Post office
- 2 Restaurant
- 3 Shopping center
- 4 Church
- 5 School
- 6 Library
- 7 Home of a friend
- 10 Bar
- 11 Community Center
- 12 Convenience Store
- 13 Natural Area/Open Space
- 14 Other____specify

7. What amount of time do you consider to be walking distance?

8. What affects your decision to walk, bike, or drive to different locations within your community, weather, safety concerns, gas prices, health issues, other? Indicate all that are applicable reasons

- 1 Weather
- 2 Safety concerns
- 3 Gas prices
- 4 Health issues
- 5 Other, specify____
- 8 Don't know
- 9 Refused

9. How many total cars are owned by members of your household?

- 98 Don't know
- 99 Refused

10. How many total bicycles are owned by members of your household?

- 98 Don't know
- 99 Refused

11. How often do you ride your bike to get places in your community? Every day, several times per week, once a week, once a month, every couple of months, once a year, never, or other?

- 1 Everyday
- 2 Several times per week
- 3 Once a week
- 4 Once a month
- 5 Every couple of months
- 6 Once a year
- 7 Never
- 8 Don't know
- 9 Refused

12. How often do you walk to get places in your community? Every day, several times per week, once a week, once a month, every couple of months, once a year, never, or other?

- 1 Everyday
- 2 Several times per week
- 3 Once a week
- 4 Once a month
- 5 Every couple of months
- 6 Once a year
- 7 Never
- 8 Don't know
- 9 Refused

13. Do you work outside of the home?

- 1 Yes
- 2 No SKIP TO 17
- 9 Refused SKIP TO 17

14. Approximately how many miles away from your home is your place of work?

15. What form of transportation do you use to get to get to work? Car, bus, bike, walking?

- 1 Car
- 2 Bus
- 3 Bike
- 4 Walking
- 5 Other
- 8 Don't know
- 9 Refused

16. On average, how long (in minutes) does it take you to commute to work?

Could you please tell me if you agree or disagree with the following statements?

17. Global Warming is something people can control.

- 1 Agree mostly
- 2 Agree somewhat
- 3 Neutral
- 4 Disagree somewhat
- 5 Disagree mostly
- 8 Don't know
- 9 Refused

18. I look for new ways to save energy in my daily life.

- 1 Agree mostly
- 2 Agree somewhat
- 3 Neutral
- 4 Disagree somewhat
- 5 Disagree mostly
- 8 Don't know
- 9 Refused

19. Please think back to when you decided to move to your current home. In choosing to live where you live what were some of the most important factors that made your decision? Please list these factors in the order of importance to you if possible.

INTERVIEWER CAN PROMPT THE RESPONDENT IF THEY CAN'T THINK OF ANYTHING BY STATING, "for instance, proximity to job, access to the natural environment and open space, access to services, schools..."

20. Do you have any other comments related to your community and the environment (both natural and built), land use, or access to services that you think might be relevant to

our study?

Next, we'd like to ask you some questions about how you view other people, groups, and institutions.

21. Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?

- 1 People can be trusted
- 2 You can't be too careful
- 3 (VOLUNTEERED) Depends
- 8 Don't know
- 9 Refused

We'd also like to know how much you trust different groups of people.

22. First think about **people in your neighborhood**. Generally speaking, would you say that you can trust them a lot, some, only a little, or not at all?

(CLARIFY IF NECESSARY: How about in general?)

- 1 Trust them a lot
- 2 Trust them some
- 3 Trust them only a little
- 4 Trust them not at all
- 5 (VOLUNTEERED) Does not apply
- 8 Don't know
- 9 Refused

23. (How about) **The police in your local community** (would you say that you can trust them a lot, some, only a little, or not at all?)

- 1 Trust them a lot
- 2 Trust them some
- 3 Trust them only a little
- 4 Trust them not at all
- 5 (VOLUNTEERED) Does not apply
- 8 Don't know
- 9 Refused

24. **People who work in the stores where you shop**

- 1 Trust them a lot
- 2 Trust them some
- 3 Trust them only a little
- 4 Trust them not at all
- 5 (VOLUNTEERED) Does not apply
- 8 Don't know

9 Refused

25. People of racial or ethnic background that differs from your own?

- 1 Trust them a lot
- 2 Trust them some
- 3 Trust them only a little
- 4 Trust them not at all
- 5 (VOLUNTEERED) Does not apply
- 8 Don't know
- 9 Refused

My next questions are about public affairs.

