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(1) A Difference in Difference Study of Greenway Use

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Focus Area: Research

Background and Purpose

Urban greenways have often been designed to incorporate multi-use trails and can provide opportunities for physical activity, recreation, and transportation to a large number of individuals¹ The Task Force on Community Preventive Services has recommended the creation or enhanced access to places for physical activity, such as creating greenways or trails, as an effective method for physical activity.² Previous research has demonstrated that individuals who use greenways or trails for physical activity are more likely to meet national recommendations for physical activity than those who rarely or never use them for physical activity.³

The St. Louis, Missouri region recently completed and approved a comprehensive Gateway Bike Plan to support over 1,000 miles of on-road and greenway bicycle paths. An early example of this work is the 1.3-mile extension of the St. Vincent Greenway, which will connect residents of an underserved neighborhood in St. Louis with opportunities for recreation, transportation, and civic engagement.

Although several studies have objectively examined the demographic characteristics and physical activity behaviors of greenway and trail users³⁻⁵, no study to date has assessed changes in greenway use before and after installation and with a control neighborhood (difference in difference).

Objectives

In collaboration with a local public-private partnership, Great Rivers Greenway, this study assessed the differences in greenway and control site users before and after the completion of the new 1.3-mile St. Vincent Greenway.

Methods

The System for Observing Play and Recreation in Communities (SOPARC)⁶ and adapted transect counts from Open Streets initiatives⁷ were used to assess the number of users, demographic characteristics, and physical activity behaviors of users along the greenway site and a control site with closely matched demographics. The greenway site was a sidewalk prior to greenway construction. The control site included a bike lane, sharrows, and sidewalks that did not change during the course of observation. Trained observers conducted the systematic scans and summary counts over 14 consecutive days prior to the greenway completion in June 2012 and one year after installation in June 2013. Estimated physical activity level and demographic characteristics including gender and age group were assessed.

Preliminary statistical analyses have been performed with additional analysis forthcoming. Descriptive statistics using SPSS examined all users from the greenway and control sites by gender and age group pre- and post-installation of the greenway. Difference in difference estimation was used to examine prevalence pre- and post- completion of the greenway.

Results

An average of 1.72 individuals were observed at each target area along the greenway site before installation and an average of 2.09 individuals were observed after completion ($p=.126$). For the control site, an average of 3.31 individuals were observed before installation and an average of 3.50 individuals were observed after completion ($p=.707$). Although these changes from pre- to post-greenway installation



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were non-significant, using difference in difference, there was an 18% increase in individuals using the greenway and only a 5% increase observed at the control site. Given the observed increase in individuals at the control site, the additional increase in individuals at the greenway site is equivalent to 29 persons per mile during the observation period.

There were statistically significant increases by gender and age group among greenway users. Adult greenway users increased from pre- to post-greenway installation ($p=.005$). More specifically, male adult greenway users increased from pre- to post-greenway completion ($p=.009$). There was no significant change among adult users of the control site. Among individuals assessed along the control site, children users and senior users decreased significantly ($p=.040$ and $p=.036$, respectively). Specifically, these decreases were among female children and senior users ($p=.010$ and $p=.033$, respectively). There was no significant change among children or seniors at the greenway site.

Conclusions

The current preliminary study explores changes in prevalence of greenway users before and after the installation of a St. Louis greenway. Our findings reveal a significant increase in adults, a population more likely to engage in active transportation in comparison to children or seniors. There was a significant decrease between the two years in the number of children and seniors using the bike lane, sharrows, and sidewalk at the control site, but no significant change in these populations at the greenway site.

Implications for Practice and Policy

The creation of or enhanced access to greenways, particularly those in urban settings, has been shown to assist individuals in meeting physical activity guidelines. Understanding characteristics of urban greenway users, and changes among urban greenway users, is important for public health, urban planning, and parks and recreation professionals to promote greenway use and physical activity. Continued research will examine the changes in physical activity behavior along urban greenways and additional demographic characteristics, such as race/ethnicity, of greenway users.

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Support / Funding Source

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(2) **How In-Class Bicycle and Pedestrian Safety Trainings can Impact Future Choices for Active Transportation**

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Focus Area: Practice/Policy

Background and Purpose

In order to encourage children and parents to walk and bike to school as part of the City of Claremont's Safe Routes to School Program, Alta Planning + Design implemented in-class trainings at elementary and middle schools to teach children important bicycle and pedestrian safety lessons and skills. The in-class trainings aimed to get children excited about active transportation at a young age so that they establish life-long healthy habits and choose active transportation. The trainings were also meant to provide instruction on safe biking and walking to those who already bike or walk to school either by choice or because of a lack of access to motorized transportation.

Description

Alta Planning + Design developed curriculum and taught in-class bicycle and pedestrian safety trainings to grades Kindergarten through eighth at eight schools in the Claremont Unified School District. Students in grades kindergarten through third learned pedestrian safety skills, including safe street crossings, walking buddies, and traffic signals and signs. Grades fourth through eighth learned bicycle safety skills, including helmet safety, riding in traffic, and hazard avoidance. Instructors presented curriculum to small intimate groups or as part of multi-grade assemblies depending on the wants and needs of the individual school, and tailored each topic to the appropriate grade level. Both bicycle and pedestrian trainings included an indoor interactive discussion and an outdoor skills practice portion. In the outdoor walking courses, instructors led students on a maximum one-mile walk around the school to practice safe street crossing skills they learned in the classroom. In the outdoor bicycling course, instructors helped students practice skills for riding in traffic, such as hand signals and merging, and hazard avoidance drills.

Lessons Learned

Implementing safety trainings at eight schools with unique characteristics and student populations allowed instructors to learn valuable lessons about how to address child-perceived barriers to walking and biking to school, as well which portions of the trainings get students excited about biking and walking and may impact them to engage in active transportation to and from school in the future.

Prior to going through our courses children perceived many barriers to walking and biking to school. In relation to walking, a large portion of children stated that they lived too far from school to walk as their concepts of distance were not based on reality. Students generally thought that a mile was much farther than it actually was. The outdoor portion of the trainings addressed this issue as walking around the school opened students' eyes to how far they could actually walk without feeling tired. In addition to having a new perspective on distance, students enjoyed the walk because of the visual stimulation it provided them, such as seeing interesting plants, their friends' and family's homes, and interesting behaviors of other people.

The biggest barrier to students biking to school was that they simply didn't know how or lacked confidence in their skills, which was especially true for middle school and upper elementary school students. Many children hadn't ridden bikes for several years and were used to only going around in circles in front of their houses. The concept of riding for transportation seemed scary, however giving them the opportunity to practice at school changed this for a number of students. Even children that were



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very hesitant about getting on a bike made drastic improvements by the end of the courses, thus instilling them with a new sense of confidence. Students told us they thought this was fun and wanted to ride again.

Conclusions and Implications

The overarching lesson learned is to give every student an opportunity to take part in in-class bicycle and pedestrian skills courses. Such a high number of the students we taught had never experienced what it was like to walk or bike to school, thus likely impacting a potential decision to not try active commuting as adults. Allowing students to learn what it feels like to walk or bike a short distance and give them the confidence to know they are capable of this has the potential to change their commute choices in the future.

Next Steps

Cities and other interested parties should work toward getting in-class trainings as part of existing school curriculum so that every student gets the opportunity. Because this can often take a significant period of time, in the interim jurisdictions and schools can implement less frequent or one-time non-mandatory encouragement and education events like bicycle rodeos, walk/bike to school days, and walking school buses and bike trains. It is also critical to provide training to parents to address their concerns about letting their children walk and bike to school. Adult skill courses, for example, can give parents the confidence to ride with their children and continue the education at home.

Support / Funding Source

This effort was funded by a California Safe Routes to School grant for non-infrastructure projects. Parents and volunteers from the community attended the outdoor trainings to provide additional adult support.



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(3) Open Streets Organizers: Walking the Walk and Talking the Talk

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Focus Area: Practice/Policy

Background and Purpose

The US Centers for Disease Control and Prevention (CDC) recommends community-wide initiatives to promote physical activity.¹ One such initiative that is gaining popularity in the US is the Ciclovía or Open Streets initiative, where city streets are opened for residents to use for physical activity and closed to motorized traffic.² Originating in Bogota, Colombia, Open Streets initiatives have been viewed by policy makers and health and community advocates as being beneficial to social, environmental, and community health.³

Popularity of Open Streets in the US has recently surged. In a recent review, 47 cities hosted Open Streets events in 26 states and Washington, DC, in 2011 alone.⁴ Between 2008 and 2013, over 90 US cities hosted at least one event. Even though dozens of cities host initiatives, little is known about what goes into planning, implementing, and evaluating Open Streets.⁵ The purpose of this presentation is twofold. First we aim to explore planning, implementing and evaluating Open Streets initiatives through interviews with Open Streets organizers across the US; and second, to develop a set of recommendations for increasing the capacity of organizers to improve success.

Description

A list of Open Streets initiatives and their organizers was developed as part of an evaluation project to evaluate the Open Streets initiative in St. Louis, MO. Calls to the organizers were made by trained research staff during the summer of 2012. The interview guide was developed by the research team and included initiation, financing, sponsorship, route planning, community and business support, marketing and promotion, gauging success, and information sharing. The interviews were conducted by telephone, digitally audio-taped, and professionally transcribed. Two members of the research team read over three transcripts to help develop a coding tool. Once the final coding tool was developed, all transcripts were coded by hand by each researcher and discussed in detail to reach consensus. Of the 46 original contacts, we interviewed a total of 27 organizers across 25 cities, representing diversity in city size, location, and event specifics.

Lessons Learned

Planning. Many organizers described Open Streets as a “new concept” to communities. As one organizer stated, “People really had trouble grasping it.” Communities hosting the initiative for the first time and areas with strong driving cultures commonly reported initial resistance from residents, businesses, and policy makers. It was also noted that planning Open Streets initiatives takes a persistent and coordinated effort and the process often begins with identifying a target population. Most organizers interviewed indicated that their initiatives were planned with a broad audience in mind, and they wanted the initiative to be “open and accessible to everybody” or “for the whole community”. Families, children, and people of all ages were mentioned as the target for the event. While some targeted specific racial/ethnic or income groups, the overall sentiment seemed to be that the goal was integration of different socio-demographic groups or neighborhoods.

Support from policy makers and business community. Most organizers viewed political support as crucial for sustainability and success. Those lacking support described a need to find “a local cheerleader...somebody who can lead the charge.” For communities with strong support, implementation



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of Open Streets events were the impetus for related policy initiatives such as Complete Streets or active transportation initiatives. In addition to policy makers, support from the business community was essential since many initiatives either highlighted places where local businesses existed or happened to have businesses along the route. Outreach to gain their support often began early, with organizers including businesses and neighborhood associations in the planning process.

Evaluation. The importance of having some type of measure of success was mentioned by all of the organizers, but not always implemented. Organizers employ a combination of qualitative and quantitative tools to evaluate initiative success that were often as unique as the events themselves. Attendance counts were the most common metric. Many relied on formulas from local universities or health organizations to accurately count number of participants.

Conclusions and Implications

Open Streets initiatives can be complex and replete with challenges. Promoting the initiative was a reported challenge among organizers as was funding. Even though many sites lacked rigorous evaluation, the sentiment of success was indicated by most interviews. These initiatives were seen as a positive opportunity for physical activity access, social connectedness, and city-wide promotion.

Next Steps

There are many opportunities for the research community to contribute to the expanse and sustainability of Open Streets:

- Become an organizational partner to contribute expertise for incorporating evaluation in early planning stages.
- Use existing and emerging literature to determine best communication and promotional strategies.
- Partner with researchers in other host cities to develop and test effective and feasible evaluation tools.
- Disseminate lessons learned broadly to both the research and practice community.

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Support / Funding Source

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(4) **I Know What You Did Last Summer: A Collection of Operations Data and Success Stories from the Summer of Bikesharing**

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Focus Area: Practice/Policy

Background and Purpose

The summer of 2013 brought with it an unprecedented rollout of large-scale public bikesharing systems throughout the United States.

Between May and September alone, New York, Chicago, and the San Francisco Bay Area launched bikeshare systems, designed to allow system members unlimited short-term use of public bicycles to complement and in some instances replace traditional public transit, walking, and private automobile use. Membership structures vary by location, and typically offer users a choice of annual memberships or 24-hour passes.

Regardless of location, this new mode of transportation has shown to markedly improve the health and fitness of users, reduce traffic congestion, improve air quality, and increase economic activity and traditional transit usage. Most of all, it's fun!

Description

This oral presentation will focus on first-year user and operations data for systems in New York City, Chicago, and the San Francisco Bay Area, and will contrast them the data gathered from established systems in Boston and Washington DC.

Attendees will receive a brief background in system development, funding sources, ideal system scale and operating environment, and best practices for a successful launch.

The focus of the talk will be on presenting the vast amounts of user demographics, system operations, and user survey data collected in the summer of 2013, with a focus on public health benefits, including caloric burn and greenhouse gas reductions.

For example, in New York City, users took over 2.5 million trips between Memorial Day and Labor Day, biking over 5 million miles. Very rough estimates place the caloric burn of these trips at over a quarter of a million Big Macs! In Chicago, over 50,000 trips totaling over 150,000 miles were taken in their system's first 3 weeks of operations, and over 230,000 trips in the first 2 months.

Similar data and success stories from the San Francisco Bay Area will also be presented, and will be compared to the more established bikeshare systems in Washington DC and Boston, allowing attendees to draw broad conclusions about the ability of a bikeshare system to succeed in their area, and attendees will have a greater understanding of how this mode of transportation can seamlessly integrate into an existing urban environment to promote a more active, more livable city.

Lessons Learned

The presentation will also highlight lessons learned throughout the summer, including how to make use of social and traditional media, program ambassadors, and other customer service elements.



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In addition, the presentation will highlight efforts made to make the system accessible to all residents and visitors, regardless of ethnicity or income level. Examples include helmet giveaways, discounted memberships for low-income cyclists, and planned system expansions into more ethnically and culturally diverse neighborhoods in the near future.

Conclusions and Implications

The future of bikesharing looks bright. Enthusiastic early adopters have helped ensure successful launches throughout the country, and cities nationwide have begun planning for systems of their own, including Portland, Seattle, and several smaller-scale systems in Southern California.

The concept of "nothing succeeds like success" is very apparent with bikeshare, and the implications of long-term system success will include greater mobility options for residents, positive public health outcomes, reduced congestion, and improved air quality.

Next Steps

Generally, the expansion of the profiled systems are focused on both infill (increasing the number of bikeshare stations in an area already served), as well as geographic expansion (new stations in currently-unserved areas).

In addition, local jurisdictions have used the presence of bikeshare systems as a catalyst to create and improve their overall cycling infrastructure, using newly-approved facilities such as green bike lanes, bike boxes, and cycletracks. These improvements benefit all cyclists, and contribute to a greater awareness of cycling and cyclists in general, which in turn creates additional public health and active living benefits.



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(5) Barriers to Walking in a Large, Metropolitan Airport: The Walk to Fly Study

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Focus Area: Research

Background and Purpose

Less than half of American adults meet the public health guideline for aerobic physical activity. Those who walk for transportation or for leisure are more likely to meet the aerobic guideline. Encouraging adults to walk is therefore a viable strategy to increase physical activity levels in the U.S.

One reason adults cite for not participating in physical activity is lack of a suitable environment. For those who fly, airports minimize this barrier as they provide a safe, comfortable environment for physical activity such as walking.

The Guide to Community Preventive Services recommends point-of-decision prompts as a strategy to increase stair use as one form of physical activity. In the Walk to Fly Study, point-of-decision prompts will be used to encourage walking, rather than riding the train, in a large, metropolitan airport. To develop signage that encourages travelers to walk to their departure gate, rather than ride the airport train, we assessed barriers to walking. The purpose of this analysis was to identify, among travelers riding the airport train to their gate, barriers to walking.

Objectives

Among travelers in a large, metropolitan airport, identify barriers to walking to their gate (rather than riding the airport train) overall and by sex and travel purpose.

Methods

Face-to-face interviews were conducted with air travelers seated in waiting areas near or at their departure gate. Participants were randomly selected from seating areas chosen based on probability proportional to size of the seating area. Travelers were eligible if they spoke English and had an opportunity to ride the airport train. During the interview, travelers were asked if they rode the airport train or walked to their gate. If the traveler reported riding the airport train, they were asked a series of questions on why they chose to ride the train, rather than walk to their gate. Travelers were asked about hypothesized walking barriers such as not knowing it was possible to walk or fear of getting lost, lack of time or suitable clothing, and walking being too difficult.

Travelers responded yes, no or not sure to nine specific barrier questions: (1) Everyone else was riding the train; (2) Did not know walking was an option; (3) Not enough time; (4) Walking was too difficult; (5) Afraid of getting lost; (6) Not wearing suitable clothing; (7) Did not want to sweat; (8) Do not like walking; and (9) Riding the train is more fun than walking. Interviews were conducted by a trained research team member and responses were simultaneously entered into a hand-held tablet. Travelers reported demographic characteristics (age group and sex) and purpose of travel (business or leisure). The proportion of travelers in agreement (reporting yes) for each barrier is reported overall and by sex and travel purpose. Exploratory factor analysis was conducted to identify the barrier constructs to airport walking. Data analyses were conducted using R version 2.14.1.



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Results

Interviews were initiated with 397 air travelers, of whom 247 consented to participate. Among them, 186 were eligible and 184 completed the survey. Of these, 156 reported riding the train to get to their departure gate. Overall, the following barriers to walking were reported most frequently by travelers: Riding the train is more fun than walking (35.3%); Did not know walking was an option (24.7%); Walking is too difficult (22.4%); and Not enough time to walk (20.9%). The proportion of men (19.6%) reporting not knowing walking was an option was 12 percentage points less than for women (31.9%). Barriers reported by business and leisure travelers were similar to the overall sample. From the exploratory factor analysis with factor loadings >0.4 , one barrier construct emerged [did not know walking was an option (factor loading = 0.54); everyone else riding train (0.69); afraid of getting lost (0.44)] representing inadequate directions about walking options. This analysis supports further testing of directional signs to encourage walking at airports.

Conclusions

Most travelers reported riding the airport train to their departure gate instead of walking. To increase airport walking, a modifiable barrier is to provide directions to travelers about walking options. Point-of-decision prompt interventions to increase walking in airports may consider providing directional signs about walking options.

Implications for Practice and Policy

Taking simple measures such as providing air travelers with directions about walking options may help increase walking. With at least 17 million travelers per year making the decision to walk or ride the train at one location in a large, metropolitan airport, this walking intervention has the potential to increase walking among many air travelers. If this intervention is successful, the signage can be disseminated to other U.S. airports where getting to one's gate involves the choice between walking and riding on a train or other automated transport system.

Support / Funding Source

The Kresge Foundation and the CDC Foundation



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(6) Traveler Traffic Pattern in a Large, Metropolitan Airport: The Walk to Fly Study

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Focus Area: Research

Background and Purpose

Less than half of American adults meet the public health guideline for aerobic physical activity. Those who walk for transportation or for leisure are more likely to meet the aerobic guideline. Encouraging adults to walk is therefore a viable strategy to increase physical activity levels in the U.S.

One reason adults cite for not participating in physical activity is lack of a suitable environment. For those who fly, airports lessen this barrier as they provide a safe, comfortable environment for physical activity such as walking.

The Guide to Community Preventive Services recommends point-of-decision prompts as a strategy to increase stair use as one form of physical activity. In this study, point-of-decision prompts will be used to encourage walking, rather than riding the train, in a large, metropolitan airport.

Data on traveler movement and mode choice are necessary to develop and evaluate interventions to promote walking at airports. To characterize traveler traffic volume and mode choice, and to evaluate the effectiveness of the point-of-decision prompts, the number of travelers who walk, and those that ride the train in getting to their departure gate are being monitored at the study airport.

Objectives

To characterize traveler traffic volume and mode choice by diurnal pattern based on baseline (prior to installation of point-of-decision prompts) data on the number of travelers who walk, use the moving walkway, or ride the train to their departure gate.

Methods

Travelers entering the transportation mall connecting the concourses of the airport may choose to ride the train (operational 4 am to midnight daily), walk, or use a moving walkway, to get to their departure gate. Six ceiling-mounted infrared sensors are being used to count travelers at the domestic terminus of the airport transportation mall. The sensors count travelers who enter the transportation mall terminus, and those who walk or use the moving walkway to continue to their departure gates. The count of travelers riding the train is the difference between the entry, and the combined walk and walkway sensor counts.

Counts are aggregated and logged in 15-minute frames. Any count frame with train ridership below 50% of travelers is suggestive of interruption of train service and is dropped from the analysis. Counts are analyzed to estimate the average number of travelers entering the transportation mall terminus daily and to discern diurnal patterns in volume and mode choice. Sensors were validated against manual counts, and reconfigured until they registered fewer than 5% miscounts. Analyses were performed using R version 2.14.1.

Results

Sensor validation was completed on June 14th, 2013. The findings represent data collection from June 15th through August 21st, 2013. On average, more than 46,000 travelers entered the transportation mall terminus daily – 99% of them during train operation hours. Of travelers who entered when the train was operational, 89.9% rode the train, 4.6% walked, and 5.5% used the moving walkway. During operational

hours, average entering traffic volume varied from 129 travelers/hour (11 pm to midnight) to 4,123 travelers/hour (7 am to 8 am). Mean hourly train ridership between 5 am and 11 pm varied between 88.7% and 92.5% of those entering the transportation mall terminus (Figure).

Conclusions

Baseline data obtained at one point-of-decision location at a large metropolitan airport show that, of 46,000 travelers/day, 10.1% walk or use the moving walkway, rather than ride the train, to get to their departure gate.

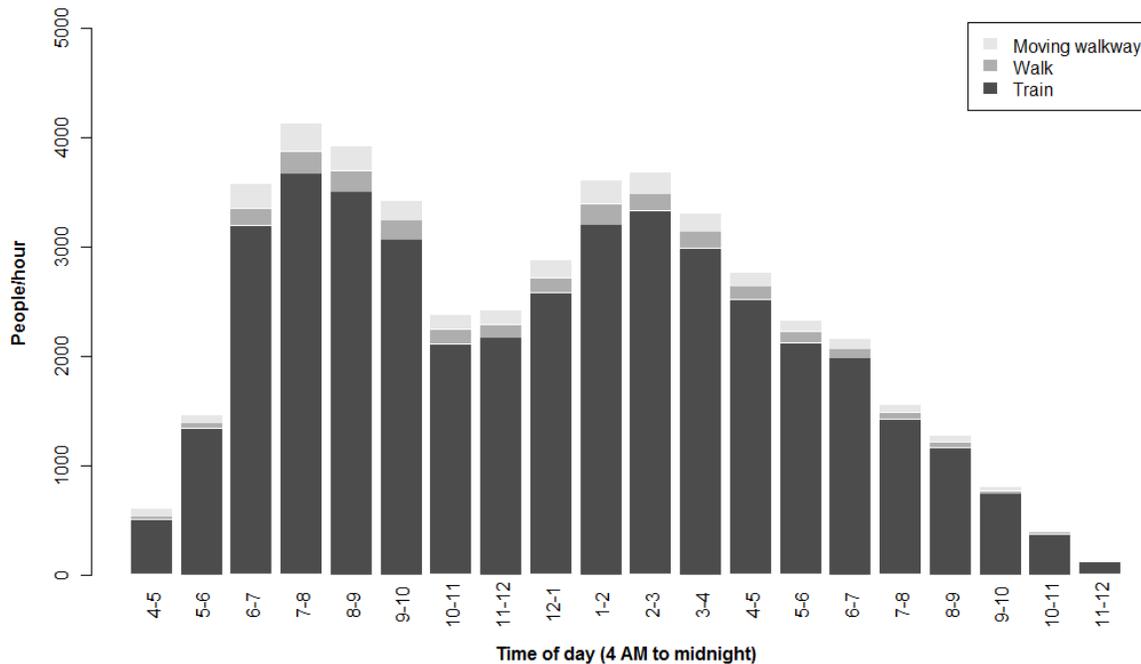
Implications for Practice and Policy

Knowing the baseline traveler traffic patterns will help understand airport travelers' choice to walk or ride the airport train. These data can be used to develop and evaluate interventions to promote walking at public venues such as airports. With at least 17 million travelers per year making the decision to walk or ride the train at just one location in a large, metropolitan airport, this walking intervention has the potential to increase physical activity among air travelers at that location. If successful, the signage from this study can be disseminated to other U.S. airports where getting to one's gate involves the choice between walking and riding on a train or other automated transport system.

Support / Funding Source

The Kresge Foundation and the CDC Foundation.

Figure: Average traffic pattern for travelers entering the transportation mall terminus





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(7) Exploring Racial Bias in Drivers' Behavior at Pedestrian Crossings

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Focus Area: Research

Background and Purpose

Minorities are disproportionately represented in bicycle and pedestrian traffic fatalities, which creates a significant public safety issue and may dissuade minorities from adopting healthy transportation choices. While some of this disproportionality may be due to increased exposure in urban areas where minorities are concentrated, there may be subtle psychological factors that influence drivers' behaviors in interactions with minority pedestrians that contribute to these inequitable outcomes. For example, implicit racial bias--which represents subtle stereotypes that individuals hold beneath their conscious awareness--can affect split-second decisions regarding safety-related behavior, such that minorities are exposed to more dangerous outcomes than majority group members (Kahn & Davies, 2011).

This pilot study tests whether drivers' racial bias affects their behavior when encountering pedestrians. Using African American and White research confederates, we explore whether, holding location, behavior, and dress constant, drivers behave differently in their stopping behavior or position. For example, if drivers' racial bias means they are less likely to stop for a minority pedestrian, those longer waiting times may lead to those pedestrians stepping into traffic to try and force drivers to comply with right-of-way laws, or to dash across in unsafe gaps in traffic. Or, if drivers are more likely to infringe into the crosswalk with a minority pedestrian, this unpleasant interaction can deter minorities from wanting to walk at all. Using quasi-experimental conditions and both manual and video observations, the project provides a valuable "first look" at the impact of race on driver-pedestrian interactions.

Objectives

To examine drivers' behavior at crosswalks depending on the race of the pedestrian waiting to cross. Understanding the differences in the quantitative and qualitative experience of pedestrians, particularly minorities, can shed light on potential barriers to choosing healthier modes of travel, and point toward particular infrastructure that improves drivers' compliance and behavior at crosswalks.

Methods

The research team will observe drivers' passing and yielding behavior at a marked crosswalk at an unsignalized intersection in Portland. Using trained confederates, the research team will simulate a pedestrian crossing situation under normal traffic conditions. In half of the trials, the race of the crossing pedestrian will be African American, and in the other half, the race of the crossing pedestrian will be White. The confederates will have small sensors that catalog the exact distance from themselves that drivers stop. Trained observers will catalog the number of cars that do not stop for the pedestrian, how long it takes for a car to stop after the confederate has stepped up to the crosswalk, and the distance between the stopped car and the crossing pedestrian. Video recordings of the crossings will be used to confirm and further analyze observations made in the field.

Results

This study will be conducted in September 2013. As a pilot study funded by the National Institute for Transportation and Communities (NITC), this project represents a cutting edge look at a historically-neglected research area, that of racial differences in drivers' treatment of pedestrians. Although we do not have results at the time of this abstract submittal, we feel that ALR 2014 is an ideal venue to first share the results of this exciting research.



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Conclusions

As a pilot study, this project provides opportunities to take a unique look at potentially discriminatory behavior toward pedestrians, which has implications for safety and public health. One outcome of the pilot is to ground-truth the methodology and usefulness of the sensors and the camera observations. Future planned work will replicate this study in neighborhoods with different socio-demographic characteristics, and with different street design. We also plan to use methodology and equipment developed through this study to explore drivers' racial or gender biases in their interactions with bicyclists.

Implications for Practice and Policy

Identifying the potential safety and social impacts of drivers' behaviors toward pedestrians, and how those behaviors vary by the race of the pedestrian, is an important step toward understanding what policies or designs lead to building safe and socially vibrant communities. By focusing on how design, operations, and users affect safety outcomes for vulnerable roadway users, particularly under-served minorities, this study directly addresses a key goal of Active Living Research. The pilot study will be replicated at different types of crosswalks, to test whether crosswalk design – like curb extensions or special signage – might negate the impact of racial bias, and encourage drivers to treat all pedestrians equally.

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Support / Funding Source

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(8) **Adolescent Attitudes toward Active Travel: A Multi-Year Look at Gender and Age Effects**

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Focus Area: Research

Background and Purpose

This research provides a detailed look into adolescent attitudes toward physical activity and active transportation modes. The analysis demonstrates some striking initial findings and suggests areas for future exploration. We know that childhood obesity has reached epidemic levels in the United States, and that obesity has implications for the health, well-being, and mortality rates of today's children and tomorrow's adults. The rising economic costs due to obesity and sedentary lifestyles, with their accompanying diseases, are also well-documented. The reasons for the declining activity of children, particularly adolescents and most particularly girls, needs to be better understood so that public health professionals, planners, education professionals, and families can design interventions that will help reverse these dangerous trends and improve children's health.

This paper represents the next phase of research presented last year at ALR 2013. The study utilizes data from the Family Activity Study, a multi-year longitudinal intervention study in Portland, Oregon. The Family Activity Study is seeking to determine the effect of traffic calming interventions on the active travel behaviors, perceptions, and attitudes of families in the Portland area. Data collection includes surveys and observed behaviors using a combination of GPS and accelerometer data. This research draws from the surveys taken by the children in the FAS, representing 355 children aged four to seventeen years. Better understanding children's attitudes from their own perspectives can help illuminate the appropriate types and target groups for particular interventions, physical or otherwise.

