

Conceptual Approach

Opportunities for Integrating Public Health and Urban Planning Approaches to Promote Active Community Environments

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Synopsis

The growing emphasis on promoting environmental change as a means to increase physical activity has motivated conversation and collaboration between researchers and practitioners in the fields of public health and urban planning. Although these fields share similar objectives, their methodological approaches for examining the association between the environment and behavior often differ in significant ways. To facilitate communication, this article discusses ways these fields can collaborate in developing and applying conceptual frameworks, adopting behavioral and environmental measures, and strengthening study designs. By collaborating to build synergism in research and dissemination, public health and urban planning professionals can enhance efforts to increase the number of communities that promote active living. (Am J Health Promot 2003;18[1]14–20.)

INTRODUCTION

Following their combined efforts to improve living conditions in the overcrowded and disease-ridden cities of the late 19th century, the disciplines of public health and urban planning largely went their separate ways. Decades later, the two fields have reunited with respect to a considerably different issue: How can we get people to walk and bicycle more? For the public health field, this question is linked to growing concerns over

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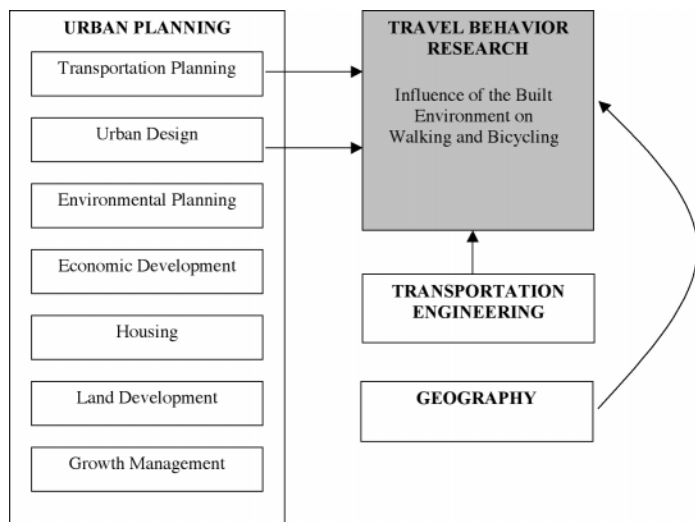
the high prevalence of inactivity, obesity, and associated chronic diseases.^{1–4} For the urban planning field, this question is often tied to increasing concerns over congestion and the environmental impacts of automobile use. Until now, the two fields have primarily focused on different strategies for addressing these problems—public health on individual, interpersonal, and sometimes multilevel interventions and urban planning on measures that shape the built environment. Yet, the growing recognition that both approaches are essential for achieving significant changes in behavior has motivated collaboration between researchers within the two fields. To stimulate discussion among researchers and practitioners, this article reviews and recommends improvements for key conceptual and methodological approaches used by public health and urban planning researchers for studying the physical activity and travel behavior of adults. The goal is to present opportunities for creating synergism in building evidence for active community environments.

This discussion will focus on two specific concentrations within the broad fields of public health and urban planning, namely, physical activity research and travel behavior research. Physical activity research comprises a specific area within the field of public health—a set of disciplines that emphasize research and practice concerned with the health of populations.⁵ Within the broad discipline of urban planning, travel behavior research combines the interests of two distinct fields, namely, transportation planning and urban design, each concerned with studying the influence of the built environment on human behavior (Figure 1). Travel behavior researchers can also be found in a variety of other disciplines, including engineering and geography.

LINKING CONCEPTUAL FRAMEWORKS AND THEORIES

To begin the process of acquiring and building evidence, answers to the following questions are essential: What factors in the community environment need to be examined? How do these factors relate to behavior and to each other? How can active community environments be

Figure 1
Schematic Illustration of the Fields Both Within and Outside Urban Planning Involved in Travel Behavior Research (Indicated by Arrows)



created? Conceptual frameworks and theories address these questions through an interrelated set of propositions to explain behavior and a systematic method to guide practice. An especially important framework, serving as an opportunity for collaboration across fields, is the ecological framework. This framework offers insight into the context for promoting health and behavior change through consideration of individual, interpersonal, community, organizational, policy, and environmental influences, as well as the dynamic exchange among these factors.⁶⁻¹¹ Wing and colleagues¹² state that these ecological factors are needed to determine key variables related to community and cultural influences on physical activity.

