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From a socio-ecological perspective, a built environment that provides safe, convenient, attractive places for transportation or recreational physical activity is a prerequisite for increasing physical activity levels of the population. Support from decision-makers, including urban planners and developers, will be necessary to alter the built environment through policy change and innovative development strategies. The purposes of this mixed-method study are to develop an understanding of how built environments that are conducive to transportation and recreational physical activity can result from the planning and development process in urbanized areas. The study aims are to: 1) characterize barriers to developments that support physical activity that occur during the planning and development process from urban planners and developers and 2) develop a theoretical framework to explain the relationships among these barriers to developments that support physical activity.

In depth, semi-structured interviews were conducted with twelve (12) planners from the four most populous municipalities in the Greensboro--Winston-Salem--High Point, North Carolina Combined Statistical Area and six (6) residential developers who were currently involved in one or more of these jurisdictions. Typical case sampling was used to select planners from each of the municipalities while theoretical sampling was used to select the developers. The digitally recorded interviews were transcribed and

analyzed using NVivo 8. Quantitative data were analyzed using non-parametric statistics in SPSS.

The study finds that the purposes of land-use regulation as defined by planners and developers do not include health promotion. Participants perceived that recreational opportunities were more important to residents than opportunities for transportation physical activity. Through the use of images, participants agreed that isolated single-use developments provided fewer opportunities for physical activity. While high density, mixed-use developments with a variety of housing and transportation choice and meaningful open space provide opportunities for physical activity, these development strategies can cause conflict during the planning and development process. Three types of conflict were identified as barriers to development strategies that promote physical activity: 1) Professional Conflict between planners and developers, 2) Resident Conflict between developers and residents, and 3) Historical Conflict within local governments. Differences in the value systems of planners, developers, and residents used to make decisions serve as catalysts for these conflicts. The theoretical framework for increased physical activity through development strategies illustrates the relationships between the development strategies, the central phenomenon of conflict, and the value systems.

The findings suggest that development strategies that may promote physical activity are unlikely to be widely adopted without intervention in the development process. The theoretical framework provides guidance for selecting effective intervention strategies and targets.

BARRIERS TO URBAN DEVELOPMENT STRATEGIES THAT MAY PROMOTE PHSYICAL ACTIVITY: A MIXED-METHOD STUDY OF THE PLANNING AND DEVELOPMENT PROCESS IN THE TRIAD REGION OF NORTH CAROLINA

by

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CHAPTER I

INTRODUCTION

Statement of Problem

Physical inactivity increases the risk of premature mortality from chronic illnesses such as coronary heart disease, hypertension, diabetes mellitus, and certain cancers and increases risk factors such as high blood pressure and high blood cholesterol (U.S. Department of Health and Human Services, 1996; USDHHS, 2008). Despite the recognized health benefits of physical activity, approximately half of adults in the United States do not meet minimum recommended levels of physical activity (Centers for Disease Control and Prevention, 2007). Recent studies suggest that certain characteristics of the built environment are associated with greater levels of physical activity (Transportation Research Board and Institute of Medicine, 2005; Saelens & Handy, 2008) and that multi-level interventions to increase physical activity that include increasing access to places for physical activity are effective (Task Force on Community Preventive Services, 2005). Newly constructed environments or alterations of existing environments designed with consideration of this evidence may serve as passive interventions to increase physical activity levels or as a component of active interventions targeting other levels within a socio-ecological framework (McLeroy, Bibeau, Steckler, & Glanz, 1988; Stokols, 1996; Sallis et al., 2006).

While there is sufficient evidence to support the claim that community-scale and street-scale design and land use policies and practices could be changed to increase physical activity levels, no specific recommendations have been developed yet (Heath et al., 2006). Development strategies that may promote physical activity include: high-density, mixed-use, pedestrian friendly developments that provide a variety of housing and transportation choices and access to recreational opportunities (Hoehner, Brennan Ramirez, Elliot, Handy, & Brownson, 2005; Zlot & Schmid, 2005; Saelens & Handy, 2008; Owen, Humpel, Leslie, Bauman, & Sallis, 2004).

With 213 billion square feet of development projected to be newly built or replaced between 2000 and 2030, there is an opportunity to construct built environments that support physical activity for future generations (Nelson, 2004). Because the built environment results from the development, or redevelopment, of land within the context of specific municipal ordinances, both developers and planners interact to create the built environment through land-use decisions. While the process of urban growth has been researched within the fields of urban planning and geography, there has only been limited research on how the planning and development process can result in built environments that are conducive to physical activity. Research that identifies the competing forces that influence the planning and development process and illuminates the relationship between these factors and design characteristics that promote physical activity is necessary to construct supportive environments.

Studying the planning and development process from the perspectives of developers and planners fits within a broader research agenda to create a healthy

community (Srinivasan, O'Fallon, & Dearry, 2003) by developing an understanding of how communities can translate scientific research into policies that alter the built environment. Such studies can also identify barriers that prevent or incentives that promote consideration of the impact of land-use decisions on physical activity levels by planners and developers (Dannenberg et al., 2003). These barriers and incentives may help to identify intervention targets and strategies to increase the likelihood of creating activity-friendly communities (Maibach, 2003). Studying the planning and development process can also identify proximal measures of successful adoption and implementation of land-use policies designed to increase physical activity levels (Sallis, Story, & Lou, 2009).

Specific Aims

The purpose of this study is to develop an understanding of how built environments that are conducive to transportation and recreational physical activity can result from the planning and development process in urbanized areas of the Triad region of North Carolina. The results of the study are presented within two papers: a mixed-method study (Creswell, 2003) to describe the perceived importance of physical activity and the responsibilities of planners and developers for providing physical activity opportunities in new residential areas, and a grounded theory study (Creswell, 2007; Strauss & Corbin, 1998; Glaser & Strauss, 1967) of barriers to the utilization of development strategies that may promote physical activity.

There are three study aims within the mixed-method study. The first study aim is to characterize the purposes of land-use regulations according to planners and developers

and compare this definition to the definition within the adopted municipal ordinances. The second study aim is to identify how planners and developers perceive the importance of physical activity opportunities in the public's choice of home. The final study aim of the first paper is to describe the responsibilities of planners and developers for providing opportunities for physical activity.

The grounded theory study also included three study aims. The first study aim was to identify a central phenomenon within the planning and development process that served as a barrier to development strategies that support physical activity. The second study aim was to develop an understanding of how six development strategies that may promote physical activity relate to the central phenomenon. The six development strategies used were: 1) high density development, 2) mixed-use, 3) housing choice, 4) pedestrian-friendly neighborhoods, 5) transportation choice, and 6) meaningful open space. The final study aim was to develop a grounded theory to explain the relationships among these barriers to developments that support physical activity. The theory provides a framework for future research including intervention targets and measures of policy.

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CHAPTER II

REVIEW OF THE LITERATURE

Recognizing the interdisciplinary nature of the proposed study, the review of the literature is divided into four sections. The first section includes a brief description of the health benefits and recommended levels of physical activity. Trends in physical activity levels and public health goals are provided. The findings and limitations from cross-sectional and quasi-experimental studies of the built environment and physical activity are summarized in the second section. Combined, these sections provide the justification for altering the built environment in order to increase physical activity levels. Next, theories of development and the legal legacy of land-use planning from the field of Geography are examined. The last section of the literature review includes studies that sought to understand the planning and development process results in specific built environment e.g. preserved open space. Together, the existing literature provides a justification for studying how the planning and development process can result in built environments that are conducive to physical activity.

Physical Activity

Over the past century, the leading causes of death in the United States have shifted from infectious diseases, such as pneumonia and influenza, to chronic illnesses, such as cardiovascular disease, cancers, cerebrovascular disease, and chronic lower respiratory diseases (CDC, 2007a). The underlying causes of these chronic illnesses are

behavioral; poor nutrition and physical inactivity now rank second behind tobacco-use as actual causes of death (Mokdad, Marks, Stroup, & Gerberding, 2005). Several large prospective studies including the Harvard Alumni Health Study, the Multiple Risk Factor Intervention Trial, British Civil Servants Health Study, the Aerobics Center Longitudinal Study, and the Lipid Research Clinics Mortality Follow-up Study have consistently found an inverse relationship between physical activity or physical fitness and mortality (Blair, Lamonte, & Nichaman, 2004) while other studies detail the relationship between physical activity and specific diseases. After examining the relationship between physical activity and health, the Surgeon General's Report on Physical Activity (USDHHS, 1996) concludes that:

> Physical activity reduces the risk of premature mortality in general, and of coronary heart disease, hypertension, colon cancer, and diabetes mellitus in particular. Physical activity also improves mental health and is important for the health of muscles, bones, and joints. (p.4)

Physical activity is now recognized as a leading indicator of health; the emphasis has shifted from vigorous physical activity necessary to achieve cardio-respiratory fitness to a wider range of activities that are sufficient to promote health (USDHHS, 2000). Current recommendations for physical activity from the American College of Sports Medicine and the American Heart Association (Haskell, et al., 2007) reflect the minimum levels of physical activity needed to achieve these health benefits. Public health goals emphasize the need to increase the proportion of the population who meet these recommendations through recreational and transportation physical activity (USDHHS, 2000).

The American College of Sports Medicine and the American Heart Association (Haskell, et al., 2007) have recently updated their recommendations for physical activity levels to achieve health benefits. These minimum recommendations include 30 minutes of moderate intensity physical activity on five days per week or 20 minutes of vigorous intensity physical activity on three days per week. Sessions of physical activity lasting 10 or more minutes may be accumulated for either moderate or vigorous physical activity to meet time requirements. Combinations of moderate and vigorous physical activity also meet the requirements provided sufficient energy expenditure. Furthermore, the recommendations explicitly state that because of the dose-response relationship between physical activity and health, activity beyond the recommendations will result in greater health benefits. In addition to the moderate or vigorous physical activity requirements, adults should engage in muscular strength and endurance activities two times per week.

One goal of Healthy People 2010 is to "improve health, fitness, and quality of life through daily physical activity" (USDHHS, 2000, p. 22-3). This goal is supported by 15 objectives to increase physical activity levels among adults and children and to increase access to environments conducive to physical activity. Selected goals are presented in Table 1. One objective is to increase the proportion of adults that meet the current recommended levels of physical activity. Related objectives are to decrease the proportion of adults who do not engage in any leisure-time physical activity and increase the proportion of trips made by walking or bicycling; both recreational and transportation physical activity contribute to physical activity status. Data for the Healthy People 2010 objectives are from the National Health Interview Survey and the Nationwide Personal

Transportation Survey. According to the MidCourse Review of Healthy People 2010 (USDHHS, 2006), some progress has been made toward the target for two of the objectives while data is not available for the other two objectives in Table 1.

As indicated in Table 2, data from the Behavioral Risk Factor Surveillance System (BRFSS) indicate that among adults a greater proportion reports meeting recommended levels of physical activity compared to prior years in the United States. The trend is less clear in North Carolina.

Table 1: Selected Healthy People 2010 Objectives

Objective #	Objective	Baseline (%) (year)	Target (%) (year)	Progress (% change) (year)
22-2 (updated)	Increase the proportion of adults who engage in moderate physical activity for at least 30 minutes per day 5 or more days per week or vigorous physical activity for at least 20 minutes per day 3 or more days per week	32 (1997)	50 (2010)	+6 (2003)
22-1	Reduce the proportion of adults who engage in no leisure-time physical activity.	40 (1997)	20 (2010)	+15 (2003)
22-14	Increase the proportion of trips made by walking. (adults; trips ≤ 1 mile)	17 (1995)	25 (2010)	N.A.
22-15	Increase the proportion of trips made by bicycling. (adults; trips ≤ 5 miles)	0.6 (1995)	2.0 (2010)	N.A.
Sources: (USDHHS, 2000; USDHHS, 2006)				

Table 2: Adult Physical Activity Status: United Sates and North Carolina

Year	United States (states and D.C.) Meets Recommendation (%)	North Carolina Meets Recommendation (%)
2007	49.5	44.0
2005	49.1	42.1
2003	47.4	37.7
2001	46.1	42.4
Sources: (CDC, 2007b; NCSCHS, 2007)		

Built Environment

The built environment is defined as human alterations of the physical environment including houses, workplaces, schools, businesses, recreational facilities, and infrastructure (Srinivasan, O'Fallon, & Dearry, 2003). The built environment is characterized by land use patterns, design features, and transportation systems (Transportation Research Board and the Institute of Medicine, 2005; Frank, Engelek, & Schmid, 2003). Built environments serve as settings for physical activity within the four domains of active living: active recreation, active transport, occupational activities, and household activities (Sallis, Cervero, Ascher, Henderson, Kraft, & Kerr, 2006). Within an ecological framework (McLeroy, Bibeau, Steckler, & Glanz, 1988), accessibility to built environments possessing characteristics that support physical activity behaviors are a necessary component of multi-level interventions. An underlying assumption of the ecological model is that changes in the policy environment will result in changes in the built environment and in changes in individual behaviors. Identification of the built environment correlates of physical activity must precede testing the assumption that changing the built environment will result in changes in physical activity levels (Bauman, Sallis, Dzewaltowski, & Owen, 2002).

The majority of research studies thus far have concentrated on establishing the association between the built environment and physical activity through cross-sectional designs (Frank, Schmid, Sallis, & Chapman, 2005). Several strategies typify these cross-sectional studies. One strategy is to select neighborhoods which differ in design characteristics, or "walkability," and then compare adult physical activity levels across

the different neighborhoods (e.g. Saelens, Sallis, & Frank, 2003). A second strategy is to select individual adults from numerous places and simultaneously measure physical activity and the built environment (e.g. Frank, Schmid, Sallis, Chapman, & Saelens, 2005). A third strategy is to combine national survey data with measures of the built environment (e.g. Berrigan & Troiano, 2002). Various characteristics of the built environment have been measured objectively with a Geographic Information System (GIS), as perceived by the study participants, or both. Various types of physical activity have been measured mechanically by accelerometer/pedometer, by self-report of the study participants, or both. Differences in measurement tools and procedures limit the comparability of these cross-sectional studies. Definitions of selected measures of the built environment are presented in Table 3.

Reviews of the cross-sectional studies from the fields of urban planning and transportation, leisure studies and recreation and park management, and public health suggest associations of the built environment and physical activity, but limitations in study design and measurement tools limit the strength of the findings (Godbey, Caldwell, Floyd, & Payne, 2005; Humpel, Owen, & Leslie, 2002; Owen, Humpel, Leslie, Bauman, & Sallis, 2004; Wendel-Vos, Droomers, Kremers, Brug, & van Lenthe, 2007). In general, the cross-sectional studies suggest that accessibility and proximity of non-residential/mixed use development, and density are consistently associated with walking for transportation while sidewalks and street connectivity are often associated with walking for transportation (Saelens & Handy, 2008); findings for recreational walking

have been less consistent but suggest that proximity of facilities and their aesthetic qualities are associated with frequency of use (Sallis, 2009).