Objectives

To examine attitudes and perceptions about active transportation among children and adolescents, and, using longitudinal data, to determine whether attitudes and perceptions showed the same gender and age effects as the first round of analysis. Additionally, to explore whether the installation of bicycle boulevards ("neighborhood greenways") impact those attitudes and perceptions, and whether they helped reduce some of the gender differences in adolescents' attitudes that were revealed in the first phase of this research.

Methods

As part of the Family Activity Study, 355 children from 249 households answered surveys regarding their attitudes, perceptions, and behaviors about traveling by walking, bicycling, or being in a car. Two surveys of varying length and complexity were administered to the 4-10 and 11-17 age groups, respectively. The study focuses on the survey data from the adolescents, of which 114 completed surveys two years ago at the start of the project, partway through the study period, and again in summer of 2013, after installation of the neighborhood greenways. Of the nineteen neighborhoods in the study, nine received neighborhood greenway treatments and ten control locations did not. This research includes the longitudinal data from the pre-, interim-, and post-greenway phases of the project.

Results

The original analysis showed an expected gender gap in views about active travel, particularly among adolescents. For example, girls were much more likely than boys to report concerns with embarrassment or avoiding injury while bicycling. In general, girls felt significantly less comfortable riding a bike on streets alone, while there were no differences if they were riding with their parents. Adolescent girls were



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significantly less likely to agree that biking can sometimes be easier than going by car or that they like riding a bike more than walking. Comparisons with the younger children indicate that the gender gap in attitudes regarding bicycling is weak or non-existent among younger children, but may emerge during adolescence. Combined with attitudes toward exercise, independence, and image, these results represent potential barriers to healthy travel behaviors.

The final round of surveys are complete, and this study will examine whether there are age effects and gender differences similar to the pre-intervention study. For example, the gender differences in fear of injury did not manifest until about age 12, and having longitudinal data allows us to examine whether individual adolescents began to diverge along these same gender lines. The research will explore whether the attitudes of the younger girls, whose attitudes mirrored their male counterparts in the first phase of the study, diverged from the boys as they entered adolescence, and whether the neighborhood greenways helped mediated or moderate the divergence.

Conclusions

This data offers a wealth of insight into the attitudes of children about active travel and physical activity. The ability to examine attitudes over time, among household members and between school-aged siblings, allows an unprecedented examination of the roles of children's attitudes about active travel.

Implications for Practice and Policy

The previous results about the emergent age of gender gaps in attitudes suggest likely target groups for intervening to positively affect adolescent girls' attitudes about their abilities to travel by bicycle in particular. This updated, post-intervention phase of the research further explores gender differences in adolescent attitudes about active travel, and whether a more bicycle- and pedestrian-friendly environment – namely neighborhood greenways – can reduce gender differences that may be currently carried into adulthood and contributing to the gender gap in active travel.

Support / Funding Source

The Family Activity Study and this paper were funded by the Active Living Research program of the Robert Wood Johnson Foundation, and by the Oregon Transportation Research and Education Consortium (OTREC).



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(9) Open Streets: The Use of Recurring Street Closure Programs as Policy Tools

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Focus Area: Practice/Policy

Background and Purpose

The growing popularity of recurring street closure programs, commonly referred to as “Open Streets” or “Ciclovia”, calls for a critical review of these programs and a better understanding of the strategies employed, their goals, their outcomes, and factors influencing their success. Of particular interest for this program was the use of street closures to generate economic development outcomes. To better explore these issues a cross-case comparison was conducted with eight programs of varying size from the United States. This case comparison was supplemented with a survey of merchants along the route of one of the case programs to assess the business community’s perspective on the program. While the programs were found to vary in organizational arrangement, scale, and program features, many common features were present across programs with similar goals, and the association between goals, features, and outcomes appears to be a critical lesson for program planning. In addition, while outcome measures are loosely collected, anecdotal evidence collected supports Open Streets as a potential economic development tool, with certain qualifications and considerations.

Description

Though street festivals are commonplace around the world, the recurring closure of a street space to motor vehicle traffic for the purposes of improving public health, boosting business, and fostering community is a relatively new development. These so-called “Open Streets” programs (or “Ciclovías”) are structured like recurring special events, but are undertaken by local governments and partners in order to accomplish particular policy goals and foster policy outcomes, including supporting local businesses, encouraging active lifestyles, fostering alternative transportation modes, and building stronger bonds within the community. This project seeks to better understand these programs and their impacts, particularly on local communities and businesses, by using both a localized survey and a comparative case study employing stakeholder interviews. This research includes both a quantitative and qualitative component. The Atlanta Streets Alive survey collected data on business impacts and experiences, including questions intended to capture changes in retail sales, frequency of visits, level of involvement, customer feedback, and overall perceptions. The survey goal was to capture the experience of businesses with regards to a local Open Streets program. A comparative case study was also used to illuminate contextual variables that may affect the impact of such programs. Interviews were conducted with key stakeholders (namely program organizers and sponsors) from case locations including Portland, San Antonio, Austin, Savannah, Charleston, Rome, and Macon. This case comparison informs an analysis of factors influencing program frequency, organization, size, location, and funding, as well as providing guidance and policy recommendations for both current and future programs. Finally, a comprehensive review of the associated research literature will supplement findings to form the basis of final policy recommendations.

Lessons Learned

A series of recommendations for future programs and existing programs were developed on the basis of this study.



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For new programs:

1. Goal Setting (Determine policy priorities)
2. Stakeholder Collaboration (Involve as many stakeholders as possible as early as possible; Volunteer, and coordination support as well as donations)
3. Match program features to goals (Route selection; Closure determination; Program frequency)
4. Program Evaluation (Attendance; Economic Impacts; Activity Levels; Community outcomes; Learning)

Note: Existing program recommendations included in full manuscript

Conclusions and Implications

This study of Open Streets programs identified a number of positive opportunities. Programs demonstrated the ability to increase participant physical activity, generate increase revenue and business traffic, improve community interaction and perception, and encourage alternative modes of transportation. However, programs require a great deal of planning and close interaction with stakeholders throughout the program. In addition, the quantity of resources needed to make a program successful and sustainable is non-trivial. With that said, a few specific recommendations may help to optimize Open Streets programs: Firstly, goal setting is an obvious but critical first step. Secondly, involve as many stakeholders as possible as early as possible, and in whatever ways are feasible. Thirdly, match the program features to the goals identified. By keeping in mind specific goals, route choices, street closures, and program frequency decisions can all be made to optimize desired outcomes. Finally, program evaluation is a useful step not only for validating the investment (capturing attendance, economic impacts, activity levels, and community outcomes), but also for learning and improving the program over time. Though this study is not exhaustive or without its limitations, these are confident recommendations and will serve any non-profit or public entity considering an Open Streets program well. Additional recommendations for existing programs are provided as well.

Next Steps

Improved survey methods to collect a larger survey sample from businesses, as well as expanding the case comparisons to include a more diverse sample could both provide greater support for conclusions, and inform potential adjustments to recommendations. Additionally, a thorough case study beginning pre-program as a new Open Streets program develops around these recommendations would be an ideal tool for testing their practical application.

Support / Funding Source

Georgia Economic Innovation and Development Internship (GEIDI), Science and Technology Innovation Policy (STIP) program at Georgia Institute of Technology



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Tables

Survey Lessons

Pros	Cons	Lessons
Increased revenue and foot traffic for businesses actively engaging participants	May require additional hours and/or staffing	Work with businesses to evaluate their needs and encourage businesses to be engaged
Exposure to broad, semi-captive audience	Businesses reliant upon auto traffic (furniture stores, hotels) may require alternative access routes	Consider secondary access routes, provide come-back coupons
Environment supports window shopping, walk-ins	Activities may compete with businesses for attention	Offset activities from dense commercial blocks
Businesses along heavily visited sections of route saw high traffic	Businesses farther from activity centers may see declined traffic	Location of businesses along route matters; route must be carefully planned w/ businesses



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Case Cities

	Atlanta	Austin	San Antonio	Portland	Charleston	Savannah	Rome	Macon*
Title	<i>Streets Alive</i>	<i>Viva! Streets</i>	<i>Siclovia</i>	<i>Sunday Parkways</i>	<i>2nd Sunday on King</i>	<i>Play Streets</i>	<i>Streets Alive</i>	<i>First Friday</i>
Frequency	3x annually	Annual	2x annually	Monthly (May-Sep)	Monthly	2x annually	Annual	Monthly
Route length	2-6 mi	1.5 mi	2.2 mi	4.5-8 mi	.6 mi	.2 mi	.56 mi	~1 sq mi
Cost per occurrence	\$35,000	\$40,000	\$75,000	\$80,000	\$9,000	\$12,500	\$2,000	\$1,500
Organizer	Non-profit	Partnership	Non-profit	Public	Non-profit	Partnership	Public	Public
Major sponsors	Coke, City	HEB	HEB, City	Kaiser Permanente, City	King St Marketing Group	Partnership for a Healthier America	Bike Walk NW GA	Robins Federal Credit Union
Average attendance	17,500	20,000	45,000	20,000	10,000	900	900	2,000
Cost per attendee	\$2	\$2	\$1.66	\$4	\$.90	\$13.9	\$2.2	\$.75

*Macon's program does not include a street closure

Program Goals

	Atlanta	Austin	San Antonio	Portland	Charleston	Savannah	Rome	Macon
Increase physical activity	X	X	X	X		X	X	
Economic Development	X			X	X		X	X
Community Development	X	X	X	X	X	X		X
Promote alternative transportation	X			X				
Promote parks/new facilities				X		X		
Encourage interaction across communities		X	X	X				



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Economic Development and Open Streets

	Development Goals	Development Program Strategies	Business Impacts Observed
Atlanta	Yes	Dense mixed-use corridor; businesses expanded hours, space, and activities, outside vendors excluded	Businesses which were actively engaged in some way (special activities, open doors, specials) have reported increased sales; mixed results from remaining businesses (though businesses along corridors have consistently asked for a return of the program or arrival of the program to their area)
Austin	No	Contact with businesses during planning	Some businesses reported higher traffic and exposure, others reported same as usual; appears that businesses more engaged in the program did better business
San Antonio	No	Contact with businesses during planning	Small retail and restaurant businesses have reported increased sales and traffic; businesses have all approved return of program each year
Portland	Yes	Outside vendors excluded, occasional inclusion of commercial corridor, business involvement	Mixed responses; some corridors have had lower than normal traffic as potential clients are active rather than entering businesses (varies greatly among type of business). Also commercial density is low.
Charleston	Yes	Promotion, dense commercial corridor, expanded business space, close business cooperation, outside vendors excluded	Majority of businesses have reported it as their best Sunday of the year (60-65%), with additional businesses reporting their best day of the month. All businesses on corridor (regardless of direct sales boost) are supporters of program
Savannah	No	Contact with businesses during planning	Positive reception from the few businesses along route
Rome	Yes	Ties into promotion of major annual event, dense commercial corridor	Some businesses have expressed increased sales and promotional benefits; others have reported that the clientele does not suit their particular business. Program occurs on Saturday, making it harder to increase sales over benchmark
Macon	Yes	Promotion, dense commercial corridor, expanded space and hours, specials, close business cooperation	Mixed impact directly on businesses (program occurs on Friday night), though city has seen notable increase in interest in the area, with additional investment and development in downtown recently



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Expansion Considerations

	Interest in expanding	Reservations about expanding
Atlanta	Aim to have program as regular as possible	Cost is a barrier; also concerned about not reducing the special event appeal of the program without replacing it with the appeal of regularity
Austin	Split between interest in frequency and route size increases. Currently looking at increasing frequency and varying location	Program requires a great deal of human and financial capital, plus an organizing entity that can devote to it
San Antonio	Looking at new route choices and the possibility of having a more regular program	Have to secure both the financial support and the needed manpower
Portland	Interest in expanding scale of program, not frequency. May consider additional neighborhoods however	Concern about diluting program impact, and climate limits available months to hold the program
Charleston	Residents want it more frequently, and have considered expanding it for holiday shopping season	Businesses worry about diluting its impact, and holding the program more often in past has seemed to reduce its appeal; also, closing street is complex and costly
Savannah	Some interest; currently aiming just to maintain the program into future years	Funding is a serious challenge to overcome even just to maintain current program into future years
Rome	Little interest, since program is paired to an annual event	Program is currently only tied to one event as a promotional bolster
Macon	Attempted it, may consider again but likely not for some time	Previous attempt diluted impact of program and made it harder to operate

Optimal Program Frequency

Pros	Cons
Participants and neighborhood groups interested in expanding programs	Cost and volunteer requirements
Increases health benefits to participants	May dilute the uniqueness of the program, lead to declining attendance
Expands audience, improves awareness	Balance between frequency of program and size of program



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Program structure suggestions

Ideal Features	Goal		
	Economic Development	Physical Activity	Community Development
Route location	<i>Prominent retail district</i>	<i>Mixed-use area</i>	<i>Residential area</i>
Consistency of location	<i>No variation</i>	<i>Some variation</i>	<i>Variation</i>
Program Frequency	<i>Monthly</i>	<i>Weekly</i>	<i>Weekly</i>
Route Length	<i>.5-1 mile (strip)</i>	<i>2-10 miles (loop)</i>	<i>1-5 miles (block or strip)</i>
Program Features	<i>Business involvement (specials, open seating, promotion) and coordination</i>	<i>Variety of free niche physical activities</i>	<i>Large open space, free public activities</i>
Essential stakeholders	<i>Local businesses, local municipality</i>	<i>Activity-based orgs, municipality</i>	<i>Community orgs, churches, officials</i>
Road Closure	<i>At least partial closure</i>	<i>Full closure</i>	<i>Full closure</i>

Takeaways

Opportunities	Requirements
<ul style="list-style-type: none"> ▪ Increase physical activity of participants ▪ Opportunities for increased revenue and foot traffic ▪ Positive impact on local community <ul style="list-style-type: none"> ○ Foster community interaction ▪ Encourage alternative modes of transportation ▪ Encourage community collaboration 	<ul style="list-style-type: none"> ▪ Planning <ul style="list-style-type: none"> ○ Location & Frequency ○ Programming/Features ○ Road Closure ▪ Stakeholder Coordination <ul style="list-style-type: none"> ○ Planning ○ Engagement ▪ Promotion <ul style="list-style-type: none"> ○ Local media ○ Social media ○ Word of mouth ▪ Resources <ul style="list-style-type: none"> ○ Volunteers ○ Money



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(10) Segment-level Analysis of the Environmental Context of MVPA during Active Commuting

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Focus Area: Research

Background and Purpose

Recent studies have used matched GPS-accelerometer data to examine levels of moderate-to-vigorous-physical-activity (MVPA) during “active” commuting (walking/cycling) and to identify the land use, green space, and walkability of areas associated with greater MVPA. Available studies tend to assess the influence of daily environmental exposures on individual MVPA, but an alternative planning-relevant approach is to conduct roadway segment-level analysis to identify the context-specific factors which make particular blocks and roadway segments more conducive for walking. In response to California Senate Bill 375 which seeks to reduce vehicle miles traveled (VMT) and associated greenhouse gas (GhG) emissions, recently-adopted Regional Transportation Plans (RTP) direct future growth towards: denser, mixed-use, transit-oriented and infill developments which may encourage greater physical activity (PA). A better understanding of “where” MVPA occurs during active travel and the associated environmental contexts along walking paths is needed to understand the implications of these near-transit development plans. Whereas other studies have examined the amount of MVPA which occurs in parks and green space, this is the first study which (1) examines the roadway segment-level factors associated with MVPA and (2) assesses these relationships for an adult sample, and (3) investigates the role of transit access on the level of MVPA on roadway segments.

Objectives To introduce a segment-level approach to identify “where active transport” occurs and associations of walking with transit access and the underlying built environment.

Methods

Participants in Phase I of a before-after new light rail study in Los Angeles, CA were recruited from neighborhoods adjacent to the Exposition (Expo) Light Rail Line before its official opening in April 2012. The respondents completed trip logs and were asked to wear accelerometers and GPS devices to track physical activity levels and locations where it occurred over a seven-day period. Participants’ homes and transit station locations were identified and road segments within a half-mile radius from each were extracted. In addition, 40-meter buffers were created to determine the land uses along the street segments. The resulting unit of analysis was (N =5,649) roadway segments within the Expo study area. Built environment features hypothesized to influence the probability of walking on any segment were included in the analysis such as: commercial/retail uses, residential and employment densities, street intersection density, traffic volume and green spaces. Descriptive statistics and single sample t-tests were performed to explore differences among study area roadway segments and those segments with incidence of walking in the sample. Binary logit regressions were also utilized to assess whether and how environmental factors were associated with the probability of walking and MVPA on roadway segments.

Results

Descriptive statistics show that our sample was predominantly female (68%), 56% were of African-American descent, 55% were over the age of 50 years and 45% earned an annual household income less than \$35,000. Preliminary results of the single sample t-tests indicate that roadway segments with walking incidences have higher densities of commercial and employment uses, more transit stops, higher traffic volumes and higher densities of impervious land cover. The binary logit results confirm the important role that greener spaces and commercial activity centers play in attracting pedestrians and increasing the probability of walking per segment particularly around transit stations.



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Conclusions

The fine level of analysis performed provides more precise estimates of the impacts of mixed-use, transit-oriented and infill developments on active travel and MVPA. Further, implementing smart growth tools along transit corridors may potentially lead to increases in non-motorized travel over private vehicle use which helps accomplish SB 375 goals.

Implications for Practice and Policy

Results suggest that policymakers can promote active transport and walking by developing denser, commercially diversified uses with higher levels of green spaces. In addition, new transportation investments may encourage more active transport especially when transit stations are in close proximity to activity centers.



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(11) Detecting Bike and Walk Travel without Activity Diaries: A New Approach Combining GPS, Accelerometer, and GIS Data

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Focus Area: Research

Background and Purpose

Over the past decade, interest in person-based Global Positioning System (GPS) data to augment or even replace diary-based travel and activity surveys has increased rapidly. In physical activity studies, GPS provides location data that complements accelerometer measures of activity level—providing the “where” to the accelerometer’s “how much.” In the field of active travel research, GPS has generally been used on its own to capture data about trips and routes taken. For both fields, GPS promises reduced cost and respondent burden along with greater detail and facilitation of longer-term data collection. Optimism is tempered mainly by the burden of processing and questions about accuracy.

One particular challenge relevant to both the health and travel fields is the identification of travel mode (e.g. bike, walk, transit) from raw GPS data. The present study proposes a new methodology for imputing mode probabilistically leveraging both GPS and accelerometer data. Special focus is placed on distinguishing bicycle trips, an important potential source of daily activity that has thus far been difficult to detect in GPS data and difficult to measure with accelerometers.

Troped et al.¹ also used GPS and accelerometer data to impute travel mode, but that study was conducted in a selected environment (a multi-use path) with a small sample (n=10). This study extends the previous application to a much larger sample in free-living conditions.

As methodological hurdles are overcome, potential exists for breaking through the silos that have traditionally separated physical activity and active travel research. Instead of looking separately at a trip to the park and an activity in the park, we might instead look at the entire activity chain. This more holistic approach holds promise not only for research but also in support of more integrated health and travel policies such as neighborhood greenways.

Objectives

This research seeks to improve the imputation of travel mode from combined GPS and accelerometer data. Special attention is given to bicycle trips, which are difficult to distinguish using GPS data alone. Detection of cycling activity is particularly important for physical activity research, since it is not measured accurately by accelerometers. As GPS use in health-focused studies becomes more common, it is hoped that improved, automated prediction of travel mode can facilitate the integration of active travel within broader physical activity research.

Methods

This study develops a multinomial logit (MNL) model to assign modes probabilistically (e.g. 75% predicted probability that trip was by bike). The data used to estimate the model were collected from 2012 to 2013 in Portland, Oregon as part of an ongoing longitudinal study on family travel and physical activity.² GPS (GlobalSat DG-100, 4s intervals), accelerometer (Actigraph GT3X, 15s epochs), and GIS transit network data were available. Participants included both adults and children.

In order to test our data processing accuracy, during the second phase of data collection, participants in a subsample of households were invited by email to provide recalled mode and purpose for up to 20



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recently recorded trips. A website allowed participants to view up to trips one at a time using a Google Maps-based interface (Figure 1). In total, 1459 trips by 120 participants were available for analysis.

Results

Using only GPS data and GIS transit network data, walk trips could be detected with fairly high accuracy (79%) and bicycle trips with lower but still reasonable accuracy (70%). Accelerometer data—common in health studies but mostly unknown in transportation research—significantly improved detection of walk (+3%) and bicycle travel (+4.7%) by the model. Segmenting by age did not significantly affect the results, suggesting that a single model can predict both adult and child travel modes.

Conclusions

The multinomial logit (MNL) model showed promise for active travel mode imputation. Accelerometer data significantly improved the model's ability to detect walk and bicycle trips. A benefit of using the MNL framework is the ability to place probabilities on the model predictions. A researcher could, for instance, consider for analysis only trips with a mode probability greater than 50 percent. The model developed here provides a flexible, automated way to detect active travel using GPS, accelerometer, and transit network data without further information.

Implications for Practice and Policy

The ability to detect active travel without the burden of error-prone activity diaries presents intriguing possibilities for large-scale or long-term data collection. Combining methods common to the transportation and health fields furthers the potential for integrating physical activity and active travel research.

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Support / Funding Source

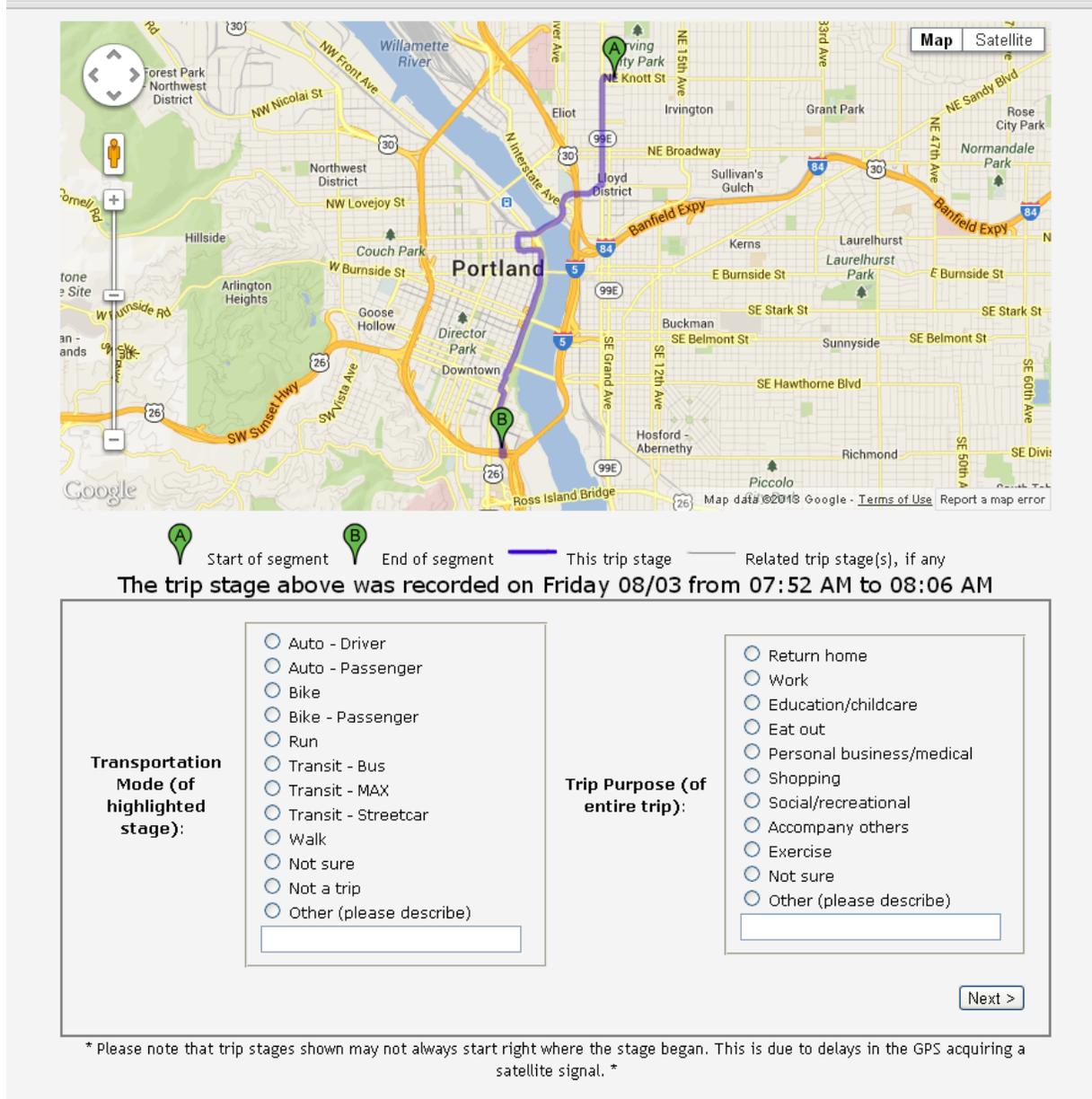
This research was funded by the Robert Wood Johnson Foundation Active Living Research program and the Oregon Transportation Research and Education Consortium (OTREC), a national university transportation center funded by the US Department of Transportation.

Table 1: MNL Model Prediction Success

(percent)	Model 1 GPS only	Model 2 +Transit network	Model 3 +Accelerometer	n
Walk	79.2	78.8	81.8	236
Bicycle	67.6	69.9	74.6	173
Auto	92.4	94.3	94.8	1011
Transit	7.7	66.7	66.7	39
<i>All modes</i>	<i>87.5</i>	<i>89.6</i>	<i>90.8</i>	<i>1459</i>

Figure 1: Web-based survey for mode and purpose recall

.net/FAstrips/996/996-1/238084/map1.php



Map Satellite

Start of segment End of segment This trip stage Related trip stage(s), if any

The trip stage above was recorded on Friday 08/03 from 07:52 AM to 08:06 AM

Transportation Mode (of highlighted stage):

- Auto - Driver
- Auto - Passenger
- Bike
- Bike - Passenger
- Run
- Transit - Bus
- Transit - MAX
- Transit - Streetcar
- Walk
- Not sure
- Not a trip
- Other (please describe)

Trip Purpose (of entire trip):

- Return home
- Work
- Education/childcare
- Eat out
- Personal business/medical
- Shopping
- Social/recreational
- Accompany others
- Exercise
- Not sure
- Other (please describe)

Next >

* Please note that trip stages shown may not always start right where the stage began. This is due to delays in the GPS acquiring a satellite signal. *



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(12) Mitigating Exposure to Air Pollution During Active Travel: Comparing Spatial Patterns of Cyclists, Pedestrians, and Particulate Air Pollution

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Focus Area: Research

Background and Purpose

Non-motorized traffic volumes and air pollution concentrations vary on small spatial scales (i.e., within cities). The spatial patterns of non-motorized traffic and air pollution may impact cyclists' and pedestrians' exposure to hazardous air pollution. A key urban planning question is how best to plan for neighborhoods that promote physical activity while protecting against exposure to air pollution.

Objectives

Explore how particulate air pollution varies with non-motorized traffic volumes, and thereby identify high- and low-exposure areas for pedestrians' and cyclists'.

Methods

We measured particulate air pollution during morning (7-9am; n=12 days) and afternoon (4-6pm; n=30 days) rush hours on weekdays (8/14 – 10/16/2012). Measurements were performed using a mobile platform. Our modified bicycle trailer contained equipment to measure: (1) particle number concentration, (2) PM_{2.5} mass concentration, (3) black carbon concentration, and (4) particle size distributions. Three sampling routes (~20 miles each) were cycled repeatedly (10 [4] times per route in the afternoon [morning]) to estimate typical rush hour concentrations in urban environments throughout Minneapolis, MN. Our estimates of air pollution exposures for pedestrians and cyclists combines three spatially- and temporally-resolved inputs: (1) pedestrian traffic volumes, (2) bicycle traffic volumes, and (3) particulate air pollution concentrations. Each input has a spatial resolution that allows for block-by-block estimates of non-motorized travel and air pollution concentrations. We explore correlates of the built environment and overall air pollution exposure during active travel.

Results

Our approach provides estimates of air pollution exposure to walkers and bikers in Minneapolis, MN. We found that spatial patterns of exposure (and the relationship with the built environment) differ between pedestrians and cyclists. For example, we found heavy pedestrian traffic is mostly on streets with high air pollution (arterial/collector streets: 719 pedestrians per day, 19,500 pt/cc) and heavy bicycle traffic is on off-street trails with low air pollution (off-street trails: 621 cyclists per day, 13,200 pt/cc). Population-weighted particle number concentrations for total non-motorized travel were higher for high traffic roads (arterials or collectors) than for local roads or off-street trails (arterial: 19,037 pt/cc, collector: 20,272 pt/cc, local: 15,624 pt/cc, off-street trail: 13,354 pt/cc).

We identified ways in which modest modifications to bicycle and pedestrian infrastructure could reduce air pollution exposure. For example, we found that, on average, moving non-motorized traffic from major roads to adjacent local roads 100-200 meters away reduces exposure by 30% for particle number concentration and 23% for black carbon. Our results are meant to give planners and transportation officials spatially precise information on air pollution exposure to use in future planning activities.



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Conclusions

Our approach illustrates how air pollution exposures for non-motorized travelers vary with the built environment, and highlights exposure hot spots where pedestrian or bicycle traffic is high and where air pollution concentrations are high.

Implications for Practice and Policy

Our results suggest differing mitigation approaches for walkers and bikers. Namely, cyclists seemed to more frequently use separated infrastructure (i.e., removing themselves from high traffic areas when possible) while pedestrians seem to walk mostly in areas of high pollution (suggesting traffic may need to be removed from areas with high levels of walking).