In public health, theories and planning frameworks are integrally related to the development of pertinent research questions and hypotheses, the identification of factors that influence health and behavior, the determination of program or policy objectives and activities, the implementation of programs, and the measurement and evaluation of program or policy effectiveness over time.¹³⁻¹⁵ In urban planning, the use of theory is less pronounced, since it relates primarily to the identification of factors and analytic models to explain and predict travel behavior. Theories applied to urban design research also provide useful hypotheses about the elements of the built environment that influence travel behavior, although they do not provide a framework for studying this influence. In practice, transportation planners may use theory to forecast travel demand.

A challenge for those seeking cross-disciplinary collaboration is to build on conceptual similarities and learn from each field's definitions and use of theory. Table 1 provides examples of widely used theories within each field and highlights points of convergence and divergence

across fields. Transportation theory is conceptually similar to public health theory, since professionals in both fields seek to understand factors that influence travel or physical activity behavior. Likewise, urban designers and public health professionals are engaged in similar processes to understand specific factors in the built environment that influence individual behavior. A central point of divergence between travel behavior and physical activity researchers is the notion that demand for walking and bicycling is a "derived demand." In urban planning, the demand for walking and bicycling derives from the demand for other activities (e.g. work, shopping), a *utilitarian* model for active living. In contrast, by emphasizing leisure-time physical activity, public health has most often applied a *recreational* model for active living. Under such a model, physical activity may be derived from a variety of internal and external factors, for example, a person's inherent interest in engaging in activity (e.g., jogging, dancing, skiing, team sports) and social support.

Participation from both fields will be necessary to develop cross-cutting frameworks. For example, public health professionals can advocate for incorporating utilitarian activity into frameworks previously focused on recreational activity alone. Urban planning professionals can highlight both the intrinsic desire of individuals to participate in physical activity and the maximization of population health as additional evidence for creating active community environments. Both fields can explore theories and frameworks from other disciplines and consider tailoring existing ecological frameworks or developing new frameworks to account for cross-disciplinary factors or alternative causal structures. Finally, through collaboration, experts within both fields can develop a design model to guide urban planners in developing cities and regions within the context of health promotion.

ASSESSING WALKING AND BICYCLING BEHAVIORS

Increasing walking and bicycling as two means of improving health and quality of life represents a shared goal between the fields of public health and urban planning. For public health, walking and bicycling for transportation or recreation are specific forms of physical activity, that is, forms of "bodily movement . . . produced by the contraction of skeletal muscle . . . that substantially [increase] energy expenditure."¹ Within the field of urban planning, walking and bicycling represent specific modes of travel, with "travel" referring to movement from one destination to another destination.

To assess walking and bicycling, urban planners and public health professionals have traditionally used two different types of measurement tools, population-based surveys or surveillance and direct observation. Population-based surveys conducted by government agencies reflect national and state trends concerning physical activity and travel patterns and illustrate opportunities for collecting standardized measures of behavior across populations. Direct observation is typically implemented on a more limited geographical scale or for hypothesis testing.