Table 3: Measures of the built environment

Measure	Types	Definition	Effect on Physical Activity
Density	Population	Number of residents per area (persons per acre)	Proxy measure for potential trip destinations; Reduces distance which effects travel behavior
	Housing	Number of residential units per area (units per acre)	
Mixed Land-use (Diversity)	Accessibility	Distance to specific destination	Decreases trip length to allow mode choices
	Intensity	Comparison of percentage of area designated to different uses (zones)	
Recreational facilities	Accessibility	Distance to specific destination	Increase proximity to facilities; Reduce barriers to recreational physical activity
Recreational facilities	Intensity	Proportion of area that is park and/or non-park area	
Street Pattern	Connectivity	Number of intersections per street network length	Influences potential trip routes and transportation mode choice
Sidewalk	Coverage	Sidewalk length per road length	Implies purpose of street (automobile vs. pedestrian); safety
Sources: (Brownson, Hoehner, Day, Forsyth, & Sallis, 2009; Frank, Engelke, & Schmid, 2003)			

A major limitation of the cross-sectional studies is the inability to substantiate a causal relationship between the built environment and physical activity levels. Such findings could result from sampling bias; individuals who choose to live in communities which have more resources for physical activity may do so because they value physical activity and its impact on health (Saelens, Sallis, & Frank, 2003). However, the cross-

sectional studies indicate potential intervention targets that can be evaluated through quasi-experimental research designs to demonstrate a causal relationship. Several quasi-experimental studies have begun to demonstrate a causal relationship, at least for transportation physical activity.

These quasi-experimental studies utilize natural experiments to measure changes in physical activity behaviors. Over a period of several years, street lighting was added or improved on three streets near rail stations in different areas of London, England (Painter, 1996). While primarily crime-reduction interventions, frequency counts of pedestrians were also collected during evening hours before and after the lighting installations; pedestrian usage increased 51% over the three interventions. A similar study design was used to determine the impact of retrofitting six existing roads with 30 miles of bicycle lanes in Toronto, Canada (Macbeth, 1999). While motor vehicle traffic remained constant along the six streets following the conversion, seasonally adjusted average weekday bicyclist counts increased 23% over the six interventions. The findings of these studies are consistent with a causal relationship between the built environment and transportation physical activity. However, because frequency counts were only collected on the intervention streets, it is impossible to say whether more adults engaged in physical activity or if those adults who were already walking or cycling altered their route in response to the intervention.

By following a small group of community members, Brown and Werner (2007) were able to measure changes in physical activity accompanying the installation of a new rail stop. Bouts of moderate physical activity were defined by eight minute intervals

while allowing for short interruptions. Addition of the new rail stop increased the percentage of respondents reporting rail usage within the previous 14 days from 50% to 68.75%. Frequency of rail ridership and larger household size were associated with increased number of bouts of moderate physical activity in the longitudinal analysis after controlling for initial physical activity level. While some of the increase in physical activity is explained by trips to and from the new rail stop, the use of non-automobile transportation required additional physical activity during the day.

Two studies that investigated the effects of the construction of new trails failed to demonstrate a causal relationship between the built environment and recreational physical activity. Merom, Bauman, Vita, and Close (2003) surveyed pedestrians and bicyclists living near a newly constructed Rail-Trail in Sydney, Australia before and after the grand opening. In addition to the structural intervention, a media campaign included the distribution of trail brochures. Evenson, Herring, and Hutson (2005) conducted a similar survey of residents within two miles of a new segment of a Rail-Trail in Durham, North Carolina. For the Australian trail, trail awareness and trail-usage were both low; only 34% of respondents were aware of the trail and only 6.2% of respondents had ever used the trail. In comparison, more respondents were aware of the North Carolina trail and more respondents had used it at least once, 88.7% and 23.9% respectively. Neither study showed population level increases in physical activity. While insufficient to change physical activity levels, such environments may be necessary to support interventions at other levels within an ecological perspective.

The quasi-experimental studies are consistent with the findings from the cross-sectional studies; transportation physical activity is directly linked to the built environment while recreational physical activity is indirectly linked to the built environment. To understand how to develop areas to support physical activity, it is necessary to understand the process of planning and designing communities.

Theories of Planning and Development

The built environment at a specific location results from the interaction of the physical environment and human activities that are based on economics, culture, politics, and law. In order to alter the built environment, it is necessary to understand these human activities. Within a capitalist society, property is a commodity used to generate income and wealth. Growth machine theory is an economic-political theory that explains the disproportionate influence of the land-based elite in the decision-making process of how properties are used. Planning has a long history of social movements and regulations consistent with growth machine theory.

Properties have two types of value: exchange value and use value (Smith, 1776). Exchange value is based on the ability to purchase other commodities while use value is based on utility. Properties have exchange value because of speculation over future rents; land becomes a "pure financial asset" (Harvey, 1989, p. 96). The use value of a residence includes shelter, a relative location, an absolute location, and neighborhood characteristics (Harvey, 1972). The relative location includes accessibility to activities of daily living, such as work, shopping, social services, and recreation, and separation from offensive activities, such as pollution or crime. Because homes are not easily moved,

they include an absolute location unlike other commodities. The land-based elite are focused on the exchange value of the land while consumers are focused on the use value of built environment.

According to growth machine theory, the future well-being of a landowner is tied to the potential uses of his or her land; "any given locality is thus an aggregate of land-based interests" (Molotch, 1976, p. 310). Along with landowners, local businessmen, investors, lawyers, realtors, and media representatives are united within a growth coalition. These community members belong to the land-based elite that have individual and collective interests in intensifying local land-use through growth. The land-based elite participate in politics to utilize government authority and resources to direct growth, both population and economic growth, to their community instead of to competing areas. The purpose of local government is therefore to develop and implement policies that promote growth and enable the conversion of land to more intense uses. Growth is purported to benefit the entire community by increasing the tax base, creating jobs and reducing unemployment, and allowing choices in the housing stock. However, the elite may disproportionately gain while the entire community experiences the costs of growth (Logan & Molotch, 1987). Planning becomes a tool to ensure long-term growth and income for the land-based elite rather than being value-free market regulation to improve the lives of community members.

Stakeholders

The importance of the attitudes of planners, developers, and other stakeholders has been recognized in other aspects of the built environment including preserving rural

character and protecting open space as part of managing urban growth. Their attitudes and beliefs influence the development and implementation of policies that impact the health of the public. An investigation of the attitudes and beliefs of planners and developers regarding built environments that support and promote physical activity can gain insight from this previous research.

In San Diego, California, community members and local members of the American Planning Association were surveyed to assess their attitudes toward growth related issues including: quality of life, initiatives and referenda, growth limitation approaches, civic boosterism, and cost/benefits of growth (Calavita & Caves, 1994). The findings of the study were consistent with growth machine theory with planners favoring growth more than local residents. The majority of citizens and planners agreed that the quality of life had deteriorated, but the citizens stated that the community was growing too fast significantly more often than did the planners. A greater proportion of the citizens agreed that the cost of growth outweighs the benefits and that the number of new houses constructed each year should be limited; planners commented that more control over growth was necessary rather than less growth. Both groups agreed that public infrastructure should keep pace with development. Many planners blamed local politicians for ineffective leadership and for being influenced by the developers for what they saw as the cost of growth. Two limitations of the study were that responses from planners in the public and private sectors were not analyzed separately and the viewpoints of developers were not solicited.

After characterizing the importance, similarities, and differences between the perceptions of rural character among residents, planners, and homebuilders, Ryan (2006) found that planners and residents supported greater increases in regulations in rural areas compared to homebuilders. Planners were asked to rate the effectiveness of several strategies for protecting rural character while developers were asked what features they were likely to preserve in new subdivisions and their motivations for doing so. Developers were likely to preserve land more often because of appeal to homeowners, a reflection of the developer's values, and for the image of the development; developers also indicated that neighborhood designs other than traditional subdivisions were currently discouraged by existing regulations. The rural character of the study area may limit the applicability of growth machine theory to the findings.

Through a mailed survey using likert-type items, Broussard, Washington-Ottombre, and Miller (2008) sought to compare the decision making process of planning commission members and local residents to protect open space through regulation. Planning commission members thought that there was too little growth while residents were satisfied with the amount of growth; the groups differed on the perceived need for regulating growth and development. Of the respondents who indicated limitations on growth were necessary, residents were more likely to support limitations to avoid increased government spending while planning commission members were more likely to support limitations to maintain the character of the county. The planning commission members and residents have different perceived needs and motivations for regulating growth.

These previous studies focus on growth and suggest that planners and residents have different beliefs and different motivations for supporting regulations. In the context of physical activity and community design, little is known about the beliefs of planners, developers, or residents. Studying these beliefs and motivations is a necessary first step to develop strategies to successfully include physical activity in land-use decisions. Only one study was identified that addressed attitudes and beliefs about physical activity among government officials.

Hollander, Martin, and Vehige (2008) compiled information from five separate surveys of the importance of community design to health, particularly physical activity. The surveys of national organizations of local government officials, health officials, and planners included the International City/County Management Association, National Association of Counties, National Environmental Health Association, the American Planning Association, and the National Association of County and City Health Officials. Although the surveys asked different questions, had relatively low response rates, and lacked psychometric measures, the surveys addressed the importance of physical activity, barriers to addressing physical inactivity, current practices, and need for technical assistance and collaboration.

Physical activity was less important among planners than elected and appointed government officials. Planners were also less likely than government officials to report that physical activity was important to residents. Lack of funding, staff, and resources was most often cited as a barrier to addressing physical activity among government officials, health officials, and planners; knowledge was also frequently cited by planners

as a barrier. The most common policy to promote walking and cycling through community design was to introduce "initiatives that link biking, walking, and community design" while "locate schools in walkable neighborhoods" and "implement zoning to support active living" were cited less often. Two types of needs were surveyed: technical assistance and collaboration. Sample policies, programs, and zoning codes as well as best practices were desired among government officials. Collaboration with planners and developers was desired among 50-57% of health officials while collaboration with "public health" was only desired among 36% of planners. Only a small minority of planners and health officials desired collaboration with citizen advisory groups. Unfortunately, developers were not included in any of the surveys. It will be critical to add the perspective of developers for successful policy development.

History of Urban Planning

The legal authority to regulate land-use is predicated on the government's responsibility to protect public health, safety, and welfare. The urban planning movement built upon the foundation of sanitary reforms to accommodate the intensification of land-use that occurred during the industrial revolution in the 19th century (Platt, 1996). In addition to new forms of financing and regulation, technical expertise was necessary to implement large public infrastructure projects such as the Croton River project which supplied water to New York City and Central Park as a mechanism to provide recreational opportunities to the growing population. A separate strategy to overcome the challenges of a growing population was to relocate workers to entirely new, planned communities. George Pullman developed the town of Pullman

outside of Chicago to house and support workers for his train car plant; Ebenezer Howard designed the "Garden City" as an alternative to large cities or rural land. Howard proposed that the Garden City merged the benefits of town living, e.g. high wages and places for amusement, and of country living, e.g. beauty of nature and abundance of water, while minimizing their negative features. Development prior to World War II was characterized by dense, mixed-use neighborhoods with grid street networks and integrated parks.

In the early part of the 20th century, zoning became a new tool of local governments to shape the built environments of the United States. It quickly became the standard tool for local land-use regulation (Wickersham, 2006) and helped change development patterns after World War II. Federal housing policies and investments in transportation systems contributed to suburbanization after World War II (Frumkin, Frank, & Jackson, 2004). Euclidian zoning was first adopted in 1916 in New York City to ensure proper circulation of air and exposure to sunlight which were limited by tall buildings; numerous districts with requirements for maximum building height, area, and allowable uses were developed (Cullingworth & Caves, 2009). The Standard Zoning Enabling Law, developed by the U.S. Department of Commerce, and the favorable U.S. Supreme Court Decision in Village of Euclid v. Amber Realty Co. encouraged adoption of zoning throughout the country. With this ruling, zoning was not viewed as a "taking" within the 5th amendment of the constitution and therefore local governments were able to regulate land-use through zoning without compensating land-owners for any potential decrease in property value (Levy, 2006).

Zoning regulates private land-use in three ways: 1) by defining what uses are permitted, conditionally permitted, or excluded, zoning fosters a separation of industrial, commercial, and residential property, 2) by defining the density of buildings per unit of land, zoning separates single and multi-family housing and affects population density by establishing minimum lot sizes, and 3) by defining building dimensions and setbacks, zoning further regulates the amount of land used per building. The combined effect of these regulations is to sub-divide the community into different zones with specified uses, minimum lot sizes, and building size requirements (Platt, 1996). Through the influence of the growth machine, zoning becomes a tool of the land-based elite to direct where growth occurs (Logan & Molotch, 1987).

A zoning ordinance is composed of two parts: zoning text and a zoning map. The zoning text describes the regulations and allowable uses within each category and the zoning map indicates to which category all parcels of land belong (Platt, 1996). As part of the Standard Zoning Enabling Law, the zoning ordinance should be consistent with the comprehensive plan of the community. The comprehensive plan provides a "vision for the future of a community" (Cullingworth & Caves, 2009, p. 126). The comprehensive plan is a long range plan covering multiple issues such as housing, transportation, open space, and public services that is adopted and amended by the elected officials of the community. The comprehensive plan provides a legal framework for land-use decisions such as zoning changes.

The Standard City Planning Enabling Act, developed shortly after the Standard Zoning Enabling Act, provides local governments with the power to review and approve

proposed subdivisions of land into smaller parcels before construction can begin (Platt, 1996). The subdivision of land must be consistent with the zoning ordinance and the proposed infrastructure must meet performance standards such as street width and storm drainage set within a development ordinance. Thus, the developer must obtain the approval of a variety of government departments, as many as 10 or more, through a permitting process where plans are reviewed for regulatory compliance (Cullingworth & Caves, 2009; Ben-Joseph, 2005).

The planning process of local governments may be divided into four stages: initial review/feasibility, rezoning, plan review, and inspection. The initial review would assess availability of public infrastructure and required changes to the zoning ordinance and/or the comprehensive plan. If necessary, the rezoning would occur through the zoning commission. With the appropriate zoning in place, multiple copies of a site plan or plat are submitted to the planning department for review and approval. Resubmissions of plans may be required before approval is granted if non-compliant elements are identified in the review process. After the plan is approved, building permits can be acquired and construction may begin. Subsequent inspections ensure that plans are implemented faithfully. The process of approval takes 17 months on average, but may take up to two years (Ben-Joseph, 2005) and involve several departments and specialized planners. A list of selected specialties within the planning profession and their roles are provided in Table 4.

The Smart Growth movement and New Urbanism are recent critiques of the development patterns encouraged by zoning and subdivision regulations. New urbanism

is a multi-discipline design philosophy that attempts to reduce the negative effects of "sprawling" development through public policy and planning and development design and practice. The Charter of the Congress for the New Urbanism (2001) lists principles applicable to different scales of development, from metropolitan areas to individual buildings. These principles include mixed-use development that includes a variety of destinations and housing types of different price levels that create sufficient densities to support public transportation systems. With an interconnected street network, neighborhoods can encourage walking or bicycling to destinations including schools and a park system. Smart growth is promoted by the American Planning Association, the International City/County Management Association (ICMA) and the U.S. Environmental Protection Agency (EPA). The National Association of Homebuilders also views smart growth as a solution to the problems of zoning. The perspectives of developers and planners about smart growth are presented in Table 5.