26. How interested are you in politics and national affairs? Are you very interested, somewhat interested, only slightly interested, or not at all interested?

- 1 Very interested
- 2 Somewhat interested
- 3 Only slightly interested
- 4 Not at all interested
- 8 Don't know
- 9 Refused

27. Are you currently registered to vote?

- 1 Yes
- 2 No
- 3 (VOLUNTEERED) Not eligible to vote
- 8 Don't know
- 9 Refused

28. How much of the time do you think you can trust the NATIONAL government to do what is right—just about always, most of the time, only some of the time, or hardly ever?

- 1 Just about always
- 2 Most of the time
- 3 Some of the time
- 4 Hardly ever
- 8 Don't know
- 9 Refused

29. How about LOCAL government? How much of the time do you think you can trust the LOCAL government to do what is right?

- 1 Just about always
- 2 Most of the time

- 3 Some of the time
- 4 Hardly ever
- 8 Don't know
- 9 Refused

30. Thinking POLITICALLY AND SOCIALLY, how would you describe your own general outlook—as being very conservative, moderately conservative, middle of the road, moderately liberal, or very liberal?

- 1 Very conservative
- 2 Moderately conservative
- 3 Middle-of-the-road
- 4 Moderately liberal
- 5 Very liberal
- 6 (VOLUNTEERED) Something else
- 8 Don't know
- 10 Refused

Now I'm going to ask you how many times you've done certain things in the past 12 months if at all. For all of these, I want you to just give me your best guess, and don't worry that you might be off a little. About how many times in the past 12 months have you (ACTIVITY):

31. (How many times in the past twelve months have you) **Worked on a community project?**

VALID RANGE 0 to 53

- 98 Don't know
- 99 Refused

(IF RESPONDENT IS UNABLE TO ANSWER, PROBE:) Would you say you never did this, did it once, a few times, about once a month on average, twice a month, about once a week on average, or more often than that?

(IF RESPONDENT ANSWERS "A FEW TIMES" PROBE WITH:) Would that be closer to 2-4 times or 5-9 times?

- 1 never did this
- 2 once (in last year)
- 3 a few times (ENTER ONLY IF FIGURE CANNOT BE CLARIFIED)
- 4 2-4 times (in last year)
- 5 5-9 times (in last year)
- 6 about once a month on average
- 7 twice a month
- 8 about once a week on average
- 9 more than once a week

- 98 Don't know
- 99 Refused

32. (How many times in the past twelve months have you) **Donated blood?**

VALID RANGE 0 to 53

- 98 Don't know
- 99 Refused

(IF RESPONDENT IS UNABLE TO ANSWER, PROBE:) Would you say you never did this, did it once, a few times, about once a month on average, twice a month, about once a week on average, or more often than that?

(IF RESPONDENT ANSWERS "A FEW TIMES" PROBE WITH:) Would that be closer to 2-4 times or 5-9 times?

- 1 never did this
- 2 once
- 3 a few times (ENTER ONLY IF FIGURE CANNOT BE CLARIFIED)
- 4 2-4 times
- 5 5-9 times
- 6 about once a month on average
- 7 twice a month
- 8 about once a week on average
- 9 more than once a week
- 98 Don't know
- 99 Refused

33. (How many times in the past twelve months have you) **attended any public meeting in which there was discussion of town or school affairs?**

VALID RANGE 0 to 53

- 98 Don't know
- 99 Refused

(IF RESPONDENT IS UNABLE TO ANSWER, PROBE:) Would you say you never did this, did it once, a few times, about once a month on average, twice a month, about once a week on average, or more often than that?

(IF RESPONDENT ANSWERS "A FEW TIMES" PROBE WITH:) Would that be closer to 2-4 times or 5-9 times?

- 1 never did this
- 2 once
- 3 a few times (ENTER ONLY IF FIGURE CANNOT BE CLARIFIED)
- 4 2-4 times

- 5 5-9 times
- 6 about once a month on average
- 7 twice a month
- 8 about once a week on average
- 9 more than once a week
- 98 Don't know
- 99 Refused

34. (How many times in the past twelve months have you) **Attended a political meeting or rally?**

VALID RANGE 0 to 53

- 98 Don't know
- 99 Refused

(IF RESPONDENT IS UNABLE TO ANSWER, PROBE:) Would you say you never did this, did it once, a few times, about once a month on average, twice a month, about once a week on average, or more often than that?