Support / Funding Source

Funding is through the Center for Transportation Studies at the University of Minnesota.



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(13) Does the Installation of New Infrastructure Improve Residents' Perception of the Bicycling and Walking Environment? A Panel Study

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Focus Area: Research

Background and Purpose

Changing the built environment as an intervention to increase walking and bicycling behavior has attracted attention in both transportation and public health disciplines over the last decade (Ewing and Cervero 2010; Saelens et al. 2003; Saelens and Handy 2008; Sallis et al. 2004). There has been growing evidence on the relationship between the built environment and walking and bicycling. However, the behavioral mechanisms of walking and bicycling remains less well understood.

One important part of the puzzle is the relationship between the objectively-measured environment and people's perceptions of the environment. Socio-cognitive theory (Bandura 1986) has pointed to an important distinction between the built environment as it is objectively measured and the built environment as perceived by individuals. According to this theory, the built environment may influence behavior but it will do so by influencing the perception of individuals. The perceived environment may, therefore, mediate associations between the built environment and behavior. Mediation by perception may provide a plausible explanation for why some studies fail to find a strong association between built environment and walking or bicycling behavior. It is therefore important to understand the relationship between objective and perceived environment, and what factors may influence this relationship. Although there has been some work on the mismatch between objective and perceived environment, there has been little consideration of the causal relationship between them. Further, most of previous studies relied on cross-sectional data.

Objectives

This study explores the causal relationship between built environment and perceptions using on a panel study and aims to answer two questions: (1) Does installation of new infrastructure improve residents' perception of the environment? (2) How do other factors, such as socio-demographics, attitudes, previous behavior, distance to the new infrastructure, and time after installation of new infrastructure, influence the link between the objective and perceived environment?

Methods

The Family Activity Study is a longitudinal study of the effects of traffic calming infrastructure (bicycle boulevards) on behavior. The study started with 333 households with children living in 19 study sites (nine treatment and ten control). Surveys were conducted at three points in time: Pre, Post, and Interim. The Pre (n=491 adults) and Post (n=385) surveys are approximately two years apart, with bicycle boulevard construction occurring in between. The Interim (n=364) surveys were fielded about one year after the Pre surveys, during the phased construction of the projects. Data from the Pre and Interim surveys is ready for analysis. Post surveys have been conducted and data are being cleaned. This presentation will use data from all three surveys.

Paired-sample t tests will be conducted for each pair (Pre/Interim and Pre/Post) of perception measures for both treatment and control group. This analysis will help to assess whether the bicycle boulevards improved resident's perception of traffic safety and other environmental attributes friendly for walking and bicycling. Respondents' socio-demographic characteristics, attitudes towards walking/bicycling, and behavior may contribute to different changes in perceptions. Also, the length of time between construction



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and the surveys varies some between households, as does the distance from the boulevard. Logit models will be employed to explore whether all of these factors mediate the effect of the intervention on perceptions.

Results

To date, we have analyzed the Pre and Interim surveys. A comparison of the changes of the perceptions between these two surveys is shown in Fig. 1. Because construction was not complete at all of the sites at the time of the Interim surveys, these results are limited. The conference presentation will include an analysis of the Post survey. Perceptions of much traffic for walking goes up for both the treatment and control group, but a much smaller increase is observed for treatment group. This implies that the new infrastructure may influence the perceptions. However, the intervention effect on perception of traffic for bicycling was not evident.

There are also differences in the perception of presence of sidewalks and signals. The respondents in treatment group do report a higher score in perception of presence of sidewalk and signals in the Interim; there is no evident change for the control group. There is also evident difference in perception of "I know where I can bike safely ...with children" between the treatment and control group. However, for other similar perception measures, no difference was found between the treatment and control group.

The next phase of analysis will explore the role of attitudes, behavior, and other factors in these changes.

Conclusions

Our preliminary analysis indicates that the installation of traffic calming infrastructure can effect people's perceptions of presence of features such as sidewalks and traffic signals. The effect on cognitive aspects of perceptions, such as know where safe walk/bicycle routes are, feeling easy to walk and bicycle, may take longer, and may need other interventions, such as marketing materials and public bicycling events.

Implications for Practice and Policy

Environmental intervention should be accompanied by perception intervention programs.

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Support / Funding Source

The Family Activity Study and this paper were funded by the Active Living Research program of the Robert Wood Johnson Foundation, and by the Oregon Transportation Research and Education Consortium (OTREC).

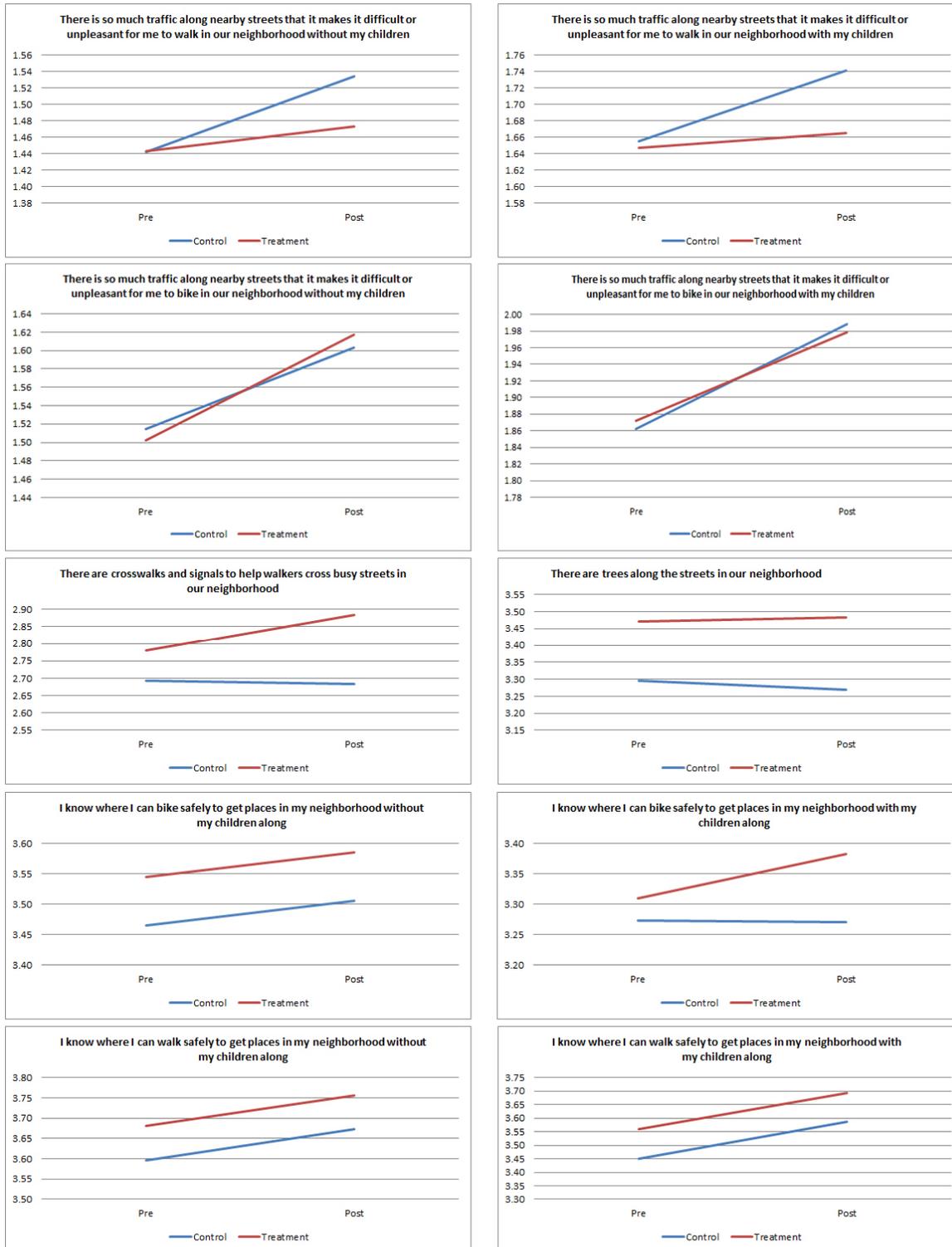


Fig. 1 Mean score of the perception measures before and after installation of traffic calming infrastructure



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(14) Individual, Social and Environmental Correlates of Active Transportation in African American and Hispanic or Latina Women: A Structural Equation Model Analysis

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Focus Area: Research

Background and Purpose

Physical inactivity is an ongoing problem in the United States, particularly among women and minorities [1] and is associated with obesity, cardiovascular disease, diabetes and cancer [2, 3]. Despite strategies to increase physical activity in women and minorities, individually-focused programs fail to achieve substantial, sustainable increases in physical activity [4], suggesting the need to address factors related to physical activity beyond the individual [5, 6]. Ecologic models of health behavior take into account intrapersonal factors, interpersonal relationships, the physical environment and policies and how they influence health behaviors, such as physical activity [7-9].

Objectives

The purpose of this study was to examine the influence of individual, social and environmental factors on physical activity among African American and Hispanic or Latina women using structural equation modeling.

Methods

Cross-sectional individual and environmental data were used from the Health Is Power study, a multi-site longitudinal randomized controlled trial that aimed to increase physical activity among community dwelling ethnic minority women in Houston and Austin, Texas. Overweight and obese women (N=410, 68.2% African American, M BMI=34.7±8.5 kg/m²) completed a physical assessment and body image, self-efficacy, motivational readiness, social support, home environment for physical activity, and perceived environment questionnaires at baseline. Self-reported active transportation was measured using the International Physical Activity Questionnaire (IPAQ) long form. The Pedestrian Environment Data Scan (PEDS) was completed by trained assessors and used to measure environmental features and pedestrian facilities related to walking and cycling in each participant's neighborhood, which was defined as the area within an 800 meter buffer surrounding each participant's residence. Variables specifically used in the current study include percent of segments with mixed land use, pedestrian facilities, such as sidewalks, and bicycle facilities, presence of buffers, path connections, travel lanes, speed limit, traffic control devices, crossing aids, lighting, amenities, and attractiveness for walking and cycling. Only women with complete individual and environmental data (N=333) were included in the current study. To meet assumptions of normality, active transportation was transformed for analyses using an exponential transformation [10]. Structural equation modeling was used to determine the indirect and direct effects of the physical and social environments and individual influences on active transportation. The measurement and structural models were tested in Mplus version 7 [11]. Missing data were estimated using full information maximum likelihood [11, 12]. The measurement model was used to define the relationships between observed and latent, or unobserved, variables, and the structural model was used to define and estimate the strength of the relationships between unobserved and other unobserved variables, controlling for ethnicity, age, education and income. Maximum likelihood estimates with the chi-square fit statistic, the Bentler-Bonnett non-formed fit index (NNFI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA) were used as indices of goodness of fit.



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Results

Of the 333 participants included in the current study, 68.2% were African American. Women were middle-aged ($M=44.9\pm 9.5$ years) and obese ($M=34.7\pm 8.5$ kg/m²). Most participants completed some college (44.4%) or were college graduates (46.5%), and nearly half (49.8%) reported an income greater than 400% above the federal poverty level in 2007, or greater than \$82,600 for a family of four. African American women did more transportation-related physical activity ($M=226.7\pm 865.9$ MET-min/week) than Hispanic or Latina women ($M=132.8\pm 237.9$ MET-min/week), but this difference was not statistically significant. The proposed structural model fit was acceptable ($\chi^2=2876.8$, $df=2080$, $RMSEA=.034$, $CFI=.884$). There were significant relationships between body image and motivational readiness ($\beta=0.159$, $p=.033$) and exercise self-efficacy and home environment ($\beta=-0.222$, $p<.001$). Home environment ($\beta=-0.139$, $p=.047$) and measured neighborhood environment ($\beta=0.111$, $p=.042$) had significant direct effects on active transportation.

Conclusions

Results suggest that multiple levels of influence are operating to explain active transportation in ethnic minority women. The structural model fit the data well, suggesting that active transportation is influenced by an interaction among individual and environmental factors. The measured neighborhood environment and home environment directly influenced active transportation, while exercise self-efficacy indirectly influenced it through the home environment. Results suggest greater self-efficacy related to exercise was associated with less availability of physical activity equipment in the home, which in turn was related to increased active transportation and physical activity occurring outside of the home.

Implications for Practice and Policy

Results affirm the need to continue to address exercise self-efficacy in physical activity interventions and increase understanding of how self-efficacy may be used to directly and indirectly promote healthy behaviors. Policy changes to enhance the pedestrian environment in neighborhoods, such as increasing the presence of sidewalks, lowering speed limits, improving lighting and increasing the number of amenities, such as benches and garbage cans, may increase active transportation in women residing in these neighborhoods. Although effective for behavior change, policy changes in the environment may have greater sustained impact when coupled with individual strategies to change physical activity. Thus, intervention designs should include multilevel strategies.

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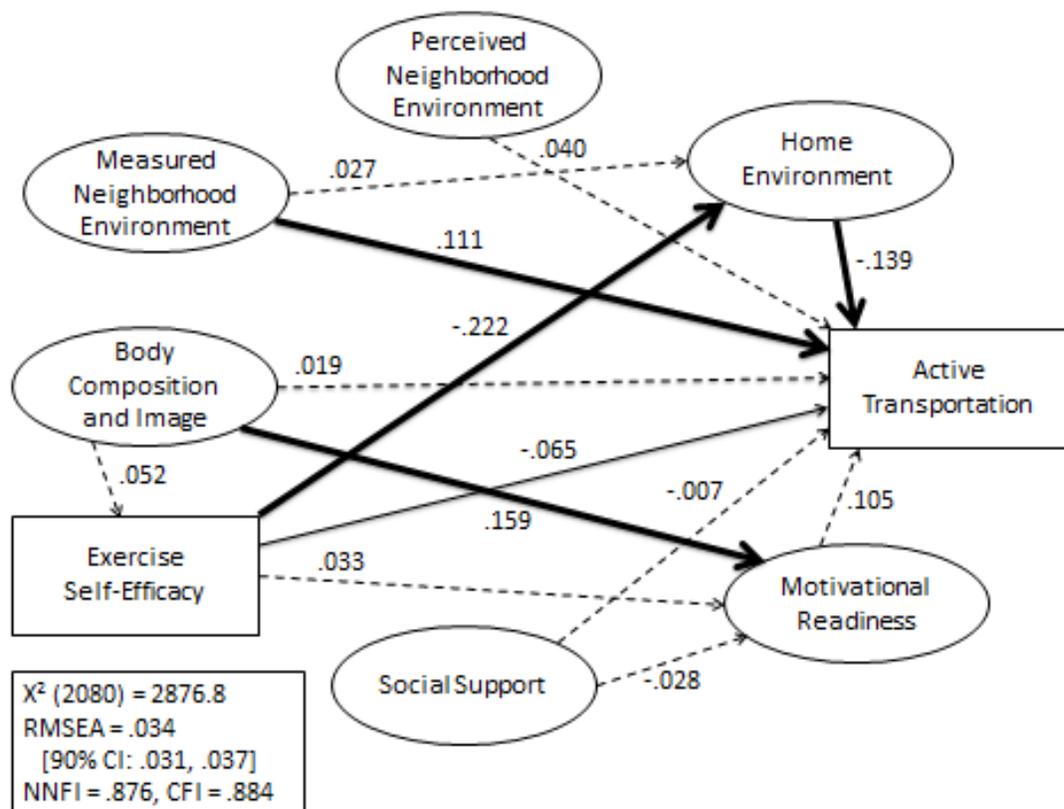
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Support / Funding Source

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Figure: Structural model with standardized (β) path coefficients



Note: Pathways from conceptual model that were significant in structural model are bolded; dashed line indicates pathways from conceptual model that were not significant in the structural model.



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(15) Federal Planning for Biking & Walking Facilities

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Focus Area: Practice/Policy

Background and Purpose

Advocacy Advance is a partnership between The League of American Bicyclists and The Alliance for Biking and Walking. We exist to empower local and regional advocates and agency staff who are interested in funding biking and walking infrastructure. It is our goal to increase federal spending on biking and walking infrastructure and to measure our success we are interested in how federal spending is tracked.

Description

My research looks at State Transportation Improvement Programs (STIPs), which are federally required documents that indicate planned transportation projects and expenditures for a four year period and which must be updated at least every four years. A STIP is a collection of projects programmed in Transportation Improvement Programs (TIPs) created by Metropolitan Planning Organizations (MPOs) and projects programmed by State Departments of Transportation. The goal of the research is to understand how biking and walking infrastructure was included in these plans, particularly when that infrastructure is not the focus of a transportation project. The first part of my research involved collecting the documents for all 50 states. In some states this included collecting documents from MPOs because their projects were not reflected in the STIP. Through this process I collected data on transparency issues. The second part of my research involved looking at the projects described in the STIPs and determining whether they involved biking, walking, or shared-use infrastructure and whether their primary purpose was to serve those active transportation modes or motorized transportation modes.

Lessons Learned

The current method of accounting for biking and walking infrastructure paid for by federal spending likely under counts projects that include such infrastructure. Although a publicly available document exists detailing projects paid for by federal spending exists it is not released in a manner that fosters public engagement and understanding.

Conclusions and Implications

Transparency is a major issue for advocates and agency staff that want to ensure the inclusion of biking and walking infrastructure in transportation planning. Most states and MPOs provide their project lists in difficult to analyze formats and there is often inconsistency within states. A number of states were able to provide better information upon request and there is reason to believe that the capacity for more open and digestible information exists with state DOTs and some MPOs. Inconsistencies in formatting, descriptiveness and other factors cast doubt on the value of comparing states based upon the planned projects reflected in their STIPs. Better transparency could lead to these documents being easier for the public to understand and influence, potentially leading to solutions that incorporate non-traditional transportation goals, such as health.

The analysis of project descriptions revealed that our current tracking systems for federal spending do not fully account for investments made in biking and walking infrastructure. The Federal Highway Administration (FHWA)'s Fiscal Management Information System (FMIS) is currently the best data we have for federal transportation spending. Between 2008 and 2012, states on average spent 1.8% of their federal transportation dollars on biking and walking projects, with no state spending more than 4%. My



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analysis of STIPs shows that biking and walking infrastructure is included on up to 30% of projects in some STIPs. While it is difficult to parse how states value these components when they occur in projects that are not primarily for the purpose of creating biking and walking infrastructure, it seems likely that a greater portion of federal dollars is spent on biking and walking infrastructure than is reflected in our current methods. FMIS relies upon state identification of improvement types included in projects and currently there is no way to trace projects from STIPs (which reflect projects to be built) to FMIS (which reflects projects actually built). Improving both systems so that tracking a project, and its included components, is both feasible and publicly accessible could be extremely useful in the context of complete streets and other multi-modal projects.

Next Steps

By March, analysis will be done for all 50 states and the analysis will be placed in the context(s) that make(s) it most useful to active transportation advocates, agency staff, and other interested parties. Context is important because there is reason to believe that some of the variability in inclusion of active transportation components is unrelated to their actual likelihood of inclusion.

I have met with the Sunlight Foundation and hope to build upon the transparency information already created through my research. Through cooperation with the Sunlight Foundation I hope to further develop a framework for understanding how state DOTs and MPOs can improve the accessibility and usability of this data that is required to be created by federal law. The Sunlight Foundation is a non-profit whose mission is to increase government transparency and openness with a goal of making more government information available in real-time and online.

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3. Tracking State Transportation Dollars Report: <http://www.trackstatedollars.org/>
4. State Transportation Improvement Programs for all 50 states
5. MPO Transportation Improvement Programs for selected MPOs (151 in total)

Support / Funding Source

SRAM Cycling Fund
Kaiser Permanente

Figure 2

MICHIGAN

SCORE CARD

GRADING ALL 50 STATES ON FUNDING TRANSPARENCY AND BICYCLE & PEDESTRIAN SPENDING

FUNDING >> GRADE: D	
1.2	% OF \$ SPENT ON BIKE/PED
5.6	% PROJECTS WITH BIKE/PED
28/68	DIVERSITY OF \$

TRANSPARENCY >> GRADE: D	
1	OPEN DATA
3	PAPER TRAIL
2	POINT OF CONTACT
3	DESCRIPTION CLARITY



PERCENTAGE OF TOTAL PROJECTS



PERCENTAGE OF TOTAL COSTS



STATEWIDE TRANSPORTATION SPENDING IN BIKING AND WALKING: MICHIGAN

	NUMBER OF PROJECTS	PERCENTAGE OF PROJECTS	TOTAL COSTS OF PROJECTS	PERCENTAGE OF TOTAL COST	AVERAGE PROJECT COST
Total of all bicycling and/or pedestrian only projects	155	4.013%	\$131,632,175.85	0.776%	\$849,239.84
Total of all projects mentioning bicycling and walking facilities	216	5.593%	\$201,755,722.85	1.189%	\$934,054.27
Total of all projects that do not mention bicycling and walking facilities	3646	94.407%	\$16,766,777,832.61	98.811%	\$4,598,677.41
Bicycle Project Only	5	0.129%	\$165,625.00	0.001%	\$33,125.00
Pedestrian Project Only	37	0.958%	\$13,058,974.00	0.077%	\$352,945.24
Bike and Ped Only (nonroad)	113	2.926%	\$118,407,576.85	0.698%	\$1,047,854.66
Road project with pedestrian component	43	1.113%	\$27,054,042.00	0.159%	\$629,163.77
Road project with bicycle and pedestrian components	9	0.233%	\$36,576,262.00	0.216%	\$4,064,029.11
Bike/Ped-friendly road projects	2	0.052%	\$879,000.00	0.005%	\$439,500.00
Total in STIP	3892	100.000%	\$16,968,533,555.46	100.000%	\$4,393,716.61



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(16) Revisiting the Role of Active Transportation in Overall Levels of Physical Activity: A Longitudinal Study of Families in Portland, Oregon

Nathan McNeil, MURP¹, Jennifer Dill, PhD¹

¹Portland State University

Focus Area: Research

Background and Purpose

The CDC recommends that children and adolescents do at least 60 minutes of moderate to vigorous physical activity (PA) per day, and that adults do at least 150 minutes of moderate intensity physical activity per week. Lack of physical activity is one factor that is contributing to the rise in obesity among both children and adults. People can get physical activity through exercise/leisure activities and forms of active transportation (AT) such as walking and bicycling.

We use data from a multi-year longitudinal intervention study of households with children in Portland, Oregon, to explore how AT contributes to overall and CDC recommended levels of physical activity. Data collection consisted of two longitudinal phases of GPS and accelerometer (AM) data (5 days each), along with household and individual surveys. The second phase of data collection was completed on the study in August 2013. We previously presented findings from Phase 1 showing that active transportation was responsible for an increasingly high percentage of PA among adults for people with higher levels of overall PA, and that for kids aged 11-17, who were generally not meeting suggested PA levels, AT accounted for a significant portion of their achieved PA levels (37-44% of PA was attributable to AT amongst those kids 11-17 who did NOT achieve the recommended levels) (1).

This paper explores how AT's role in achieving PA levels has changed from two years prior among the population of children and adults. Additionally, this paper incorporates methodological improvements in calculating amounts of PA achieved from bicycling trips (including an improved method for calculating PA levels for bicycle trips [see separate abstract from McNeil/Broach] and in imputing bicycle trips based on GPS and accelerometer data [see separate abstract from Broach]).

The Family Activity Study is seeking to determine the effect of traffic calming interventions on the active travel behaviors, perceptions, and attitudes of families in the Portland area. Data collection includes surveys and observed behaviors using a combination of GPS and accelerometer data.

Objectives

Objectives of the paper are: to understand if and when active transportation plays a significant role in the overall levels of physical activity attained by children and adults in an observed study of households in Portland, Oregon; to improve our prior methodology for calculating levels and amounts of PA derived from AT; and, to examine differences between age groups and genders, as well as differences in AT/PA levels over time.

Methods

GPS and Accelerometer data are pulled from 333 households, including 495 adults, 325 children age 5-10, and 176 children aged 11-17. All participants were asked to wear an accelerometer and GPS device for 5 consecutive days, including at least one weekend day, and to complete surveys on stated attitudes and behaviors. Of the 333 households participating in Phase 1 of data collection (Fall 2010 – Spring 2011), 262 returned for Phase 2 - another round of 5 days - two years later (Fall 2012 – Spring 2013). Accelerometer data was broken down into four categories (sedentary, light, moderate or vigorous



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activity), and bicycle trips were adjusted to account for AMs poor applicability to such trips. GPS and AM data was used to identify transportation trips, including walk and bike trips.

Results

Using the CDC recommendations of 150 minutes of moderate physical activity per week for adults, and 60 minutes per day for children, we found that during Phase 1 of data collection adults in our sample received over half of the recommended physical activity from walking and biking, while children received only 15-20% from walking and biking. Older kids (11-17) had much lower overall levels of physical activity than younger kids, but their PA from AT represented a high level of their overall actual PA achieved (see Table 1).

Data from the final round of data collection is currently being processed (collection was completed in August 2013), and will be used to examine how PA levels changed in this study group over two years. Of particular interest are changes as kids age (e.g. do younger kids levels of PA drop to similar levels as older kids, do kids with higher levels of AT maintain or add to those levels?), general trends in the sample over time, and an impact of new infrastructure on the sample populations level of AT.

Conclusions

Active transportation can be a significant source of physical activity, particularly among adults, and older children.

Implications for Practice and Policy

Examining active transportation behaviors among different age groups over time allows us to understand targeting measures that might yield longer lasting improvements in levels of physical activity.

References

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Support / Funding Source

The Family Activity Study and this paper were funded by the Active Living Research program of the Robert Wood Johnson Foundation, and by the Oregon Transportation Research and Education Consortium (OTREC).



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Table 1. Contribution of Active Transportation to Overall and Recommended Levels of Physical Activity

Group	Gender	Grouped Attainment of CDC Recommended PA Levels *	Phase 1 (Fall 2010 - Summer 2011)				Phase 2 (Fall 2012 - Summer 2013)		
			n	Total Minutes of Mod. & Vig. PA	Percent of ACTUAL PA derived from AT	Percent CDC RECOMMENDED PA derived from AT	n	Total Minutes of Mod. & Vig. PA	Percent of ACTUAL PA derived from AT
Adults	Male	Not Meeting	26	62	26%	15%	tbd.		
		Meeting	33	127	39%	46%			
		Exceeding	95	292	51%	138%			
	Female	Not Meeting	65	51	32%	15%	tbd.		
		Meeting	62	119	44%	49%			
		Exceeding	132	257	50%	120%			
Young Kids (4-10)	Male	Not Meeting	12	200	20%	14%	tbd.		
		Meeting	54	343	16%	18%			
		Exceeding	55	543	16%	29%			
	Female	Not Meeting	42	179	16%	10%	tbd.		
		Meeting	58	321	15%	16%			
		Exceeding	25	494	22%	37%			
Older Kids (11-17)	Male	Not Meeting	45	137	37%	17%	tbd.		
		Meeting	12	317	35%	37%			
		Exceeding	4	483	25%	40%			
	Female	Not Meeting	44	104	46%	16%	tbd.		
		Meeting	6	279	24%	23%			
		Exceeding	1	403	24%	33%			

*CDC recommends 150 minutes of moderate or vigorous activity per week for adults (adjusted here for 5 days), and 60 minutes per day for children.



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(17) San Antonio Bike Share: Users, Uses, and Effects

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Focus Area: Research

Background and Purpose

Bicycle sharing programs, which make fleets of bicycles available for public use on a self-serve basis, are appearing in large and medium size cities throughout the US. Few descriptive data are available on users of these programs and their bicycling practices before and after becoming bike share program members.

Objectives

The objectives of the study were to describe the characteristics of the San Antonio (Texas) Bike Share system (SA B-Cycle) members, to assess the effects of membership on cycling frequency and cycle trip purposes, and to identify the mode of travel replaced by bike sharing. Differences between lower and higher income respondents were explored.

Methods

This cross-sectional study used an online questionnaire to survey SA B-cycle members in the fall of 2012, after the program had begun in spring of 2011. The study was approved by the Institutional Review Board of the University of Texas Health Science Center at Houston. The questionnaire included questions on demographics and pre- and post-membership cycling practices, including cycle trip purposes (exercise/recreation or transportation, by the type of destination).

Results

Of the 1,218 current and former annual members with email addresses on file, 160 responded to the survey (13%). About half (53%) of the respondents were male, 26% were 50-59 years old; 18% were under the age of 29 and 11% were 60 or older. A majority (70%) was white; 21% were Hispanic. Forty percent of respondents reported annual household earnings over \$95,000, and 19% reported earning less than \$40,000.

Twenty-eight percent (28%) of respondents reported that they had not biked for any purpose in the year before joining SA B-cycle. More respondents reported cycling weekly after joining B-cycle than before (83% vs 49%, $p < 0.001$). Although respondents living in households earning over \$95,000 annually were less likely than those earning $< \$40,000$ to report weekly cycling prior to joining (54% vs. 75%, $p = 0.04$), no difference existed in weekly cycling after joining (78% vs. 78%).

Although the proportions reporting at least one recreational cycling trip in the year prior to joining and at least one recreational cycling via B-cycle were similar (66% vs. 70%), a greater proportion reported using B-cycle for a transportation trip than had reported using a bicycle for transportation the year before joining (66% vs. 38%, $p < 0.001$). The difference was almost entirely due to an increase in trips to destinations other than work or transit (e.g. to visit friends, go shopping, or eat out). Sixty-four percent of members reported using B-cycle for a non-work, non-transit trip, compared to 31% who did so via SA B-cycle ($p < 0.001$). Members who did not cycle in the year before joining were more likely to use B-cycle for a recreational trip than those who had cycled in the prior year (84% vs. 65%, $p = 0.02$), while those who had cycled in the prior year were more likely to use SA B-cycle for a transportation trip than those who had not cycled in the prior year (72% vs. 51%, $p = 0.02$).