Table 4: Types of planners and their roles

Comprehensive Planner	Ensure consistency with comprehensive plan
Zoning Administration	Zoning approval and inspection
Transportation Planner	Street and sidewalk regulations
Environmental Planner	Storm water regulations, tree preservation,

Alternatives to zoning or modifications of zoning may be better suited to achieving the goals of smart growth and new urbanism. Options for regulations include planned unit developments (PUDs) and performance zoning (Levy, 2006). Within a PUD, the entire project is reviewed under a separate set of regulations. Residential and commercial land-uses could be included within the same PUD whereas the two uses

could not co-exist in traditional zoning. While performance zoning still regulates the general type of use allowed, there is greater flexibility within each category and there are fewer categories. Performance zoning relies on the floor area ratio (FAR) and impervious coverage to limit the intensity of development. The New Urbanists have developed "Common Interest Communities" outside of public regulatory boundaries to evade the restrictions of zoning and subdivision regulations (Ben-Joseph, 2005).

Table 5: Perspectives on Smart Growth

National Association of Home Builders	Smart Growth Network
Planning for and accommodating anticipated growth in economic activity, population, and housing demand as well as ongoing changes in demographics and lifestyles while protecting the environment.	Foster, distinctive, attractive communities with a strong sense of place
Using land more efficiently by allowing higher density development and innovative land use policies and encouraging mixed-use and pedestrian-friendly developments with access to open space and mass transit.	Take advantage of compact building design
	Mix land uses
	Create walkable neighborhoods
	Provide a variety of transportation choices
Providing for a wide range of housing types to suit the needs, preferences, and income levels of a community's diverse population.	Create a range of housing opportunities and choices
Revitalizing older suburban and inner-city markets and encouraging infill development	Preserve open space, farmland, natural beauty, and critical environmental areas
Adopting balanced and reliable means to finance and pay for the construction and expansion of roads, schools, water and sewer facilities, and other infrastructure required to serve a prosperous community.	Strengthen and direct development towards existing communities
Adopting a comprehensive land-use planning process at the local level that clearly identifies land uses, such as residential, commercial, recreational, and industrial as well as land to be set aside as meaningful open space.	Make development decisions predictable, fair, and cost effective
Oppose further federal intervention into state and local land use planning.	Encourage community and stakeholder collaboration in development decisions
Sources: (NAHB, 1999; SGN, 2006)	

Study Rationale

Physical inactivity increases the risk of premature mortality from chronic illnesses such as coronary heart disease, hypertension, diabetes mellitus, and certain cancers (USDHHS, 1996). Despite the recognized health benefits of physical activity, approximately half of adults in the United States do not meet minimum recommended levels of physical activity (CDC, 2007b). Therefore, public health goals aim to increase levels of recreation and transportation physical activity. Recent studies suggest that certain characteristics of the built environment are associated with greater levels of physical activity (TRB & IOM, 2005; Saelens & Handy, 2008) and that multi-level interventions to increase physical activity that include increasing access to places for physical activity are effective (Task Force on Community Preventive Services, 2005).

Because the built environment results from the development, or redevelopment, of land within the context of specific municipal ordinances, both developers and planners interact to create the built environment through land-use decisions. Growth machine theory indicates that these professionals direct where new development occurs, but there has only been limited research on how the planning and development process can result in built environments that are conducive to physical activity. The perspective of developers has been overlooked thus far in the emerging field. Research that identifies the competing forces that influence the planning and development process and illuminates the relationship between these factors and design characteristics that promote physical activity is necessary to construct supportive environments.

The purpose of this study is to develop an understanding of how built environments that are conducive to transportation and recreational physical activity can result from the planning and development process in urbanized areas of the Triad region of North Carolina. The results of the study are presented within two papers: a mixed-method study (Creswell, 2003) to describe the perceived importance of physical activity and the responsibilities of planners and developers for providing physical activity opportunities in new residential areas, and a grounded theory study (Creswell, 2007; Strauss & Corbin, 1998; Glaser & Strauss, 1967) of barriers to the utilization of development strategies that may promote physical activity.

There are three study aims within the mixed-method study. The research questions for the first study are presented in table 6. The first study aim is to characterize the purposes of land-use regulations according to planners and developers and compare this definition to the definition within the adopted municipal ordinances. The second study aim is to identify how planners and developers perceive the importance of physical activity opportunities in the public's choice of home. The final study aim of the first paper is to describe the responsibilities of planners and developers for providing opportunities for physical activity.

The grounded theory study also included three study aims. The first study aim was to identify a central phenomenon within the planning and development process that served as a barrier to development strategies that support physical activity. The second study aim was to develop an understanding of how six development strategies that may promote physical activity relate to the central phenomenon. The six development

strategies used were: 1) high density development, 2) mixed-use, 3) housing choice, 4) pedestrian-friendly neighborhoods, 5) transportation choice, and 6) meaningful open space. The final study aim was to develop a grounded theory to explain the relationships among these barriers to developments that support physical activity. The theory provides a framework for future research including intervention targets and measures of policy.

Table 6: Research questions for study 1

Main Question 1-1	How do urban planners and developers define the purposes of local land-use regulation?
Sub-questions	How does this definition compare to the legal basis for land-use regulation?
	Are physical activity and/or health considered by urban planners and developers as a purpose of land-use regulations?
Main Question 1-2	How do urban planners and developers perceive the importance of transportation and recreational physical activity in the public's choice of home?
Sub-questions	Is transportation or recreational physical activity perceived to be more important in the public' choice of home?
	Is there a difference in perceived importance of physical activity in the public's choice of home between urban planners and developers?
	Do planners and developers perceive different levels of support for physical activity between different development scenarios?
Main Question 1-3	What responsibilities do urban planners and developers perceive for providing opportunities for physical activity in the community?
Sub-questions	What type of physical activity do these perceived responsibilities support?
	How do planners and developers share responsibility for providing opportunities for physical activity?

Table 7: Research questions for study 2

Main Question 2-1	What factors influence the planning and development process for residential [or mixed-use] areas?
Sub-questions	How do these factors support or hinder the development of residential [or mixed-use] areas that are conducive to physical activity?
Main Question 2-2	How do urban planners and developers resolve competing considerations to create residential [or mixed-use] areas?
Sub-questions	How does the resolution process relate to development strategies that may promote physical activity?
	Who benefits from residential [or mixed-use] areas that support physical activity? How do they benefit? Who is harmed/excluded by residential [or mixed-use] areas that support physical activity?
Main Question 2-3	How can the planning and development process result in a built environment that supports transportation and recreational physical activity?

Methods

A two-stage sampling procedure was employed in the study. In stage one, the geographical area to be sampled was purposefully selected using intensity sampling to provide "information rich cases" (Creswell, 2007, p. 127). Existing research was used to identify municipalities with experts having experience with the phenomenon, barriers to implementation of development strategies that promote physical activity (Denzin & Lincoln, 1998). In stage two, planners from within the geographical area were selected for semi-structured interviews using typical case sampling; developers were selected to confirm/disconfirm the emerging theory (Creswell, 2007).

The Greensboro--Winston-Salem--High Point, NC Metropolitan Statistical Area (MSA) was purposefully selected for the area of this study because it was identified as the second most sprawling metropolitan region in the United States based on 1990

boundaries (Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2003; Ewing, Pendall, & Chen, 2002). The sprawl index included four composite measures: residential density, land-use mix, degree of centering (vibrant urban center), and street accessibility (connectivity). The Greensboro--Winston-Salem--High Point, NC MSA received low scores on all four measures within the index, suggesting that the local planning and development process would contain significant information for the development of a theory, particularly related to barriers to development patterns.

Although the Riverside--San Bernardino, CA PMSA was identified as the most sprawling of the 83 metropolitan regions, the area was excluded from the present study because of it was more densely populated and had greater street connectivity (Ewing, Pendall, & Chen (2002). The density scores of the Greensboro--Winston-Salem--High Point, NC MSA and the Riverside--San Bernardino, CA PMSA were 74.2 and 93.5 respectively. Out of the 83 areas studies, 39 areas had density scores lower than the Riverside--San Bernardino, CA PMSA. Furthermore, the Riverside--San Bernardino, CA PMSA experienced an increase in the density factor during the 1990s while the Greensboro--Winston-Salem--High Point, NC MSA experienced a decrease. Because parts of the Mojave and Sonoran deserts are in the Riverside--San Bernardino, CA PMSA, the geographical extent of urban growth is constrained whereas the urban areas in the Greensboro--Winston-Salem--High Point, NC MSA may continue to expand. The street connectivity score of the Greensboro--Winston-Salem--High Point, NC MSA was also lower than the score for the Riverside--San Bernardino, CA PMSA, 66.3 and 80.5 respectively. The two areas had similarly low scores for land-use mix, 46.7 and 41.5,

respectively. Because of the associations of density and street connectivity to physical activity levels, the Greensboro--Winston-Salem—High Point, NC MSA may provide more information about the barriers to development strategies that promote physical activity even though it had an overall higher sprawl score.

Since the development of the sprawl index, the Greensboro--Winston-Salem--High Point, NC MSA has been divided into three MSAs. The Greensboro-High Point, NC MSA, the Winston-Salem, NC MSA, and the Burlington, NC MSA are now part of the Greensboro--Winston-Salem--High Point, NC Combined Statistical Area (OMB, 2008). There are four municipalities within the CSA with populations over 50,000: Greensboro, Winston-Salem, High Point, and Burlington. The municipalities serve as sampling units for planners.

Table 8: Population estimates, rank, and change 2000 to 2008

City	Population Estimate (State Rank)		% Population Change 2000-08
	July 1,2008	July 1, 2000	
Greensboro	250,642 (3)	228,883 (3)	9.5
Winston-Salem	217,600 (5)	201,661 (4)	7.9
High Point	101,835 (8)	86,708 (9)	17.4
Burlington	50,857 (17)	45,914 (17)	10.8
(U.S. Census Bureau, 2009)			

A list of planners was developed from the four municipal websites. Based on the department, division, or job title, each planner was assigned to one of the following categories: transportation planning, comprehensive planning, or neighborhood planning/zoning. Staff members who did not perform planning tasks (administrative

personnel, coded enforcement officers, and GIS technicians) were excluded. Within each municipality, a typical case sampling strategy was used to select three planners to be interviewed by randomly selecting one planner from each category. By applying a typical case approach, the most likely scenario within a municipality is received (Creswell, 2007). In order to guide the development of a theory, a list of developers was compiled from trade group associations within the four municipalities. The criteria for selection included being currently active in residential development and being head-quartered in one of the four municipalities. A theoretical sampling approach was used for selecting interviewees from the master list (Strauss, 1987). The residential developers were selected to provide confirmation or disconfirmation of the emerging theory (Creswell, 2007). Residential developers were selected because residential developments currently occupy the greatest proportion of the land in the municipalities. Up to three attempts were made to contact key decision makers within each of the companies.

Following the informed consent procedure (Appendix A), each interview followed the study protocol that included twelve primary questions and lasted 45 to 60 minutes. The primary questions were open-ended; follow-up questions in the study protocol were used when necessary to increase understanding. Images of developments and site plans served as catalysts for conversations about development patterns. When appropriate to the research question, planners and developers were asked close-ended questions with a five-point likert type scale followed by discussion. Questions were similar, but tailored, for planners and developers (Appendix B and Appendix C). The

interviews were transcribed verbatim from digitally recorded voice recordings and identifying information was removed from transcripts. The original voice recordings were deleted at the completion of the study. The transcripts were analyzed in NVivo 8 (QSR International Pty Ltd.); the quantitative data were analyzed using SPSS 15.0 (SPSS, Inc.). Non-parametric statistics were used to analyze the data due to the small sample size and measurement level of the data, i.e. ordinal. Detailed procedures for the separate analyses are presented within the following two chapters.

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CHAPTER III

PURPOSES OF LAND-USE REGULATION AND RESPONSIBILITIES FOR OPPORTUNITIES FOR PHYSICAL ACTIVITY: VIEWS FROM PLANNERS AND DEVELOPERS

Introduction

The legal authority to regulate land-use is predicated on the government's responsibility to protect public health, safety, and welfare (Schilling & Linton, 2005). Physical inactivity and poor nutrition rank as the second leading cause of death in the United States (Mokdad, Marks, Stroup, & Gerberding, 2004). Physical inactivity increases the risk of premature mortality from chronic illnesses such as coronary heart disease, hypertension, diabetes mellitus, and certain cancers and increases risk factors such as high blood pressure and high blood cholesterol (U.S. Department of Health and Human Services, 1996; USDHHS, 2008). Within a socio-ecological framework, zoning and development policies affect the utilization of development strategies that promote physical activity in a variety of settings (McLeroy, Bibeau, Steckler, & Glanz, 1988; Sallis, Cervero, Ascher, Kraft, & Kerr, 2006). The Guide to Community Preventive Services recommends that communities increase access to places for people to be physically active through community-scale interventions (Heath et al., 2006). Such interventions include promoting mixed-use, interconnected neighborhoods with recreational facilities such as walking trails. However, the historical context of zoning and development ordinances which regulate land-use will influence how planners and

developers perceive their roles in providing opportunities for physical activity. Understanding these perceptions is necessary for health education and promotion professionals who seek to successfully initiate interventions to change land-use practices.

The urban planning movement built upon the foundation of sanitary reforms to accommodate the population growth, halt the spread of infectious disease, and manage the intensification of land-use that occurred during the industrial revolution in the 19th century (Platt, 1996). In addition to new forms of financing and regulation, technical expertise was necessary to implement large public infrastructure projects such as the Croton River project which supplied water to New York City and Central Park as a mechanism to provide recreational opportunities to the growing population. The planning profession developed to provide this expertise.

In the early part of the 20th century, zoning became a new tool of local governments to shape the built environments of the United States. Euclidian zoning was first adopted in 1916 in New York City to ensure proper circulation of air and exposure to sunlight which were limited by tall buildings; numerous districts with requirements for maximum building height, area, and allowable uses were developed (Cullingworth & Caves, 2009). The Standard Zoning Enabling Law, developed by the U.S. Department of Commerce, and the favorable U.S. Supreme Court Decision in Village of Euclid v. Amber Realty Co. encouraged adoption of zoning throughout the country (Levy, 2006). It quickly became the standard tool for local land-use regulation and helped change development patterns after World War II (Wickersham, 2006). Zoning has been used to insulate single-family residential units from all other uses (Schilling & Linton, 2005).

Federal housing policies and investments in transportation systems contributed to suburbanization after World War II (Frumkin, Frank, & Jackson, 2004).

Land-use regulation has continued to increase as additional subdivision regulations and environmental regulations have been adopted by local governments (Schillings & Linton, 2005). As a result of increased regulations, developers must obtain the approval of a variety of government departments, as many as 10 or more, through a permitting process where plans are reviewed for regulatory compliance (Cullingworth & Caves, 2009; Ben-Joseph, 2005). The process of approval takes 17 months on average, but may take up to two years (Ben-Joseph, 2005). As health education and promotion practitioners endeavor to change land-use regulations, they must recognize the significant resources invested by planners and developers in this process.

Part of the research agenda for enabling regulatory reform to reflect the importance of physical activity as one of the leading indicators of health in the 21st century is to understand how planners and developers perceive the purposes of land-use regulation in the Triad region of North Carolina. Through in-depth interviews, this study seeks to determine if the perceived purposes of land-use regulation are consistent with providing opportunities for physical activity to improve the health of the community. This study continues by characterizing the importance of, and responsibilities for providing opportunities for physical activity in the community among planners and developers. Through the use images of different development scenarios, planners and developers identified development strategies they believed to promote physical activity.