(IF RESPONDENT ANSWERS "A FEW TIMES" PROBE WITH:) Would that be closer to 2-4 times or 5-9 times?

- 1 never did this
- 2 once
- 3 a few times (ENTER ONLY IF FIGURE CANNOT BE CLARIFIED)
- 4 2-4 times
- 5 5-9 times
- 6 about once a month on average
- 7 twice a month
- 8 about once a week on average
- 9 more than once a week
- 98 Don't know
- 99 Refused

35. (How many times in the past twelve months have you) **Attended any club or organizational meeting (not including meetings for work)?**

VALID RANGE 0 to 53

- 98 Don't know
- 99 Refused

(IF RESPONDENT IS UNABLE TO ANSWER, PROBE:) Would you say you never did this, did it once, a few times, about once a month on average, twice a month, about once a week on average, or more often than that?

(IF RESPONDENT ANSWERS “A FEW TIMES” PROBE WITH:) Would that be closer to 2-4 times or 5-9 times?

- 1 never did this
- 2 once
- 3 a few times (ENTER ONLY IF FIGURE CANNOT BE CLARIFIED)
- 4 2-4 times
- 5 5-9 times
- 6 about once a month on average
- 7 twice a month
- 8 about once a week on average
- 9 more than once a week
- 98 Don't know
- 99 Refused

36. (How many times in the past twelve months have you) **had friends over to your home?**

VALID RANGE 0 to 53

- 98 Don't know
- 99 Refused

(IF RESPONDENT IS UNABLE TO ANSWER, PROBE:) Would you say you never did this, did it once, a few times, about once a month on average, twice a month, about once a week on average, or more often than that?

(IF RESPONDENT ANSWERS “A FEW TIMES” PROBE WITH:) Would that be closer to 2-4 times or 5-9 times?

- 1 never did this
- 2 once
- 3 a few times (ENTER ONLY IF FIGURE CANNOT BE CLARIFIED)
- 4 2-4 times
- 5 5-9 times
- 6 about once a month on average
- 7 twice a month
- 8 about once a week on average
- 9 more than once a week
- 98 Don't know
- 99 Refused

37. (How many times in the past twelve months have you) ***been in the home of a friend of a different race or ethnicity or had them in your home?***

VALID RANGE 0 to 53

- 98 Don't know

99 Refused

(IF RESPONDENT IS UNABLE TO ANSWER, PROBE:) Would you say you never did this, did it once, a few times, about once a month on average, twice a month, about once a week on average, or more often than that?

(IF RESPONDENT ANSWERS "A FEW TIMES" PROBE WITH:) Would that be closer to 2-4 times or 5-9 times?

- 1 never did this
- 2 once
- 3 a few times (ENTER ONLY IF FIGURE CANNOT BE CLARIFIED)
- 4 2-4 times
- 5 5-9 times
- 6 about once a month on average
- 7 twice a month
- 8 about once a week on average
- 9 more than once a week
- 98 Don't know
- 99 Refused

38. (How many times in the past twelve months have you) **been in the home of someone of a different neighborhood or had them in your home?**

VALID RANGE 0 to 53

- 98 Don't know
- 99 Refused

(IF RESPONDENT IS UNABLE TO ANSWER, PROBE:) Would you say you never did this, did it once, a few times, about once a month on average, twice a month, about once a week on average, or more often than that?

(IF RESPONDENT ANSWERS "A FEW TIMES" PROBE WITH:) Would that be closer to 2-4 times or 5-9 times?

- 1 never did this
- 2 once
- 3 a few times (ENTER ONLY IF FIGURE CANNOT BE CLARIFIED)
- 4 2-4 times
- 5 5-9 times
- 6 about once a month on average
- 7 twice a month
- 8 about once a week on average
- 9 more than once a week
- 98 Don't know
- 99 Refused

39. (How many times in the past twelve months have you) **been in the home of someone you consider to be a community leader or had one in your home?**

VALID RANGE 0 to 53

98 Don't know

99 Refused

(IF RESPONDENT IS UNABLE TO ANSWER, PROBE:) Would you say you never did this, did it once, a few times, about once a month on average, twice a month, about once a week on average, or more often than that?

(IF RESPONDENT ANSWERS "A FEW TIMES" PROBE WITH:) Would that be closer to 2-4 times or 5-9 times?