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Thirty-six percent reported that they would have made their last B-cycle trip by car, and 32% would have walked, had B-cycle not been available. Thirteen percent said they would not have made the trip at all without B-cycle. Over half (51%) of respondents reported an increase in physical activity as a result of a B-cycle membership.

Conclusions

Despite a fairly low participation in the study, results suggest that, among respondents, more people reported regular cycling, and more people cycled for transportation, particularly to non-work destinations, after joining than before joining. More experienced cyclists were more likely to report using SA B-cycle for transportation than those with less cycling experience. Conversely, less experienced cyclists were more likely to report using SA B-cycle for recreation than those with more experience. These findings suggest that inexperienced cyclists who join bike share may start with recreational rides, and a certain level of comfort and familiarity with cycling may be a prerequisite for transportation cycling.

Differences were seen by socioeconomic status. Higher income members were significantly more likely to cycle in the year prior to joining than were lower income members, yet no difference in the proportion of weekly cyclists in higher and lower income groups existed after joining. A larger proportion of lower income members compared to higher income members used B-cycle once per week, suggesting that SA B-cycle membership may have contributed to closing the cycling gap between lower and higher income members.

Implications for Practice and Policy

This study suggests that people who join bike share programs vary in their prior cycling experience and the types of trips they take via bike share. Developing an approach to categorizing members when they join in terms of their cycling experience and readiness to cycle for transportation could lead to tailored interventions designed to increase ridership, encourage more transportation cycling, and maintain these behaviors.

Support / Funding Source

Ms. Nehme receives support as a Dell Health Scholar at the Michael & Susan Dell Center for Healthy Living.



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(18) Staff's Perceptions of Girls' Physical Activity at Afterschool Programs

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Focus Area: Research

Background and Purpose

Girls physical activity (PA) levels are consistently lower than boys. Afterschool programs (ASPs) present an important setting in which to improve girls' PA. ASP staff are a critical component to the success of ASPs. Within the context of PA, staff who serve as role models to support and encourage PA may positively impact girls' PA. Interventions are needed to train staff to serve as active role models by engaging in PA, supporting PA, and facilitating opportunities for girls to be active. Unfortunately, existing staff training programs still result in a disparity between girls and boys PA and more research is needed to better understand how to utilize staff to promote PA to girls in ASPs.

Objectives

An area that has received little attention is the perception of ASP staff related to promoting PA utilizing evidence-based strategies. This information may inform components of staff training to improve PA in girls' afterschool. Therefore, the overall purpose of this study was to explore staff perceptions of the use of evidence-based PA promotion strategies for promoting PA in girls. This information will help advance staff training to improve PA in ASPs specifically related to girls.

Methods

This was a qualitative collective case study conducted within the boundaries of staff at community-based ASPs located within a school setting. Participants were staff recruited from three community-based ASPs located within three separate schools. Semi-structured interviews were conducted with staff from three ASPs (n=18). Data was analyzed using the process of immersion/crystallization.

Results

When asked if their ASP had any policies related to PA, less than a quarter of staff expressed that having a PA policy was important and a majority of staff did not know if there was a policy related to PA at their ASP. Few staff had received any type of PA training and those that did had difficulty remembering any specifics of the training. Overall, staff reported that girls were difficult to motivate to participate in PA. Staff mentioned a variety of PA promotion strategies they used to motivate girls to participate in PA but mentioned they were not always utilizing these strategies. Also, staff that reported using motivational strategies (e.g., engaging in PA, verbal encouragement) to encourage girls participation in PA typically only mentioned one type of motivational strategy that they used and if the strategy did not work, they left the girl alone.

When discussing the types of activities offered to motivate children to be active, staff reported boys preferred competitive games (e.g., dodge ball, knock out) and competitive games were the most often implemented games during organized PA time. Girls' preferred activity was tag and staff reported girls were often intimidated by boys during competitive games. When discussing staff's ability to promote PA during organized group PA time, staff identified long-term staff (employed by ASP more than a year) as those who typically led PA. Staff who had been employed by the ASP less than one year did not appear confident in their ability to lead organized PA. None of the staff said they were currently monitoring PA (e.g., tracking PA through the use of pedometers) and only a few mentioned they had ever monitored the amount of PA that children accumulated at their ASP.



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Conclusions

Overall, a majority of staff appeared to have some knowledge of PA promotion strategies (e.g., engaging in PA, offering age-appropriate scheduled PA). However, few staff consistently offered the PA promotion strategies they were aware of and a majority of staff felt several strategies were unnecessary (i.e., having a PA policy, monitoring PA). These findings provide further evidence for the need to train ASP staff to promote girls' PA.

Implications for Practice and Policy

These findings lead to several recommendations for future staff trainings to promote girls' PA in ASPs. First, there is a need to address staff's belief that PA policies are not needed. PA professionals need to work with key change agents (e.g., staff employed by the organization longer than one year) to ensure that all staff perceive that PA policies are important and that these policies are enforced. Second, staff need to be trained to use PA promotion strategies that will increase girls' PA (e.g., using multiple PA strategies at one time). Third, staff need to ensure that girls-only PA time is scheduled daily to allow girls the opportunity to participate in PA without interference from boys. Fourth, engagement by staff (especially female staff) could positively impact girls' PA and staff need to be trained on the importance of consistently engaging in PA with girls. Finally, future staff trainings need to emphasize the importance of monitoring PA as a tool for PA promotion for children and as a policy evaluation tool.



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(19) Use of Qualitative Methods to Develop Educational Materials for the Active Commuting to School (ACTS) study

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Focus Area: Research

Background and Purpose

One in three children in the United States are overweight or obese, and low levels of physical activity play an important role in the high prevalence of obesity.¹ Currently, only one in three children obtains the recommended amount of physical activity. One proposed strategy for increasing daily physical activity among children has been to promote active transportation to/from school.² Data indicates that between 1969 and 2009, the proportion of K-8 students who regularly walked or biked to school dropped from 47.7% to 12.7%.³ ACTS capitalized on a unique and time-sensitive opportunity to assess the impact of changes to the built and sociocultural environment on active commuting (AC) to school among elementary school children in four schools in the Winston-Salem/Forsyth County Schools (WS/FCS) system. Because decisions for AC can be influenced by children, parents, and school staff, the project used focus groups to identify variables that might encourage or discourage AC.

Objectives

This abstract describes findings from focus groups using to develop a sociocultural campaign to promote AC in elementary schools.

Methods

Focus group participants were recruited from four WS/FCS elementary schools. Two schools were located on a greenway and two additional schools were not located on a greenway but had infrastructure (e.g., sidewalks) that supported AC; all schools shared similar size and student demographics and principals at all schools were willing to promote AC among students. Separate focus groups with parents, teachers/staff, and students were planned for each school (n = 12). Principals from each school selected focus group participants. Focus groups, held during the school day in space designated at each school, were conducted during spring 2012. Participants received a \$10 gift card for participating.

Focus group questions for parents and school staff focused on knowledge, attitudes and beliefs related to AC. Participants commented on personal past experiences with AC, perceived barriers and benefits of AC, willingness to allow and feasibility of AC, and factors that could encourage or discourage AC. Student focus groups included similar questions, with special emphasis on how to engage youth in AC. A standardized focus group guide with identified probes was used for all focus groups.

Results

A sample of 94 participants (17 parents, 35 school staff, and 42 students) participated in focus groups. General themes regarding AC were identified were around overall benefits, concerns/barriers and willingness to engage in AC. Most parents and school staff reported previous engagement in AC and noted benefits for AC, including increased physical activity, engagement in creativity, and free play that allowed children to learn problem solving and social skills. Concerns and barriers mentioned by parents included perception of increased crime since they (parents) grew up, environmental barriers (e.g., lack of sidewalks and bike racks, poor greenway upkeep, and general pedestrian safety issues). Most parents indicated they would not be willing to allow their children to engage in AC, primarily because of safety concerns.



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School staff noted similar benefits for AC and barriers related to infrastructure and safety concerns. Teachers indicated more willingness to allow their own children to engage in AC, contingent upon distance from the school and having a trust-worthy adult to assist with the commute. Teachers also did not believe parents of students would allow children to engage in AC because parents were perceived as “over protective”.

Students were generally supportive of AC and identified several benefits of AC. Students raised multiple concerns and challenges, including pedestrian safety and perceived crime, primarily taught to them by their parents. Students noted opportunities to engage in AC were limited by adverse weather conditions and distance to school. Students’ willingness to engage in AC was influenced by their ability to get exercise and living close to the school. Students also mentioned that parents were unlikely to allow AC because of safety concerns and distance to school.

Conclusions

Initial assumptions from the research team were that the sociocultural campaign to promote AC should focus on convincing students of the importance of physical activity and benefits of AC; however, students were already convinced in these areas. Focus groups identified additional concerns that should be addressed to encourage parents to consider AC. Subsequently, “Walk This Way!, a 10 part video series was developed that was geared toward students, emphasized the benefits of AC and directly addressed parental concerns (e.g., pedestrian safety, handling weather-related concerns, developing walking groups with responsible adults; see Table). An accompanying brochure was developed for parents to practice pedestrian safety skills at home. Materials were used in intervention school classrooms as part of a campaign to promote AC.

Implications for Practice and Policy

Use of qualitative methods can be helpful for addressing concerns among target populations and decision makers and should be employed in projects aiming to address policy and environmental issues.

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Support / Funding Source

Robert Wood Johnson Foundation, Active Living Research grant 69823



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Table

Walk This Way!: 10 Part Video Series		
Walk This Way was a video series that was shown in the classrooms over the course of 2 weeks. Ten, 2-3 minute, videos taught students how to actively commute safely.		
Series	Series Title	Series Description
1	"Convincing the Parents"	Parent/child discussions regarding active commuting.
2	"Traffic Signs"	Teaching children how to read and react to traffic signs.
3	"Be Prepared"	Things to do in preparation for active commuting.
4	"Walking to School"	Making sure your child is ready.
5	"Crossing the Street"	Following the rules when crossing the street.
6	"When the Sidewalk Ends"	How to walk properly on the correct side of the road when a sidewalk is not available.
7	"Getting to School"	Understanding the benefits of active commuting.
8	"Walking Home"	Additional benefits of active commuting.
9	"The Walking School Bus"	What is a walking school bus and how can you start one?
10	"Review of All Previous Videos"	Recapping video highlights and establishing drop-off points.



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(20) **Walk this Way! Results from the Active Commuting to School (ACTS) study**

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Focus Area: Research

Background and Purpose

Active commuting (AC) has been identified as a strategy for increasing daily physical activity among children [1, 2]. Previous strategies to increase AC have focused on changing the built environment, but not the sociocultural environment, and have reported only small effects on AC. A combination of social and built environmental supports could increase AC.

Objectives

To evaluate the impact of planned built environment changes, combined with sociocultural environment change on AC in four Southern elementary schools.

Methods

The study aimed to measure AC on a greenway before and after connecting structures were put in place to provide additional greenway access from bordering neighborhoods (built environment change). An educational campaign to address student, parent, and school staff concerns and to encourage AC was developed (sociocultural environmental change). Two schools on the greenway and two comparable schools not on the greenway but with infrastructure (e.g., sidewalks) to support walking participated in the study.

We developed a 10-part video series and accompanying brochures teaching pedestrian safety and promoting AC benefits. One greenway and one non-greenway school were randomly assigned to receive the intervention. In intervention schools, the video series was shown for one week prior to an organized Walk to School Day followed by a 3-week promotional campaign encouraging continued AC. AC was encouraged at control schools but no educational or campaign materials were provided. The intervention was implemented in Fall (~late September/early October) 2012 at the beginning of the school year and ended ~late November 2012. Tally sheets assessing AC within the school were conducted before and immediately after the campaign and then again in May 2013 at the end of the school year. Tallies were collected for 3 days (Tuesday – Thursday) at each time point. Surveys assessing knowledge, attitudes, beliefs, and barriers to/facilitators for AC were administered to teachers/school staff (baseline only) and parents (all three time points). An additional survey evaluating the Walk to School Day and promotional campaign was administered to parents immediately after the campaign.

Results

Prior to the data collection, plans to improve the greenway infrastructure were delayed due to a required flood study. Thus, built environment changes were not implemented during this study. During the Summer prior to the start of the intervention, the school district reduced the distance that students were required to live from school to be eligible for free bussing from ½ mile to ¼ mile. The school system also moved from directly hiring to outsourcing crossing guards and reduced the number of crossing guards available and crossing guard locations. During the course of the study, there were two highly publicized instances of children being injured by vehicles attempting to pass stopped school busses—one fatally—resulting in increased news reports and concerns about safety.

The four schools in the study had student enrollment of ~800 at each school; the number of students living < ¼ mile from school ranged from 4 to 23 students (Table 1). Over 1,500 classroom tally sheets



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assessing student transportation methods were collected over the 3 data collection time points; most trips were made using passive (mean+SD 20.2+4.7 trips) vs. active (0.45+1.59 trips) transport. There was a slight increase in AC from baseline to immediately post campaign in intervention schools and a decrease in control schools over the same time period; AC returned to baseline values in intervention schools by the third data collection time point. One quarter of parents (25.2%) reported that their children had seen the educational video series at school and 26.2% of parents reported that their children participated in Walk to School Day. Overall parents reported that they and their children enjoyed the organized Walk to School Day; however, only 3.3% of parents reported that their children's AC changed as a result of the campaign. Parental knowledge, attitudes, and beliefs about AC did not change as a result of the study.

Conclusions

Although the current study showed limited immediate success in increasing AC, schools involved in the study are planning monthly Walk to School Days and campaigns promoting AC for the 2013 – 2014 school year. Because of increased attention to AC, several local news reports have focused on pedestrian safety and benefits of AC. Parent groups from intervention schools are meeting with school and Transportation Department representatives to advocate for improved infrastructure to support AC; one school has already installed bike racks and a gravel trail to facilitate AC. Control schools will implement the AC campaign in Fall 2013. The school system has incorporated pedestrian/bicycling safety as a part of the elementary school curriculum and the 10-part video series and brochures have been distributed to all 42 elementary schools.

Implications for Practice and Policy

A sociocultural campaign can be useful for raising awareness of and advocates for built environment changes to support AC and may be an important precursor to garnering support. Additional built environment changes may lead to increased AC.

References

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2. Tudor-Locke, C., B.E. Ainsworth, and B.M. Popkin, Active commuting to school: an overlooked source of childrens' physical activity? *Sports Med*, 2001. 31(5): p. 309-13.

Support / Funding Source

This project was funded by Active Living Research, a national program of the Robert Wood Johnson Foundation (grant #69823)

Table 1. Distance to School

	01ME	02JE	04RE	05WE
	N	N	N	N
≤1/4 mile from school	14	19	23	4
≤1/2 mile from school	77	42	99	33
≤1 mile from school	355	171	289	117
>1 mile from school	447	492	352	691
Total	802	663	641	808



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(21) **Active Afterschool? Promoting Physical Activity in the Out of School Time Nutrition and Physical Activity Initiative (OSNAP) Cluster-randomized Controlled Trial**

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Focus Area: Research

Background and Purpose

Nationally, approximately 8.4 million children participate in afterschool programs.¹ The Out of School Nutrition and Physical Activity (OSNAP) Initiative, a community-based intervention, was designed to improve nutrition- and physical activity-related policies, environments, and practices in afterschool settings.

Objectives

To test the effectiveness of OSNAP on increasing children's physical activity levels in afterschool programs.

Methods

Setting and Design: This study was a cluster-randomized controlled trial in 20 afterschool programs (10 intervention sites paired with 10 matched controls) in Boston, Massachusetts from Fall 2010 through Spring 2011. Prior to randomization, sites were matched on key program characteristics and school-level racial/ethnic and socio-demographic composition obtained from administrative records. Control sites were invited to participate in the intervention the following school year. Informed consent procedures were followed for all students.

Intervention: Teams of afterschool program directors and staff from the intervention program sites were invited to participate in a series of three OSNAP Learning Collaborative (LC) sessions modeled after existing community partner professional development programs and prior research.^{2,3} At LC sessions, afterschool teams reviewed reports of baseline data related to physical activity provision and other OSNAP goals at their programs and set action plans to improve program practices, develop relevant policies, and communicate changes with parents and other partners using tools provided by the OSNAP team. Key physical activity-related OSNAP goals included providing 30 minutes of moderate physical activity for every child each day (including outdoor activity when possible) and offering 20 minutes vigorous physical activity three times per week. Intervention programs selected action steps regarding increasing physical activity time/or days offered, participation of all students for 30 minutes, and/or including outdoor activity time. At each LC session, intervention teams shared progress with other teams and participated in physical activity skill development sessions. Program staff also had opportunity to participate in additional physical activity program skill-building sessions (i.e., Playworks, SPARK, Food & Fun) offered during the school year.

Subjects: Participants were 404 students (mean age 7.7 (SD 1.7) years) in grades Kindergarten-6. Students were multi-ethnic (30% Black, non-Hispanic, 35% Hispanic, 7% non-Hispanic white, 3% Asian, 24% Other/Unknown) and 51% were female (Table 1).

Measures: Data collectors visited each program for one week at baseline and follow up to observe program activities, including types and amount of physical activity provided. Students wore accelerometers during program time to capture physical activity levels.



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Outcomes: Primary outcomes included accelerometer (Actigraph 7164/GT1M/GT3X) assessments of total accumulated minutes and bouts of moderate-and-vigorous physical activity (MVPA) per day in the afterschool period. Secondary outcomes included vigorous and sedentary activity minutes per day and total activity intensity counts measured during the afterschool period. Accelerometer data were collected in 1-minute epochs. Minutes and bouts spent in MVPA and VPA were estimated according to the Freedson⁴ age-specific cut points for children ages 6-18 years, using thresholds of 4 METs for moderate and 6 METs for vigorous activity. Activity levels during observed swimming periods when children were not wearing accelerometers were imputed (at 6 METs).

Analysis: We used SAS PROC MIXED (SAS 9.3, SAS Institute, Cary, NC) to construct random intercepts models accounting for clustering of students within afterschool programs. The REPEATED statement was used to account for nesting of repeated daily physical activity observations within students, assuming a compound symmetry within-person error covariance structure.

Results

182 students in the intervention programs (mean age 7.9 (SD1.8) years) and 222 in comparison programs (mean age 7.6 (SD 1.6) years) provided complete accelerometer data (average: 4.1 days at baseline, 4 days at follow-up). At baseline, seven of 10 intervention programs provided at least 30 minutes of daily physical activity opportunities. As part of their intervention implementation, nine of 10 programs included practice, policy, and communication actions providing 30 minutes of physical activity time for every child (including outdoor activity if possible). Intervention programs did not make significant changes in time allotted for physical activity, but successfully made existing time more active. After adjustment for accelerometer model and wear minutes, student demographics, and study design and clustering variables, students in intervention programs demonstrated greater increases in vigorous physical activity minutes/day (2.5, 95% CI 1.1-4.0; $p < 0.001$), minutes/day in bouts of vigorous physical activity (3.3, 95% CI 1.9-4.8; $p < 0.001$), and overall activity counts (14,353 95% CI 2,603-26,103; $p < .003$) during afterschool time when compared with students in control programs. Changes in sedentary and MVPA were not statistically significant (Table 2).

Conclusions

Programs participating in OSNAP increased vigorous physical activity levels of participants by 27% during the afterschool program period.

Implications for Practice and Policy

Afterschool programs can effectively increase vigorous physical activity levels during program time. Supportive policies, practices, and skill development may be needed to impact activity levels. The tools, resources, and an implementation guide used in this intervention project are available at www.osnap.org.

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Support / Funding Source

Support for this project was provided by cooperative agreements with the Centers for Disease Control and Prevention [CDC U48DP001946] including the Physical Activity Policy Research Network and the Nutrition and Obesity Policy Research and Evaluation Network. The content is solely the responsibility of



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the authors and does not necessarily represent the official views of the Centers for Disease Control and Prevention.

Table 1. Demographic characteristics of afterschool program students participating in the OSNAP randomized trial, Boston, September 2010 - May 2011

Characteristic	Participating Students ^a		
	All N=404	Intervention N=182	Control N=222
<i>Gender</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
Male	198 (49)	85 (47)	113 (51)
Female	206 (51)	97 (53)	109 (49)
<i>Race/Ethnicity</i>			
White, Non-Hispanic	30 (7)	8 (4)	22 (10)
Black, Non-Hispanic	123 (30)	44 (24)	79 (36)
Hispanic/Latino	140 (35)	68 (37)	72 (32)
Asian	13 (3)	9 (5)	4 (2)
Other/Unknown	98 (24)	53 (29)	45 (20)
<i>Grade</i>			
Kindergarten	53 (13)	27 (15)	26 (12)
1	69 (17)	27 (15)	42 (19)
2	85 (21)	32 (18)	53 (24)
3	71 (18)	33 (18)	38 (17)
4	68 (17)	29 (16)	39 (18)
5	47 (12)	25 (14)	22 (10)
6	11 (3)	9 (5)	2 (1)
	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>
<i>Age (yr) Mean (SD)</i>	7.7 (1.7)	7.9 (1.8)	7.6 (1.6)

SD, standard deviation.

a Participating Students: all students at 20 afterschool programs who provided at least 2 weekdays of valid accelerometer data per data collection period

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Table 2. Estimated intervention impact on physical activity levels from baseline to follow up among 404 children in intervention and control afterschool programs, OSNAP randomized trial, September 2010 - May 2011

	Baseline ^a		Follow Up ^a		Crude Change ^a		Adjusted Change ^b		p-value
	Mean (SE)	Mean (SE)	Mean (SE)	Mean (SE)	95% CI				
Minutes MVPA Overall	24.0 (3.6)	33.3 (3.8)	9.3	-1.5 (1.2)	-3.8 - 1.8	0.20			
Intervention									
Control	30.3 (3.7)	40.6 (3.7)	10.3						
Minutes MVPA in Bouts									
Intervention	11.8 (4.0)	20.5 (4.1)	8.7	-0.6 (1.3)	-3.2 - 2.1	0.68			
Control	18.8 (4.0)	27.7 (4.1)	8.9						
Minutes VPA Overall	9.1 (2.2)	12.9 (2.3)	3.8	2.5 (0.7)	1.1 - 4.0	<0.001			
Intervention	13.5 (2.2)	14.5 (2.3)	1						
Minutes VPA in Bouts									
Intervention	3.3 (1.9)	5.3 (2.0)	2	3.3 (0.7)	1.9 - 4.8	<0.001			
Control	7.1 (2.0)	5.7 (2.0)	-1.4						
Minutes Sedentary Overall	48.9 (3.7)	44.2 (3.9)	-4.7	-0.7 (1.3)	-3.3 - 1.8	0.57			
Intervention									
Control	43.2 (3.8)	39.8 (3.9)	-3.4						
Minutes Sedentary in Bouts									
Intervention	30.5 (4.4)	31.5 (4.6)	1	-1.6 (1.6)	-4.8 - 1.5	0.31			
Control	25.0 (4.5)	28.2 (4.6)	3.2						
Total Activity Intensity Counts	130,717 (17,486)	162,962 (18,143)	32,245	14,353 (5,993)	2,603 - 26,103	0.02			
Intervention									
Control	163,076 (17,680)	179,078 (17,986)	16,002						

SE, standard error; CI, confidence interval; MVPA, moderate-to-vigorous physical activity; VPA, vigorous physical activity.

a. Adjusted for average daily wear minutes and meter type only; estimates represent average activity levels for a child wearing an Actigraph model 7164 meter for average daily wear time
b. Adjusted for average daily wear minutes, meter type, sex, grade, race/ethnicity, program matched pairs, % deviation from annual average temperature, and precipitation



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(22) Factors Associated with School Level Implementation of Wellness Policies and Practices: A State-Wide Analysis

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Focus Area: Research

Background and Purpose

Local wellness policies (LWP) in schools have the potential to impact the health of school-aged children through creating opportunities for, and an environment that supports physical activity and healthy eating. LWPs are written by school systems and implemented on a school level. Schools are encouraged to form School Wellness Committees (SWCs) to aid in implementing federal and local policies. To comply with federal legislation mandating the implementation and evaluation of LWPs, evidence is needed to determine school system and school level factors associated with the implementation of wellness policies and practices.

Objectives

The objective is to determine factors associated with school level implementation of wellness policies and practices. It is hypothesized that schools are more likely to implement wellness policies and practices when (1) their school system has a strong/comprehensive written LWP, (3) their school system provides support for LWP implementation and evaluation, and (2) the school has a SWC in place.

Methods

Two wellness surveys were developed based on existing surveys, criteria from evidence based school health ranking programs, and federal legislation. The school administrator survey addressed implementation of wellness policies and practices (17 items) and SWC characteristics. The school system survey targeted officials overseeing health and wellness and addressed school system support for LWP implementation and evaluation (21 items). After pilot testing, the surveys were sent to officials in 24 school systems and to administrators in the 1439 schools within those school systems, in one eastern state. Written LWPs for each of the 24 school systems were evaluated using a standardized tool (WellSAT), providing an overall score ranging from 0-100 for both strength and comprehensiveness. Bivariate analyses included independent t-tests and correlations. Multi-level linear regression models were used to determine the association between implementation of wellness policies and practices given the factors hypothesized above, adjusting for clustering within school systems.

Results

The majority of school system officials (83.3%, 20/24) and over half of school administrators (57.5%, 827/1439) completed the wellness surveys. Less than half of schools had a SWC in place (43.0%). The 17-item implementation scale (Cronbach's alpha = 0.91) was used to generate an implementation score (sum of "fully implemented" items, mean+SD = 3.5+4.3). The 21-item scale addressing school system support for the implementation and evaluation of LWPs (Cronbach's alpha = 0.89) was used to generate a school system support scale (sum of "fully implemented" items, mean+SD = 11.8+5.4). Evaluation of written LWPs revealed strength and comprehensiveness scores of 31.6 (range 0-74) and 59.86 (range 20-96), respectively. When adjusting for clustering within school systems, the associations between the implementation scores and the strength/comprehensiveness of the written LWP were non-significant ($p>0.05$). Implementation scores were positively correlated with school system support scores ($r=0.10$, $p<0.001$). In a multi-level linear regression model, adjusting for clustering within school systems,



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implementation remained positively associated with system support ($\beta=0.15$, $p=0.035$). Implementation scores were higher among schools that reported having a SWC (5.6 ± 4.9) compared to schools without a SWC (2.0 ± 2.9), $t=-12.0$, $p<0.001$. When adjusting for clustering within school systems, schools with a SWC had higher implementation scores ($\beta=3.7$, $p<0.001$). In a final multi-level linear regression model, including SWCs, school system support, and comprehensiveness of the written LWP (strength was excluded due to collinearity), higher implementation scores were observed among schools with SWCs ($\beta=3.6$, $p<0.001$). School system support scores were marginally associated with implementation scores ($\beta=0.09$, $p=0.062$). The comprehensiveness of the written LWP continued to have no significant relationship with implementation.

Conclusions

Schools were more likely to implement wellness policies and practices when a SWC was in place. However, the majority of schools did not have a SWC and overall implementation scores were low. School system support for the implementation and evaluation of LWPs was associated with implementation, however when included in a model with SWCs, the significance became only marginal. The strength and comprehensiveness of the written LWP was not associated with implementation. The association between school/school system demographic factors and the constructs described above should be examined, and possibly controlled for in future analyses. Although both the implementation and school system support scales demonstrated high internal reliability, specific items and subscales should be considered to identify possible areas for intervention.

Implications for Practice and Policy

These findings support the establishment of SWCs to implement LWPs on the school level. The school system also plays a role in supporting the implementation of LWPs, but having an organized entity within the school to do this work has a stronger association with school-level implementation. The language of the written wellness policy was not associated with school level implementation in this study, however this does not negate the importance of having a strong and comprehensive policy in order to set the standard for wellness in schools and school systems.

Support / Funding Source

CDC Special Interest Program (Nutrition and Obesity Policy Research and Evaluation Network); CDC Community Transformation Grant.



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(23) **GoGirlGo!: Evaluation of a National Program to Increase Physical Activity in Girls and Evidence-Based Suggestions for Improvements**

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Focus Area: Research

Background and Purpose

Girls are consistently less physically active than boys regardless of race, income level, weight status, age, and/or setting (i.e., before, during or after school). Only 35% of girls (6-11 years) meet physical activity (PA) recommendations compared to 48% of boys. Regrettably, interventions that specifically target girls are limited and have not been any more successful at improving PA levels in girls as compared to interventions targeting boys and girls. This lack of success represents a significant challenge that needs to be addressed.

To address this challenge, numerous studies have explored correlates of girls' PA. Correlates with the strongest evidence include self-efficacy, social support, enjoyment, and organized girl-only environments. There is a need to design interventions that are better targeted towards the specific needs of girls to increase participation in PA. Additionally, there is a need to conduct research within real-world settings. Typically, interventions targeting girls for the purpose of research lack components that would support real-world sustainability (e.g., coincides with mission/objective of site, fits with current cultural/social norms of organization). For example, the Girls Health Enrichment Multisite Study, a federally funded, multi-site trial, was developed by researchers and then applied to afterschool programs (ASP) and a summer camp. After the intervention, investigators reported that continued enthusiasm and participation from girls and their parents would be a significant challenge due to the unrealistic time commitment outside of the intervention setting. Additionally, researchers recommended that future research should consider enhancing existing programs or environments to improve health behaviors in girls and that this may have more promise for effecting long-term sustainable changes in PA, as opposed to creating new programs.