The study concludes by discussing implications for health education and promotion practitioners.

Methods

A two-stage sampling procedure was employed in the study. The Greensboro--Winston-Salem--High Point, NC Metropolitan Statistical Area (MSA) was purposefully selected for the area of this study in the first stage using intensity sampling. In previous research, the area was identified as the second most sprawling metropolitan region in the United State (Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2003; Ewing, Pendall, & Chen, 2002). The sprawl index included four composite measures: residential density, land-use mix, degree of centering (vibrant urban center), and street accessibility (connectivity). Higher scores for the density, land-use mix, and street connectivity components may support physical activity by increasing the number and variety of destinations accessible by walking or bicycling. Because the Greensboro--Winston-Salem--High Point, NC MSA was the only one of the 83 areas to rank in the bottom ten in all four measures, it was expected that the local planning and development process would contain significant information related to barriers to development strategies that promote physical activity. Although the Riverside--San Bernardino, CA PMSA had a lower overall sprawl score, the area ranked near the 50th percentile for density and near the 25th percentile for street connectivity (Ewing, Pendall, & Chen, 2002). Because these development characteristics are positively associated with physical activity levels, the Riverside--San Bernardino, CA PMSA was excluded from the present study.

The Greensboro--Winston-Salem--High Point, NC MSA has been divided into three MSAs within the Greensboro--Winston-Salem--High Point, NC Combined Statistical Area (OMB, 2008). There are four cities within the area with populations over 50,000: Greensboro, Winston-Salem, High Point, and Burlington. The municipalities serve as discrete sampling units for selecting planners. In contrast, the developers may conduct work in multiple jurisdictions.

A list of planners was developed from the four municipal websites. Based on the department, division, or job title, each planner was assigned to one of the following categories: transportation planning, comprehensive planning, or neighborhood planning/zoning. Staff members who did not perform planning tasks (administrative personnel, coded enforcement officers, and GIS technicians) were excluded. Within each municipality, a typical case sampling strategy was used to select three planners to be interviewed by randomly selecting one planner from each category. By applying a typical case approach, the most likely scenario within a municipality is received (Creswell, 2007). Of the initial twelve planners contacted, one planner had retired and one planner declined to participate in the study. Each of these planners was replaced with a randomly selected planner from the same category and municipality. Twelve planners were interviewed. The mean number of years employed as a planner was 14.1 years with a range of 3 to 32 years; the mean number of years employed as a planner in the area was 11.5 years with a range of 3 to 29 years.

A list of developers was compiled from trade group associations within the four municipalities. A theoretical sampling approach was used for selecting interviewees

from the master list (Strauss, 1987). The developers were selected to provide confirmation or disconfirmation of the emerging themes from the planners (Creswell, 2007). Twenty development companies head-quartered in one of the selected municipalities were identified based on size of subdivisions, types of housing, and price range. Up to three attempts were made to contact key decision makers within each of the companies. A total of six development professionals were interviewed. The mean number of years of employment in the development industry was 27.5 years with a range of 12 to 42 years; the mean number of years of employment in the development industry in the area was 25.2 years with a range of 8 to 42 years.

Digitally recorded interviews began in August 2009 and concluded in February 2010. Following the informed consent procedure, each interview followed the study protocol that included twelve primary questions and lasted 45 to 60 minutes. The primary questions were open-ended; follow-up questions in the study protocol were used when necessary to increase understanding. Images of developments and site plans served as catalysts for conversations about development patterns. Questions were similar, but tailored, for planners and developers. Selected questions are presented in Table 9. Interviews were transcribed verbatim from digitally recorded voice recordings and identifying information was removed from transcripts. The original voice recordings were deleted at the completion of the study.

The images of development were chosen to represent different patterns of development. The developments included aerial images of a high density development with vertical mixed-use, a single-family development removed from the urban core, and

an infill/traditional neighborhood design with mixed-residential development and commercial areas. The high-density development was a depiction of the downtown Kendall, Florida master plan developed by Dover, Kohl & Partners, Duany, Plater-Zyberk & Company, Hall Planning & Engineering. The image was chosen because the development had mixed-use within individual buildings and was of sufficient density to support mass-transit. The single family-development was chosen because it included only a single-category of land-use for a large area and represented the conversion of farmland at the urban-suburban fringe. The image was provided by the USDA Natural Resource Conservation Service. The final development image provided a variety of housing choice within a mixed-use development. Within the image, there were single-family units, townhomes, and apartments/condominiums in addition to commercial properties. This image was provided by Tunnell-Spangler-Walsh & Associates.

Table 9: Selected questions from study protocol

1	What are the purposes of local government land-use regulations for residential development?
2	In your opinion, how important are opportunities for transportation activities such as walking or biking to stores, restaurants, or work to the public's choice of home?
3	In your opinion, how important are opportunities for recreational activities such as walking or biking for pleasure or exercise to the public's choice of home?
4a	What level of responsibility should local governments have for providing opportunities for transportation or recreational physical activity?
4b	What level of responsibility should developers have for providing opportunities for transportation or recreational physical activity?
5	Please look at the pictures and then indicate your level of agreement: The development provides opportunities for transportation physical activity.
6	Please look at the pictures and then indicate your level of agreement: The development provides opportunities for recreational physical activity.

The transcripts were analyzed in NVivo 8 (QSR International Pty Ltd.). After reviewing all of the transcripts, each transcript was coded using free nodes. The free nodes were then organized within a hierarchical structure of parent and child nodes. In vivo statements were selected to capture the essence of the interviews from the interviewees themselves. Questions 1 and 4 provided the greatest opportunity for responses from the participants and are presented as separate qualitative analyses. The remaining questions provided ordinal responses followed by opportunities for discussion.

The quantitative data from questions 2, 3, 5 and 6 were analyzed using SPSS 15.0 (SPSS, Inc.). Non-parametric statistics were used to analyze the data due to the small sample size and measurement level of the data, i.e. ordinal. The perceived importance of transportation and recreational physical activity were assessed using a 5 point ordinal scale where 1 = unimportant and 5 = very important. A Wilcoxon signed rank test was used to compare the importance of transportation physical activity to the importance of recreational physical activity in the public's choice of home. The perceived support for transportation and the perceived support for recreational physical activity among each of the three development scenarios were assessed from two separate questions each with a five point ordinal scale where 1=strongly disagree and 5= strongly agree. A composite score of support for physical activity was then created for each interviewee by combining the transportation physical activity and recreational physical activity responses for each of the three development scenarios. A Friedman test was performed to determine if there were significant differences in the perceived support for physical activity across the development scenarios. Non-directional post hoc comparisons were conducted using

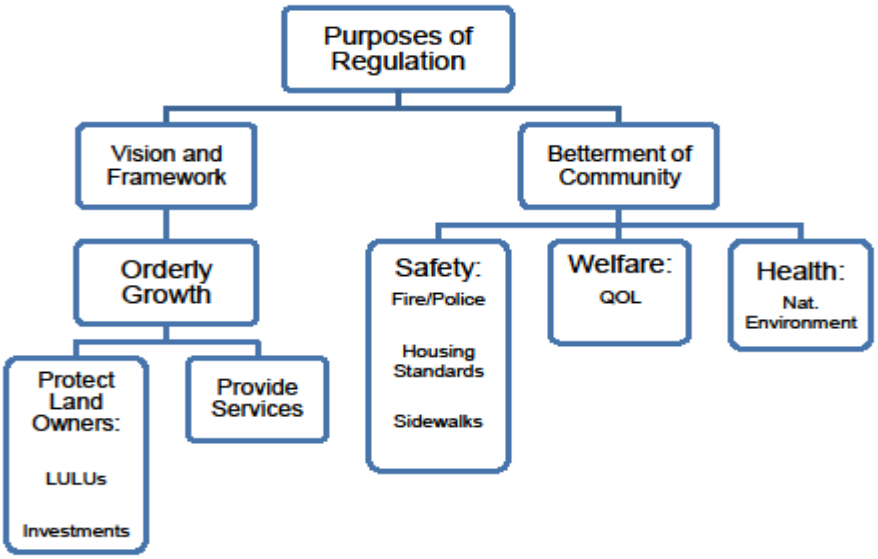
three Wilcoxon tests for pairwise comparisons of the composite scores. The critical value was adjusted because of the increased potential of Type I error (alpha' = alpha/k) (Pett, 2004).

Results

Purposes of Land-Use Regulations

Two overarching themes emerged when the participants were asked to discuss the purposes of land-use regulation for residential development. The in vivo codes used to characterize these categories were: 1) vision and framework and hopefully shape a community and 2) for the betterment and the good of the community. The relationships among the purposes of land use regulation are shown in figure 1.

Figure 1. Purposes of land-use regulation



For land-use regulations to provide a vision and framework and hopefully shape a community, growth of the population is necessary and is accompanied by intensification of land-use. Regulations provide for orderly growth that maintains adequate provision of municipal services. Orderly growth is achieved through zoning and extension of public infrastructure including roads and water/sewer lines. While planners and developers agree that growth is desirable, they may disagree over the form and distribution of the population growth.

The land-use regulations guide the type and location of growth with implications for adjacent property owners and for the wider community. While these policies provide some certainty over future land-use decisions and investments, they also influence property values. From one perspective, they protect the integrity of residential areas and property-owners from locally unwanted land-uses (LULUs), but they also restrict how land can be developed and therefore its exchange value. The regulations provide a rationale for making legally defensible decisions that limit private property rights. As part of this discussion, developers expressed general frustration with regulations. The regulations were seen as never-ending and as an attempt to control everything. Regulations were perceived to increased costs of developments and limit affordability of housing in the community. The current regulations were so explicit that they limited flexibility. While acknowledging the limitations of explicit regulations, planners viewed regulations as a balance on private (business) activities.

Closely tied to the theme of providing a vision and framework to shape the community is the theme of the betterment and good of the community. The betterment

and good of the community describes the role of regulation in protecting the public health, safety, and welfare. Issues of safety were characterized by the provision of services such as fire and police while welfare was characterized by maintaining or improving quality of life. Planners were also concerned with providing safe and affordable housing for all. Protection of the public health was least discussed among the participants and only in relation to regulation of the natural environment such as storm water regulation.

Importance of Physical Activity

Planners and developers were asked to estimate the importance of opportunities for physical activity in the public's choice of home. For transportation physical activity, the planners and developers provided their opinions of the importance of walking or bicycling to stores, restaurants, and work in the public's choice of home. For recreational physical activity, the planners and developers provided their opinions of the importance of walking or bicycling for pleasure or exercise in the public's choice of home. A Mann-Whitney test indicated that the perceptions of the planners were not significantly different from the perceptions of the developers for the importance of transportation physical activity or for the importance of recreational physical activity in the public's choice of home. Therefore, the perceptions of the planners and developers were combined for comparing the importance of transportation physical activity to recreational physical activity. The mean importance of opportunities for transportation physical activity was 2.94; the mean importance of opportunities for recreational physical activity was 3.78. The results of the Wilcoxon signed rank test indicated that among planners and

developers there was a statistically significant difference between the perceived importance of transportation physical activity and the perceived importance of recreational physical activity in the public's choice of home (p=0.008). (See table 10).

Table 10: Perceived importance of opportunities for physical activity in home choice

	N	Mean	S.D.	Median	Wilcoxon P
Transportation PA	18	2.94	1.2	2	
Recreation PA	18	3.78	0.9	4	0.008

Planners and developers were asked to indicate if each of three development scenarios provided opportunities for transportation and recreational physical activity. A Mann-Whitney test indicated that there were no significantly differences between the perceptions of the planners and developers about the support for physical activity among the three developments. Therefore, the perceptions of the planners and developers were combined. Planners and developers indicated that the high density and mixed-use developments provided opportunities for physical activity, means of 8.2 and 8.0, respectively. (See table 11.) The results of the Friedman test indicated that there were statistically significant differences in the perceived support for physical activity of the three development scenarios among the 18 planners and developers (p=0.007).

Post hoc analyses, using Wilcoxon tests to compare the developments pairwise (Pett, 2004), indicated significant differences between the High Density and Single-Family developments and between the Mixed-Use and Single-Family developments. The

adjusted alpha for the Wilcoxon tests was p=0.017. The High Density and Mixed-Use developments were not found to be significantly different for perceived support for physical activity.

Table 11: Comparison of opportunities for physical activity in three development scenarios

	N	Mean	S.D.	Median	Friedman χ^2	Friedman P
High Density[a]	18	8.2	1.5	8.5		
Single-Family[a,b]	18	6.7	1.4	6.5	9.9	0.007
Mixed-Use[b]	18	8.0	0.8	8.0		

[a] significant difference between H.D. and S.F. (p=0.015)
[b] significant difference between M.U. and S.F. (p=0.003)

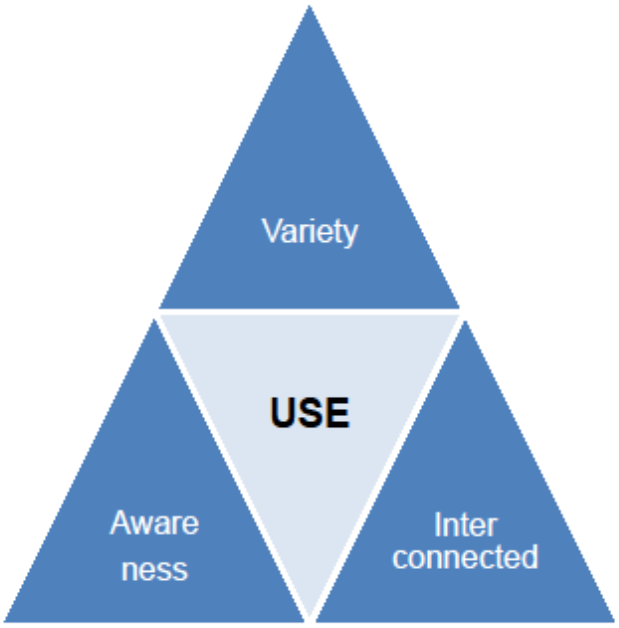
Responsibilities of Local Government and Developers

Three themes emerged from the data of responsibilities of local governments and developers to provide opportunities for physical activity: awareness, variety, and connectivity. As depicted in figure 2, these three characteristics can result in developments that encourage the use of infrastructure for physical activity. This model occurs within the context of local government budget constraints and private developers' investment plans.

Public/consumer awareness about physical activity emerged as theme among both planners and developers. Consistent with the quantitative analysis of the importance of physical activity to housing consumers, there was more awareness of and importance

attributed to recreational activities in determining home selection. As one developer said about transportation physical activity, “It’s not even, it’s not on their radar.” Several planners noted that the importance of transportation physical activity was increasing among portions of the public. Planners envisioned themselves as more aware of and progressive on these issues than the public, but cautioned that the public may resent attempts to increase opportunities for transportation and recreational physical activity, or may be against increasing public funds for these projects.

Figure 2: Shared responsibilities for providing opportunities for physical activity



Both planners and developers embraced the idea of variety: providing a variety of housing choice and physical activity opportunities for the public depending on their needs. Developers perceived the word responsibility for transportation and recreational

physical activity as an infringement on private property rights. To the developers, responsibility implied additional requirements which would restrict how they could develop parcels of land. The developers also cautioned that additional requirements would decrease affordability of new housing for consumers. Within the development model, it is important to link the type of housing and services to the prospective homebuyer. According to developers, regulatory requirements for opportunities for physical activity would limit their ability to provide a development package that meets consumers' demands. Planners noted the need to look beyond typical pool and clubhouse facilities included in some neighborhoods. Developers were discouraged by the lack of use of such facilities by new residents. Opportunities for physical activity within neighborhoods should enhance public infrastructure rather than being a replacement for it.