1 never did this

2 once

3 a few times (ENTER ONLY IF FIGURE CANNOT BE CLARIFIED)

4 2-4 times

5 5-9 times

6 about once a month on average

7 twice a month

8 about once a week on average

9 more than once a week

98 Don't know

99 Refused

40. (How many times in the past twelve months have you) **volunteered?**

VALID RANGE 0 to 53

98 Don't know

99 Refused

(IF RESPONDENT IS UNABLE TO ANSWER, PROBE:) Would you say you never did this, did it once, a few times, about once a month on average, twice a month, about once a week on average, or more often than that?

(IF RESPONDENT ANSWERS "A FEW TIMES" PROBE WITH:) Would that be closer to 2-4 times or 5-9 times?

1 never did this

2 once

3 a few times (ENTER ONLY IF FIGURE CANNOT BE CLARIFIED)

4 2-4 times

5 5-9 times

6 about once a month on average

7 twice a month

- 8 about once a week on average
- 9 more than once a week
- 98 Don't know
- 99 Refused

41. In the past twelve months, **have you served as an officer or served on a committee of any local club or organization?**

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

42. Not including weddings and funerals, how often do you attend religious services? (IF NECESSARY PROBE WITH CATEGORIES) (Every week (or more often)/Almost every week/ Once or twice a month/ A few times per year/Less often than that/Don't know/Refused)

- 1 Every week (or more often)
- 2 Almost every week
- 3 Once or twice a month
- 4 A few times per year
- 5 Less often than that
- 6 Never
- 8 Don't know
- 9 Refused

43. People and families contribute money, property, or other assets for a wide variety of charitable purposes. During the past 12 months, approximately how much money did you and the other family members in your household contribute to all secular causes and all religious causes, including your local religious congregation?

(IF NECESSARY: By contribution, I mean a voluntary contribution with no intention of making a profit or obtaining goods or services for yourself).

(IF NECESSARY: REPEAT ASSURANCES OF ANONYMITY)

- 1 None
- 2 Less than \$100
- 3 \$100 to less than \$500
- 4 \$500 to less than \$1000
- 5 \$1000 to less than \$5000
- 6 More than \$5000
- 8 Don't know
- 9 Refused

44. All things considered, would you say you are very happy, happy, not very happy, or not happy at all?

- 1 Very happy
- 2 Happy
- 3 Not very happy
- 4 Not happy at all
- 8 Don't know
- 9 Refused

45. And how would you describe your overall state of health these days? Would you say it is excellent, very good, good, fair, or poor?

- 1 Excellent
- 2 Very good
- 3 Good
- 4 Fair
- 5 Poor
- 8 Don't know
- 9 Refused

46. Please tell me for the following statement whether you agree strongly, agree somewhat, disagree somewhat, or disagree strong. *Television is my primary form of entertainment.*

- 1 Agree strongly
- 2 Agree somewhat
- 3 (VOLUNTEERED) Neither/depends
- 4 Disagree somewhat
- 5 Disagree strongly
- 8 Don't know
- 9 Refused

Our last few questions are used to ensure that our sample for this survey accurately reflects the population as a whole.

47. First, we'd like to know your employment status, if you are working now, temporarily laid off, or if you are unemployed, are you retired, permanently disabled, a homemaker, a student, or something else?

(INTERVIEWER: IF MULTIPLE RESPONSES ARE GIVEN, ENTER THE ONE WITH THE LOWEST CODE NUMBER).

- 1 Working
- 2 Temporarily laid off
- 3 Unemployed

- 4 Retired
- 5 Permanently disabled
- 6 Homemaker
- 7 Student
- 8 Don't know
- 9 Refused

48. What is the highest grade of school or year of college you have completed?

- 1 Less than high school (Grade 11 or less)
- 2 High school diploma (including GED) SKIP TO 50
- 3 Some college SKIP TO 50
- 4 Assoc. degree (2 year) or specialized technical training SKIP TO 50
- 5 Bachelor's degree SKIP TO 50
- 6 Some graduate training SKIP TO 50
- 7 Graduate or professional degree SKIP TO 50
- 8 Don't know SKIP TO 50
- 9 Refused SKIP TO 50

49. Do you have a GED or high school equivalency?

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

50. Do you consider yourself Hispanic or Latino?

- 1 Yes
- 2 No SKIP to 53
- 8 Don't know SKIP to 53
- 9 Refused SKIP to 53

51. Would you say your background is Mexican, Puerto Rican, Cuban, or something else?

- 1 Mexican
- 2 Puerto Rican
- 3 Cuban
- 4 Other
- 8 Don't know
- 9 Refused

52. Do you consider yourself to be White, Black, or African American, Asian or Pacific Islander, Native American or some other race?