Table 1
Conceptual Frameworks and Theories Used by Public Health and Urban Planning

Fields and Approach	Example Theories and Frameworks	Description	Basic Assumptions	Example Constructs or Dimensions
<i>Physical activity research in public health</i> (individual level) To understand why people engage in health-risk or health-compromising behavior	Health Belief Model Social Cognitive Theory The Transtheoretical Model	The theories identify, quantify, and promote understanding of the impact of individual-level determinants on health behaviors. They also guide intervention programs targeting individual-level determinants of health behavior.	People value good health Behavior is under volitional control. Cognitive processes drive behavior	Perceived benefits Perceived barriers Self-efficacy Behavioral intention Stages of change Emotional coping responses
<i>Physical activity research in public health</i> (community level) To understand the diverse community factors that influence an individual's adoption or maintenance of health-compromising behavior	Ecological Framework Community Capacity Social Marketing	The theories and frameworks identify and describe the impact of community (i.e., social, cultural, economic, environmental, policy) influences on health behaviors. They also guide intervention programs targeting community determinants of health behavior.	Environments influences individual access to resources and individual behavior. Environments influence community norms. Community norms and access to resources influence behavior.	Participation/civic engagement Social networks Organizational networks Sense of community Resources Leadership
<i>Travel behavior research in transportation planning</i> To understand why people make particular choices about travel, including whether or not to travel, where to go, and how to get there	Microeconomic Demand Theory	The theory assumes that the maximization of utility, or individual well-being determines choices about travel. It is used in research to identify the relative contribution of different factors to travel choices and in practice to predict travel demand under different conditions	People make decisions to maximize utility Individuals are aware of the range of alternatives and their characteristics Rational decision making drives behavior	Trip monetary cost Trip time Comfort Convenience Safety and security Level of service
<i>Travel behavior research in urban design</i> To guide the design of the built environment to foster human activity in public places	Normative theory	A body of work that provides principles for the design of public places, including streets, which are enabling and encouraging of human activity, including walking and bicycling. Classic studies in this area serve as a basis for evaluating the design of public places in practice.	Human interaction in public places helps to build community and enhance quality of life. The physical environment shapes human behavior and can foster or inhibit human interaction	Walkable communities Vibrant public spaces Pedestrian-oriented design Transit-oriented design Bicycle friendly Livable communities

Public health professionals have used the Behavioral Risk Factor Surveillance System to measure self-reported leisure-time physical activity on a state-by-state basis since 1984 (Table 2).¹⁶ In its current form, all types of leisure-time activities are combined to derive rates of inactivity and rates of participation in recommended moderate or vigorous activity. Following extensive reliability testing, it is anticipated that the newly developed International Physical Activity Questionnaire may help researchers identify additional forms of activity, such as walking and bicycling for transportation (Table 2).^{17,18} For urban planners, travel diaries are surveys focused solely on transportation (i.e., utilitarian walking and bicycling) and assist in the development of travel forecasting models. The National Household Transportation Survey, formerly named the Nationwide Personal Transportation Survey, has provided travel behavior data every 5 to 7 years since 1969 for individuals and households throughout the United States (Table 2).¹⁹ Another alternative, activity diaries, structured around activities rather than trips, are increasingly used in place of traditional travel diary surveys (Table 2).^{20,21} Researchers believe that it is easier for survey participants to

think in terms of activities rather than trips and that, as a result, activity diary surveys produce more complete and accurate data about travel.^{22,23}

Physical activity and travel behavior researchers have also developed a number of observational measures. One type of observational tool is a portable device for measuring people's activity and travel patterns. Physical activity researchers have used electronic motion sensors (accelerometers) to pick up motion or acceleration of a limb or trunk and pedometers to measure locomotion by counting steps.²⁴ In a recent study in Atlanta, Georgia, travel behavior researchers implemented portable global positioning system units to collect data about personal travel, including walking and bicycling and transit and automobile use.²⁵ Initial indications suggest that this innovative technique generates useful data and can be used for validating travel or activity diaries but is challenging to implement for a variety of practical reasons.²⁵ Data on walking and bicycling can also be collected with counting devices. For example, infrared beam counters can be placed on walking trails and bicycle paths to estimate patterns of use.²⁶ Although not commonly used to assess pedestrian

Table 2

Examples of Population-based Approaches Used by Physical Activity and Travel Behavior Researchers to Measure Behavior