The provision of physical activity opportunities was limited for both planners and developers by financial considerations. Planners reported that local budget constraints limited the ability of the government to purchase additional areas for recreational infrastructure. The provision of such amenities by developers was limited by their ability to maintain costs and provide affordable housing, particularly in smaller developments. Private infrastructure for recreational facilities may become a financial burden on the home owner's association.

> You've got to understand your target market. You've got to understand what kind of shelter you're building and then you've got to understand what kind of services you're linking to it. And then you've got to understand the financial aspect of it.

Interconnectedness bridged the topics of transportation and recreational physical activity for planners and developers. Connectivity of infrastructure increases the accessibility to destinations. Planners must overcome the historical legacy of non-connected uses in previous decades. Developers are responsible for providing connections to existing infrastructure; planners are responsible for filling in the gaps. When these expectations are supported by land-use plans, they provide developers with the ability to determine the feasibility of projects. Thus the responsibilities of planners and developers for providing opportunities for physical activity are consistent with their perceived purposes of land-use regulation.

Discussion

This study sought to identify entrenched rationales for land-use regulation among planners and developers in the Triad region of North Carolina and determine how to begin to increase transportation and recreation physical activity levels among local residents. The discussion of land-use regulations occurred prior to questions specifically addressing physical activity to avoid conditioning the participants' responses. Increasing physical activity to improve the health of the public was not among the purposes of land-use regulation discussed by either planners or developers. For planners and developers, environmental quality was associated with protecting health, but the provision of sidewalks was a safety concern rather than a means to support physical activity. Salvesen, Evenson, Rodriguez and Brown (2008) also found a disconnection between planning and physical activity in Montgomery County, Maryland. Among the planners

interviewed in their study, walking and bicycling were valued for decreasing traffic congestion and improving air quality rather than for improved health.

Health education and promotion practitioners should be advised that the use of zoning and other land-use regulations for purposes other than "promoting the health, safety, morals, *or* the general welfare of the community (Department of Commerce, 1926, p.4, emphasis added)" as prescribed in the Standard State Zoning Enabling Act of 1926 has been criticized for decades (Platt, 1996). Protecting property values and (single-family) residential districts have long been the impetus for zoning decisions (Schilling & Linton, 2005). Stakeholders in the development industry invest in the political process to help ensure a regulatory environment that favors growth and financial security of investments in land (Molotch, 1976). Thus, finding a primacy of protecting property owners in this study over other regulatory purposes provides background on the context for policy change initiatives.

The perceived importance of physical activity among planners and developers may influence the types of developments that are constructed. Less than one third of planners surveyed by Hollander, Martin, and Vehige (2008) perceived that physical activity was an important issue for residents. However, no other study has attempted to determine the salience of different categories of physical activity among planners. In this study, more than half of the planners and developers perceived recreational physical activity as important or very important to residents. Only one-third of planners and developers thought transportation physical activity was important or very important to residents. The difference in perceived importance of transportation and recreation

physical activity has implications for how land-use policies are implemented, which development strategies are used by developers, and how health education and promotion practitioners may develop interventions that use existing infrastructure for recreational physical activity.

Future studies need to assess the validity of the perceptions of the planners and developers about the importance of opportunities for physical activity among housing consumers. Understanding the importance of opportunities for physical activity from the consumers themselves would inform future interventions. If the importance of opportunities for physical activity among consumers is inconsistent with perceptions of planners and developers, interventions aimed at changing these perceptions would be necessary. Changing these perceptions may facilitate policy change or increase the willingness among developers to include more opportunities for physical activity. Additionally, opportunities for physical activity may not be of uniform importance across different segments of the public. This future research should also identify competing demands among housing consumers in order to promote activity-friendly development strategies in a way that supports these other needs.

Development strategies that promote transportation physical activity have been more consistently associated with increased levels of physical activity than development strategies that promote recreational physical activity (Saelens & Handy, 2008). Because the municipalities in the Triad have not yet embraced higher density, mixed-use developments with interconnected street and sidewalk networks, there are only limited areas in which transportation physical activity is pragmatic. The lack of high-density and

mixed-use developments limits the number and variety of destinations accessible to residents via walking or biking. Accessibility of destinations is further reduced by incomplete street and sidewalk networks. Street networks that lack high connectivity require circuitous routes that increase the traveling distance to destinations; sidewalks that are not continuous discourage walking and increase the risk of injury.

Current efforts to increase physical activity levels through active transportation must be targeted toward residents of specific developments or areas with adequate density, destinations, and interconnectedness to support safe and sensible trips. However, changing the characteristics of existing areas through redevelopment and creating new developments with higher densities and a mixture of uses may provide more opportunities for active transportation in the future. Street scale design elements that provide aesthetic qualities and characteristics of the mixed-use developments may also need to be considered to promote transportation physical activity (Wells and Yang, 2008).

While planners and developers thought that recreational physical activity was more important than transportation physical activity to the local residents, access to recreational opportunities may be insufficient to increase physical activity levels. Because the perceived under-utilization of existing recreational opportunities discourages developers from including expanded facilities in new developments, future research needs to investigate how privately developed facilities are valued and used by residents in new developments. Subsequently, health education and promotion practitioners can

develop interventions to increase physical activity levels of residents tailored to specific resources accessible to the community members.

Planners and developers in the Triad saw a need for a variety of quality infrastructure to provide opportunities for recreational physical activity. As additional public and private infrastructure are developed in the Triad, health promotion professionals can better utilize built environment resources in their programs to increase individual physical activity levels within a socio-ecological framework. Interventions may seek to develop social networks within a neighborhood and promote physical activity by changing normative behaviors.

Beyond interventions targeted at individuals to increase their physical activity, the role of health education and promotion professionals becomes evident within the shared responsibilities for providing opportunities for physical activity framework. For planners and developers, increasing opportunities for physical activity appeared to be conditional on increasing awareness of both the importance of physical activity and the relationship between physical activity and the planning process among the public. Increasing awareness among local government staff and elected officials is one opportunity for health professionals to increase the adoption and consistent implementation of land-use policies that promote physical activity. Limited funding and resources as well as lack of knowledge were barriers to addressing physical activity in their survey of planners (Hollander et al. 2008). Salvesen, Evenson, Rodriguez and Brown (2008) found that having an advocate for change was useful in the adoption and implementation of land-use policies that increase physical activity. Practitioners can work to develop champions

within the development process and coalitions external to the development process to ensure that physical activity and health are given more consideration in future land-use decisions.

This study may be one of the only studies that used images of developments to assess perceptions of support for physical activity. The findings suggest that planners and developers can distinguish between developments that support physical activity and those that inhibit physical activity. Future studies using images of developments among a larger sample of planners and developers are necessary in an attempt to falsify the hypothesis that the perceptions of planners and the perceptions of developers about the level of support that various developments provide are not different from one another. While the images used in this study were chosen because of their different design paradigms, future studies should include several alternatives for a particular location. The use of images of development scenarios may be extended to the residents of a community and to elected officials both as a research tool and as an intervention strategy. As a research tool, images of development can be used to assess competing considerations among housing consumers. As an intervention strategy, images of developments can be used to demonstrate the implementation of proposed development regulations.

The disparate levels of participation between the planners and developers in this study suggest that different recruitment methods or interview procedures may be necessary to increase participation among developers. Strategies to increase participation of developers would be to provide a financial incentive as compensation for their time or

use gatekeepers to gain access to the development community. Acceptance by the gatekeepers and gaining their assistance in recruitment efforts may require the establishment of the trustworthiness of the researcher. The nature of the interview, i.e. individual, in-depth, recorded interview, may have served as a deterrent for participation among developers. Alternative procedures that may increase participation among developers include focus group interviews conducted at trade association meetings or surveys administered at the behest of gatekeepers within the development community. Participation among developers may also be increased as the salience of the issue increases in the community. In the face of policy change efforts, developers may be more willing to have their perspective reported.

Conclusions

Interventions to change land-use policy should consider the implications of the perceived purposes of existing regulations and attempt to increase the variety and connectivity of amenities. The small, purposefully selected sample limits how the findings can be generalized to other municipalities. The use of images of developments to analyze perceptions of physical activity opportunities should be further researched. Within the socio-ecological framework, interventions to increase physical activity should be implemented and evaluated in new developments.

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CHAPTER IV

THEORETICAL FRAMEWORK OF INCREASED PHYSICAL ACTIVITY THROUGH DEVELOPMENT STRATEGIES

Introduction

Members of the fields of urban planning and public health have begun to learn from and educate each other as evidence develops out of research employing a socio-ecological framework of the importance of the built environment in supporting physical activity (McLeroy, Bibeau, Steckler, & Glanz, 1988; Stokols, 1996; Sallis, Cervero, Ascher, Henderson, Kraft, & Kerr, 2006). While there is now sufficient evidence to support the claim that community-scale and street-scale design and land use policies and practices could be changed to increase physical activity levels, no specific recommendations have been developed yet (Heath, Brownson, Kruger, Miles, Powell, Ramsey and the Task Force on Community Preventive Services, 2006). Development strategies that may promote physical activity include: high-density, mixed-use, pedestrian friendly developments that provide a variety of transportation choice and access to recreational opportunities (Hoehner, Brennan Ramirez, Elliot, Handy, & Brownson, 2005; Zlot and Schmid, 2005; Saelens & Handy, 2008; Owen, Humpel, Leslie, Bauman, & Sallis, 2004). Development strategies that discourage physical activity are synonymous with urban sprawl characterized by low-density development with separated uses and lack of interconnectedness.

While continued research is necessary to improve study designs and measurement tools in order to explore the causal relationship between the built environment and physical activity levels, another research priority is to investigate policy change and implementation (Sallis, Story, & Lou, 2009). The Transportation Research Board and the Institute of Medicine (2005) recommends that local government officials (i.e. urban planners) and developers and builders should increase accessibility, safety, and aesthetics of places to be physically active within a community. With 213 billion square feet of development projected to be newly built or replaced between 2000 and 2030, there is an opportunity to construct built environments that support physical activity for future generations (Nelson, 2004). In order to capitalize on these development opportunities and to construct developments that support physical activity, we must understand the decision making process of urban planners and developers within a community (Dannenberg et al., 2003). Identifying barriers to adoption and implementation of development strategies that promote physical activity is necessary to facilitate policy change in governments and businesses (Schmid, Pratt, & Witmer, 2006).

Three study aims were developed to advance policy research through this grounded theory study. The first study aim was to identify a central phenomenon within the planning and development process that served as a barrier to development strategies that support physical activity. The second study aim was to develop an understanding of how six development strategies that may promote physical activity relate to the central phenomenon. The six development strategies used were: 1) high density development, 2) mixed-use, 3) housing choice, 4) pedestrian-friendly neighborhoods, 5) transportation

choice, and 6) meaningful open space. The final study aim was to develop a grounded theory to explain the relationships among these barriers to developments that support physical activity. The theory provides a framework for future research including intervention targets and measures of policy change.

Methods

A two-stage sampling procedure was employed in the study. In stage one, the geographical area to be sampled was purposefully selected using intensity sampling to provide "information rich cases" (Creswell, 2007, p. 127). Existing research was used to identify municipalities with experts having experience with the phenomenon, barriers to implementation of development strategies that promote physical activity (Denzin & Lincoln, 1998). In stage two, planners from within the geographical area were selected for semi-structured interviews using typical case sampling; developers were selected to confirm/disconfirm the emerging theory (Creswell, 2007).

The Greensboro--Winston-Salem--High Point, NC Metropolitan Statistical Area (MSA) was purposefully selected for the area of this study because it was identified as the second most sprawling metropolitan region in the United States based on 1990 boundaries (Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2003). The sprawl index included four composite measures: residential density, land-use mix, degree of centering (vibrant urban center), and street accessibility (connectivity). The Greensboro--Winston-Salem--High Point, NC MSA received low scores on all four measures within the index, suggesting that the local planning and development process would contain significant information for the development of a theory, particularly related to barriers to

development patterns. The Riverside--San Bernardino, CA PMSA was identified as the most sprawling of the 83 metropolitan regions; however, the area was excluded from the present study because it had higher density and connectivity scores than the Greensboro--Winston-Salem--High Point, NC MSA. The two areas had similar scores for land-use mix. Development strategies used within the Riverside--San Bernardino, CA PMSA may be influenced by the geography of the area; the buildable area is limited by the Mojave and Sonoran deserts within its borders. This unique contextual factor of the Riverside--San Bernardino, CA PMSA would limit the applicability of the findings to other areas.

Since the development of the sprawl index, the Greensboro--Winston-Salem--High Point, NC MSA has been divided into three MSAs. The Greensboro-High Point, NC MSA, the Winston-Salem, NC MSA, and the Burlington, NC MSA are now part of the Greensboro--Winston-Salem--High Point, NC Combined Statistical Area (OMB, 2008). Approximately 291,000 housing units and 351,000 square feet of commercial and institutional development will be constructed between 2000 and 2030 in this MSA (Nelson, 2004). There are four municipalities within the CSA with populations over 50,000: Greensboro, Winston-Salem, High Point, and Burlington. Characteristics of the municipalities are presented in table 12. The municipalities serve as sampling units for planners.

A list of planners was developed from the four municipal websites. Based on the department, division, or job title, each planner was assigned to one of the following categories: transportation planning, comprehensive planning, or neighborhood planning/zoning. Staff members who did not perform planning tasks (administrative

personnel, coded enforcement officers, and GIS technicians) were excluded. Within each municipality, a typical case sampling strategy was used to select three planners to be interviewed by randomly selecting one planner from each category. By applying a typical case approach, the most likely scenario within a municipality is received (Creswell, 2007). Of the initial twelve planners contacted, one planner had retired and one planner declined to participate in the study. Each of these planners was replaced with a randomly selected planner from the same category and municipality. Twelve planners were interviewed. The mean number of years employed as a planner was 14.1 years; the mean number of years employed as a planner in the area was 11.5 years.

Table 12: Population estimates, rank, and change 2000 to 2008

City	Population Estimate (State Rank)		% Population Change 2000-08
	July 1,2008	July 1, 2000	
Greensboro	250,642 (3)	228,883 (3)	9.5
Winston-Salem	217,600 (5)	201,661 (4)	7.9
High Point	101,835 (8)	86,708 (9)	17.4
Burlington	50,857 (17)	45,914 (17)	10.8
(U.S. Census Bureau, 2009)			

In order to guide the development of a theory, a list of developers was compiled from trade group associations within the four municipalities. A theoretical sampling approach was used for selecting interviewees from the master list (Strauss, 1987). The developers were selected to provide confirmation or disconfirmation of the emerging theory (Creswell, 2007). Twenty development companies head-quartered in one of the selected municipalities were identified based on size of subdivisions, types of housing,

and price range. Up to three attempts were made to contact key decision makers within each of the companies. A total of six development professionals were interviewed. The mean number of years of employment in the development industry was 27.5 years; the mean number of years of employment in the development industry in the area was 25.2 years.