- | | | |
|---|--------------------------------|------------|
| 1 | White | SKIP TO 54 |
| 2 | African American or Black | SKIP TO 54 |
| 3 | Asian or Pacific Islander | |
| 4 | Alaskan Native/Native American | SKIP TO 54 |
| 5 | Other | SKIP TO 53 |
| 8 | Don't know | SKIP TO 54 |
| 9 | Refused | SKIP TO 54 |

Specify:

53. Would you say your background is Chinese, Korean, Japanese, Filipino, or something else?

- | | |
|----|--------------|
| 1 | Chinese |
| 2 | Korean |
| 3 | Japanese |
| 4 | Filipino |
| 5 | Asian Indian |
| 6 | Vietnamese |
| 7 | Cambodian |
| 8 | Other |
| 98 | Don't know |
| 99 | Refused |

54. Are you an American citizen?

- | | |
|---|------------|
| 1 | Yes |
| 2 | No |
| 8 | Don't know |
| 9 | Refused |

55. How many different **telephone numbers** does your household have including cell phones but not counting those dedicated to a fax machine or computer?

56. If you added together the **yearly incomes**, before taxes, of all the members of your household for the last year, would the total be (READ LIST)

- | | |
|---|--------------------------------------|
| 1 | \$20,000 or less |
| 2 | Over \$20,000 but less than \$30,000 |

- 3 Over \$30,000 but less than \$50,000
- 4 Over \$50,000 but less than \$75,000
- 5 Over \$75,000 but less than \$100,000
- 6 \$100,000 or more

---DO NOT READ BELOW---

- 8 Don't know
- 9 Refused

57. Are you currently married, separated, divorced, widowed, or have you never married?

- 1 Currently married
- 2 Separated
- 3 Divorced
- 4 Widowed
- 5 Part of a civil union
- 6 Never Married
- 9 Refused

58. How many children, aged 17 or younger, live in your household?

- 98 Don't know
- 99 Refused

59. Do you or your family own the place where you are living now, or do you rent?

- 1 Own
- 2 Rent
- 3 Other
- 8 Don't know
- 9 Refused

Thank you very much for your participation in this study. If you have any questions about your rights as a participant in this process, you may contact Julie Simpson at the University of New Hampshire's Office of Sponsored Research at 603-862-2003. If you have any questions about the study or comments that you may have forgotten to share with me today, please feel free to contact me at _____.

Appendix D

**New Hampshire
Community, Transportation
& Environment
Survey**



UNIVERSITY *of*
NEW HAMPSHIRE

Dear New Hampshire Resident,

You are invited to participate in a research project that is studying community, health, transportation, and the environment in New Hampshire. This project is being conducted by Dr. Kevin Gardner, an associate professor in the Department of Civil and Environmental Engineering at the University of New Hampshire. This survey has been approved by the UNH Institutional Review Board (IRB) for the Protection of Human Subjects in Research.

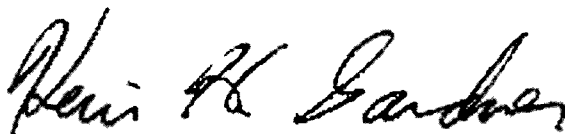
* The actual survey is confidential and will take approximately 15 minutes to complete. Your participation is purely voluntary and you are free to withdraw your consent and discontinue participation at any time. Only a household member over the age of 18 should answer the survey.

*Because you are part of a small group of residents being surveyed we truly appreciate your time and input. **Additionally, as a thank you for your participation you can choose to be entered in a raffle to win one of several \$100 pre-paid gift cards.**

*If at any time you have questions or concerns about any procedure in this project, you may call 603-862-4334 to speak with the investigator or you may e-mail graduate research assistant Shannon Rogers at shrogers@unh.edu. You can also request a summary of the findings. If you have questions about your rights as a research subject, you may contact Julie Simpson in UNH Office of Sponsored Research, 603-862-2003 or julie.simpson@unh.edu

Thank you in advance for your time and participation!

Sincerely,



Dr. Kevin H. Gardner

Survey with Coding

The first set of questions is meant to get a sense of your neighborhood and community.