Objectives

In an effort to help reduce sedentary behavior in girls and keep girls involved in PA, the Women's Sports Foundation developed GoGirlGo! (GGG). This developmentally appropriate, free nationwide curriculum is designed to provide girls (5-13 years) in urban afterschool settings with PA opportunities and weekly lessons about various health-related behavior topics (e.g., drug prevention, bullying). Over a million girls have participated in GGG. The purpose of this study was to scientifically evaluate GGG. This information will contribute to suggestions for improvement to GGG to assure that with its national presence and impact on over a million girls, GGG is effective at helping girls to increase their daily MVPA.

Methods

Using a single group repeated measures design, nine afterschool programs were recruited to participate in the evaluation. GGG was offered one-hour per week for 12 weeks consisting of 30 minutes of education and 30 minutes of PA. Data was collected at baseline, mid (twice), post, and at follow-up (3-months after the intervention ended). Outcome measures were both quantitative (accelerometers, questionnaires) and qualitative (staff interviews, girls focus groups, fidelity checks). Accelerometers were worn for four consecutive days by girls age 5-13 (n=182 girls) at each evaluation point. Self-report questionnaires were completed by girls age 8-13 (n=139) to assess self-efficacy and enjoyment of PA at baseline, post, and follow-up. Interviews with staff (baseline, post, and follow-up) and focus groups with



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girls (post, follow-up) were conducted to explore staff and girls' overall experience. Implementation fidelity was assessed during the intervention by an outside evaluator.

Results

Approximately half the girls that participated were overweight (25.3%) or obese (24.7%). One third of the girls were Hispanic and 43.9% were African American. When GGG was delivered, girls accumulated an average of 11 minutes of moderate-to-vigorous PA compared to 8 minutes accumulated on non-GGG days. After GGG ended and on days when GGG was not implemented, girls PA levels did not change from baseline PA levels. Girls' self-efficacy for PA increased between baseline and post ($p < .001$), and this was maintained at follow-up ($p < .001$). A significant increase was also found in enjoyment of PA between baseline and follow-up ($p = .016$). Girls and staff reported they enjoyed the curriculum but desired more PA and had several suggestions for improvement.

Conclusions

Our findings suggest GGG curricula improvements are warranted. Future GGG programming could explore offering GGG every day, including multiple PA opportunities in each lesson and/or providing a list of supplementary physical activities, working with site directors to create policies around days/times for offering GGG, incorporating more visuals (i.e., videos, additional pictures), re-structuring the 5-7 year old curriculum to ensure it is developmentally appropriate, and providing interactive trainings that allow staff to watch a lesson being implemented.

Implications for Practice and Policy

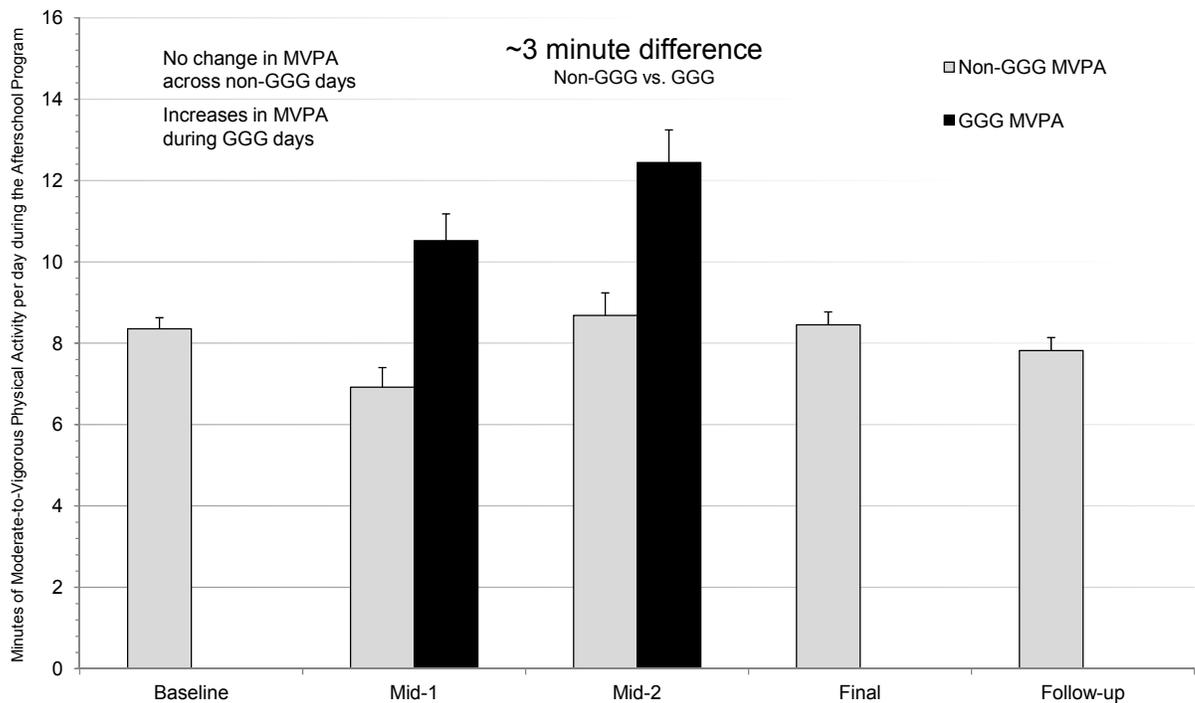
With GGG's national presence, reaching over 1,000,000 girls (e.g., Atlanta, New York City, Baton Rouge, and Seattle), GGG has the potential to significantly impact girls' PA nationwide. While other curricula to increase PA typically have costs associated with them, GGG could have an even greater impact by providing a free resource to communities to offer PA opportunities to girls. An enhanced version of GGG including the suggestions above could help to leverage GGG as the nationwide resource for quality afterschool PA programming in girls.

Support / Funding Source

Women's Sports Foundation

Figure 1

Comparison of Non-GGG versus GGG days from baseline to post assessment for all girls



Comparison of Non-GGG versus GGG days from baseline to follow-up assessment for all girls

Note: Midpoint comparison of non-GGG and GGG days occurred within same week

MVPA = moderate-to-vigorous physical activity



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(24) **Finding Space to Play: Policy, Website, and Qualitative Research on Shared Use in City of Phoenix Elementary School Districts**

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Focus Area: Research

Background and Purpose

Community use of school facilities is widely recognized as a way to promote physical activity and reduce the onset of chronic disease among residents, particularly in areas with limited public recreational spaces. Arizona state law has specific provisions related to use of school property for public purposes that serve community interests. To understand how this statute was operationalized and implemented at the school district level in the metropolitan City of Phoenix, the Public Health Law Center at William Mitchell College of Law and non-profit agency Pima Prevention Partnership undertook a multi-pronged research project that combined policy analysis with qualitative information from school district representatives. This approach was unique in that it analyzed both written regulations as well as micro-level implementation factors to attain a well-rounded picture of actual utilization levels and processes. The purpose of this research was to identify the current status of shared use policy and practice, identify best practices within district-specific contexts, and make recommendations to the County for improving public access to school facilities in the interest of promoting community health.

Objectives

The research objectives were to:

1. Understand how community use of school facilities policies were being implemented in the City of Phoenix, including factors that facilitated and hindered utilization.
2. Distinguish key elements for accessible and frequent public use based on the policies and practices of school districts with heavy community use.
3. Provide recommendations to the Maricopa County Department of Public Health for advancing the implementation of shared use.

Methods

This study employed a mixed methods approach that involved document review as well as a key informant survey and interview for 21 school districts. Specifically, the researchers conducted a policy analysis of district regulations and guidelines, a website analysis for shared use information available in the public sphere, an online survey with district representatives about community use volume and philosophies, and a key informant interview with district representatives about each stage of the community use process and perceptions of benefit/risk. Researchers analyzed each district's school board policies and regulations using legal analytical methods, and outlined the findings with a descriptive narrative summary. A thorough school district website analysis identified content related to community use of school property during non-school hours; parent and student handbooks were also analyzed to determine the extent to which they delineated community recreational use for district constituents. District-level community use personnel were contacted individually about policy implementation using qualitative methods. Online survey responses were aggregated for descriptive analysis of both numerical and categorical data, as well as used referentially to guide district-specific interviews. Semi-structured key informant interview responses were analyzed thematically by critical elements of implementation. The qualitative findings were leveraged to further interpret the implications of policy analysis findings, and provide practical recommendations about organizational structure and processes around shared use.



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Results

The policy language used by a majority of City of Phoenix elementary school districts was largely drawn from the Arizona state statute that supports community use of school facilities. The Arizona School Boards Association created several template policies, regulations, and agreements. A majority of districts use the templates, but those with high community usage have significantly altered the templates or created different materials to outline community use policies, regulations, and agreements. School districts with high community usage also had websites with accessible shared use content, managed community use calendars, and produced handbooks for public communication. Districts with high community usage tended to have a Community Education or Enrichment Department that promoted community use, strong city governmental partnerships, shared calendars to expedite scheduling, and campuses open for unscheduled public use. Barriers to community use included lack of clear written guidance for use options and forms, individual school gatekeepers, lengthy approval process, financially restrictive fee schedules, and concerns about costly vandalism.

Conclusions

Arizona's community use law provides strong support for comprehensive school district policies. However, other written documents available in the public sphere, such as regulations, agreements, handbooks, and website content provide a comprehensive policy environment to support community use of school property. Recreational opportunities may also be more readily available when community use implementation is structured within a district department that includes community use into its mission.

Implications for Practice and Policy

Shared use of school property efforts are taking place across the country. State and local efforts are being promoted by the Robert Wood Johnson Foundation, American Heart Association, Centers for Disease Control, and National Association of State Boards of Education. This research contributes to these efforts, as this study's unique mixed methodology provided a bridge between the realms of policy and practice, thus creating a strong foundation of findings to inform both at the state and local level.

Support / Funding Source

This research was funded by an initiative of the Maricopa County Department of Public Health in Arizona.



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(25) What's Wrong With Recess? Fact vs. Fiction

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Focus Area: Research

Background and Purpose

The rise in obesity has become an important public health risk among children. The concept of recess combined with curriculum enhancements has emerged as an opportunity for increasing physical activity levels (PA), which could address this risk. However, given the facts regarding school administration and the demands of a typical school day, can the use of recess effectively increase PA in children? Furthermore, should the resources needed for recess be better spent elsewhere within a typical school day?

Objectives

The Intervention of Physical Activity in Youth (IPLAY) study focuses on environmental (playground renovations) and curriculum intervention for elementary school children during the recess period. A process evaluation was completed to evaluate the degree and effectiveness of these changes. It is through this process that questions were raised on the feasibility of schools administering enhanced recess strategies, and if the resources needed would be best used at recess or elsewhere throughout the school day.

Methods

As part of the larger IPLAY study, (serving 24 schools in Metro Denver), 6 were randomly selected to receive a curriculum intervention during recess as part of the study. Three of these schools had a recently renovated playground and three did not. Schools were matched according to size, ethnicity, and percentage of students receiving free or reduced lunch. Permission was granted through the school district and the principals. The research staff was responsible for implementation, administration, and equipment with minimal assistance needed from the school staff. Trained graduate research assistants (employed by the university) implemented the curriculum for eight weeks during the fall and spring semesters of 2010-2013. A 15-point checklist, session tracker, instructor lesson plans and playground feature analysis was used to track the quality of implementation. Larger study methods (SOPLAY observations, accelerometry, surveys, GIS analysis) are being used for the outcomes measures and will be published at a later date.

Results

A total of 58 process evaluations were conducted. The total score on the evaluations ranged from 3-14 points (out of 15 total) with a mean of 11.8. The session specific data showed a total of 1364 different activities implemented during the first intervention year, with the mean number of children participating per session as 19. The average time spent in PA per instructor led session was 18 minutes.

Conclusions

While these numbers may seem like an effective use of recess to increase PA, these results were not sustained once the instructors were no longer present. These data also represent a great deal of time, planning and resources the schools are not able to sustain on their own. It is expected upon final analysis of the data that time spent in PA will drastically decrease when a dedicated instructor is no longer present on the playground.



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Implications for Practice and Policy

Recess is defined as regularly scheduled periods within the elementary school day for unstructured physical activity and play. As efforts are increased to use recess as a tool to increase PA levels, the true definition of recess is lost. It may be fiction to believe that recess is the answer to the obesity problem, when the fact might be that the administrative demands of recess put more stress on limited school resources. Moreover, recess time is usually combined with lunch, which leaves limited time for both. We are not recommending that recess be eliminated entirely, however, these preliminary findings suggest that recess be evaluated in the context of today's changing school environment. Further research is needed to investigate a different approach to physical activity throughout the school day that relies less on limited recess time and more on restructuring the school day.

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Support / Funding Source

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(26) Perceptions of the Neighborhood Environment and Children's Afterschool Physical Activity

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Focus Area: Research

Background and Purpose

Previous research has identified several factors that may influence children's PA behavior; however, evidence suggests that the neighborhood physical environment may play an important role (1-3). Further, research has identified afterschool hours as a critical time for PA as during this time youth have the highest propensity for PA (4-6) and the neighborhood environment may have a greater impact on PA during this time compared to other segments of the day (i.e. school hours). However, results from previous studies assessing the relationship between neighborhood physical environment and PA among youth have been inconsistent and equivocal (7-10). These inconsistencies could be due to a superficial understanding of how perceptions of the neighborhood environment might interact with other critical factors related to PA (i.e. parent support and outdoor activities) and the influence on children's afterschool moderate-to-vigorous PA (MVPA). The purpose of this study was to gain a thorough understanding of the relationship between the perception of the neighborhood environment and children's afterschool MVPA and how these perceptions may interact with parent support and child outdoor physical activities and the influence on children's afterschool MVPA.

Objectives

To test a conceptual model linking parent and child perceptions of their physical environment, parent support for PA, and child outdoor physical activities with children's afterschool MVPA.

Methods

Baseline (5th grade) data were used from the Transitions and Activity Changes in Kids (TRACK) study, a multilevel longitudinal study, examining the influences that may impact the changes in children's physical activity levels as they transition from elementary to middle school. Children completed a 12-item questionnaire assessing perceptions of their neighborhood physical environment and a 61-item checklist of physical activities in which they participated in the previous 5 days. Parents completed a 14-item questionnaire assessing perceptions of their child's neighborhood physical environment and parent support for PA. Afterschool MVPA was assessed objectively via accelerometry. The proposed conceptual model was tested using structural equation modeling (SEM) techniques (MPlus version 5.21).

Results

The proposed conceptual model provided an acceptable model fit (CFI=0.91; RMSEA=0.04; Chi-Square Test=211.97, df=117; p<0.0001). The SEM yielded two significant direct paths, one indirect and one non-significant indirect path for predicting children's afterschool MVPA. Children's perceptions of their neighborhood environment directly and positively predicted their afterschool MVPA ($\beta=0.16$; p=0.003). Child outdoor activities directly and positively predicted their afterschool MVPA ($\beta=0.11$; p=0.02). Parent's perceptions of their child's neighborhood environment indirectly predicted their child's afterschool MVPA via parent support for PA ($\beta=0.51$; p<0.0001 and $\beta=0.20$; p<0.0001) and the child's outdoor physical activities ($\beta=0.11$; p=0.02). Child perception of the neighborhood environment did not significantly predict their afterschool MVPA via their outdoor activities as proposed ($\beta=0.10$; p=0.08). Child perception and parent perception of the neighborhood environment were strongly correlated (r=0.98; p<0.0001). The model was adjusted for sex, race/ethnicity and education.



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Conclusions

Positive child/parent perceptions of the neighborhood physical environment were associated with higher levels of children's afterschool MVPA. For the child, their perception of the environment was critical as this was directly related to their MVPA. Important environmental perceptions for children were safety (i.e. safe to walk/jog and well lit areas at night), accessibility of PA facilities (i.e. parks and playgrounds), nearby walking/biking trails and the presence of sidewalks and others playing outdoors. Similarly, important environmental perceptions for parents were the safety of playing outdoors and the presence of other children. Moreover, a positive perception of the neighborhood environment was associated with an increase in parent support for PA. This increase in parent support was associated with increases in outdoors activities and subsequently associated with an increase in afterschool MVPA. Perceptions of the neighborhood environment accompanied by parent support for PA and opportunities for outdoor activities are important factors in changing PA behavior among youth.

Implications for Practice and Policy

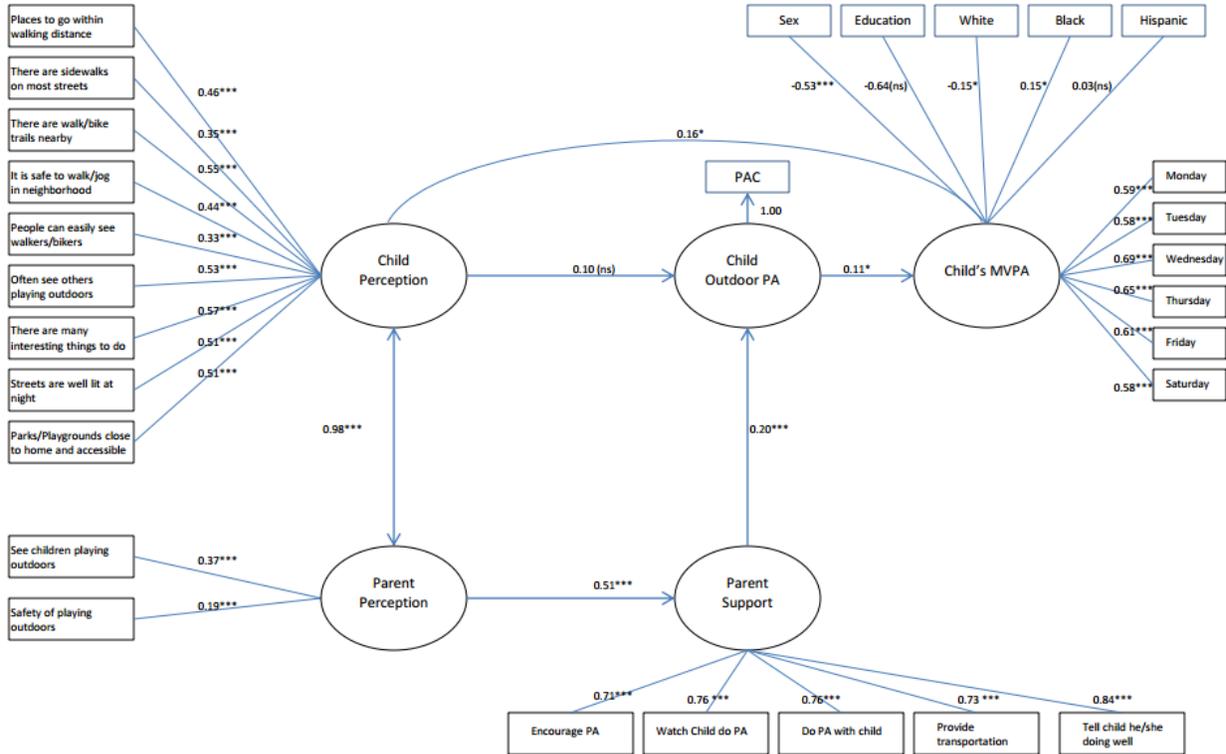
In order to increase children's afterschool MVPA it is important to ensure that the neighborhood environment perceived by the parent and the child closely resembles reality. Given that positive perceptions are associated with increases in afterschool MVPA, strategies to increase these perceptions of the neighborhood environment include educating children on the opportunities to be active outdoors in their neighborhood. In addition, to provide education to parents on the awareness of outdoor physical activity opportunities, ways to support outdoor PA, safety measures and to emphasize the importance of their child's perception of their environment and its' influence on their PA behavior. To further understand the relationship between the neighborhood environment and PA, it is suggested that future research assess how the perception and actual nature of the environment interact and influence children's PA.

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Support / Funding Source

Supported by NIH#RO1HL091002



CFI = 0.91
 RMSEA = 0.04
 Chi-Square Test of Model Fit: $\chi^2_{117} = 211.974$ $p < 0.0001$
 * $p < 0.05$; ** $p < 0.001$ *** $p < 0.0001$
 Estimates adjusted for Race/Ethnicity, Sex and Education

	Sex	Education	White	Black	Hispanic
Child Perception	-0.06	0.08	-0.22***	0.29***	0.05
Parent Perception	-0.04	0.26*	0.44*	0.46*	0.08
Parent Support	-0.09	-0.04	0.21*	-0.21*	0.02
Child Outdoor PA	-0.02	0.01	0.002	-0.01	0.03



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(27) Predictors of Active Commuting to Elementary School among US Children

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Focus Area: Research

Background and Purpose

Active commuting to school (ACS; walking or cycling to school) has been associated with children obtaining greater amounts of moderate-to-vigorous physical activity (MVPA), which lowers risk of obesity and multiple other chronic diseases. However, rates of children's ACS in the US have declined from 47.7% in 1969 to only 13% in 2009. ACS has become a frequent missed opportunity for physical activity for many children. Understanding predictors of ACS is important to inform programs and policies that seek to increase rates of ACS, such as the federal Safe Routes to School program in the US. However, most previous studies on predictors of US children's ACS have been cross-sectional in design. Studies with long term follow up are necessary to understand influences on ACS.

Objectives

Examine predictors from kindergarten (1999) and 3rd grade (2002) of ACS among a large, nationally representative US cohort of elementary schoolchildren.

Methods

We conducted analyses on participants from the Early Childhood Longitudinal Study, Kindergarten (ECLS-K) conducted by the US Department of Education's National Center for Education Statistics. The ECLS-K had a complex, multistage probability sampling design which selected counties, schools, and then kindergarten students during the 1998-1999 academic year. ACS was assessed by parental recall in kindergarten (predictor) and 3rd grade (primary outcome) by the following: "How does {child} usually get to school in the morning? School bus, Parent drives, Carpool, Walk, Other, Refused, or Don't know" with ACS defined as "walk" or "Other: bicycle or bike" and the remaining answers defined as passive commuting. This question, while not previously validated, is very similar to other ACS questions with acceptable validity and reliability. Other predictors included: (1) Neighborhood safety assessed in kindergarten and 3rd grade through parental recall, (2) Distance of commute from home to school in kindergarten only by parental recall, (3) Commuting time from home to school in 3rd grade only by parental recall, (4) BMI z-score in kindergarten and 3rd grade calculated from measured height and weight, and (5) Participants/households' composite socioeconomic status score and demographics, i.e. age, gender race/ethnicity, and single- versus two-parent households, region of country and urbanicity using 3rd grade data. We used logistic regression with 3rd grade ACS as the main dependent variable and the independent variables as listed above. Since BMI z-score in kindergarten and 3rd grade were highly collinear ($r=0.999$, $p<.0001$), we dropped kindergarten BMI z-score from analyses. We included a race/ethnicity*neighborhood safety (3rd grade) interaction term. We present means \pm standard errors. The significance level was 0.05. All analyses accounted for the complex sampling design of the ECLS-K dataset. This secondary analysis of de-identified, publicly available data was deemed exempt from IRB review.

Results

The final sample ($n=10605$) had a mean age of 9.2 ± 0.01 years in 3rd grade, $48.9\% \pm 0.6\%$ were female, and the majority were non-Hispanic white ($58.3\% \pm 1.5\%$) followed by Hispanic ($19.0\% \pm 1.2\%$), non-Hispanic black ($15.3\% \pm 0.9\%$), and Other race/ethnicity ($7.4\% \pm 0.8\%$). Most lived within 2.5 miles of school in kindergarten, i.e. $31.2\% \pm 0.9\%$ within $\frac{1}{2}$ mile and $32.1\% \pm 0.8\%$ from $\frac{1}{2}$ to 2.5 miles. The prevalence of ACS in kindergarten was $9.0\% \pm 0.5\%$ and in 3rd grade was $11.3\% \pm 0.6\%$. The logistic



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regression model predicting ACS in 3rd grade yielded significant effects as follows: (1) compared to children who were passive commuters in kindergarten, active commuters to school in kindergarten had almost 6-fold higher odds of ACS in 3rd grade; (2) compared to non-Hispanic white children, racial/ethnic minority children in unsafe neighborhoods had higher odds of ACS in 3rd grade; and (3) inverse predictors included socioeconomic status, female gender, 1- or 2-parent families (compared to "Other"), commuting time to school, distance to school, living in a small town/rural area, and living in the Southern US.

Conclusions

Among this large US cohort, the prevalence of ACS was low in both kindergarten and 3rd grade compared to rates of previous generations in the US and contemporary peers in Europe. The strongest predictors of ACS in 3rd grade were ACS in kindergarten (positive), living in the Southern US (inverse), and time or distance to school (inverse). Perceived neighborhood safety also influenced children's ACS and this relationship differed by race/ethnicity.

Implications for Practice and Policy

Efforts to increase ACS should additionally focus on several groups including kindergarteners, female students, small town/rural areas, middle/high income students, and the Southern US. These results also suggest that policies to reduce the school commuting time and distance to school, i.e. school siting policies, may increase ACS. Extra efforts to improve the safety of ACS should focus on racial/ethnic minorities living in neighborhoods their parents perceive as unsafe.

Support / Funding Source

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(28) Physical Activity in Physical Education: Are Longer Lessons Better?

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Focus Area: Research

Background and Purpose

California state law mandates that high schools provide students with 400 minutes of physical education (PE) every 10 days.[1] Nonetheless, local school administrators and school principals determine the school bell schedule from day to day. Types of schedules range from traditional (i.e., class periods of similar duration 5 days per week) to block (i.e., class periods of longer duration and fewer classes per week). Modified block scheduling occurs when the school offers a combination of traditional and block schedule days. Importantly, modified block schedules result in variability in lesson length and number of class periods from day to day within a school. To date, no study has examined physical activity (PA) outcomes in PE in relation to the type of school schedule. Such a study could inform decisions on designing optimal schedules to promote PA in PE. Therefore, the purpose of this study was to compare accrual of moderate and vigorous PA in PE, in schools that adopted traditional vs. modified block schedules.

Objectives

The objective of this study was to examine differences in high school PE outcomes (e.g., moderate and vigorous PA) between schools that use a traditional scheduling vs. a modified block scheduling format.

Methods

The System for Observing Fitness Instruction Time (SOFIT) was used to observe 73 lessons in 2 high schools that adopted traditional schedules and 80 lessons in 2 high schools that adopted modified block schedules. Two schools were categorized as traditional and two were modified block. Students in traditional schools attended PE every day for 52-58 minutes per class. In comparison, students in modified block schools attended PE four days per week. The scheduled length of classes was 57-58 minutes three days per week and 110-130 minutes on the other two days. T-tests, bivariate Pearson correlations, and hierarchical linear random intercept models were used to examine associations between schedule type and moderate and vigorous PA. Lesson context (percentage of lesson time spent in management, knowledge, fitness, skill, game play, and other), percentage of lesson time lost to transition at the start and end of class due to locker room duties, and teacher promotion of PA in PE were examined as potential mediators.

Results

Results of Table 1 demonstrate that moderate PA was significantly higher in modified block schools, but vigorous PA was significantly higher in schools with traditional schedules. Teachers spent a significantly greater percentage of lesson time on classroom management and knowledge in modified block schools than in traditional schools. In addition, although PE was scheduled for more minutes in modified block schools, they spent significantly more time in transition, and as a result, actual lesson length was shorter in modified block schools. Results of multilevel regression models (Table 2) indicate significant teacher-level variation in moderate and vigorous PA. Students in block schedule schools spent significantly more time engaged in moderate PA, and students in traditional schedule schools spent significantly more time engaged in vigorous PA. Lesson context only partially mediated these differences. After controlling for lesson contexts and other class and teacher characteristics, students in modified block schedule schools remained significantly disadvantaged in relation to amount of PE time spent engaged in vigorous PA.



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Conclusions

PA outcomes were significantly different depending on the type of school schedule. Although PE proponents widely advocate for more time, longer lessons within modified block schools did not result in more vigorous PA. The difference in vigorous PA between the two types of schools was partially explained by several structural factors, including time lost in transition at the start and end of class due to locker room routines, how time was spent in lesson contexts, teacher promotion of PA, lesson location, and class size. Importantly, many of these factors are associated with teacher classroom management.

Implications for Practice and Policy

These findings contribute to a limited evidence base on the structural delivery of PE and have two important implications for practice and policy. First, teacher professional development with a specific focus on the providing and promoting PA during PE may increase PA related outcomes in PE. Second, in terms of PA outcomes, there may be an optimal threshold for PE lesson length. More studies are clearly needed in this area, however these results suggest that there is a need to carefully examine scheduling options for PE. There may be ways to creatively schedule PE within an existing schedule format by pairing it with other like subjects and offering these classes for less time per day but more frequently across the week. Such a measure would (a) not require additional time or funding resources, and (b) potentially allow for a more effective delivery model of PE that more fully optimizes its potential to promote and provide PA.

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Support / Funding Source

San Diego State University Research Foundation



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Table 1. Sample Descriptive Statistics by Type of Class Schedule^a

	Traditional (N=73)	Modified Block (N=80)	t-value
Outcomes			
Percent Moderate	40.0 (11.68)	46.77 (17.08)	-2.88**
Percent Vigorous	19.8 (10.02)	14.0 (9.74)	3.62***
Independent Variables			
Percent Game Play	36.3 (28.90)	24.8 (28.60)	2.46
Percent Fitness	29.1 (26.10)	28.6 (27.91)	0.12
Percent Management	16.9 (8.32)	22.6 (9.55)	-3.95***
Percent Knowledge	6.2 (7.59)	11.8 (16.77)	-2.72**
Percent Skill	4.9 (11.27)	5.0 (13.64)	-0.05
Percent Other	6.7 (11.73)	7.2 (13.07)	-0.28
Percent Transition Time ^b	29.8 (6.61)	40.9 (9.19)	-8.64***
<i>Scheduled length of lesson (mins.)</i>	55.8 (2.92)	62.5 (18.37)	-3.22**
<i>Actual length of lesson (mins.)</i>	39.1 (3.20)	37.5 (15.21)	0.93
Percent Promotion of PA in PE	16.3 (11.50)	14.1 (10.23)	1.25
Covariates			
Lesson location			
<i>Indoors only</i>	16.4	21.3	-0.75
<i>Outdoors only</i>	64.4	52.5	1.49
<i>Indoors and outdoors</i>	19.2	26.3	-1.04
Lesson size	34.2 (9.90)	38.3 (9.18)	-2.62**
Student gender ratio (percent female)	51.2 (21.00)	51.2 (9.84)	-0.00
Teacher gender (female)	61.6	47.5	1.76

Note: ^aTwo-tailed t-tests; means and standard deviations (in parentheses) presented for interval-ratio variables and percentages presented for categorical variables *p<.05; **p<.01; ***p<.001. After listwise deletion the sample included 153 lessons nested within 21 teachers.