Digitally recorded interviews began in August 2009 and concluded in February 2010. Following the informed consent procedure, each interview followed the study protocol that included twelve primary questions and lasted 45 to 60 minutes. The primary questions were open-ended; follow-up questions in the study protocol were used when necessary to increase understanding. Images of developments and site plans served as catalysts for conversations about development patterns. Questions were similar, but tailored, for planners and developers. Selected questions are presented in Table 13. Interviews were transcribed verbatim from digitally recorded voice recordings and identifying information was removed from transcripts. The original voice recordings were deleted at the completion of the study.

The transcripts were analyzed in NVivo 8 (QSR International Pty Ltd.). Three initial interviews for each group, i.e. three planners and three developers, were annotated by the researcher to characterize the responses and increase familiarity with the transcripts. These six transcripts were then open coded by the researcher. The open coding scheme was reviewed by a second researcher; additional codes were incorporated into the coding scheme. The remaining transcripts were coded by the researcher using the open coding scheme. As new concepts were identified in the transcripts, they were

added to the coding scheme. Data saturation was reached after coding ten of the planner interviews. The final open coding scheme was reviewed with the second researcher. No new information emerged from the final two planner interviews. The remaining developer interviews were coded to provide confirmation or disconfirmation of the developing theory.

Table 13: Selected questions from study protocol

1	Imagine that you are preparing a new *comprehensive plan for* [community in] this area. Regulations may be added, changed, or removed if necessary. Please describe the type of residential community you would envision in the plan.
2	Now imagine that you are preparing a new *comprehensive plan for* [community in] this area under current economic and regulatory conditions. Please describe the type of residential community you would include in the plan.
3	Thinking about the area in which you work, during the last three years, do you think the amount of population growth has been too little, about right, or too much?
4	The National Association of Homebuilders and the American Planning Association have proposed strategies to accommodate population growth. These strategies include mixed-use developments, high density development, pedestrian-friendly neighborhoods with a variety of housing and transportation choices, and meaningful open space. Which, if any, of these strategies characterize the new communities *in your planning area* [you build]?
Words in italics are used in planner questions. Words in brackets replace italicized words for developer questions.	

The researcher selected a central phenomenon from the open codes. Axial codes were selected from the remaining open codes to describe contributing factors to the central phenomenon. Selective coding was then used by the researcher to describe hypotheses of the relationships between the axial codes. These relationships are presented in the grounded theory of increased physical activity through development strategies.

Results

The construction of the theoretical framework for increased physical activity through development strategies (IPADS) involved three phases of coding: open, axial, and selective coding. The result of each of these phases is described below and characterized in a visual model, figure 3.

Open Coding

Conflicts that altered the characteristics of proposed or potential developments emerged as the central phenomenon from the open coding of the interviews. Planners and developers discussed several categories of conflict. Planners and developers may engage in conflict over development and/or zoning regulations: site specific building requirements and allowable uses, respectively. This conflict is referred to as professional conflict, i.e. conflict between the professions of planning and developing. The second type of conflict is referred to as resident conflict. Existing residents of the community may mount a challenge to a proposed development, engaging planners, developers, and elected officials in the battle. Finally, planners may experience internal discord over historical legacies and future visioning of the community within their perceived role as politically neutral technicians. This third type of conflict is referred to as historical conflict. The three categories of conflict, professional conflict, resident conflict, and historical conflict, are not mutually exclusive for any particular development proposal.

Axial Coding

Statements from the planners and developers about six broad development strategies (high density development, mixed-use development, a variety of housing

choice, pedestrian friendly neighborhoods, meaningful open space, and to a lesser degree transportation choice) indicated these strategies were potential catalysts for conflicts. Such conflicts between the different stakeholders in the development process decrease the utilization of these development strategies in two ways. First, the perceived inevitability of conflict discourages innovative designs from being proposed while passively incentivizing developments that conform to historic patterns that inhibit physical activity. Second, when these strategies are proposed by either planners or developers, the resolution of the ensuing conflict may decrease the authentic implementation of the strategies through compromises. Ultimately, conflict over the use of these strategies deters developments that promote transportation and recreational physical activity.

Because population growth is a necessary precursor to the development process, Growth Machine Theory (Molotch, 1976; Logan & Molotch, 1987) provides a useful lens to interpret how the three categories of conflict identified as the central phenomenon discourage development strategies that may promote transportation and recreational physical activity. Growth Machine Theory states that land is a commodity and that the potential for intensified use creates a land-based elite that is united in efforts to direct economic and population growth to a specific municipality and away from a competing locale. The land-based elite is made up of landowners, local businessmen, investors, lawyers, realtors, and media representatives. Growth disproportionately benefits the land-based elite because it increases the exchange value of properties, i.e. the ability to purchase other commodities. Elected officials and developers are part of the "growth

machine" to ensure a favorable distribution of resources (Molotch, 1976). They may extend considerable resources (time and money) to achieve this goal.

> I think, locally we need to create more jobs, which with that would come population growth, and controlled, obviously some. Developer

In contrast to the land-based elite, local residents are more driven by use value, those qualities necessary for physical and emotional security (Logan & Molotch, 1987). The use value of a residence includes shelter, a relative location, an absolute location, and neighborhood characteristics (Harvey, 1972). The relative location includes accessibility to activities of daily living, such as work, shopping, social services, and recreation, and separation from offensive activities, such as pollution or crime. Developers, as part of the growth machine, and local residents use different values for making decisions.

> In CITY, and largely in North Carolina, a developer has the money, has the power to wield his or her influence. And typically, development codes, land-use planning, kind of get written to the advantage of the development community versus the general neighbors. Planner

While the values of developers and local residents are clearly defined in growth machine theory, the drivers of planners are less understood. Urban planners may be part of the growth machine because their employment is tied to growth and the growth machine (Logan & Molotch, 1987), but they may not receive the same level of benefits as other members of the land-based elite. Because planners are responsible for ensuring adequate services to residents, they are also in tune to implications to use values of new

developments. This partial membership in the growth machine helps to explain conflicts between planners and developers and within planners themselves.

> The opposite of growth is not stability; it's stagnation. Planner

> We want to be able to grow, and that's usually how we mostly operate here. But the question becomes numbers, total numbers, and I guess to some degree where growth occurs. Planner

> Local government policies can be very political…Generally since the planning board is made up of developers, they side with developers probably 90% of the time….Well the developer wins most of the time. And I think the citizens lose in that case. Planner

Selective Coding

Applying the implications of exchange value and use value to the six development strategies helps to clarify the crux of the conflict in the theoretical framework of increased physical activity through development strategies. The development strategies are divided into two groups based upon the category of regulation, zoning and development regulations. The six development strategies have different effects upon the exchange value and use value of properties within the two categories of regulation.

High density developments, mixed use developments, and variety of housing choice are regulated primarily through zoning ordinances. Zoning determines the allowable uses including the maximum allowable number of housing units per area. Residential units are separated from commercial areas and different densities of housing are separated. Variety of housing choice allows for single and multi-family dwellings as well as owner/renter occupied units to be in close proximity to one another. Single and

multi-family housing units occur in different zoning categories with the result of being geographically separated. Zoning has historically limited the three development strategies.

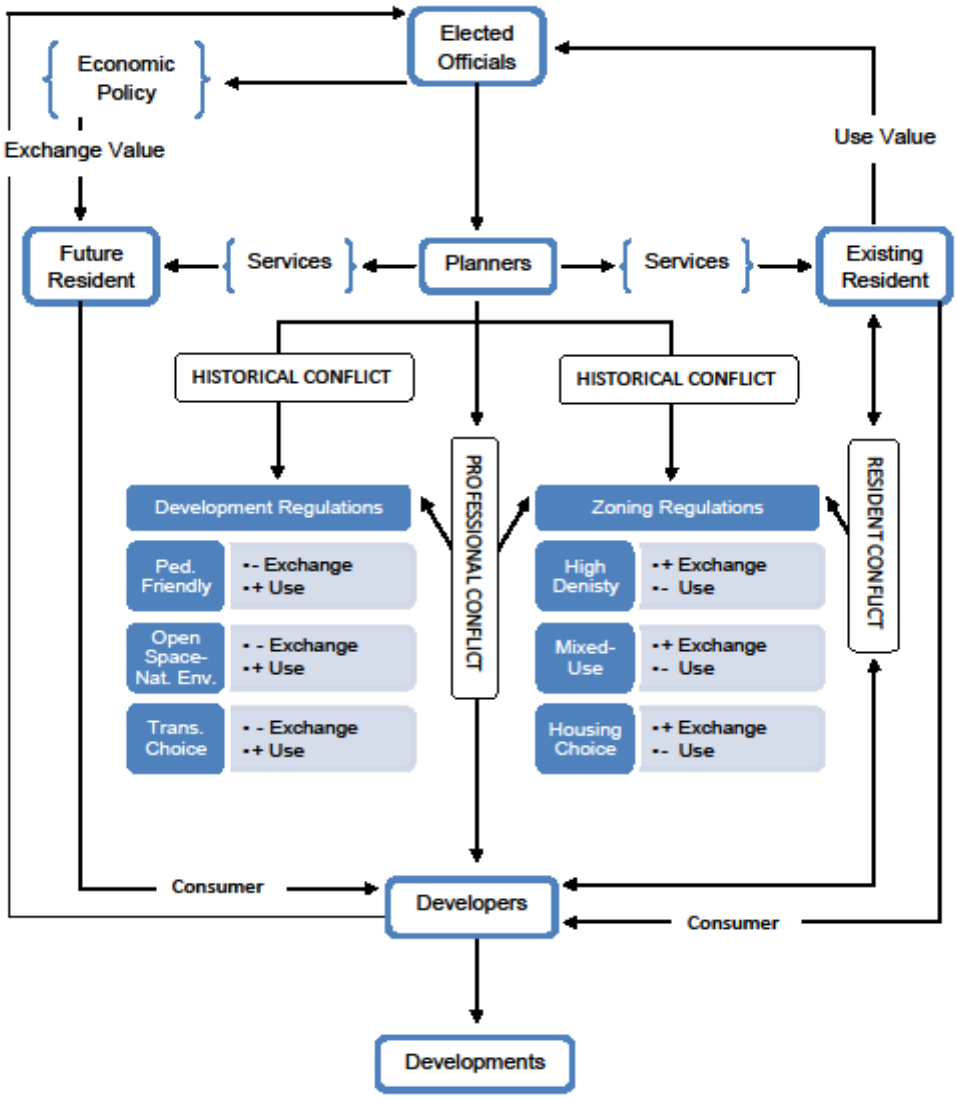
> Every piece of property in the city is pre-zoned. If you happen to have development in a high density zoning, then that's what you're going to develop in it. Developer

Pedestrian-friendly designs are not limited to sidewalks and trails, but may also include building setback requirements, safety features, and landscaping. Pedestrian-friendly designs are one element within providing transportation choices. Bike paths and interconnected road-networks may also be part of transportation choice. The provision of open space includes protecting environmentally sensitive areas, buffering disparate uses, and maintaining aesthetics. Regulation of these development strategies are usually within a development ordinance.

> There's a development ordinance that developers have to use as guidelines and really the Bible for new development. Developer

Higher density, mixed-use developments potentially increase the exchange value of properties because of the increased intensity of land-use. Variety of housing choice contributes to both higher densities and mixed-use by avoiding a reliance on single-family dwellings. Intensified land-use may be, or may be perceived to be, detrimental to use value evidenced by a decrease in quality of life. Pedestrian friendly designs, transportation choice, and providing open space may decrease the intensity of land-use unless other adjustments are made; including pedestrian features and open space

Figure 3: Theoretical framework of physical activity through development strategies



decreases the buildable area of a development site. Pedestrian features and amenities that allow transportation choice such as bike-lanes also increase the infrastructure costs associated with development.

Professional Conflict

Planners and developers may engage in conflicts due to existing regulations that prohibit a desired development or require undesired elements. These regulations limit the exchange value (expected future value) of property owned by the developer. The resolution of these conflicts can occur through a technical review process or when developers call upon elected officials to make a final decision. Elected officials and developers are united on an ideal of growth. Planners may be discouraged or angered when elected officials overturn their decision that was based on the regulation.

> There's places where, the cities around here haven't done, but down near CITY, some of them where neo-traditional, alleys, those things I would find very restrictive and would try to stay away from those kinds of places because it's not in keeping with what we try to do by providing quality, value-oriented, affordable housing to people. Those things just add costs with all those restrictions. And I'm not sure it changes, the municipality is just trying to decide what somebody's lifestyle ought to be and I'm not a fan of that. Developer

> Because the problem is…we ask for stuff and they balk. They don't want to spend the money; they don't want to put it in…they don't want to install sidewalks even. Planner

> It took some education for them to understand that what we were trying to do was going to do what they wanted to do. Developer

Resident Conflict

A second type of conflict occurs between developers and existing residents. In this instance, characteristics of a proposed development may be disliked by neighboring property owners. Residents focus on the use value of their home. Intensification of land-use is often viewed as detrimental to the use value of their home and is therefore unwanted. The existing residents may take action through the political process to alter or prohibit the development. Existing regulations protect the use value by discouraging alternate land uses.

> There may be a residential neighborhood – apartments go in. To some people that's a big problem; apartments are not so good a use. That's kind of in their mind…it obstructs their view or there's like loud noises that they didn't use to have and it increases the area traffic. Planner

> And so with the rezoning, it's a public hearing process and you know, not only is the technical merit of the case considered, but you have the public opinions that come into play and that always makes it a lot more challenging…So that would be a big, big barrier to achieving a community of this nature [different product types]. Developer

> A developer could propose what we would consider good urban design…but you can have people come out and say, 'we have a single family house, we're worried about devaluation…Good developments can get taken down because of popular concerns. Planner

Historical Conflict

Planners may exhibit a third type of conflict, an internal conflict. Planners must bridge the gap between exchange value and use value. Planners respond to the directives of elected officials who are growth oriented. However, planners are technocrats who

remain in government longer than individual elected officials. The planners attempt to provide adequate services to the public into the future, protecting use-value of existing properties. Because exchange value and use value cannot be maximized at the same time, the desires and actions of Planners may be incongruent.

> There's also a way that it's considered by these other bodies, the council and boards, which sometimes leads to waiving of particular standards which is kind of like extra process which isn't always so systematic which creates issues of potential perception or actuality of arbitrary, capricious decision-making – so it's a political process as well as a technical one. Planner

> We try to work out our differences, but many, many times, their position is pretty firm and we feel strong about what we need to make the project viable and most times it's left up to the elected officials to kind of mediate and decide what is best for the community. Developer

The development strategies of high density, mixed-use developments with meaningful open space that are pedestrian friendly and provide a variety of housing and transportation choices do not simultaneously increase exchange value and use value. For instance, high density development increases the number of units a developer is able to offer for sale and therefore increase the exchange value of the land. However, there may be a real or perceived decrease in use value of neighboring properties if higher density units are introduced. Existing zoning regulations discourage mixing housing densities to maintain use value. Thus while planners may desire higher densities, they may be unable to approve developments due to existing regulations.

Pedestrian-friendly designs may increase the use value of a property by increasing safety or aesthetics. However, pedestrian-friendly designs may decrease the exchange

value of a property because they consume land that would otherwise be developable. Such requirements add to the cost of development at the same time as they decrease the buildable land. Thus in both instances where exchange value is increased and use value is decreased, or vice versa, the result is conflict.