- E. On a scale from 1 to 5, how convenient is it for you to do the following things in the neighborhood in which you live? (1 is very convenient, 5 is very inconvenient). Please check one number for each activity.**

	1 (very convenient)	2	3	4	5 (very inconvenient)
Walking					
Cycling					
Use Public Transit					

- 2. What street do you live on? _____**

In the table below please place a check next to all the locations you *can* walk to in the community in which you live. In the second column, please place a check mark next to those places you actually *do* walk.

Post office		
Restaurant		
Coffee Shop/Café		
Shopping Center		
Church		
School		
Library/Bookstore		
Home of a friend		
Grocery Store		
Bar/Pub		
Community/Recreation Center		
Convenience Store		
Natural Area/Open Space/Park		
None of the above, it is hard to get anywhere without a car		
Other, please specify _____		

3. Assume you were going to walk to one of the locations listed on the previous page. What would you consider a maximum acceptable distance in minutes?

_____ minutes

4. What affects your decision to walk to different locations within your community? Check all that are applicable reasons.

___ 1 ___ Weather

___ 2 ___ Safety Concerns

___ 3 ___ Gas Prices

___ 4 ___ Health Issues

___ 5 ___ Presence of Sidewalk

___ 6 ___ Distance to Destination

___ 7 ___ Convenience of Driving

___ 8 ___ Inconvenience of Walking

___ 9 ___ Other (please specify) _____

5. How many total vehicles are owned and used by members of your household?

_____ vehicles

6. How many total bicycles are owned and used by members of your household?

_____ bicycles

7. How often do you ride a bike to get places in your community? (Circle one choice)

Everyday 1

Several times per week 2

- Once a week 3
- Once a month 4
- Every couple of months 5
- Once a year 6
- Never 7
- Don't know 8

**8. How often do you walk to get places in your community?
(Circle one choice)**

- Everyday 1
- Several times per week 2
- Once a week 3
- Once a month 4
- Every couple of months 5
- Once a year 6
- Never 7
- Don't know 8
- Refused 9

9. Do you work outside the home? (Circle one choice)

- Yes 1
- No (if no, please skip to question 13) 2
- Refused 9

10. Approximately how many miles away from your home is your place of work?

_____miles

11. What form of transportation do you use to get to work on most days? (Circle one choice)

- | | |
|-----------------------------|---|
| Car | 1 |
| Bus | 2 |
| Bike | 3 |
| Walking | 4 |
| Don't know | 5 |
| Other (please specify)_____ | 8 |
| Refused | 9 |

12. On average, how long (in minutes) does it take you to commute to work?

_____minutes

13. Could you please state if you agree or disagree with the following statements?

	Agree Mostly	Agree Somewhat	Neutral	Disagree Somewhat	Disagree Mostly	Don't Know
Global Warming is something people can control	1	2	3	4	5	8
I look for new ways to save energy in my daily life	1	2	3	4	5	8
My choice of daily transportation contributes to global warming	1	2	3	4	5	8

Refused=9

14a. Are there things that could be done to make you more likely to walk in your neighborhood?

14b. Assume you were able to live in any type of neighborhood you would like to. Please describe what that would be, in general.

15. Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people? (Circle one choice)

- | | |
|--------------------------|----------|
| People can be trusted | 1 |
| You can't be too careful | 2 |
| Depends | 3 |
| Don't know | 8 |
| Refused | 9 |

16. Please indicate the level of trust you have for the groups listed in the first column. Check just one box for each group.

	Trust them a lot	Trust them some	Trust them only a little	Trust them not at all	Don't know
People in your neighborhood	1	2	3	4	8
Police in your community	1	2	3	4	8
People who work in the stores where you shop	1	2	3	4	8
People of racial/ethnic background that differs from your own	1	2	3	4	8
National Government	1	2	3	4	8
Local Government	1	2	3	4	8

Refused=9

17. How interested are you in politics and national affairs? (Please circle one)

- Very interested 1
- Somewhat interested 2
- Only slightly interested 3
- Not at all interested 4
- Don't know 8
- Refused 9

18. Are you currently registered to vote? (Please circle one)

Yes	1
No	2
Not eligible to vote	3
Don't know	8
Refused	9

19. Please check *yes* or *no* to indicate whether you have done the activities detailed in the box below in the last 12 months. If you can, please approximate the number of times you did each activity in the last 12 months.