^bTransition time was the proportion of scheduled class time students spent not engaged in PE content due to changing clothes and going to and from the locker room to the lesson location at the start and end of class [(((scheduled lesson time-observed lesson time)/scheduled lesson time)*100].



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Table 2. Hierarchical Linear Models Predicting Percentage of Lesson Time Spent Engaged in Moderate and Vigorous Physical Activity^a

	% of Time Engaged in Moderate PA				% of Time Engaged in Vigorous PA			
	I	II	III	IV	I	II	III	IV
Intercept	44.404 [1.866]***	40.169 [2.538]***	42.619 [5.220]***	39.743 [8.016]***	16.38 0 [1.315]***	19.97 1 [1.685]***	15.05 2 [3.73 2]***	20.0 39 [5.60]***
Modified block Schedule ^b		7.711 [3.471]*	8.963 [3.044]**	9.855 [3.00]**		-6.541 [2.305]*	- 5.792 [2.43 1]*	- 5.32 5 [2.25]*
<i>Lesson Context</i>								
% Fitness			0.001 [.040]	-0.007 [.039]			0.123 [.028] ***	0.12 7 [.027]***
% Management			0.279 [.121]*	0.159 [.126]			-0.2 [.08]* *	0.22 8 [.084]**
% Knowledge			-0.646 [.076]***	-0.582 [.079]***			- 0.075 [.052]	0.10 1 [.054]
% Transition time			-0.008 [.122]	-0.064 [.121]			0.088 [.084]	0.10 6 [.084]
% Promotion of PA			-0.184 [.095]	-0.164 [.094]			0.192 [.067] **	0.17 9 [.066]**
<i>Control Variables</i>								
Class size				-0.049 [.118]				- 0.05 0 [.084]
% Female Students				0.095 [.066]				- 0.08 0 [.047]



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]
									-
Outdoors only ^c				6.987					3.75
				[2.773]*					7
									[1.91
									3]
									-
									2.50
Indoors and outdoors				4.289					0
				[2.968]					[2.03
									3]
									3.96
									3
Female Teacher ^d				-4.080					[1.94
				[2.519]					1]
Teacher						22.89	14.86	14.64	9.05
Level Error	43.584	34.121	14.962	11.169	3	5	1	8	
	[24.711]*	[21.115]	[11.031]	[10.329]	[11.88	[8.861	[9.07	[7.24	
					0]*]*	8]]	
Lesson					84.62	83.82	59.50	58.8	
Level Error	188.33	187.060	131.450	127.330	1	3	7	91	
	[23.358]***	[23.063]***	[16.310]***	[16.022]***	[10.44	[10.26	[7.58	[7.58	
					8]***	9]***	8]***]***	
ICC ^e	0.188	0.154	0.102	0.080	0.213	0.151	0.197	0.13	
								3	

Note: N=153 ^alessons nested with 21 teachers; variances and results of two-tailed tests *p<.05, **p<.01, ***p<.001 in parentheses; ^bReference group = Traditional Schedule; ^cReference Group = Indoors Only; ^dReference Group = Male; ^eIntraclass Correlation Coefficient



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(29) Building the Case for Physical Activity in Chicago Public Schools

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¹Chicago Public Schools

Focus Area: Practice/Policy

Background and Purpose

Using an active and engaged approach within education creates sustainable learning environments, and assists in the development of physically literate students who have the knowledge, skills and confidence for academic success and lifelong health. Chicago Public Schools (CPS) aims to provide 400,000 students with daily opportunities for quality physical education (PE), structured and active recess, and classroom physical activity to support the Centers for Disease Control and Prevention's (CDC) recommendation of 60 minutes of physical activity every day for youth.

Although Illinois has some of the most aggressive requirements for PE in the country, many school districts, including CPS, have received waivers that provide exemption for some or all of their students. This waiver is a major contradiction to the recommendations made by the National Association of Sport and Physical Education and the CDC. Current data shows among CPS high school students, 57.5% do not attend daily PE and 81.8% are not physically active for 60 minutes a day.

Description

The establishment of the CPS Office of Student Health and Wellness (OSHW) in July 2012 was the first step toward establishing a movement to provide students with increased opportunities for physical activity and build physical literacy for academic success among CPS students. Through utilization of evidence-based research and best practice, CPS OSHW has successfully and continuously advocated for quality PE and increased physical activity at both the district level (top-down) and school level (bottom-up).

First, OSHW established a strategic planning process, called Minds in Motion, in which over 500 stakeholders were engaged to set goals that strengthen the quality and quantity of PE over the next five years. Secondly, OSHW identified a subset of schools to engage in proof of concept pilots. At the elementary level, schools will offer 30 minutes of PE, 20 minutes of recess and 10 minutes of classroom physical activity breaks daily; at the high school level PE will be offered daily to all grades 9-12. The information from these pilots will be shared across the district in preparation for the current PE waiver to expire in June 2014. Finally, this work is further supported at the school level through provision of professional development, onsite technical assistance and additional resources.

Lessons Learned

Internal and external support for the importance of physical activity during the school day is essential. Empowering teachers and school based staff with tools and resources to advocate for increased physical activity time has increased buy-in among CPS stakeholders and expanded the impact of the Office of Student Health and Wellness' messages around physical activity. Additionally, external partners are kept abreast of the initiative progress to ensure external stakeholders are supporting the work effectively.

Conclusions and Implications

The ongoing support provided to school-based Principals, PE teachers and Wellness Champions ensures that they have the necessary tools and resources available in order to promote increased physical activity to create and support healthier school environments that ensure student success.



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Next Steps

Chicago Public Schools plans to continue working with schools and external partners in order to present data relating to increased physical activity within the district. District-wide annual surveys of PE teachers and schools are conducted in the fall to identify the impact of the work. These results will be used to inform current and future programming to increase access to physical activity.

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Support / Funding Source

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(30) Continued Efforts are Needed to Increase Elementary School Students' Physical Activity Opportunities During the School Day

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Focus Area: Research

Background and Purpose

Recently, the US Institute of Medicine (2013) acknowledged the importance of physical activity (PA) and physical education (PE) in schools, and recommended a whole-of-school approach to meeting national recommendations that children obtain 60 minutes of moderate- to-vigorous physical activity (MVPA), half of which should occur during school hours. Work quantifying the impact of school-based PA opportunities on energy expenditure (Bassett et al, 2013) suggests that school policy changes can increase the daily minutes of MVPA accrued through strategies such as: mandatory PE class (23 minutes); classroom activity breaks (19 minutes); and traditional or enhanced recess (7-12 minutes), among other strategies.

Objectives

We used survey data from the Bridging the Gap research program, which conducts ongoing surveillance of health-related practices in elementary schools to examine a set of school PA practices. Using surveys gathered from administrators at nationally-representative samples of public and private elementary schools during the 2011-12 school year, we examined the prevalence of three types of PA opportunities—PE class, recess, and classroom activity breaks—both separately and in combination. Additional school PA practices will be considered for the presentation.

Methods

Surveys were gathered during the spring (second-half) of the 2011-12 school year; most were completed by school administrative staff. A total of 553 public schools and 270 private schools participated (total response rate = 57.7%). Respondents were offered a modest (\$100) incentive for completing the survey, which contained items pertaining to school meals, competitive foods, physical activity, and implementation of district wellness policies. Due to variability by grade in scheduling of PE and recess times, these items were anchored specifically to third-grade students. The data were weighted to provide inference to elementary schools nationwide.

Results

Public schools. Almost all public elementary schools (93.5%) required students to take PE. At 20.5% of schools, third-grade students attended physical education class daily, with most schools (77.0%) offering third-grade students a total of at least 60 minutes of PE per week, and 19.7% of schools offering third-grade students a total of at least 150 minutes per week. Offering students recess for at least 20 minutes every day was common (72.9% of schools). Activity breaks were offered (by at least some classroom teachers) in 30.3% of schools. Examining PA opportunities in combination showed that very few schools offered students multiple types of PA (PE, recess, activity breaks): 14.2% offered daily PE and daily recess; only 3.5% offered daily PE, daily recess, and some activity breaks. Results were very similar with 150+ minutes/week of PE instead of daily PE; 11.4% of public schools offered both 150+ minutes/week of PE and recess, and 3.4% offered PE, recess, and activity breaks.

Private schools. Among private schools, 89.7% required students to take PE. At 11.3% of schools, third-grade students attended PE class daily; 72.0% offered students a total of at least 60 minutes of PE per week, and 13.8% offered at least 150 minutes per week. Requiring PE and offering PE daily were both significantly less prevalent among private schools than public schools ($ps < .05$), but total minutes per



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week did not differ. In private schools, offering students recess for at least 20 minutes every day was common (72.9% of schools), and not significantly different from the prevalence in public schools. Offering activity breaks (by at least some classroom teachers) was significantly less common in private schools (21.0%), versus public schools. Examining PA opportunities in combination, 8.2% of private schools offered third grade students daily PE and daily recess; only 1.5% offered all three types of PA. Again, results were very similar with 150+ minutes/week of PE instead of daily PE; 9.0% of private schools offered both PE and recess, and 1.7% offered PE, recess, and activity breaks.

Conclusions

In public and private schools, much more work is needed to increase the availability and frequency of PA opportunities. Although most public and private elementary schools offer daily recess, few schools provide students with daily PE or activity breaks in the classroom. Taken in combination, very few schools regularly provide a combination of these key aspects of a physically active school environment. Further dissemination of PA break curricula and technical assistance for implementation—along with expanded district and school support for quality PE programming through adequate resources and professionally-trained PE staff—may be useful in ensuring that elementary-age students remain active every day at school.

Implications for Practice and Policy

Additional support is needed to assist schools in implementing strategies to regularly provide children with PA opportunities during the school day.

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Support / Funding Source

Robert Wood Johnson Foundation, through the Bridging the Gap research program.



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(31) **Georgia SHAPE: A Statewide, Multiagency, Multidimensional Initiative of Governor Nathan Deal that Brings Together Governmental, Philanthropic, Academic, and Business Communities to Address Childhood Obesity in Georgia**

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Focus Area: Practice/Policy

Background and Purpose

Background

Georgia's leadership at the highest level is committed to reducing childhood obesity. Georgia SHAPE is a statewide multiagency, multidimensional program bringing together the governmental, philanthropic, academic and business communities to reduce childhood obesity. In 2009 the SHAPE act was passed; whereby all students enrolled in Physical Education were required to have their fitness levels assessed via the FITNESSGRAM (The Cooper Institute, 1982). The Governor's Office created the Georgia SHAPE partnership in 2010 to guide the implementation of the act. During the 2010-2011 school year, five local school districts participated in a voluntary pilot and evaluation of the fitness assessment process funded by the Atlanta Falcons Youth Foundation. Researchers from Georgia State University conducted an evaluation of this pilot program that provided valuable guidance for a statewide rollout. Statewide testing began in 2011, and by 2012 the first annual Fitness Assessment Report was provided to Governor Nathan Deal. The 2012 findings reported that only 16% of students were able to pass all 5 components (aerobic capacity, muscular strength, endurance, flexibility, and body composition); 20% were unable to pass a single component; and 43% were defined as overweight or obese.

Purpose

To combat these dismal findings, Georgia SHAPE has partnered with HealthMPowers (Training and Implementation), and the Coca Cola Company (Support and Funding) to train 3 teachers/staff members in every elementary school in Georgia to incorporate 30 minutes of physical activity into the school day. This promotes and allows students to be active before, during and after school. Academic time is not altered and there is no financial drain for the school(s) involved in the initiative.

Through increased levels of physical activity during the school day, students may improve BMIs, improve overall fitness as assessed by the end of year FITNESSGRAM assessment, have a higher probability of improving standardized test scores (CRCT), and have lower absenteeism and disciplinary problems. In addition, schools may have stronger physical activity policies, teachers may improve the health of their classrooms while also serving as positive wellness role models, and parents may be more supportive of providing physical activity opportunities in their home and in the community.

Description

Research has shown significant improvements in academic achievement after implementing 90 minutes of Moderate to Vigorous Physical Activity (MVPA) per week during the school day (Donnally, et al., 2009). Power Up for 30 is an initiative developed by Georgia SHAPE that trains 3 teachers/staff members per school to effectively increase student physical activity levels by creatively adding 30 minutes of physical activity into the school day (150 minutes per week). Georgia SHAPE has partnered with HealthMPowers to implement these statewide trainings and offer tools, resources, and a curriculum based on evidence based practices that have been evaluated and shown to increase physical activity in the school setting. Examples include, but are not limited to, organized before school physical activity, interdisciplinary



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lessons that weave physical activity into core curriculum, MVPA breaks in the classroom using technology innovations such as HOPSports, increased amounts of MVPA in physical education, after school physical activity, and structured recess.

The GDOE is currently sending joint communications to every physical education teacher, principal, and school nurse in the state in order to promote the Power Up for 30 initiative and asking districts to sign district wide pledges. Baseline school physical activity data (self report surveys) are currently being collected across the state from Georgia School Administrators, Teachers, and Physical Education Teachers to allow Georgia SHAPE to evaluate the initiative and individual school physical activity levels.

Lessons Learned

Without Governor's Deal's Strategic Goals for Georgia (these include reducing childhood obesity and encouraging healthy lifestyles through preventive care, disease care, and early intervention) this initiative and state wide buy in would not be possible. A working and productive relationship with the Department of Education is instrumental in attaining district level support, buy in and participation.

Communications to schools and districts must be concise, clearly promote the positive relationship between physical activity and academic achievement, and blatantly state that the initiative will not be taxing to them fiscally or create additional work for teachers and staff. Research based outcomes that clarify how the intervention will positively impact the learning environment and academic performance must be effectively communicated to districts/schools. School "wellness champions" can be very effective in gaining district and school level support for this initiative (school staff, parents, community members).

Conclusions and Implications

Georgia SHAPE and Power Up for 30 may promote daily physical activity and academic achievement for Georgia's children, many of whom may not get adequate levels outside of the school day. By attempting to increase student physical activity levels by 30 minutes a day (150 minutes per week), the percentage of students that fall in the overweight and obese category (currently 43%) may decrease.

Next Steps

Georgia SHAPE is currently implementing FITNESSGRAM/PowerUpfor30 for the 2013-2014 school year.

References

1. Joseph E. Donnelly, et.al., Physical Activity Across the Curriculum (PAAC): A randomized controlled trial to promote physical activity and diminish overweight and obesity in elementary school children, Preventive Medicine, Volume 49, Issue 4, October 2009, Pages 336-341.

Support / Funding Source

Georgia SHAPE is the Governor's Initiative, therefore support comes from state leaders of the highest level. The support and hard work of Commissioner Brenda Fitzgerald, MD, (Georgia Department of Public Health) allowed Georgia SHAPE to grow into what it is today. Support for the training component comes from HealthMPowers, and evaluation of the FITNESSGRAM data comes from the Georgia State University. Funding for this piece of the SHAPE initiative came from the Atlanta Falcons Youth Foundation and the Coca-Cola Company.



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(32) **Giving and Taking Away: What Role Do Playground Supervisors Play in Physical Activity at Recess?**

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Focus Area: Research

Background and Purpose

School has been recognized as a key setting for achieving children's daily physical activity (PA) goals. Recess creates promising opportunities for children to be active during school day and has the potential to maximize their PA. For children to get the most out of recess, it is important to have school recess staff who supervise the playground and understand the value of PA during this limited playtime. With their intimate knowledge of children's preferences and school-specific "playground culture", staff members have unique insight into the world of recess. Although many efforts have been made in terms of school physical environment, there has been little exploration regarding the relationship between staff behaviors and children's participation in PA. To help fill this research gap, more understanding is needed of school recess staff's perceptions of their role in PA as well as more information regarding their training and their on-the-ground experiences negotiating school rules.

Objectives

The purpose of this study was to examine school recess staff's perceptions of their role on the playground, especially their roles in facilitating or discouraging children's participation in PA.

Methods

Participants included 13 recess staff from four elementary schools in central Missouri, who were regularly assigned "playground duty" and could speak to the procedures for recess. The schools were part of a larger research project with intervention sites present in three schools' playgrounds (i.e., soccer field, Frisbee golf and movable soccer goals, track). Individual interviews were conducted over a 6-week period in December 2012 to January 2013, and demographic information was collected from the staff being interviewed. During the qualitative interviews, a broad set of questions were asked that might impact recess staff's views on their role in facilitating/discouraging PA, including topics of: the supervisor's engagement in the larger school community; the basics of supervising (the procedures); socialization and school/community views of supervising; hierarchies and decision-making; child preferences/community views of play; questions about the PWB interventions; and broader community views/suggestions from supervisors. All qualitative data was analyzed by three initial coders using the grounded theory method. Coding categories were identified to determine the themes that suggested encouragement or discouragement of PA.

Results

Three broad themes emerged related to the staff's role in PA of young children—School Culture, PA in the Day-to-Day context, and Negative Associations with PA & Recess.

1. School Culture represented the types of training that the staff received before beginning their duties. Four subthemes emerged including Training, Transitions, Academics Trump PA and Safety as A Priority. It is found that many of the recess staff were not clear that encouraging PA was part of their jobs and instead took child safety as a more important priority. In addition, school culture and structure often dictated the way that recess staff managed children's behavior. As a result, transition time between playground and classroom was cut short, i.e. recess made way for academic performance.



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2. Regarding PA in the Day-to-Day Context, recess staff had strong feelings about the expectations for their interactions with the children. Three major themes that influenced their role in PA for children were: Openness to Change/Adaption, “Hands on” Policies, and Encouragement of Staff/Child Creativity. For example, most recess staff stated that they “kept things fresh” by rotating equipment.
3. A key finding was that PA and recess staff saw themselves as Manager of Conflict and Discipline & Punishment, which often led to negative associations. For example, walking and running were often given as punishment to children when redirection from conflict did not work. As a result, some students were less inclined to partake in those activities for fun.

Conclusions

School recess offers an opportunity to encourage PA, and research has shown that some interventions have promise. The role of recess staff has been understudied and our study shows that it is an area that warrants further research. Through our exploratory study, we were able to determine a number of key issues that influenced recess staff’s views of their role in PA. Specifically, this study highlighted the supervisors’ frustration with their lack of training, lack of equipment/inappropriateness of equipment, conflict between the instructions (keeping kids safe vs. encouraging play), and lack of options for managing behaviors.

Implications for Practice and Policy

Recess staff have the power to influence student views and behaviors and are the carriers of the school’s larger views on PA to the students. With proper training and support, they could—through modeling and encouragement—potentially increase the effectiveness of recess as a window of time in which children are active. Findings from this study offer insights for school administrators and policy makers in future staff training.

Support / Funding Source

Robert Wood Johnson Foundation, Active Living Research Program grant # 68506.



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(33) Cross-Sectional and Longitudinal Association of Different Indicators of Park Access with Body Mass Index

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Focus Area: Research

Background and Purpose

More than one third of U.S. adults are obese. Obesity increases the risk of several chronic conditions including heart disease, type 2 diabetes, stroke and some cancers. Research suggests that people who live near parks and open spaces have reduced risk of obesity and are also more physically active. However, much of the existing research is cross-sectional which limits our ability to draw causal conclusions.

Objectives

This research used a population-based dataset to examine the longitudinal association of objectively measured park availability with changes in weight status among adults over approximately 6 years.

Methods

We used data from 1,118 adults surveyed in Waves 1 and 2 of the Los Angeles Family and Neighborhood Survey (LAFANS). LAFANS is a multi-level, population-based survey of individuals living in Los Angeles County administered from 2000-2002 and 2006-2008, respectively. Self-reported height and weight were used to calculate Body Mass Index (BMI). Park data from the California Protected Areas Database was cross-referenced with 2001 land use data from the Southern California Association of Governments to identify public parks and open space in Los Angeles County in 2001. This park data was linked with LA FANS data using geocoded household locations to create several indicators of park access at both the household level and the census tract level. Four park access indicators were created at the census tract level: total park acres, park acres per 1,000 residents, total number of parks, and park density (number of parks per square mile). Five park access indicators were created at the household level: total park acres within one-half mile of the household, park acres within one mile, number of parks within one-half mile, number of parks within one mile, and Euclidean distance to the nearest park. Multilevel regression models were used to examine the longitudinal association of park availability with Wave 2 BMI adjusting for Wave 1 BMI, age, gender, race/ethnicity (white, Latino, Asian, African American and American Indian), and household income and accounting for clustering at the census tract. In addition, we examined the cross-sectional association of park availability with Wave 1 BMI.

Results

In cross-sectional analyses based on Wave 1 data, two of the census tract level and two of the household level park access variables were negatively associated with Wave 1 BMI ($p < 0.05$): number of parks in the census tract, density of parks in the census tract, number of park acres within one-half mile of the household, and number of parks within one mile of the household. In addition, two other household level park access variables were negatively associated with Wave 1 BMI, but did not reach traditional levels of significance ($p < 0.10$): park acres within one mile of the household and number of parks within one-half mile of the household. However, in longitudinal analyses examining the association of access to parks with Wave 2 BMI adjusting for Wave 1 BMI, age, gender, race/ethnicity, and household income, few associations were significant. Only park density in the census tract (number of parks per square mile) showed a trend toward a longitudinal association with Wave 2 BMI. Increasing park density was associated with lower BMI at Wave 2 ($p < 0.07$).



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Conclusions

Research suggests that access to parks is associated with increased physical activity and reduced risk for obesity. However, much of the research examining associations between access to parks and weight status has been cross-sectional. The current results suggest there may be some inconsistencies between associations found in cross-sectional analyses and those found in longitudinal analyses. For example, six of the nine measures of park access were associated with BMI in cross-sectional analyses, but only one was associated with BMI in longitudinal analyses. Our current longitudinal analyses were limited to adults living in the same neighborhoods in both waves. However, this inclusion criterion significantly reduced the sample size from 1,118 panel adults to 709 panel adults. Additional analyses will be needed to test whether including all panel adults while adjusting for moving to a different neighborhood between waves provides a different pattern of results. Our findings also suggest that measures of amount of park space or density of parks may be more useful indicators of access to parks than distance to the single closest park. Distance to the nearest park was not associated with weight status in either cross-sectional or longitudinal analyses.

Implications for Practice and Policy

The creation of places to engage in physical activity is a recommended strategy for promoting physical activity and may help reduce risk for obesity. The current research provides some evidence that increasing density of parks can contribute to reduced BMI over 6 years.

Support / Funding Source

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(34) **Park Hop: An Inter-agency Collaboration to Promote Park Visitation and Physical Activity in Greenville, SC**

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Focus Area: Practice/Policy

Background and Purpose

Parks are important venues for physical activity (PA) [1,2], but research indicates that they are underutilized by youth [3,4] and the number and types of park features are related to increased park awareness and park-based PA [5,6]. The Task Force on Community Preventive Services strongly recommended the creation or enhancement of access to places for PA combined with informational outreach activities for PA promotion [7]. This abstract describes the preliminary evaluation of Park Hop, an innovative collaboration of diverse agencies to create an incentivized passport-style initiative to increase awareness, visitation, and active use of parks among youth in Greenville County, South Carolina.

Description

Park Hop occurred in summer 2013 as a partnership between Livewell Greenville, seven area parks departments, local schools, and partner organizations to help Greenville County families discover parks in their community in a fun, cost-effective way. The goals of Park Hop were to foster an awareness and appreciation for the wealth of parks in Greenville County, increase youth PA, and establish an annual tradition for all to enjoy.

Park Hop featured a summer-long scavenger hunt of 17 total parks from the seven area parks and recreation departments. Participants completed Park Passports which contained interactive clues about each park along with a short youth survey. Clues for each park were released weekly from local media outlets and participants were recruited through a website, newspaper ads, or through flyers at recreation facilities, schools, and partner organizations. Completed passports were submitted online, through mail, or in person at the closing event. Depending on the number of parks visited, participants received fun, adventure-themed prizes such as water park passes, t-shirts, or camping gear.

Several methods were used to collect process and outcome evaluation data, including the youth's park passports, a post-Park Hop survey of parents of youth participants, and program website analytics. Park Hop process evaluation measures included information regarding program accessibility, enjoyment, and ease of participation (1=strongly disagree, 5=strongly agree). Outcome evaluation measures included information about park awareness and visitation (e.g., number and names of parks visited, parks visited for the first time), perceived change in park enjoyment (1=a lot less than before; 5=a lot more than before), and park-based PA (total minutes during most recent visit).

Lessons Learned

A total of 231 youth submitted completed passports, ranging from 7 months to 16 years old (M=7.0 years). Of these, 6.5% of youth visited 1-5 parks, 26.4% of youth visited 6-10 parks, 112 48.5% of youth visited 11-16 parks, and 18.6% of youth visited all 17 parks. All but one youth (99.6%) indicated that they visited at least one park for the first time during Park Hop, with an average of 7.0 new parks visited per youth. 147 adults completed the post evaluation survey, with 143 indicating that they had children who had participated in Park Hop. The majority of people learned about Park Hop through the website



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(36.7%), school (21.1%), friends/family (19.7%), and newspaper (18.4%) advertisements. The main Park Hop webpage had 8131 views and the Park Hop passport webpage had 1794 views.

Parents indicated that, on average, 2.2 youth per household participated in Park Hop. Overall, parents reported strong agreement that Park Hop information was easily accessible ($M=4.32$), that they would recommend Park Hop to a friend ($M=4.64$), and that they would participate again next year ($M=4.58$). Parents were more neutral regarding appropriateness of the number of parks included ($M=3.29$) and the ease of answering scavenger hunt clues ($M=3.22$). Further, 98% of parents indicated that their child agreed or strongly agreed that they enjoyed participating in Park Hop ($M=4.61$).

With respect to outcomes, youth reportedly participated in an average of 87.1 minutes of PA during their last park visit. After participating in Park Hop, 46.2% of parents indicated that their children would visit a park more often, while only 3.4% of parents forecasted a lower number of park visits. Finally, 76.5% of parents indicated that after participating in Park Hop, their child enjoys parks in Greenville County somewhat to a lot more than before.

Conclusions and Implications

Results indicate that Park Hop was well-received by parents and successfully influenced awareness and visitation (especially to new parks) among youth. Park Hop effectively translated park awareness research into a sustainable initiative that can influence youth park-based PA. Further, Park Hop exemplifies a successful collaboration of multiple recreation partners across Greenville County. Such partnerships may be critical during times of budgetary constraints while cross-promotion of all area parks offers a wider variety of parks to citizens.

Next Steps

Next steps for Park Hop include development of a mobile app for individual park scavenger hunts and establishment of Park Hop as an annual event. In future, more focused and rigorous evaluation of Park Hop will explore effects according to the types and features of parks most frequently-visited, spatial analyses of youth and parks, and pre-post effects on youth PA.

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(35) Landscape Preference as a Mediator between Park Characteristics and Physical Activity and Park Use

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Focus Area: Research

Background and Purpose

Neighborhood parks provide opportunities for physical activity. Attractiveness of park settings has been shown to positively associate with physical activity and park use.¹ However, few studies have examined the role of perceptions of park landscapes in influencing park use and park-based physical activity. In particular, little is known about landscape preference as a potential mediator between physical characteristics of parks and park use and physical activity.

Objectives

This study examined the extent to which landscape preference mediated relationships between park characteristics (park size, park quality, extent of tree canopy), and park use and physical activity.

Methods

Data on park characteristics were obtained from 20 neighborhood parks in Greensboro, NC. Trained raters audited each park using the Environmental Assessment of Public Recreation Spaces tool (EAPRS).² Kappa values for counts and presence or absence (.76 - 1.0), condition (.54 - .92), and cleanliness (.46 - .92) of activity areas, features, and amenities were in acceptable ranges. Using an adaptation of Saelens's scoring system³, EAPRS items were aggregated to produce park assessment scores by multiplying the sum of condition and cleanliness items by a multiplier for elements assumed to influence physical activity. Park size (acres) and percent tree canopy (acres of tree canopy/park size) were obtained using GIS and local government databases. A mail survey to 893 randomly sampled residences was used to obtain park use, physical activity, and landscape preference measures. A 31% response rate was achieved (N=230). Park use was measured by a recoded measure of 1= never – rarely, 2= once a month – couple times a month, and 3= few times a week – everyday. Physical activity was derived from responses to the question “What do you usually do when you visit the park closest to your home?” (check all that apply: e.g., walk, jog/run, bicycle, sit in park, supervise children, eat/picnic, etc.). Ainsworth et al.'s⁴ compendium of physical activities was used to categorize respondents as “participants” or “non-participants” in active park use. Confounding variables included general health (1=poor, 2=fair, 3=good, 4=very good, 5=excellent) and children in the home (0=no children in the home or 1=children in the home). Following established methodology in the landscape literature^{5,6}, landscape preference was measured using nine photographs of parks selected by an expert panel representing three landscape conditions: 1) low openness/low development, 2) medium openness/medium development, and 3) high openness/high development. Prior research show perceptions of landscapes vary by these conditions.^{5,6} Respondents rated the extent to which they would like to participate in physical activities in each setting pictured (1=not at all, 2=a little, 3=somewhat, 4=quite a bit, 5=very much). Descriptive statistics were calculated for all study variables. Multilevel mediation analyses were used to examine the mediating role of landscape preference between park assessment scores, size, and percent tree canopy and physical activity and park use.