Discussion

Five groups of behavioral environmental agents were identified in the theoretical framework for increased physical activity through development strategies: elected officials, planners, developers, existing residents, and future residents (Bartholomew, Parcel, Kok & Gottlieb, 2006). The framework suggests that these groups engage in behaviors that discourage the utilization of development strategies that may promote physical activity. Consequently, the framework also provides direction for the selection of health promotion theories to develop interventions that are targeted at the organizational and community levels. These interventions should aim to reduce one or more of the three categories of conflict in the framework. Multiple interventions that target different groups in the framework may be necessary to overcome all of the conflicts that inhibit development strategies that promote physical activity.

Zoning and development regulations that promote physical activity are innovations that have yet to be embraced in the Triad region of North Carolina. The dissemination of model zoning and development regulations may reduce both the Professional Conflict and the Historical Conflict identified as barriers to development strategies that promote physical activity. Health promotion practitioners may use Stage Theory of Organization Change, based on earlier works of Lewin and Diffusion Theory,

to increase the adoption of these regulations. The theory suggests that organizations must pass through a series of steps in order to successfully institutionalize change (Steckler, Goodman & Kegler, 2002). A succession of interventions targeted toward elected officials, planning administrators, and developers is necessary to move through the steps to adopt and implement development regulations that promote physical activity. The impetus for change can come from a champion among these stakeholders in the planning and development process.

In areas characterized by low density development and separated land-uses that inhibit physical activity, the target audience of decision makers may not have entered into the first stage of change, realization that the current system is problematic. Initial interventions would attempt to increase awareness of the importance of the design of a community for physical activity within the target audience. A champion of these strategies among the elected officials or planning administration may be a critical component of success (Mccreedy &Leslie, 2009). Innovative developers may call upon elected officials to alter the development process to facilitate developments that promote physical activity. Elected officials may themselves become champions of development strategies that promote physical activity and enhance perceived characteristics of the city they represent or a potential champion may strive to become part of the city council to initiate change.

Interventions that provide viable alternatives to current policies help to move elected officials from awareness to adoption. Hollander, Martin, and Vehige (2008) reported that having access to sample policies was an important area for technical

assistance among local government officials. Policies that provide incentives to developers to mitigate losses in exchange value would reduce the Professional Conflict that occurs over development regulations that decrease buildable land. Such policies may also provide alternatives to historical policies that propagated the Historical Conflict of planners.

Future research to extend the theoretical framework for increased physical activity through development strategies could be conducted in environments that are successfully implementing development strategies that promote physical activity. This research should identify characteristics that differentiate areas that use these strategies from areas that do not use these strategies. There may be additional stakeholders involved in the planning and development process or there may be different economic and population growth rates. The findings would provide information to increase the generalizability of the theoretical framework, establishing under what conditions it is applicable. Additional research should identify catalysts for changes in development strategies used in communities that now promote physical activity through community design.

Another strategy to bring about the adoption and successful implementation of policies that promote physical activity friendly designs is to introduce additional behavioral environmental agents into the theoretical framework. Coalition Theory provides an opportunity to build outside power that interrupts the connection of the growth machine – from developers to elected officials – that maintains the status quo and fuels the Historical Conflict (Butterfoss & Kegler, 2002). The development of a coalition may unite a variety of local organizations including the local health department, cycling

and running clubs/businesses, community health foundations, economic development corporations, and neighborhood associations. The coalition can increase the salience of physical activity and community design among elected officials. Through continuous input from the coalition, the elected officials can be moved to initiate and sustain change. The coalition can work on individual developments as well as strengthen efforts for policy change. The coalition can support the work of champions within the planning and development process.

Diffusion Theory can be used to change the behavior of local developers (Rogers, 1995; Oldenburg & Parcel, 2002). The business models of new communities characterized as neo-traditional or New Urbanist serve as innovations that could be disseminated among developers in sprawling areas. Demonstrating the relative advantages of development strategies that promote physical activity may result in their adoption. The relative advantages that are compatible with the existing values of developers in sprawling areas include increased intensity of land-use and increased rates of occupancy. Early stages of interventions would focus on awareness knowledge followed by procedural knowledge. Face to face interactions may be the preferred communication channels to persuade local developers to reach the decision making stage. Change agents and opinion leaders may offer strategies that have been used successfully in other communities to increase the communicability of the new development model. Developments that promote physical activity in other areas of the country serve as a model for observability. Use of these strategies would reduce the Professional Conflict between planners and developers. The theory suggests that there are still barriers to

successful adoption of these strategies. Because there is high financial risk for the developers who select these strategies and lack of reversibility, multi-level change is necessary. Increasing the consumer demand for higher density mixed-use developments that provide a variety of transportation and recreation choices reduces the risk for developers.

Social marketing holds promise for reducing the Resident Conflict between local residents and developers and for increasing consumer demand for activity-friendly neighborhoods (Maibach, Rothschild, &Novelli, 2002). Local residents who oppose development strategies that may promote physical activity are doing so to protect the perceived use-value of their property. Images of proposed developments may serve to illustrate the "product" being introduced to existing property owners. Social marketing would seek to change the perceived threat of increased density and diversity of land-uses into a perceived benefit among local residents, reducing the psychological "price" of change. The "promotion" of these strategies through mass media campaigns can affect existing residents who may oppose such development strategies, but also influence potential housing consumers. Targeting a broader portion of the public, existing and future residents of new developments that are activity-friendly have the ability to create market demand for these strategies. As demand for these strategies increases, developers may be more willing to adopt alternative development philosophies and accept policy changes.

Conclusions

The theoretical framework for increased physical activity through development strategies is grounded in data from the Triad region of North Carolina during a time of national economic difficulties. These contextual factors may be inseparable from the framework. However, there is little reason to think that these planners and developers are significantly different from those in similar urban and economic areas of the U.S. Thus, practitioners in these areas may be able to use the findings of this study to develop interventions for their locales. Planners and developers from other jurisdictions should also be interviewed to enrich the theory. Future studies should confirm the perceptions of existing residents and elected officials that were given by the planners and developers. Evaluations of physical activity levels should be completed in new developments that use different combinations of the six development strategies that may promote physical activity.

The Stage Theory of Organization Change, Diffusion Theory, Coalition Theory and Social Marketing should be used by health promotion practitioners to bring about change at the community level. Interventions using these theories work to change the behavior of environmental agents in order to bring about changes in the design of the community to increase access to existing opportunities for physical activity and provide additional opportunities for physical activity.

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EPILOGUE

The studies presented in this dissertation serve two complementary purposes for health education and promotion practitioners. First, the studies suggest that health education and promotion practitioners need to become more involved in the planning and development process to increase opportunities for physical activity in the community; they must be cognizant of existing relationships between planners and developers and the perceived purposes of land-use regulations. Second, through the theoretical framework for increased physical activity and development strategies, the studies suggest intervention targets and strategies to be used by health education and promotion practitioners to increase the utilization of development strategies that promote physical activity.

The studies identify the need for increased awareness of the importance of built environments that promote physical activity in the community. At present land-use regulations are viewed as a mechanism to guide growth and ensure adequate provision of municipal services. Regulations discourage locally unwanted land-uses, even those that may promote physical activity, and allow for increased security of investments among land-owners. Health, and more specifically, prevention of pre-mature mortality and chronic-illness through increased levels of physical activity, was not a key purpose of land-use regulations among planners and developers in the Triad region of North Carolina.

Planners and developers perceived opportunities for recreational physical activity to be more important than opportunities for transportation physical activity among area residents. Using images of developments, planners and developers associated different levels of support for physical activity among different development strategies. Planners and developers identified three categories of responsibilities for providing opportunities for physical activity: awareness, variety, and interconnection. By working to include a greater variety of quality opportunities for physical activity that are part of a system of connected infrastructure, health education and promotion practitioners can help establish supportive built environments as part of multi-level interventions. Tailored interventions are needed to increase physical activity of residents depending on the built environment resources that are available to them.

The theoretical framework for physical activity and development strategies identified three categories of conflict that deter the use of development strategies that may promote physical activity in the Triad region of North Carolina: 1) conflict between planners and developers, 2) conflict between developers and local residents, and 3) historical conflict of planners. Using Growth Machine Theory as an interpretive lens, these conflicts arose because of differences in the systems used to value land. Exchange value, where land is a commodity, is positively associated with the intensity of land-use. Use value, where a residence provides physical and emotional security, may be threatened by intensification of land-use. Three development strategies were identified that increase exchange value: high-density development, mixed-use development, and a variety of housing choice. Three development strategies were identified that decreased

exchange value: pedestrian-friendly neighborhoods, a variety of transportation choices, and meaningful open space. Health education and promotion practitioners will be able to use the theoretical framework as a guide for selecting intervention targets and strategies to increase the implementation of the six development strategies that promote physical activity. One strategy is to alter regulations to include incentives to offset decreases in exchange value that accompany the development strategies of pedestrian friendly neighborhoods with a variety of transportation choices and meaningful open space. A complementary strategy is to work with developers and local residents to increase the benefits associated with increased densities and mixed-use developments for existing residents. Both strategies reduce the source of conflict and increase the likelihood of developing areas that promote physical activity.

Implications

1. This is the first study of planners and developers in the Triad region of North Carolina. It provides an in-depth understanding of barriers to increasing access to opportunities for physical activity through the planning and development process. The construction of the theoretical framework for increased physical activity through development strategies uniquely contributes to the growing body of literature to facilitate policy change.
2. This study employed a novel method to assess the level of support for physical activity among different development strategies. One significant procedural finding from this study is that images of developments are a useful tool to use with planners and developers to identify developments that promote physical

activity. Consistent with existing research, both high density developments and mixed-use developments were perceived to provide more opportunities for physical activity than single-family developments.

3. This study highlighted differences in the perceived importance of transportation and recreational physical activity. According to planners and developers, recreational physical activity was perceived to be more important the transportation physical activity in the public's choice of home. Different intervention strategies need to be developed to target different types of physical activity and to capitalize on the resources of the built environment.
4. While not the intent of this qualitative study, the findings are not generalizable to other contexts. Characteristics of the study area and participants are specific to the Triad region of North Carolina and are situated in a particular economic and historical context. The findings provide intervention strategies for health education and promotion practitioners working within the study area. However, there is little reason to think that these planners and developers are significantly different from those in similar urban and economic areas of the U.S. Thus, practitioners in these areas may be able to use the findings of this study to develop interventions for their locales.
5. The theoretical framework includes perceptions of stakeholders who were outside the sampling frame of the study. While the perceptions that planners and developers have formed of elected officials and residents influence their personal decision-making process, the perspectives of these stakeholders need to be

confirmed. If differences are identified between the perceptions held by planners and developers and the beliefs of stakeholders themselves, health education and promotion practitioners can use the opportunity for normative education of the decision makers.

6. The theoretical framework was developed from data of the private development process. Consideration of disadvantaged populations need to included in efforts increase the use of the development strategies that may promote physical activity. Redevelopment of existing urban areas may dislocate residents who would most benefit from increased accessibility of destinations; the theoretical framework may not be applicable to government developments.
7. In order to further develop the theoretical framework, additional study sites and stakeholders should be included in future studies to increase the range of conditions when the theoretical framework is applicable.

Future Work

This dissertation provides direction for future collaborations between health education and promotion practitioners and researchers. Without intervention in the planning and development process, the current pattern of development that inhibits physical activity is likely to continue. There is a need to educate the public, elected officials, planners, and developers of the importance of community-wide infrastructure and design to support physical activity. A variety of approaches is necessary to bring about a shift in the world view that reveres low density, single-family housing separated from all other uses to a world view that espouses a different American ideal – one that

provides more opportunities for physical activity, improves health, and increases quality of life.

At the individual site level within a community, these education efforts may be targeted solely at neighboring property owners, planners, and the developer. At the community scale, community organizing can be used to identify individuals to champion the benefits of development strategies that promote physical activity to other residents and elected officials. The development strategies identified for promoting physical activity may have additional benefits such as reducing air pollution or improving social cohesion. Coalition building and advocacy efforts can emphasize the multiple benefits of compact, mixed-use developments. Social marketing campaigns may be necessary to change the perceptions of local residents about development strategies that promote physical activity. A shift in the world view of local residents would encourage developers to provide housing consistent with that view and would increase support for policy initiatives that enabled the development strategies that deterred physical activity.

Such policy change efforts can be used to test the constructs within the theoretical framework for physical activity through development strategies. In order to further develop the theoretical framework, additional study sites and stakeholders should be chosen to explore alternative contextual conditions. Practitioners and researchers can work together to investigate how the available infrastructure modifies the effectiveness of intra-personal and inter-personal level interventions within a socio-ecological framework. While striving to increase opportunities for physical activity, stakeholders should include

strategies that also benefit marginalized populations and those who are disproportionately affected by health consequences associated with physical inactivity.

Planners and developers in the Triad want to provide a community that has a high quality of life. Different strategies are necessary to increase the participation of developers and engage them in future efforts. Most of the developers are not familiar with mixed-use projects. Small mixed-use developments in the area have not been successful which discourages larger scale projects. However, it may be that the scale of the mixed-use project is a determinant to its success. We may need to increase the growth rate in order to feel the need to build more densely or recruit developers from outside the area that have successfully completed developments that use the development strategies that promote physical activity.

APPENDIX A: INFORMED CONSENT FORM

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO
CONSENT TO ACT AS A HUMAN PARTICIPANT: LONG FORM

Project Title: Planning, land development, and residential development in urban counties

Project Director: Dr. Daniel L. Bibeau

Participant's Name: __ _____.

What is the study about?
This study is a research project to identify issues that key decision makers consider in the planning, land development, and residential development process in urban counties and to relate their decisions to community characteristics that are related to physical activity of residents.

Why are you asking me?
Adults who are currently employed in the planning, land development, or residential development process are able to participate in the study.

What will you ask me to do if I agree to be in the study?
You will be asked to respond to questions and to pictures in an interview.
The interview is expected to take less than one (1) hour.

Is there any audio/video recording?
Your spoken responses to questions will be digitally audio-recorded. Because your voice will be potentially identifiable by anyone who hears the tape, your confidentiality for things you say on the tape cannot be guaranteed although the researcher will try to limit access to the tape as described below. The original digital audio recording will be deleted from the recording equipment after it is transferred to a password protected computer.

What are the dangers to me?
The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants because audio recordings are potentially identifiable.

If you have any concerns about your rights or how you are being treated please contact Eric Allen in the Office of Research and Compliance at UNCG at (336) 256-1482. Questions about this project or your benefits or risks associated with being in this study can be answered by Dr. Daniel L. Bibeau who may be contacted at (336) 334-3240 (bibeau@uncg.edu).

Are there any benefits to me for taking part in this research study?
There are no direct benefits to participants in this study.

Are there any benefits to society as a result of me taking part in this research?
Members of society may become more educated about the planning, land development, and residential development process and be able to make better informed decisions.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments made for participating in this study.

How will you keep my information confidential?
All information obtained in this study is strictly confidential unless disclosure is required by law. Signed consent forms will be retained in a locked file cabinet in the office of the Principal Investigator on the UNCG campus. Information gathered from a participant will be assigned a tracking number and stored on a password protected computer. The Principal Investigator will destroy all data via electronic shredding machine three years after the close of the study.

Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of Internet access. Please be sure to close your browser when finished so no one will be able to see what you have been doing.