Behavior	Population-based survey	Example Items
Physical activity	Behavioral Risk Factor Surveillance System ¹⁶	. . . [T]hinking about the moderate physical activities you do in a usual week, do you do moderate activities for at least 10 minutes at a time, such as brisk walking, bicycling, vacuuming, gardening, or anything else that causes small increases in breathing or heart rate? How many days per week do you do these moderate activities for at least 10 minutes at a time? On days when you do moderate activities for at least 10 minutes at a time, how much total time per day do you spend doing these activities?
	International Physical Activity Questionnaire ¹⁸	During the last 7 days, on how many days did you bicycle for at least 10 minutes at a time to go from place to place? How much time in total did you usually spend on one of those days to bicycle from place to place?
Travel behavior	National Household Travel Survey (travel diary) ¹⁹	At the beginning of my travel day I was home, some other place Where did you go? What time did you start and end each trip? Why did you go there? How did you travel? How far was it?
	Bay Area Travel Survey 2000 (regional activity diary) ²¹	Your next activity began at _____ : _____ am/pm What was this activity? If driving, riding, walking, biking, or flying, When did you arrive at your final destination? List all types of transportation used. If not a trip, Specify activity. When did you end this activity? Where did this activity occur?

and bicyclist activity, automated traffic counters can be used to count the number of vehicles passing selected points during a particular period to provide data about the quality of the environment for pedestrians and bicyclists (e.g., traffic volume, traffic speed).

The combined use of measurement tools from public health and urban planning can more comprehensively reflect measures of active living behavior (i.e., utilitarian and recreational). However, because the two different data collection techniques, population-based surveys or surveillance and direct observation, encompass varied population levels (i.e., national vs. state or local), the corroboration between measures is limited and restricts researchers' capacity to assess behavior at the community level.²⁷ In public health research, population-based surveys have generally relied on self-report, with little attention on objective measures of physical activity (e.g., with accelerometers). In addition, many of the surveys used in urban planning have not been systematically tested for reliability and validity. For example, most travel diary surveys undercount trips less than a mile, travel outside work, travel by children, and nonmotorized travel.²⁸⁻³² Differences in the design of the measurement tools and/or sampling techniques indicate a need for standardization of metrics and modification of methods.^{33,34} Such changes will help to ensure that walking and bicycling, both utilitarian and recreational, are captured and will permit bet-

ter comparison across diverse communities. The parallel efforts to monitor these complex behaviors and improve data collection methods represent opportunities for cross-disciplinary collaboration.

EVALUATING THE COMMUNITY ENVIRONMENT

To some extent, both physical activity and travel behavior researchers seek to understand what constitutes an active community environment, that is, "places that support and promote physical activity for people of all ages and abilities."³⁵ Differences between these fields in measuring the community environment likely stem from a number of factors, including the goals and practices of the professions, as well as the outcomes of interest (i.e., physical activity vs. reduced driving) and the conceptual frameworks that guide their research (i.e., maximizing health vs. maximizing utility). Table 3 presents the distinctions between each field's general approach to measuring the community environment.

What environmental features are measured and how the data are collected serve as key distinctions between how physical activity and travel behavior researchers have approached evaluating the community environment. Measuring the environment represents a relatively new area for physical activity researchers. Often drawing on the ecological framework to define the domains and variables

Table 3

Measures of the Community Environment Used by Physical Activity and Travel Behavior Researchers

Domains	Example Measures
Physical activity research in public health ³⁹	
Physical environment	Accessibility of facilities (e.g., density of facilities, distance to bikeway) Aesthetic attributes (e.g., neighborhood friendly, enjoyable scenery)
Social environment	Safety from crime Social capital (e.g., trust, cooperation among community agencies, civic engagement)
Policy environment	Worksite policies that support physical activity (e.g., flextime) Insurance reimbursement for physical activity services and counseling in health organizations
Travel behavior research in urban planning ^{27, 43}	
Land use	Population density Land use mix
Transportation systems	Travel time between two points by different modes Route directness or "street connectivity"
Site design	Shade Pedestrian access