	Yes 1	No 2	Approximate number of times in last 12 months
Worked on a community project			
Donated blood			
Attended any public meeting in which there was a discussion of town or school affairs			
Attended a political meeting or rally			
Attended any club or organizational meeting (not including meetings for work)			
Had friends over to your home			
Been in the home of a friend of a different race or ethnicity or had them in your home			
Been in the home of someone of a different neighborhood or had them in your home			
Been in the home of someone you consider to be a community leader or had one in your home			
Volunteered			
Meet friends outside of the home	189		

Coding for approx. # of times in last 12 months: 1=never did this; 2=once (in last year); 3=a few times; 4=2-4 times; 5-9 times; 6=about once a month on avg; 7=twice a month; 8=once a week; 9=more than once a week; 98=don't know; 99=refused

20. Thinking POLITICALLY AND SOCIALLY, how would you describe your own general outlook? (Please circle one)

- | | |
|-------------------------|---|
| Very conservative | 1 |
| Moderately conservative | 2 |
| Middle-of-the-road | 3 |
| Moderately liberal | 4 |
| Very liberal | 5 |
| Don't know | 8 |
| Other (please specify) | 9 |

21a. During the past MONTH, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise? (Please circle one choice)

Yes 1 No 2 Don't Know 8 Refused 9

21b, About how many times per WEEK do you engage in physical activities or exercises for more than 15 consecutive minutes? _____ times

22. In the past 12 months, have you served as an officer or served on a committee of any local club or organization? (Please circle one)

Yes 1 No 2 Don't know 8 Refused 9

23. Not including weddings and funerals, how often do you attend religious services? (Please circle one)

- | | |
|----------------------------|---|
| Every week (or more often) | 1 |
| Almost every week | 2 |
| Once or twice a month | 3 |
| A few times per year | 4 |
| Less often than that | 5 |
| Never | 6 |
| Don't know | 8 |
| Prefer not to answer | 9 |

24. People and families contribute money, property, or other assets for a wide variety of charitable purposes. During the past 12 months, approximately how much money did you and the other family members in your household contribute to all non-religious and all religious causes, including your religious congregation? (Please circle one)

None	1
Less than \$100	2
\$100 to less than \$500	3
\$500 to less than \$1000	4
\$1000 to less than \$5000	5
More than \$5000	6
Don't know	8

25. All things considered, would you say that you are... (Please circle one)

Very happy	1
Happy	2
Not very happy	3
Not happy at all	4
Don't know	8

26. How would you describe your overall state of health these days? (Please circle one)

Excellent	1
Very good	2
Good	3
Fair	4

Poor	5
Don't know	8

27. Please respond to the following statement: Television is my primary form of entertainment. (Please circle one)

Agree strongly	1
Agree somewhat	2
Disagree somewhat	4
Disagree strongly	5
Don't know	8
Neither/depends. Please explain _____	3

28. What is your employment status? (Please circle one)

Working	1
Temporarily laid off	2
Unemployed	3
Retired	4
Permanently disabled	5
Homemaker	6
Student	7
Don't know	8

29. What is the highest grade of school or year of college you have completed? (Please circle one)

Less than high school (Grade 11 or less)	1
High school diploma (including GED)	2
Some college	3
Associate degree (2 year) or specialized technical training	4
Bachelor's degree	5
Some graduate training	6
Graduate or professional degree	7
Don't know	8

30. Are you an American citizen? (Please circle one)

Yes	1
No	2
Don't know	8

31. What is your race? (Please circle as many as necessary)

White	Korean
Black, African American, or Negro	Vietnamese
American Indian or Alaska Native	Native Hawaiian
Asian Indian	Guamanian or Chamorro
Chinese	Samoan
Filipino	Other (please specify) _____
Japanese	—

32. If added together, the yearly incomes, before taxes, of all members of your household for the last year, what would the total be? (Please circle one)

- | | |
|------------------------|----|
| Less than \$10,000 | 1 |
| \$10,000 to \$14,999 | 2 |
| \$15,000 to \$24,999 | 3 |
| \$25,000 to \$34,999 | 4 |
| \$35,000 to \$49,999 | 5 |
| \$50,000 to \$74,999 | 6 |
| \$75,000 to 99,999 | 7 |
| \$100,000 to \$149,999 | 8 |
| \$150,000 to \$199,999 | 9 |
| \$200,000 or more | 10 |

33. What is your current marital status? (Please circle one)

- | | |
|-----------------------|---|
| Currently married | 1 |
| Separated | 2 |
| Divorced | 3 |
| Widowed | 4 |
| Part of a civil union | 5 |
| Never married | 6 |
| Refused | 9 |

34. How many people live in your household?

_____ people

35. How many children, aged 17 or younger, live in your household?

_____people

36. Do you or your family own the place where you are living now or do you rent? (Please circle one)

Own 1

Rent 2

Don't know 8

Other (please specify) 3

37. What is your gender? (Please circle one)

Male 1

Female 2

Transgender 3

38. What year were you born?

39. Approximately how many years have you lived in your current location?

_____years

40a. About how much do you weigh without shoes?