Results

Park assessment scores ranged from 220 to 386 (M=320.15, SD=48.84). Parks size ranged from 4 to 46 acres (M=13.50, SD=11.76). Percent tree canopy ranged from 13.33% to 88.57% (M=49.90, SD=20.35). The majority of survey respondents visited their neighborhood park once month to several times a



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week(58%), affirmed physically active uses while there(59.6%), reported very good to excellent general health (60.8%), and did not have children in the home(68.3%). Mean preference for low openness/low development settings was 2.37(SD=1.44), for medium openness/medium development settings was 3.47(SD=1.13), and for high openness/high development settings was 3.11 (SD=1.21). Landscape preference for low openness/low development settings fully mediated relationships between percent canopy and park use ($\beta=.005$, $t=1.40$ $p=.163$). Landscape preference for low openness/low development settings partially mediated the relationship between percent canopy and physical activity($\beta=0.006$, $t=0.490$, $p=.631$). Preference for other landscape conditions did not mediate relationships between park characteristics and park use or physical activity.

Conclusions

Relationships between percent tree canopy and park use and physical activity were filtered by preferences of highly vegetated, least developed settings. When these preferences were accounted for, previously observed relationships were reduced. Preference for less vegetated, more developed settings did not carry any influence in relationships between percent tree canopy and park use and physical activity. Thus, landscape preferences are a possible mechanism underlying the relationship between park environments and physical activity.

Implications for Practice and Policy

Limitations of this study include self-report measures of park use and physical activity and low response rate. Strengths of study include use of objective EAPRS and GIS measures of park characteristics. The study also included novel techniques for measuring landscape preference in parks. Findings have three implications for research and policy. First, active living studies should further explore the role of landscape preference as a mediator in physical activity research. Second, park planning processes should solicit public input about preferences for natural park features along with human-made facilities. Third, studies of this kind can inform policies seeking to balance levels of vegetation necessary for encouraging active park use and maintaining ecosystem health.

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(36) **Physical Inactivity Among Youth: Are Sports the Solution? An Assessment of Youth Sport Program Availability and Characteristics**

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Focus Area: Research

Background and Purpose

With a majority of youth failing to meet current physical activity (PA) guidelines (1), physical inactivity warrants attention and should be considered an important public health priority. Several national organizations, including the Institute of Medicine, the U.S. Department of Health and Human Services, and the American Academy of Pediatrics, have recommended sport participation as an effective strategy to increase PA among youth (2-4). However, to date, the types of sports-related opportunities available to youth as well as the availability and structure of such programs remains unclear (5-6). Identifying these opportunities will provide important information about the age-related decline in physical activity and help to develop effective strategies to increase sport participation among youth. Hence, the purpose of this study was to conduct a systematic review of literature examining the availability and structure of sport opportunities among youth.

Objectives

To identify the types of sport-related opportunities available to youth and to examine the characteristics of youth sport programs that potentially impact sport program availability and youth sport participation.

Methods

Four electronic databases (Pubmed, Web of Science, Academic Search Premiere, and SportDiscus) were searched using keywords (e.g., youth, sports, physical activity, etc.) as well as reference lists of identified articles. Articles were identified by the following inclusion criteria: conducted in North America, published in the English language, and examined elementary through high school-aged youth. No publication date restriction was applied. Additionally, articles that assessed the health benefits of sport participation, sports as a correlate of youth PA, or included only a "sport question" (i.e. in how many sports do you participate?) were excluded from the review.

Results

The review yielded 27 articles. Ten articles examined sports offered within the school setting, specifically interscholastic and/or intramural sport opportunities (n=8). Youth sport opportunities at the community-level were not reported in the peer-reviewed literature. Articles also assessed the following: contextual factors influencing youth sport-related opportunities (n=8), youth participation rates (n=7), child-level characteristics associated with participation (n=10), the effectiveness of youth sport programs (n=5), and potential barriers of sport programs (n=5).

In general, results and terminology describing youth sport opportunities were inconsistent across studies, especially among youth participation demographics. Results highlighted two youth school sport opportunities: the traditional interscholastic sport model which focused on competition among highly skilled youth and the more inclusive, multisport approach offered through intramural sport programs. Interscholastic sports (77%-99%) dominated current sport opportunities while intramural sport programs were limited (30%-74%). Geographic location and level of urbanization both impacted youth sport program availability within the Southern region of US and urbanized areas providing fewer sport opportunities compared to their counterparts. Regarding participation, youth with the following characteristics exhibited higher sport participation rates: younger, male, higher socioeconomic status,



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White, and students living in suburban areas. Importantly, when comparing interscholastic and intramural sport participants, differences in participant demographics emerged. Specifically, low-income and minority youth tended to exhibit higher levels of participation in intramural sport programs compared to interscholastic sport programs.

Conclusions

Youth can be involved in a variety of sport opportunities, yet most are competitive and tailored towards the highly skilled. The current school sport system is focused more on traditional interscholastic sport programs, excluding a large number of youth from an opportunity to engage in PA. As these traditional sport programs continue to become more focused on competition, the guidelines for participation will become increasingly selective further perpetuating participation issues regarding equality, access and exclusion among youth (7). To address this issue, the development of inclusive intramural sport programs has been recommended with growing evidence supporting the implementation of such programs. However, several competing factors such as budget constraints, resources, competition, and the prestige associated with interscholastic sports may impede implementation of intramural programs (8). It is important to note that literature pertaining to youth sport opportunities was limited, especially regarding the programmatic characteristics and structure of intramural programs. Future research should explore these characteristics to assess the effectiveness and feasibility of implementing such programs. Further, as support for intramural sport programs grows, the development of evidence-based strategies to implement these inclusive PA opportunities solely or in combination with existing sport programs should be prioritized.

Implications for Practice and Policy

Community- and school-based sports have a positive impact on youth PA levels. Hence, effectively utilizing sports as a strategy to increase physical activity levels, especially among high-risk youth, has important public health implications. As youth transition through school, sport opportunities become increasingly focused on skill level and competition, which may explain, in part, the age-related decline in sport participation among youth. To address this decline, schools should prioritize the implementation of inclusive sport programs, such as intramurals, as an effective strategy to expose a larger proportion of youth to sports. While all youth benefit from increased access to inclusive school-based sport opportunities; low-income, underserved, and economically disadvantaged youth may experience the greatest benefits of such programs.

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Figure 1

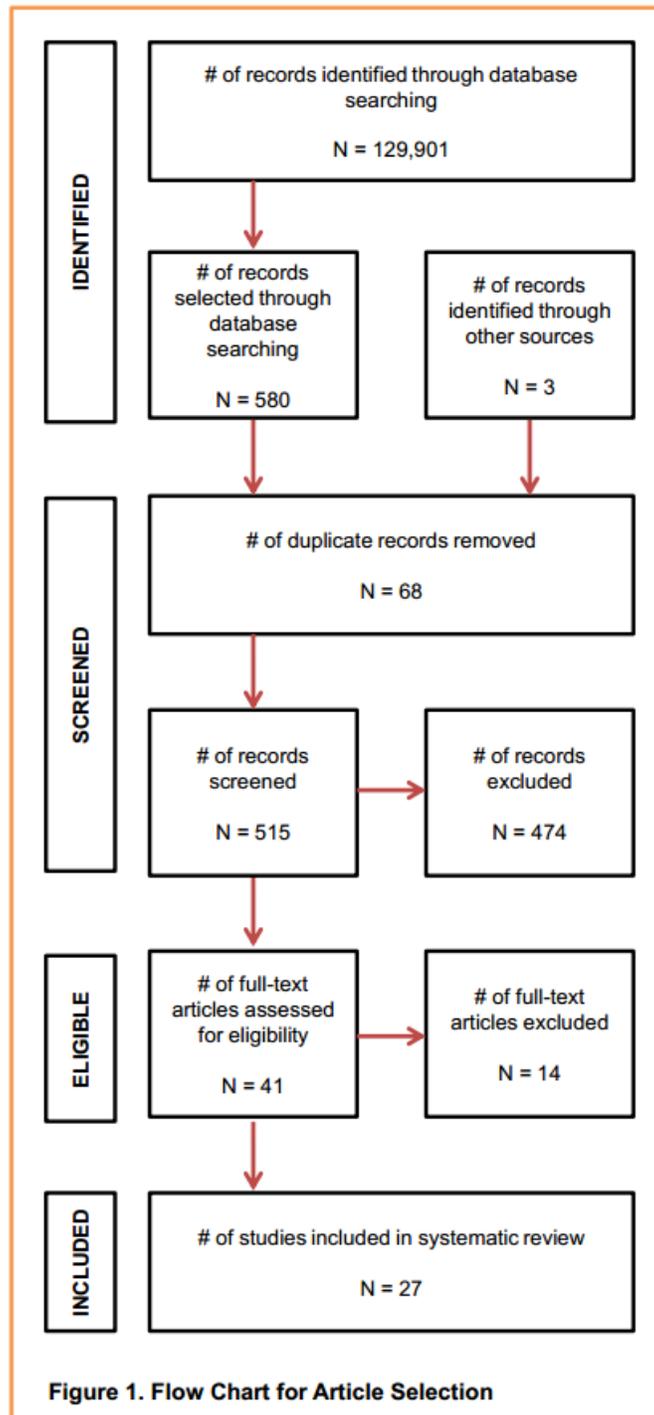
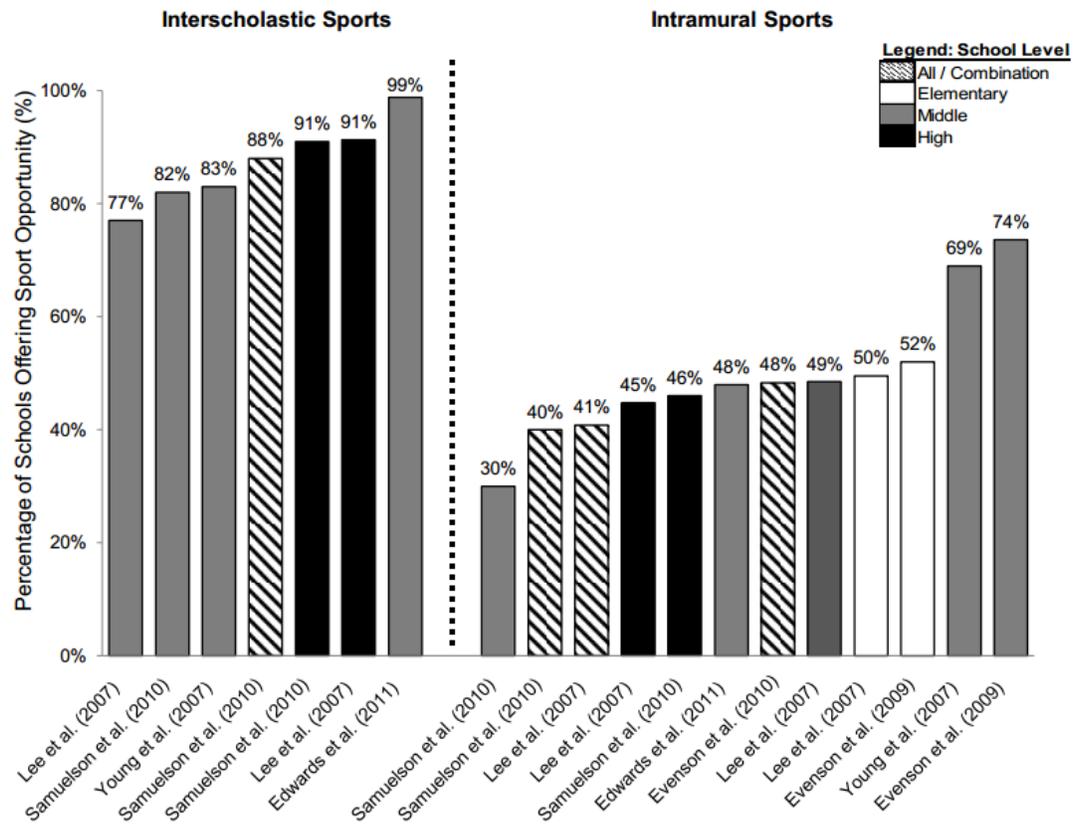


Figure 2. Youth sport opportunities by sport type and school level (%)





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(37) Active Living Experiences of College Students with Disabilities: Recommendations for Policy & Practice

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Focus Area: Research

Background and Purpose

The World Health Organization advocates people engage in regular and sustained physical activity to maintain health and quality of life. One context of recent inquiries in the active living arena is college campuses. College years are a lifespan phase when adolescents and young adults experiment with new behaviors, begin their developmental phase into adulthood, thus laying the foundation for adult behaviors (Astin, 1999). Commonly, college campuses are being designed to provide access to recreation facilities, services, and spaces to promote physical activity (Henchy, 2011). While recent studies have examined various factors associated with recreation programs on college campuses, absent from these inquiries are experiences of college students with disabilities. This life phase for college students with disabilities could be an important developmental period for establishing behaviors that promote quality of life and active living. The purpose of this study was to understand the experiences of college students with disabilities in accessing and engaging in physically active recreation, that promote active living, on campus.

Objectives

- Understand experiences of college students with disabilities in accessing and engaging in physically active recreation on campus.
- Understand environmental, policy, or programmatic features that may facilitate or create barriers to active living.
- Offer policy and practice recommendations based on findings that promote physically active recreation for adolescents and young adults with disabilities.

Methods

Qualitative method was used to gain an understanding of the experiences of college students with disabilities with active living opportunities on their campuses (Miller, 2011). Criteria for participation included: (a) full-time or ¾ time enrollment in a two or four-year institution, (b) campus must have recreation facility, (c) student must have mobility or visual impairment. Recruitment was conducted through the student accessibility services at six different colleges/universities. After initial contact and screening, 16 college students, ages 18-24 attending five different institutions met criteria and agreed to participate (see Table 1). Half of the participants were engaging regularly in leisure time physical activity and 50% occasionally engaged. Engagement in leisure time physical activity was operationalized as participation in an activity that required physical activity at least 3 days weekly for a minimum of 30 minutes. In-depth, open-ended interviews using guided questions were conducted with participants. Qualitative (Strauss & Corbin, 1998) and Classical Grounded Theory (Glaser, 1978) methods were used to analyze data. Transcripts were read and coded for themes that were common and consistent across research participants. Analyses of themes identified relationships and interactions between them to develop categories grounded in the data.

Researcher and two assistants verified emerging themes until consensus was achieved to increase trustworthiness. Credibility of findings using member checks was conducted with comments and clarifications from participants used as additional data (Strauss & Corbin, 1998). Results were agreed



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upon with triangulation of analysis from researcher's and assistants' interpretation, member checks, and review of results from an outside researcher.

Results

Analysis revealed a theme of a sense of involvement, centered on a way to connect to others, actively experience college life, and gain personal empowerment. Two categories emerged, accommodations, and stereotypes and attitudes. Accommodations had dimensions that involved a range of experiences relative to accessible physically active recreation. One participant expressed that she could 'get in the door but that is where it stopped', while another participant felt accommodations he needed were treated as a typical part of experience. A participant with blindness who was an avid hiker found the connection between the community hike and bike trails with the campus trails helpful because it provide the variety of hiking trails she sought. The other dimension was willingness which related to staff making and patrons being flexible with accommodations. They also described a range of experiences that included usable accommodations to frustrations with accommodations that didn't work. Dimensions that emerged in the category of stereotypes and attitudes included responses from staff and patrons (people expressing the 'hero' perspective of being physically active – that any level of engagement was brave or heroic), and breaking the disability sub-culture of inactivity and not taking risks.

Conclusions

When accommodations were treated as a typical aspect of the experience, students were more willing to be physically active on a regular basis. Confusion about principles of accommodations on the part of staff created a high degree of anxiety and discouragement from the students and they were less likely to participate regularly. Connections to local community recreation provided variety to experience and encouraged usage. Barriers to experiences can come from people without disabilities (e.g., hero aspect) and the disability community (sub-culture of inactivity).

Implications for Practice and Policy

Have policy to create partnerships with local community agencies for joint use agreements (e.g., hike/bike trails). Have policy to train staff on principles of accommodations. Encourage usage of campus recreation facilities with students with disabilities. Have policy and practice to offer variety of physically active recreation options to students with disabilities to encourage sustained engagement.

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Support / Funding Source

Kent State University - University Research Council



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Table 1

Information on Study Participants

Pseudonym	Age	Gender	Ethnicity	Disability
Clare	18	F	Caucasian	Paraplegia, T-8
Kate	19	F	African American	Cerebral Palsy
Jane	18	F	Caucasian	Spinal Muscular Atrophy
Bryan	21	M	Caucasian	Macular Degeneration
Abe	22	M	African American	Blindness (birth)
Ellen	19	F	Asian American	Cerebral Palsy
Lydia	24	F	Caucasian	Multiple Sclerosis
Jay	22	M	African American	Paraplegia, T-10
Craig	24	M	Caucasian	Spina Bifida
Kyle	23	M	Asian American	Paraplegia, T-6
Maryn	20	F	Asian American	Cerebral Palsy
Ashley	18	F	Caucasian	Blindness (birth)
Kevin	19	M	Caucasian	Spina Bifida
Susan	20	F	African American	Cerebral Palsy
Denise	19	F	Caucasian	Paraplegia, T-6
Nick	23	M	Caucasian	Double AK Amputation



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(38) **Re-Imagining Empty Spaces as Healthy Places: A Community-Powered Tool to Identify New Opportunity Sites for Green Space in Dense Inner-City Communities with Severe Active Living Resource Limitations**

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Focus Area: Practice/Policy

Background and Purpose

Extensive research demonstrates the ability to live a healthy lifestyle is determined largely by the built environment and food and physical activity resources available within a community. However, in dense, low-income, and minority urban communities such as South Los Angeles – many of these resources such as parks and community gardens do not exist with the same frequency as other areas nearby with better health outcomes. Despite this disparity, there exists an abundance of vacant, abandoned land. These bare and often blighted spaces – caused by a confluence of economic, political, and social factors –inhibit physical activity, induce public safety concerns, and be a barrier for local economic development. Urban communities across the country are looking to these otherwise abandoned vacant lands to revitalize neighborhoods and create greater green space equity.

Description

Like so many large cities, the City of Los Angeles owns a considerable amount of vacant land, much of which can be found in low-income racial/ethnic communities with poor access to green space. Additionally, privately-owned vacant land in areas has persisted for decades thanks to a lack of new public and private investment. Heretofore, no department or non-governmental entity in the City has comprehensively identified where and how much of these vacant lands exist and the potential for new green space. This lack of information has stunted the City's ability to develop practical and innovative policy tools that would otherwise provide a streamlined route for the creation of new parks and urban farms. In response Community Health Councils, a non-profit community based organization in South Los Angeles, in partnership with a diverse group of stakeholders and partner organizations created the "LA Open Acres" project to identify the location of vacant properties utilizing community-based researchers and advocates. The project aims to increase awareness about the role that vacant land plays in affecting community health, safety, and economic development and to identify opportunity sites for transformation into spaces for healthy living.

Lessons Learned

Through the evolution of this project many lessons have been learned. A summary is below:

1. Advocacy to green vacant land must not be divorced from affordable housing preservation.
2. A strong, nimble, and responsive communications system must be in place for the project to include community partners in the process.
3. There is no single avenue to green vacant land at scale. A diverse coalition is needed to advance causes across multiple city and county departments and elected officials.
4. Be mindful that communities lacking parks and community gardens also lack access to other healthy resources. Planning for vacant land must be broad and inclusive to address these inequities.

Conclusions and Implications

LA Open Acres together with communities will use this newly-available and -accessible information to push forward exciting and innovative open space projects that are in tune with particular local neighborhood conditions, needs and visions. LA Open Acres can provide an opportunity for Angelenos to



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serve as a national model spurring innovation and dramatic change by organizing and advocating for better use of empty and underutilized space. The data, maps, and online networking tools provided by the LA Open Acres Project will allow community members to find information about available empty spaces, and connect with their neighbors to start organizing, in cooperation with landholders, for access to unused parcels. By providing information and resources, the project will allow others to work together to launch initiatives to transform the local environment. Furthermore, this data will inform the development of multiple planning processes occurring in the city now, including the development community plans across the City. This project will allow more people to access information, connect with decision-makers, and participate in the planning process in their neighborhoods to create healthier neighborhood environments.

Next Steps

Los Angeles is one of the most park-poor cities in America: the Trust for Public Land found that only 30% of the LA's four million residents live within one quarter mile of a park compared with 80% and 90% in Boston and New York, respectively. The shortage of parks and open space is most acute in Los Angeles poorest neighborhoods, exacerbating a chronic disease and obesity epidemic that is closely tied to poor diet and lack of exercise. Given the critical need for parks, open space, and urban agriculture and the city's limited ability to develop these resources on its own, LA Open Acres partners are spearheading an effort to create a new model that capitalizes on the opportunities that exist in vacant and underutilized land throughout the City, particularly in the areas most in need. In the months ahead, LA Open Acres will be organizing networks of community leaders to support the information and analysis provided on the online platform. Through this engagement, and activism on the part of communities and elected officials we aim to have a significant impact on policies, systems, and environments.

Support / Funding Source

Goldhirsh Foundation - LA 2050 Project. Centers for Disease Control and Prevention.



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(39) Developing Theory-Based Communications to Encourage Physically Active Behavior in Parks

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Focus Area: Research

Background and Purpose

Although physical activity (PA) is a key to disease prevention and health promotion, less than half of Americans meet minimum suggested levels of daily PA,¹ especially those from low-income backgrounds.² Studies have shown the effectiveness of point-of-decision prompts (PODPs; i.e., strategically placed motivational signs encouraging people to engage in desired behaviors) for increasing PA in public spaces.^{3,4} Other information strategies (e.g., brochures, signs) have been used successfully in park settings to modify behaviors such as deterring wildlife feeding or off-trail hiking,^{5,6} but until now, studies of PODPs to increase PA have primarily been limited to signs encouraging stair use. Investigations examining the utility of PODPs in parks are lacking and hold strong potential for converting a portion of the large amount of sedentary activity in parks to more active behaviors.^{7,8}

Objectives

This project, guided by the Integrated Model of Behavioral Prediction (IMBP), is part of a larger effort to develop and test PODPs to increase park users' PA. The IMBP posits that attitudes, perceived norms, and self-efficacy determine behavioral intentions and actual behavior.^{9,10} As a key first step to develop PODP messages based on the IMBP, this initial study sought to understand factors related to park users' and non-users' attitudes, norms, and self-efficacy for park-based PA.

Methods

In June 2012, 6 focus groups (4 adult, 2 youth) were conducted at community centers in Kansas City, Missouri, with a total of 41 participants including 26 adults (8 male, 18 female; 18 African American, 8 White) and 15 youth (9 male, 6 female; 13 African American, 2 White). Participants were recruited from low-income areas through programs and fliers, with \$25 incentives offered to focus group attendees. Discussions during the groups investigated salient outcomes that may influence participation in park-based PA (attitudes), referents that influence PA participation (perceived norms), and facilitators and constraints to park-based PA (self-efficacy) that could be emphasized in PODP messages. The focus groups were recorded, transcribed verbatim and then analyzed by two coders using NVivo software for emergent themes through a grounded theory approach.¹¹ The codes were tested for inter-rater reliability through a process of coding the data and reviewing with other researchers in the team.

Results

Regarding important outcomes from park-based PA, 11 themes emerged: Escape/Being Away, Relax/Unwind, Nature Appreciation, Social Interaction, Fascination, Health, Competition/Skill Development, Exercising Pets, Connect to Past/History, Education/Learn, and Adventure. Four of these themes (Escape/Solitude, Health, Nature Appreciation, and Social Interaction) were mentioned in all six focus groups.

Participants identified 11 themes for key referents: Medical Professionals, Teachers/Educators, Church, Friends, Family, Coaches, Media/News, Athletes, Celebrities, Neighbors, and Self. Although the Family, Media/News, and Celebrities themes emerged in 5 of the focus groups, no theme appeared in all 6 focus groups, suggesting that participants are influenced by a wide variety of significant others.



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Thirteen emerging facilitators were Maintenance, Safety, Facilities, Information, Social, Events and Programs, Comfort Amenities, Education, Water, Aesthetics, Affordability, Access, and Weather. Aesthetics, Social, and Facilities, such as trails and playground equipment, were mentioned in all groups. Finally, participants identified 13 constraints to park-based PA: Maintenance, Safety, Financial, Access, Weather, Information/Awareness, Comfort, Social, Facilities, Other Places to be Active, Lack of Energy/Motivation, Health Issues, and Policies. Safety, Maintenance, Facilities and Social emerged in every focus group.

Conclusions

The focus groups revealed that participants are concerned about physical health but also value parks as a mental health escape from the pressures of daily life and a place for solitude, nature, and social interaction. They are influenced by a wide range of referents, and they are deeply concerned about park safety. Learning about factors that influence park users' behaviors is an important first step towards increasing their PA within these settings. The information gathered in this project regarding outcomes, referents, facilitators and barriers will be used to help develop effective, theoretically-based communication messages to be placed in parks to positively influence park-based PA.

Implications for Practice and Policy

Concerns over health challenges have prompted widespread efforts to combat obesity through preventative measures such as increasing PA. As available resources remain stagnant, health and recreation agencies should take advantage of the cost-effective nature and widespread availability of parks to promote PA and public health. This study provides valuable data for formulating theoretically-driven PODP messages to aid in that effort. Future testing of the signs developed through these findings will help determine if erecting PODPs in parks can improve perceptions towards park-based PA (i.e., attitudes, perceived norms, and self-efficacy), increase intentions to engage in park-based PA, and increase observed PA levels among park visitors. Achieving these outcomes will provide evidence supporting a simple, actionable strategy that can be easily, quickly and widely disseminated to other park systems. Ultimately, PODPs in parks could be an inexpensive tool to influence population-level PA and obesity using existing community park resources.

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Support / Funding Source

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(40) Does Distance Make a Difference? Physical Activity Levels of Inner City High School Aged Youth in New Orleans, Louisiana

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Focus Area: Research

Background and Purpose

Obesity is a serious health problem in the United States. Rates of obesity and overweight for adults and youth in Louisiana are higher than national averages. Being physically active is one way to maintain a healthy weight (1,2). The built environment is one of the many factors that influence physical activity (PA) among youth (3). Parks can play an important role as a place for PA. Following the widespread flooding caused by Hurricanes Katrina and Rita, many New Orleans area parks and playgrounds were damaged. Proximity to parks has been shown to be an important predictor of PA (4-5). However, little is known about these relationships with inner-city high school aged youth in a post disaster setting.

Objectives

The objective of the study was to assess the physical activity levels of urban high school youth in a post-disaster recovery setting to determine if there was a relationship with activity level and distance to a park near their home.

Methods

During the spring of 2010, 718 out of 833 eligible youth (86.2%) completed a survey at Warren Easton High School in New Orleans, LA. Students were asked to identify an intersection and park close to their home and indicate the activities in which they participated. Reported intersections and parks were verified and mapped using ArcGIS. Distance to parks was determined in radius format using distances of less than 0.25 miles, 0.26 – 0.50 miles, or more than 0.50 miles. Distances to both self-reported parks and the closest parks were calculated. Self-reported physical activity was assessed two ways: 1) an Activity Participation Score (APS) was determined for each student summing the number of activities in which they participated; and 2) students were asked to rate their physical activity compared to others of their same age and gender. Both the APS and the self-rated measure were examined both continuously and categorically. APS activities included walking or biking to and from school, for fun or transportation, participating in PE/ROTC, team sports, band, or other activities such as boxing, yoga, or dance. The APS was grouped into four categories: no PA (0 activities), low PA (1-3 activities), moderate PA (4-6 activities), high PA (7 – 11 activities). Self-rated PA responses ranged from 1 to 5 with 1 being much more PA and 5 being much less active than others of the same age and gender. Frequencies and means were determined for respondent characteristics. Respondents were stratified by gender.

Results

Of the 718 respondents, 550 (76.6%) reported an intersection near their home and 307 (42.8%) also reported a park near their home. The mean distance to parks reported by students was 1.38 miles and 0.32 miles to the closest park identified by GIS. Mean age of the high school students was 15.5 years with 62.4% male. The majority of respondents were African American (90.0%) and 4.0% were Hispanic. Nearly 60.0% of students reported going to their listed park once a week or more.

The mean number of activities was 3.98 with walking for fun (74.5%) and walking to get someplace (67.8%) being the most common activities. The mean score for self-rated PA compared to others their



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age and sex was 2.79. Over 42.4% rated their activity as somewhat or much more active as their same gender peers.

Although the number of activities in which students participated overall did not differ by distance statistically, a higher proportion of females who lived within $\frac{1}{4}$ mile of a park participated in 4 or more activities compared to those with a park over $\frac{1}{2}$ a mile away (64.1% v 54.5%). However, the opposite was true for males with 55.9% of those within $\frac{1}{4}$ mile participated in 4 or more activities compared with 65.2% of those with a park greater than $\frac{1}{2}$ mile.

Students who lived within a $\frac{1}{4}$ mile of a park were more likely to rate their activity as more or much more active than their peers than those who lived greater than $\frac{1}{2}$ mile from a park. When examined by gender, a greater proportion of females (46.5%) compared to males (40.7%) who lived within a $\frac{1}{4}$ mile of a park were more likely to rate their activity as more or much more active than their peers.