within the community environment, many of these researchers have complemented their study of individual factors (e.g., beliefs, attitudes, barriers) with various community- or neighborhood-level physical, social, and policy environmental factors that influence physical activity behavior (Table 2).³⁶⁻⁴² Among travel behavior researchers, measuring the built environment has been the standard practice. The built environment measures used in these studies fall into three general categories: land use, transportation systems, and site design (Table 2).^{27,43} Two of the primary measurement domains, the location of potential destinations and the nature of the transportation network, have been incorporated, although not always explicitly, into the utility-maximizing (or cost-minimizing) framework or other behavioral theories through their contribution to the actual or perceived cost of travel.²⁷ How the built environment measures are treated in analyses can vary from a simple categorization by neighborhood or community type⁴⁴⁻⁴⁶ (e.g., suburban vs. traditional) to sophisticated indices of land use mix and accessibility.^{47,48}

Just as the domains and measures used to reflect the environment vary, the data collection methods and data sources for obtaining these measures differ between the two fields. For example, physical activity researchers have often used individual-level surveys (telephone or mail) that are capable of assessing multiple dimensions of perceived physical activity determinants (e.g., a survey asking individuals about the presence or quality of sidewalks in their neighborhoods). In contrast, travel behavior re-

searchers have traditionally focused less on individual perceptions, depending mainly on existing data (e.g., U.S. Census, regional and local land use and transportation databases, and aerial photographs) for their built environment measures. To a lesser extent, site visits or field observations and preference surveys at the neighborhood level have been conducted,⁴⁹⁻⁵¹ usually for studies that focus on more limited geographic areas.

These distinctions in measurement approaches for evaluating the community environment, as well as their associated limitations, point to ways in which each field could contribute to the other's research practices. For example, since individual surveys make up a primary form of data collection among physical activity researchers, the environment measures tend to reflect specific characteristics (e.g., sidewalks, safety, enjoyable scenery) of individuals' immediate neighborhoods. To date, only a handful of studies in the public health literature have incorporated contextual or objective environmental indicators that may influence physical activity, such as accessibility and/or density of facilities^{40,52,53} or degree of urbanization.^{54,55} Transportation and urban planning researchers could work with public health researchers in using existing data sources (e.g., Geographical Information Systems) and alternative data collection techniques to gather data on environmental indicators. Objective data may be valuable for supplementing the research on perceived measures. In addition, assessing these data on a microscale and analyzing them spatially may help to identify the geographic scales that capture the most important environmental determinants of walking and bicycling.

Although existing databases are an important asset for travel behavior researchers, their use often limits the research by determining what environmental characteristics are selected as explanatory variables and at what geographic level the analyses take place.⁵⁶ Within travel behavior research, the growing interest in understanding why people choose to walk or bicycle rather than drive has expanded the range of variables used to represent the built environment, and travel behavior researchers are increasingly recognizing the importance of individual attitudes and preferences in explaining travel behavior.^{50,51,57} Public health researchers could assist in guiding the development of individual, organizational, social, and policy measures and in testing their measurement properties. Through this collaboration, researchers may begin to understand the contribution, sequence, and synergistic relationships of all the ecological domains applicable to explaining physical activity and travel behavior.

APPLYING ALTERNATIVE STUDY METHODS

Once the community environment and activity or travel patterns have been measured, both physical activity and travel behavior researchers have typically applied cross-sectional studies to examine the relationships between the two. Alternative study designs (e.g., longitudinal or experimental studies) that examine the effects of *changes* to the environment are often difficult to implement. For example, although experimental study designs are considered

the gold standard since randomization of study participants reduces the potential for bias,¹³ they are seldom feasible to implement when evaluating the effects of the environment on travel and/or physical activity behavior. In addition, with the exception of evaluations of transportation system performance (e.g., traffic calming or signal timing), many regional transportation planning agencies have not done research with pre-post designs, comparison groups, and/or physical activity outcomes. To add to the challenges, much of the urban landscape (e.g., highways, city parks) is already built and does not change substantially during short periods, limiting opportunities for “natural experiments.” Nonetheless, physical activity and travel behavior researchers should take advantage of studying these changes as they happen to arise.