_____pounds

40b. About how tall are you without shoes?

_____feet_____inches

41. Have you EVER been told by a doctor, nurse or other health professional that your blood cholesterol is high? (Please circle one)

Yes 1 No 2 Don't know/Not sure 8

42. Have you EVER been told by a doctor, nurse or other health professional that you have high blood pressure? (Please circle one)

Yes	1
Yes, but female told only during pregnancy	2
No	3
Told borderline high or pre-hypertensive	4
Don't know/not sure	5

43. Additional comments you might have are welcome below

----- END OF SURVEY -----

Thank you very much for completing the survey! This page will further explain the purpose of the survey research you have just participated in.

Please do not discuss or share the information on this page with any of your friends who might complete the survey or speak with someone else who might. This is to avoid invalidating the results of the study. The answers you provided will be used to look at transportation patterns, community issues, including health, and environmental issues in a few locations in New Hampshire.

We would like to remind you that all of the data you just provided will be kept in a confidential manner.

If you have any questions about your rights as a participant in this process, you may contact Julie Simpson at the University of New Hampshire's Office of Sponsored Research at 603-862-2003.

If you have any questions about the study or comments that you may have forgotten to share with me today, please feel free to contact Shannon Rogers at shrogers@unh.edu or Kevin Gardner at 603-862-4334.

As a thank you for your participation, we are entering willing participants into a raffle to win one of several \$100 pre-paid credit cards. If you are interested in the raffle, please enter your contact information below. Remember this information will be confidential and kept separate from your responses.

Name _____

Address _____

Phone Number _____

E-mail address _____

Appendix E
Notes from September 2010 stakeholder workshop

- stronger bonding within more walkable neighborhoods?
- explain outliers in graphs better
- negatives of social capital
- Reid Ewing aesthetic design
- measures of
- Bodwell doesn't want sidewalks, opposed by neighborhood itself
- community assessment tool from Colorado State, NHDHHS for improving licensing for childcare facilities. Levels of readiness for change in a community. Municipality is listening to community.
- how can we get at specific issues (i.e. violence prevention/safety)
- if don't get core group of grassroots support to oppose naysayers at the end then doomed for failure
- keypad pooling for public meeting-allows people to get their voices heard
- what do you do about people who don't even engage in the process
- Kerrie Diers-Sustainability grant walkability, demographic. What does sustainability mean to a region? What makes a community work and sustainable? Possibly quantify GHGs
- Mindset set by commuting even if portion of travel energy is not coming from commute itself
- Portland Oregon-how did it become more bikable, walkable? Regional planning initiative
- Build it and they will come?
- Colorado State
- biking distance may be larger than walking
- aging community may not be at the table. How do we maintain communities so that they can span across people's lifespan
- How to engage other networks to keep from working in silos
- What are measures we can look at in broader scale?
- Having businesses in neighborhoods. What data can be given to businesses

- Why is scale of our data important?
- seasonality of survey
- communities might not want sidewalks because they don't want to maintain them. Other barriers. May save money
- social benefits of walking to school
- driving prevention, promoting walking, "walk with your children" in addition to "read to your children" Building walking as a social norm
- NHDHHS works with school to kind of change the idea that you have the right to drive everywhere
- concern about affordability of housing, lower income people might not make their voices/needs heard as much as more affluent residents
- Manchester has a complete downtown for the most part and it is good that we expanded to a broader view of the whole City
- Manchester's new master plan identified village centers that can encourage mixed use
- Parks? Will people walk further if there are parks? Do separate destinations drive walkability?
- social marketing for walkability
- compare barriers to walking responses with number of GIS locations on maps
- public campaigns that change behavior—Harvard University
- NOAA coastal services center—how to target specific audiences.
- Provide opportunities to make healthy choices
- Access issues
- porous pavements, details of the built environment
- tourism destination-walkability, economic vitality
- take presentations on the road 15-20 minutes
- Master Plan Planning –Physical Activity Policy Research Network CDC funded
- e-mail Liz S.C. short form
- UVM TRC-materials, send to Justine