What if I want to leave the study?
You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect your in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study?
If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:
By signing this consent form you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by Andrew Peachey.

Signature: _____ Date: _____

APPENDIX B: PLANNER INTERVIEW PROTOCOL

DEMOGRAPHIC INFORMATION:

Gender

☐Male	☐Female

Education

☐High school graduate	☐Some college	☐College graduate	☐Graduate school
Location of college:			

Predominant ethnicity

☐ Black or African American	☐ Caucasian	☐ Hispanic
Other (please specify)		

How many years have you worked as a planner? _____ years
How many years have you worked as a planner in this area? _____ years

Which of the following categories best characterizes your current job responsibilities?

☐ Comprehensive planning
☐ Neighborhood / Subdivision planning
☐ Transportation planning
☐ Zoning

Q1. Imagine that you are preparing a new comprehensive plan for this area. Regulations may be added, changed, or removed if necessary. Please describe the type of residential community you would envision in the plan.

P1a. Why did you choose this type of community rather than another type of community?

P1b. Where would you locate this community?

P1b1. Why did you choose that location?

Q2. Now imagine that you are preparing a new comprehensive plan for this area under current economic and regulatory conditions. Please describe the type of residential community you would include in the plan.

P2a. How does this type of community differ from the first community you described?

P2a1. Why are there differences between the two communities?

P2b. Where would you locate this community?

P2b1. Why did you choose that location?

P2c. Is there a type of community that you would exclude?

P2c1. Why?

Q3. What are the purposes of local government land-use regulations for residential development?

P3a. How do local government policies influence what kind of community is built and where it is built?

P3b. How are conflicts resolved between local government officials and developers?

Q4. Thinking about the area in which you work, during the last three years, do you think the amount of population growth has been:

☐ Too little	☐ About right	☐ Too much

P4a. How has population growth in the area been accommodated?

P4b. How has new residential development affected the quality of life for area residents?

Q5. The National Association of Homebuilders and the American Planning Association have proposed strategies to accommodate population growth. These strategies include mixed-use developments, high density development, pedestrian-friendly neighborhoods with a variety of housing and transportation choices, and meaningful open space.

P5a. Which, if any, of these strategies characterize the new communities in your planning area?

☐ Mixed-use developments
☐ High density developments
☐ Pedestrian friendly neighborhoods
☐ Variety of housing choice
☐ Variety of transportation choice
☐ Meaningful openspace

P5a1. Why are these strategies used?

P5b. Which, if any, of these strategies do not characterize the new communities in your planning area?

☐ Mixed-use developments
☐ High density developments
☐ Pedestrian friendly neighborhoods
☐ Variety of housing choice
☐ Variety of transportation choice
☐ Meaningful openspace

P5b1. Why are these strategies not used?

P5c. How does local government policy support or prohibit these strategies?

P5d. How could these strategies be used locally?

P5e. How could local government policy support innovative design?

For the next set of questions, I will show you a series of pictures and ask several questions about each development.

(Development 1: Dover, Kohl & Partners, Duany, Plater-Zyberk & Company, Hall Planning & Engineering)

6a. Please describe what you see in the image.

P6a1. How is it similar to or different from recent developments in the area?

6b. In your opinion, why would someone build this type of development?

P6b1. What are the advantages of this type of development? (For whom?)

P6b2. What are the disadvantages of this type of development? (For whom?)

P6b3. Why would someone decide not to build, or be unable to build, this type of development?

6c. Is the development consistent with existing local regulations?

☐ Yes	☐ No	☐ Yes, under certain conditions

6d. In your opinion, what percentage of residential construction in this area in the past ten years is similar to this type of development?

6e. In your opinion, what percentage of residential construction in this area in the next ten years will be similar to this type of development?

6f. In your opinion, what percentage of consumers in the area seek this type of development for their residence?

P6. Why did you select _____?

(Development 2: NCRS, USDA)

7a. Please describe what you see in the image.

P7a1. How is it similar to or different from recent developments in the area?

7b. In your opinion, why would someone build this type of development?

P7b1. What are the advantages of this type of development? (For whom?)

P7b2. What are the disadvantages of this type of development? (For whom?)

P7b3. Why would someone decide not to build, or be unable to build, this type of development?

7c. Is the development consistent with existing local regulations?

☐ Yes	☐ No	☐ Yes, under certain conditions

7d. In your opinion, what percentage of residential construction in this area in the past ten years is similar to this type of development?

7e. In your opinion, what percentage of residential construction in this area in the next ten years will be similar to this type of development?

7f. In your opinion, what percentage of consumers in the area seek this type of development for their residence?

P7. Why did you select _____?

(Development 3: Tunnell-Spangler-Walsh & Associates)

8a. Please describe what you see in the image.
P8a1. How is it similar to or different from recent developments in the area?

8b. In your opinion, why would someone build this type of development?
P8b1. What are the advantages of this type of development? (For whom?)
P8b2. What are the disadvantages of this type of development? (For whom?)
P8b3. Why would someone decide not to build, or be unable to build, this type of development?

8c. Is the development consistent with existing local regulations?

☐ Yes	☐ No	☐ Yes, under certain conditions

8d. In your opinion, what percentage of residential construction in this area in the past ten years is similar to this type of development?

8e. In your opinion, what percentage of residential construction in this area in the next ten years will be similar to this type of development?

8f. In your opinion, what percentage of consumers in the area seek this type of development for their residence?

P8. Why did you select _____?

6/7/8. In which of the three developments would you choose to live? Why?

Q9. The strategies we discussed earlier (mixed-use developments, high density development, pedestrian-friendly neighborhoods with a variety of housing and transportation choices, and meaningful open space) may encourage physical activity through walking and biking for transportation and recreation.

Q9a. In your opinion, how important are opportunities for transportation physical activities such as walking or biking to stores, restaurants, or work to the public in their choice of home?

☐ Unimportant	☐ Of little importance	☐ Moderately Important	☐ Important	☐ Very Important

Q9b. In your opinion, how important are opportunities for recreational activities such as walking or biking for pleasure or exercise to the public in their choice of home?

☐ Unimportant	☐ Of little importance	☐ Moderately Important	☐ Important	☐ Very Important

Q10. What is more important than opportunities for transportation physical activity and recreational physical activity to the public in their choice of home?

Q11. What level of responsibility should local governments have for providing opportunities for transportation or recreational physical activity?

☐ None	☐ Little	☐ Moderate	☐ Most	☐ All

P11a. Why?

P11b. What level of responsibility should builders and developers have for providing opportunities for transportation and recreational physical activity in a community?

☐ None	☐ Little	☐ Moderate	☐ Most	☐ All

P11b1. What features in new communities in the area support physical activity?

P11b2. In your opinion, why are these features included?

P11c. Assuming some responsibility, what is the ideal combination between public and private infrastructure that supports physical activity?

P11d. In your opinion, what preferences do residents have for private community facilities over public facilities?

Now I will ask you additional questions about the pictures you saw earlier.

Please look at the pictures and then indicate your level of agreement for the next 2 statements.

(Source: Dover, Kohl & Partners, Duany, Plater-Zyberk & Company, Hall Planning & Engineering)

6g. The development provides opportunities for transportation physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

6h. The development provides opportunities for recreational physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

Please look at the picture and then indicate your level of agreement for the next 2 statements.

(Source: NCRS, USDA)

7g. The development provides opportunities for transportation physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

7h. The development provides opportunities for recreational physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

Please look at the picture and then indicate your level of agreement for the next 2 statements.

(Source: Tunnell-Spangler-Walsh & Associates)

8g. The development provides opportunities for transportation physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

8h. The development provides opportunities for recreational physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

Q12. Is there anything else that I have not asked that you feel is relevant?

Thank you again for your participation!

APPENIX C: DEVELOPER INTERVIEW PROTOCOL

DEMOGRAPHIC INFORMATION:

Gender

☐Male	☐Female

Education

☐High school graduate	☐Some college	☐College graduate	☐Graduate school
Location of college:			

Predominant ethnicity

☐ Black or African American	☐ Caucasian	☐ Hispanic
Other (please specify)		

How many years have you worked in the building and development industry?

_____ years

How many years have you worked in the building and development industry in this area?

_____ years

Residential Construction: How many housing units has your company built in the previous 12 months?

Single Family
Apartments / Condominiums
Townhomes
Other

Land Development: How many acres has your company developed in the previous 12 months?

Residential
Commercial
Industrial
Other

Engineering:

Residential
Commercial
Industrial
Other

Q1. Imagine that you are preparing to develop a new community in this area and that business risk and government regulations are removed. Please describe the type of community you would develop.

P1a. Why did you choose this type of community rather than another type of community?

P1b. Where would you build this community?

P1b1. Why did you choose that location?

Q2. Now imagine that you are preparing to develop a new community in this area under current economic and regulatory conditions. Please describe the type of community you would develop.

P2a. How does this type of community differ from the first community you described?

P2a1. Why are there differences between the two communities?

P2b. Where would you build this community?

P2b1. Why did you choose that location?

P2c. Is there a type of community that you would not develop?

P2c1. Why not?

Q3. What are the purposes of local government land-use regulations for residential development?

P3a. How do local government policies influence how you decide what type of community to build and where to build it?

P3b. How are conflicts resolved between you and the local government officials?

Q4. Thinking about the area in which you work, during the last three years, do you think the amount of population growth has been:

☐ Too little	☐ About right	☐ Too much

P4a. How has population growth in the area been accommodated?

P4b. How has new residential development affected the quality of life for area residents?

Q5. The National Association of Homebuilders and the American Planning Association have proposed strategies to accommodate population growth. These strategies include mixed-use developments, high density development, pedestrian-friendly neighborhoods with a variety of housing and transportation choices, and meaningful open space.

P5a. Which, if any, of these strategies characterize the communities you build?

☐ Mixed-use developments
☐ High density developments
☐ Pedestrian friendly neighborhoods
☐ Variety of housing choice
☐ Variety of transportation choice
☐ Meaningful openspace

P5a1. Why do you include these strategies?

P5b. Which, if any, of these strategies do not characterize the communities you build?

☐ Mixed-use developments
☐ High density developments
☐ Pedestrian friendly neighborhoods
☐ Variety of housing choice
☐ Variety of transportation choice
☐ Meaningful openspace

P5b1. Why do you not include these strategies?

P5c. How does local government policy support or prohibit these strategies?

P5d. How could these strategies be used locally?

P5e. How could local government policy support innovative design?

For the next set of questions, I will show you a series of pictures and ask several questions about each development.

(Development 1: Dover, Kohl & Partners, Duany, Plater-Zyberk & Company, Hall Planning & Engineering)

6a. Please describe what you see in the image.

P6a1. How is it similar to or different from recent developments in the area?

6b. In your opinion, why would someone build this type of development?

P6b1. What are the advantages of this type of development? (For whom?)

P6b2. What are the disadvantages of this type of development? (For whom?)

P6b3. Why would someone decide not to build, or be unable to build, this type of development?

6c. Is the development consistent with existing local regulations?

☐ Yes	☐ No	☐ Yes, under certain conditions

6d. In your opinion, what percentage of residential construction in this area in the past ten years is similar to this type of development?

6e. In your opinion, what percentage of residential construction in this area in the next ten years will be similar to this type of development?

6f. In your opinion, what percentage of consumers in the area seek this type of development for their residence?

P6. Why did you select _____?

(Development 2: NCRS, USDA)

7a. Please describe what you see in the image.

P7a1. How is it similar to or different from recent developments in the area?

7b. In your opinion, why would someone build this type of development?

P7b1. What are the advantages of this type of development? (For whom?)

P7b2. What are the disadvantages of this type of development? (For whom?)

P7b3. Why would someone decide not to build, or be unable to build, this type of development?

7c. Is the development consistent with existing local regulations?

☐ Yes	☐ No	☐ Yes, under certain conditions

7d. In your opinion, what percentage of residential construction in this area in the past ten years is similar to this type of development?

7e. In your opinion, what percentage of residential construction in this area in the next ten years will be similar to this type of development?

7f. In your opinion, what percentage of consumers in the area seek this type of development for their residence?

P7. Why did you select _____?

(Development 3: Tunnell-Spangler-Walsh & Associates)

8a. Please describe what you see in the image.

P8a1. How is it similar to or different from recent developments in the area?

8b. In your opinion, why would someone build this type of development?

P8b1. What are the advantages of this type of development? (For whom?)

P8b2. What are the disadvantages of this type of development? (For whom?)

P8b3. Why would someone decide not to build, or be unable to build, this type of development?

8c. Is the development consistent with existing local regulations?

☐ Yes	☐ No	☐ Yes, under certain conditions

8d. In your opinion, what percentage of residential construction in this area in the past ten years is similar to this type of development?

8e. In your opinion, what percentage of residential construction in this area in the next ten years will be similar to this type of development?

8f. In your opinion, what percentage of consumers in the area seek this type of development for their residence?

P8. Why did you select _____?

6/7/8. In which of the three developments would you choose to live? Why?

Q9. The strategies we discussed earlier (mixed-use developments, high density development, pedestrian-friendly neighborhoods with a variety of housing and transportation choices, and meaningful open space) may encourage physical activity through walking and biking for transportation and recreation.

Q9a. In your opinion, how important are opportunities for transportation activities such as walking or biking to stores, restaurants, or work to your client's choice of home?

☐ Unimportant	☐ Of little importance	☐ Moderately Important	☐ Important	☐ Very Important

Q9b. In your opinion, how important are opportunities for recreational activities such as walking or biking for pleasure or exercise to your client's choice of home?

☐ Unimportant	☐ Of little importance	☐ Moderately Important	☐ Important	☐ Very Important

Q10. What is more important than opportunities for transportation physical activity and recreational physical activity to the public in their choice of home?

Q11. Q11. What level of responsibility should builders and developers have for providing opportunities for transportation and recreational physical activity in a community?

☐ None	☐ Little	☐ Moderate	☐ Most	☐ All

P11a. Why?

P11b. Are there any features in the developments you build that support transportation or recreational physical activity?

P11b1. Why do include you include these features?

P11c. What level of responsibility should local governments have for providing opportunities for transportation or recreational physical activity?

☐ None	☐ Little	☐ Moderate	☐ Most	☐ All

P11d. Assuming shared responsibility, what is the ideal combination between public and private infrastructure that supports physical activity?

P11e. What preferences do customers have for private community facilities over public facilities?

Now I will ask you additional questions about the pictures you saw earlier.

Please look at the pictures and then indicate your level of agreement for the next 2 statements.

(Source: Dover, Kohl & Partners, Duany, Plater-Zyberk & Company, Hall Planning & Engineering)

6g. The development provides opportunities for transportation physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

6h. The development provides opportunities for recreational physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

Please look at the picture and then indicate your level of agreement for the next 2 statements.

(Source: NCRS, USDA)

7g. The development provides opportunities for transportation physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

7h. The development provides opportunities for recreational physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

Please look at the picture and then indicate your level of agreement for the next 2 statements.

(Source: Tunnell-Spangler-Walsh & Associates)

8g. The development provides opportunities for transportation physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

8h. The development provides opportunities for recreational physical activity.

☐ Strongly Disagree	☐ Disagree	☐ Undecided	☐ Agree	☐ Strongly Agree

Q12. Is there anything else that I have not asked that you feel is relevant?

Thank you again for your participation!