Physical activity and travel behavior researchers will need to explore feasible alternative study designs that remove some of the biases associated with cross-sectional studies (e.g., temporality concerns). Promising alternatives are quasi-experimental studies, similar in design to experimental studies, except that study participants are not allocated randomly to treatment or control conditions. In these designs, study participants are followed-up for a predetermined period, and rates of the dependent variable are computed for each group to determine if the intervention is effective. An example of a quasi-experimental study was published by Linenger and colleagues.⁵⁸ They compared baseline and 1-year follow-up rates of physical activity between intervention and comparison cohorts following simple environmental modifications in the intervention site (e.g., increased access to recreational facilities).

If a comparison group is not available, an alternative quasi-experimental study design is a time-series study. In this approach, one population is observed for a time before the intervention to show that the dependent variable was stable before the intervention was implemented. The study sample serves as its own comparison group with time as the differentiating factor in this case. An example is a study demonstrating the impact of new state laws requiring the use of seat belts.⁵⁹

Qualitative studies can also contribute to research on the environmental determinants of travel and physical activity behavior. Through use of focus groups, as well as observations, content analysis of newspapers, and photographs, qualitative studies can reveal how and why a program or policy is effective or ineffective or identify domains and questions that should be included in quantitative instruments.^{60–62} Through cooperation with community constituents, qualitative studies can be useful in ascertaining issues of priority or concern, interpreting results from quantitative studies, and identifying successful methods of implementation. A sophisticated example of combining quantitative and qualitative data collection techniques is the Household Activity Travel Simulator, developed by researchers in the United Kingdom in the 1970s. These researchers used qualitative data to explore people’s motivations behind travel and activity choices and the constraints that shaped these.^{63,64}

As the fields achieve greater collaboration, cross-sectional designs will appear particularly limited in their ability

to assess the interrelationships among the built environment, residential choices, travel behavior, and physical activity behavior. Working with city agencies, transit agencies, and others to identify planned “interventions” may assist researchers in implementing alternative study designs. Encouraging funders to support qualitative studies may help to expand data collection techniques. Moving beyond cross-sectional studies will be crucial for advancing the research so as to build more convincing evidence about the community and/or environment’s role in influencing active living.

TRANSLATING RESEARCH INTO PRACTICE

As the body of evidence accumulates, public health and urban planning communities must determine when to intervene and how to implement new or influence existing programs or policies to encourage walking and bicycling. A valuable contribution to these fields that will assist in translating research into practice is expected soon from the Task Force for Community Preventive Services. The task force is currently weighing evidence from public health and urban planning concerning transportation policy and infrastructure changes and urban planning approaches to promote nonmotorized travel.⁶⁵ The systematic review process used by the task force will serve as an excellent guide to identifying measures, interpreting results, and drawing inferences across the fields of public health and urban planning (www.thecommunityguide.com).⁶⁶

Cooperation from both urban planning and public health researchers and practitioners will be important for translating research findings into population changes in rates of physical activity. Public health will depend on transportation engineers and urban planners to execute community design changes. Likewise, transportation and urban planning will need public health practitioners to assist in justifying relevant policies. As with disease occurrence, public health interventions often follow a long “latency period” between scientific understanding and application on a population basis.⁶⁷ In light of the unacceptable levels of inactivity and associated health and economic consequences, reducing this latency period should be a top priority for public health officials, urban planners, and transportation engineers in their pursuit of enhanced community environments and quality of life.

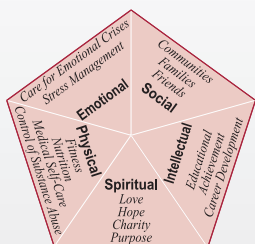
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