Conclusions

The post-disaster environment left many New Orleans' parks unusable or under repair at the time of this survey. This may have resulted in further distances traveled to parks. Still, distance was found to be important for urban high school females in both the number of activities in which they participated and how they rated their PA compared to their same gender peers. Males appeared willing to travel further distances to parks.

Implications for Practice and Policy

Separate strategies for males and females are necessary to increase both park use and physical activity levels in high school inner city youth in post disaster recovery settings.

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Support / Funding Source

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(41) Mapping the State of Play

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Focus Area: Practice/Policy

Background and Purpose

Children are losing out on the childhood they deserve. With decreasing recess and fewer places to play, children spend more time on stationary activities including 7.5 hours of screen time per day. Four out of five US children don't have a place to play within walking distance. Academic and social pressure is replacing unstructured outdoor play with structured activities, and children are missing opportunities to develop social, risk assessment, and problem solving skills.

Lack of play is causing imbalance. According to researchers from the Department of Health and Human Services, childhood obesity increases 29% in neighborhoods without parks or playgrounds. Children who live within a half mile of a park or playground are five times more likely to be at a healthy weight than children without playgrounds. Children who don't play don't learn to work in groups, share, negotiate, resolve conflicts, or advocate for themselves. This lack has dramatic effects, including greater likelihood of felony arrests by young adulthood.

Children in low-income households are even more impacted by access to play. When we understand where playspaces exist, who has access, and how those facts align with child-dense and low-income populations, we can create a picture of where access to play is in need of action.

Description

Although play deficits are documented on the large scale, no one can say for sure which neighborhoods have the most need. Map of Play is designed to answer that question, clarifying the need and providing tools for healthier, happier kids.

First, Map of Play is a user-generated map of spaces – playgrounds, parks, sports fields, and nature areas – with photos and ratings that help users find the best places to play.

Secondly, Map of Play helps gather information to create Play Desert maps. These maps document areas where children, many in poverty, don't have access to play. Once we know where Play Deserts exist, we work to improve community health and wellbeing. Our Playful City USA program honors communities committed to improving access to play.

Lessons Learned

Mapping in communities reveals excitement and opportunity for education – people discover new parks and playgrounds, internalize the need for change, and reignite childhood delight that has them returning to play.

Mapping challenges create chances for participants to live happier and healthier lives. Mappers use insights to drive action to fight obesity and keep children engaged in active play. Communities dedicated to play become Playful City USA communities that help spread the importance of active play every day.

Conclusions and Implications

Play is essential for the health and well-being of communities. Children who spend time in active, free play benefit from increased wellbeing, better academics, and more creativity.



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By encouraging communities to map parks and playgrounds, the Map of Play helps contribute to the nationwide conversation around health, active lifestyles, and happy kids.

Next Steps

Bringing awareness and resources to communities is the first step. These resources, alongside community maps, help people get moving, and get to know their cities.

Communities can access activity kits, how-tos, webinars, and mobile Map of Play to encourage play. Hosting scavenger hunts, playdays, and parties increases activity in engaging ways. Tap into grants and funding with support from KaBOOM! to improve parks and increase use and physical activity.

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(42) Youth Sport Practice Model Gets More Kids Active with More Time Practicing Skills

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Focus Area: Research

Background and Purpose

The USDHHS and American Academy of Pediatrics have identified organized sports as a mechanism for children to obtain physical activity in an environment where risks of participation can be controlled [1]. However, research connecting youth sport participation and physical activity is both limited and equivocal. Studies using objective measures of physical activity have found that children engaged in MVPA between 33-46% of the time during sport practices or games and that there was a high percentage of inactivity time [2, 3]. Similarly, Leek et al. [4] found that fewer than 25% of youth sport participants obtained the recommended 60 minutes of daily MVPA during practices. Sport practices also tend to overemphasize skill and competition strategies during instructional time, thereby limiting the efficient use of practice facilities and the amount of time children engage in MVPA. Therefore, although organized sports may create opportunities for children to be active, its full potential as a strategy to increase children's overall MVPA may be limited by policies that govern the structure and delivery of sport practices. [4]

Objectives

The purpose of this study was to build upon research that objectively measures the PA of children participating in sports and to determine if an alternate sport practice model results in different amounts of MVPA and time practicing skills.

Methods

Ice hockey teams and players were recruited from two southeastern United States youth hockey leagues (9-10 year old division). One league had implemented USA Hockey's American Development Model (ADM) for practices that promotes the use of smaller spaces, more participants, and lower child-to-coach ratios. A comparative sample of similar aged teams and players was also recruited from two separate youth hockey organizations in the same metropolitan area that did not currently use ADM. Systematic Observation of Hockey Opportunities (SOHO) was used to measure player physical activity levels and the practice context in which they occur. SOHO uses momentary time sampling and is modeled after the widely used SOFIT (System for Observing Fitness Instruction Time) [5], but is hockey-specific. Trained observers randomly selected 4 participants from each practice and observed each participant for 12 consecutive 10 seconds observations followed by 10 seconds for recording their PA level and practice context. A Metabolic Equivalent of Task (MET) score was calculated for each practice based on multiplying the percentage of time players spent in each activity level (sedentary, moderate, and vigorous) by the corresponding MET value associated with the activity level [6]. The interclass correlation for independent observers was .95 for physical activity, and .96 for practice context.

Results

SOHO data were obtained from 82 hockey practices (ages 9-10) between February 2012 and February 2013. Of the practices, 43 used the ADM approach while 39 operated under a traditional structure (non-ADM). Results presented in Table 1 show, overall, players spent 44% of practice time engaged in sedentary activities (i.e., lying down, sitting, standing), 33% in moderate physical activity (gliding/walking), and 23% in vigorous physical activity. While minutes in MVPA and MET scores did not differ significantly between the practice types, ADM practices provided overall higher MET hours than traditional practices. These practices also accommodated approximately 60% more players while having twice as many



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coaches, a lower player-to-coach ratio, and a higher percentage of practice time spent in vigorous physical activity than traditional practices. ADM practices had more time dedicated to skill drills/activities (57% vs. 52%) and knowledge transfer/instruction (17% vs. 11%). Non-ADM practices allocated more time to practice management activities (16% vs. 10%) and game simulations (16% vs. 10%).

Conclusions

Participants in these hockey leagues were accruing substantial amounts physical activity during regularly scheduled practices. As well, MVPA time is among the highest reported in studies of youth sport participants [4, 7]. More notable, however, is that the ADM helped participants achieve these high MVPA levels while accommodating 60% more players than the standard coaching model and used a significantly lower player-to-coach ratio. Finally, the ADM appears to minimize time wasted on practice management activities while creating more time for skill practice.

Implications for Practice and Policy

Because of the increasing number of children participating in sport, organized sport clubs and organizations have been identified as an important setting to facilitate physical activity and health promotion[8]. It seems apparent that USA Hockey has developed a framework to facilitate high levels of physical activity for more children without compromising attention to skill development and instruction. The ADM strategies may serve as a model for other youth sports seeking to accommodate the increasing demands for participation on constrained practice facilities and time for practice.

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Support / Funding Source

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Table 1: Comparison of means and standard deviations between ADM and Traditional Sport Practices

Variable	ADM Practice	Traditional Practice (non-ADM)	Overall	Effect Size
Practice Length in Minutes	59.86** (1.78)	56.39 (4.99)	58.21 (4.05)	1.05
Number of Players	32.30** (8.28)	19.39 (9.83)	26.16 (11.09)	1.43
Number of Coaches	8.56** (2.62)	4.28 (1.83)	6.52 (3.12)	1.91
Player to Coach Ratio	3.97* (1.04)	4.67 (1.96)	4.31 (1.57)	-0.47
Percent time in fitness activities	4.44 (4.54)	4.32 (4.17)	4.38 (4.35)	0.03
Percent time in Skill Drills/Activities	57.61 (16.17)	53.04 (14.09)	55.43 (15.30)	0.30
Percent time in Knowledge Transfer/Instruction	16.62* (8.92)	11.10 (9.51)	13.99 (9.56)	0.57
Percent time in Game Simulations	9.84 (15.71)	13.97 (18.87)	11.81 (17.19)	-0.24
Percent time in Practice Management Activities	10.58* (3.94)	15.76 (8.62)	13.05 (7.05)	-0.73
Percent Time Players Sedentary	43.83 (7.74)	44.81 (11.52)	44.42 (9.67)	-0.10
Percent Time Players in Moderate PA	30.79 (9.28)	35.19 (13.51)	32.89 (11.63)	-0.39
Percent Time Players in Vigorous PA	25.40* (9.39)	20.29 (11.12)	22.97 (10.50)	0.50
Minutes in Moderate or Vigorous PA	33.64 (4.81)	31.29 (6.91)	32.53 (5.98)	0.40
Total Player Minutes in MVPA per Practice (# players x minutes MVPA)	1087.75** (324.04)	585.17 (293.68)	848.82 (398.35)	1.62
Average Individual Player METs per Practice	3.11 (.347)	2.95 (.344)	3.03 (.386)	0.46
Total MET hours per Practice	99.75** (26.16)	57.03 (29.48)	79.43 (35.52)	1.54

Note: * indicates mean difference between ADM and traditional practice was significant at the .05 level (** = .001 level). Effect Size is Cohen's delta calculated by: $ES = (ADM_{mean} - Traditional_{mean})/SD_{pooled}$.



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(43) Predictors of Park Use Among Hispanic Mothers

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Focus Area: Research

Background and Purpose

Park use is associated with many health benefits, yet Hispanic females visit neighborhood parks infrequently. The purpose of this study was to: 1) describe neighborhood park characteristics and park use among Hispanic mothers who visit parks with their children, and 2) assess individual, psychological, and environmental predictors of park visits among Hispanic mothers who visit parks with their children.

Objectives

The following hypotheses were proposed: 1) There will be a negative association between park distance and park visits with children; 2) There will be a positive association between participants' park visits with children and participants' physical activity 3) There will be a positive association between participants' park visits with children and participants' perceptions of neighborhood parks; and 4) Acculturation, park distance, and physical activity will predict participants' park visits with their children.

Methods

A sample of 105 Hispanic mothers participated. Acculturation, physical activity, park perceptions, park distance, and park visits with children were assessed using surveys. Relationships among park visits and study variables were examined using bivariate correlations.

Results

Park visits were significantly associated with physical activity ($r = .26, p < .01$), and park distance ($r = -.21, p < .05$). Park perceptions were not significantly associated with park visits. A multiple regression model was used to determine predictors of park visits. Findings from this study indicated that acculturation and physical activity were significant predictors of park visits.

Conclusions

The study revealed that a large proportion of Hispanic mothers visited parks at least once with their children within the past 30 days. Park visits do not guarantee engagement in physical activity while in the park. Study participants were most likely to engage in sedentary behavior while visiting neighborhood parks. The few participants who were physically active usually walk at neighborhood parks. This study confirmed that living in close distances to parks increased the likelihood of park visits. Park visits were significantly associated with physical activity performed at work, at home, during transportation, and recreation. No associations were found between park visits and perceived park safety, satisfaction, and comfort and convenience. This study revealed that physical activity and acculturation were significant predictors of park visits.

Implications for Practice and Policy

Overall, findings from this study provide relevant information of Hispanic mothers' neighborhood park visits, park preferences, park perceptions, self-reported physical activity as well as the identification of predictors of park visits. Park users preferred to be sedentary while they were at neighborhood parks. Therefore, the use of neighborhood parks as a venue for recreational physical activity should be encouraged. This study also revealed that Hispanic mothers with high levels of acculturation, and low



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levels of physical activity were less likely to visit parks than those with low levels of acculturation and engaged in high levels of physical activity. This indicates that educational campaigns that encourage the use of parks as a venue for regular physical activity should focus on Hispanic mothers with high levels of acculturation and low levels of physical activity.



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(44) Examining the Association Between Trail Use and Community Quality of Life Perceptions

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Focus Area: Research

Background and Purpose

Community trails are popular for exercise with frequent trail use positively related to activity-friendly neighborhoods which support physical activity for adults (Librett, Yore, & Schimid, 2006). Trails provide benefits for communities including increased quality of life, environmental conservation and appreciation, social interaction, and economic growth. Although current literature provides insight into many aspects of trail use, the examination of social benefits that contribute to a healthier community are lacking.

Objectives

The purpose of this study was to investigate the relationship between trail use and the perception of community quality of life for the “People Trail” in Columbus, Indiana.

Methods

This study was aimed to target trail users of the “People Trail” located in City of Columbus, Indiana. Mobile interviewers were stationed at specified trail access points to intercept trail users for participation. Data was collected using electronic devices (Mini iPads) along with the software application - iSURVEY. The survey method enhanced accuracy, saved paper, and expedited the data analysis process. Data collection occurred between May and July of 2013 at various trail heads along the “People Trail” (e.g. Miller Race Park, Parkside, Clifty Park, Donner Park, Noblitt and Lincoln Park). The total survey included 32 questions related to use patterns and satisfaction, and 15 regarding Community Quality of Life (CQL). CQL items were designed to acquire information about respondents’ perceptions regarding contribution of the trail to their sense of community. Items included the contribution of open space, decrease the pollution, new business development, transportation alternative, increase access to shopping areas, social interaction, health, fitness, safe route to school, residents’ pride, business diversity, recreational opportunities, preserving wildlife habitat, economic growth, and positive community identity.

Results

There were a total of 329 respondents in this trail survey (N=329). In terms of frequencies for trail use in the past month, the majority of the respondents used the trail 1-5 times (n=150, 45.6%); followed by those who used it 6-10 times (n=59, 17.9%). Respondents who used the trail 11-15 times (n=29, 8.8%), 16-20 times (n=25, 7.6%), and 21-25 times (n=28, 8.5%) were almost even distributed. In addition, respondents who used it over 25 times during a one month period outnumbered the previous three groups (n=38, 11.6%).

The scale for CQL was based on the contribution of this specific community trail (1= strongly disagree, 5= strongly agree), and all items scored ranged from 3.41 to 4.56. Furthermore, the following report shows items associated with CQL contribute to open space (M= 4.33, SD=.71), a decrease the pollution (M= 3.88, SD= .92), to new business development (M=3.73, SD= .91), transportation alternatives (M= 4.07, SD= .86), increase access to shopping areas (M=3.41, SD= .95), social interaction among residents (M=4.20, SD= .79), health (M=4.5, SD= .67), fitness (M=4.56, SD=.65), safe route to school (M=3.75, SD .95), a residents’ pride (M=4.29, SD= .69), business diversity (M=3.70, SD= .86), recreational opportunities (M=4.40, SD= .72), preserving wildlife habitat (M=4.03, SD= .84), economic growth (M=3.87, SD= .83), and positive community identity (M=4.4, SD= .72).



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Positive correlations were shown between frequency of trail use and several items involving CQL. Statistical results regarding the amount of the open space ($r=.12$), provision of transportation alternatives ($r=.12$), and contribution of residents' pride in the community ($r=.14$) were found to have a positive relationship with more frequent trail use. A moderate relationship ($r=.27$) was found between frequent trail users and those who agree that the trail provides a safe route to school.

Conclusions

Evidence from the literature has shown a strong relationship between physical activity and trail use by engaging in walking, jogging, running and biking, etc. This research project was an attempt to extend our understanding of physical and social benefits of community trails. Users interacted with others which strengthened neighborhood and community bonds. Specific issues regarding access points and trail infrastructure were noted as considerations to enhance a trail's ability to facilitate strengthened social interaction. In addition, users who value the trail as a safe route to school tended to visit the trail on a more regular basis. Those same people then may have the potential to use it more for active transportation. Further in-depth investigation will be needed for future study.

Implications for Practice and Policy

With results indicating that trails contribute positively to aspects of CQL, city park departments should capitalize on marketing and promotion opportunities to encourage increased use. Specifically, looking at ways to further increase use of the trail for transportation which was reflected in positive correlations from the data analysis. Overall, the concept of CQL is important because any factor that draws participants to a trail ultimately encourages physical activity and active healthy life styles.

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Support / Funding Source

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(45) A Microenvironment Approach to Increasing Physical Activity

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Focus Area: Research

Background and Purpose

Sitting is associated with obesity and mortality. Most adults spend the majority of their workday seated. One way to decrease sitting during leisure time is to design the built environment to encourage standing or physical activity. A challenge of studying the influence of the built environment on activity is difficulty in manipulating the environment. Building a bike path or park requires much planning and funding. Careful control and measurement of the environment must occur before and after construction, and it is difficult to return the environment to the baseline condition to assure that the observed effects on activity were not due to the passage of time. One approach is to study microenvironment level changes that can be more easily manipulated and which may promote healthy behavior change. Social environments also influence sedentary behavior and physical activity. Free-time physical activity of parents is associated with child activity. Environments that encourage parent leisure activities when with their children may be an effective way to simultaneously increase children's activity.

Objectives

To test whether a micro-level environment change, movement of picnic tables away from a park playground, would increase the standing behavior, activity intensity and length of stay of adult caregivers and children.

Methods

Study 1: Observers assessed (SOPARC method) physical activity levels (sitting, standing, moderate, vigorous activity) of children (0-12y) and adults (19+y) at a park playground each evening for 5 weekdays and 2 weekend days during 3 conditions: baseline (A1) with picnic tables in standard locations near the playground, experimental (B) with picnic tables removed from the playground area and, picnic tables returned to baseline locations (A2).

Study 2: One year after completion of study 1, the SOPARC process was repeated, but with an additional 2-hour assessment each evening during which activity intensity of each family member was recorded every 15-min and length of stay recorded.

Statistics: Differences in MET intensity across conditions were tested with 2-way (age, condition) ANOVA. Separate log-linear models tested differences in number of adults and children observed in activity levels across conditions. For study 2 activity intensity during the 2h period was analyzed using a hierarchical linear model, with families and members within families treated as random effects. Time families spent at the playground was analyzed using Kaplan-Meier survival estimates computed for each of the 3 conditions using the Lifetest procedure (SAS Institute, Inc, Cary, NC). Mean time spent at the playground was estimated using the survival function. The survival curves were compared using the Logrank test.

Results OR Conclusions and Implications

Study 1: The MET intensity was greater ($p < 0.02$, Table 1) during condition B than conditions A1 and A2. Children were more active than adults ($p < 0.001$). For adults, the odds of their standing rather than sitting during condition B were 4.7 (95% CI 1.3 to 17.2, $p < 0.02$) to 9.4 (95% CI 2.5 to 35.2, $p < 0.001$) greater than during A1 or A2 and the odds of being in MVPA than sitting during condition B were 4.1 (95% CI 1.1



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to 15.1, $p < 0.03$) to 22.7 (95% CI 4.2 to 122.0, $p < 0.001$) greater than during A1 or A2. Activity intensities of children were not associated ($p > 0.45$) with experimental condition.

Study 2: The MET intensity during condition B was greater ($p < 0.01$, Table 1) than during conditions A1 and A2. Children were more active than adults ($p < 0.001$). The odds of adults being in MVPA rather than sitting during condition B were 4.3 (95% CI 1.6 to 11.4, $p < 0.004$) to 4.5 (95% CI 2.1 to 9.8, $p < 0.001$) greater than during A1 or A2. Opposite of Study 1, the odds of standing versus sitting during condition B were not different (OR 0.9 95% CI 0.3 to 3.0, $p > 0.90$) than during A1 or A2. Similar to Study 1, activity intensities of children were not associated ($p > 0.35$) with experimental condition. During the nightly two-hour observation periods the overall MET level of condition B (2.6 ± 0.1) was greater ($p < 0.005$) than conditions A1 (2.2 ± 0.1) and A2 (2.4 ± 0.1). The duration that families stayed at the park did not differ ($p > 0.59$, A1 56.8 min, B 51.7 min, A2 48.3 min).

Conclusions

Adult caregivers were more intensely active when the picnic tables were not accessible for sitting. This effect was replicated across studies. Duration at the playground did not differ across conditions so removal of picnic tables for sitting did not shorten the time that adults were willing stay or to allow children to play. The increases in activity intensity observed in adults were not observed in children, who were already more active than the adults.

Implications for Practice and Policy

This study demonstrates the application of a strong experimental design to study the effects of a built-environment change on activity. The greater MET intensity of adults when the tables were removed can be applied to the design of public recreation spaces to encourage healthy parent-child interactions and to promote standing and physical activity of adult caregivers who brought their children to a park playground.

Support / Funding Source

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Table 1. Observed activity intensity in METs of adults and children in Studies 1 and 2

Condition	Study 1		Study 2	
	Adults	Children	Adults	Children
Tables Near (A ₁)	1.78 ± 0.09	3.14 ± 0.19	1.67 ± 0.08	3.20 ± 0.17
Tables Far (B)	2.00 ± 0.17	3.79 ± 0.38	2.27 ± 0.18	3.55 ± 0.22
Tables Near (A ₂)	1.43 ± 0.05	3.10 ± 0.26	1.59 ± 0.09	3.38 ± 0.21

Data are mean ± standard error



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(46) PRORAGIS: A Tool for Recreation and Park Research

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Focus Area: Research

Background and Purpose

The National Recreation and Park Association (NRPA) is the leading advocacy organization dedicated to the advancement of public parks, recreation, and conservation. As part of our mission to advance parks, recreation, and environmental conservation efforts that enhance the quality of life for all people, NRPA has created the Park and Recreation Operating Ratio & Geographic Information System (PRORAGIS). PRORAGIS is designed to make the park and recreation professional's job easier by providing specific, comparative data from other similar departments and agencies nationwide.

Objectives

The goal of PRORAGIS is to provide local agencies and departments of all sizes a powerful tool to generate data about their parks, facilities, programs, and personnel. Data from PRORAGIS will enable agencies and departments to analyze information regarding their own assets, as well as compare their metrics against other entities. This data will not only allow greater insight into the utilization, effectiveness, and budgetary matters of their park and recreation facilities – it will provide agencies and their advocates powerful, fact-based arguments to communicate the importance of recreation and parks to local authorities and political representatives.

Methods

The PRORAGIS dataset is generated from a survey-based assessment of recreation and park agencies across the United States. Agencies complete a profile including a web-based survey, which populates the database with their information. Users can then generate customizable reports that display comparative data related to agency size, personnel, financials, facilities, programs, and activities. Agencies are also encouraged to submit GIS data related to their facilities, and are provided access to GIS-based maps and analysis tools as part of PRORAGIS. Based on input from users, improvements and features are constantly added to PRORAGIS to stay abreast of the latest developments in recreation and parks planning and utilization. Current plans involve inclusion of health and wellness related data and research along with a calculation tool to analyze this data. Additionally, future iterations will allow users to overlay various census, American Community Survey, Centers for Disease Control, Department of Justice, and other comprehensive data sources.

Results

As of September 1, 2013, more than 1000 agencies have added their data into the PRORAGIS system. GIS data in PRORAGIS is constantly contributed by users, and efforts are underway to integrate existing datasets into the PRORAGIS system to provide greater analytical capability to users. Full development of the PRORAGIS system is one of the main priorities of NRPA in the coming years.

Conclusions

PRORAGIS represents an important step forward in the use of research to support recreation and parks. Before PRORAGIS, comparative analysis of recreation and parks agencies required literature searches, and relied on static datasets that may have been months or years old. The data available through PRORAGIS is accessible via the Internet, and is continuously updated as users provide and update their information. The ability to comparatively analyze an agency against other agencies across the country



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represents an important benchmark in making park management, planning, and advocacy more supported by data and technologically current.

Implications for Practice and Policy

As funding for recreation and parks continues to experience increased pressure, those who recognize the importance of outdoor space and activity in all environments will require better tools to effectively protect and expand recreational activities and park facilities. Whether an agency is seeking budgetary improvements from a city or county politicians or applying for federal grant dollars to fund their mission, fact-based arguments provide the best support for their positions. Providing these agencies with a tool to generate comparative data specific to their agency increases their ability to protect and expand activities and facilities, thereby improving health and activity levels in their communities.

References

www.nrpa.org/proragis

Support / Funding Source

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(47) Examining Demographic Interactions in Perceptions of Outdoor Recreation Areas across a Decade

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Focus Area: Research

Background and Purpose

As one element of healthy communities, public parks, trails, and other outdoor recreation areas (referred to collectively hereafter as outdoor recreation areas or ORAs) provide opportunities for PA and may have important implications for promoting population-level energy expenditure and improved health.^{1,2} However, differences often exist in PA participation and ORA use by various demographic attributes.³⁻⁵ Awareness of ORAs and perceptions of safety can also influence use of and PA levels associated with ORAs. For example, data show that residents are often unfamiliar with their local ORAs^{6,7} and that being aware of such settings is associated with use of and PA in those areas.^{8,9} Likewise, perceptions of safety of recreation resources are important in affecting use of and activity within ORAs.¹⁰ Therefore, improving familiarity with and perceptions of parks and trails could translate into increases in use of ORAs for health-enhancing behaviors.

Objectives

The purpose of the current study was to examine across time and within demographic subgroups differences in awareness of, perceptions about, and use of ORAs. A better understanding of such longitudinal and demographically-differentiated changes will lead to improved efforts to promote awareness of ORAs and opportunities for PA, especially among low-active groups.

Methods

The study took place in a demographically diverse central South Carolina county which had a population of 107,500 residents in 2010,¹¹ approximately 18% of whom were living at or below the federal poverty level.

Cross-sectional telephone surveys were conducted with independent samples across the county in 2000 (n= 1,055) and 2011 (n= 1,011) using a random digit dial methodology. Participants reported multiple demographic characteristics (see Table 1) and the PA module from the Behavioral Risk Factor Surveillance System was used to calculate whether participants met recommended PA guidelines.^{12,13} To assess awareness of ORAs, participants reported the extent to which they agreed that they hear a lot about places to be active within their county. Safety of ORAs was also measured using a 4-point Likert scale. Finally, participants also reported the number of days in a typical month that they use ORAs for PA. All outcome variables (awareness of, perceived safety within, and use of ORAs) were dichotomized and logistic regression analyses examined i) the main effects of six demographic predictor variables (gender, race, age, BMI, education level, PA level) and ii) the interactions of time (year) by each demographic variable on each of the three outcomes, while controlling for all other main effects.

Results

In both study years, just over half of respondents were female, White, overweight/obese, 40+ years old, and met PA recommendations.

Table 1 shows adults age 40+ were almost twice as likely to agree that they were aware of places to be physically active than were 18-39 year olds. Less educated participants were more likely to report greater



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awareness than those with more education. A significant age by time interaction illustrates that older adults had higher levels of awareness at both time points, but younger respondents had significantly greater awareness in 2011 than in 2000 (Figure 1a).

While respondents were nearly twice as likely to report feeling very safe in 2011 than in 2000, female and Black respondents were less likely to report feeling very safe than male and White respondents, respectively. A significant time by education interaction revealed that the percentage of those feeling very safe nearly doubled among respondents with less education, and was much less pronounced among more educated respondents (Figure 1b). A significant time by PA interaction illustrated that the difference in perceived safety between 2000 and 2011 was more striking among individuals who did not meet PA recommendations than those who met recommendations (Figure 1c).

Finally, reported trail use was greater among Blacks, adults ages 18-39 years, and participants who met PA recommendations. A significant gender by time interaction revealed the percentage of women reporting trail use was greater in 2011 than 2000 while the opposite pattern was observed among men (Figure 1d).

Conclusions

Examining these diverse outcomes by demographic subgroups across time revealed specific populations that might be at risk for decreased use and PA based on awareness and perceptions of ORAs. Overall awareness of and perceptions about safety improved between 2000 and 2011. However, upon closer examination, more marked differences were observed for some demographic groups than for others. Periodic community surveillance studies of this type can be a valuable tool for prioritizing segments of citizens that might benefit from interventions to enhance awareness of recreation spaces and improve perceptions about safety or other qualities of these resources.

Implications for Practice and Policy

Exploring temporal trends in a variety of outcomes and according to multiple socio-demographic characteristics may help to illuminate sources of health disparities for particular population sub-groups. The changes observed in the data over time suggest that ongoing efforts to monitor perceptions about parks and recreational services may provide insightful information about how to promote use of parks, trails, and other ORAs.

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Support / Funding Source

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Table 1.
Association of demographic variables with awareness of, perceived safety in, and use of ORAs

<i>Predictor</i>	Awareness of ORAs		Perceived Safety in ORAs		Reported Use of ORAs	
	<i>Odds Ratio</i>	<i>95% CI</i>	<i>Odds Ratio</i>	<i>95% CI</i>	<i>Odds Ratio</i>	<i>95% CI</i>
Adjusted Main Effects						
Year (2011)	1.24	0.99-1.54	1.84	1.45-2.33^{††}	0.99	0.81-1.22
Gender (Female)	1.10	0.88-1.38	0.72	0.57-0.91^{††}	0.86	0.70-1.06
Race (Black/AfrAm)	1.05	0.83-1.31	1.54	1.22-1.95^{††}	1.54	1.25-1.89^{††}
Age (40+ years)	1.89	1.52-2.38^{††}	1.08	0.85-1.38	0.45	0.37-0.56^{††}
BMI (Overweight/Obese)	0.88	0.70-1.10	0.90	0.71-1.15	1.03	0.83-1.27
Education (12 yrs or Less)	1.33	1.07-1.67^{††}	1.09	0.86-1.37	0.88	0.72-1.08
Physical Activity Level (Does Not Meet Recommendations)	0.96	0.77-1.20	0.98	0.78-1.24	0.71	0.58-0.89^{††}
Model 1						
Gender*Year	0.92	0.59-1.42	0.98	0.62-1.55	0.55	0.37-0.82^{††}
Model 2						
Race*Year	0.76	0.49-1.18	1.47	0.93-2.33	0.76	0.51-1.13
Model 3						
Age*Year	0.60	0.39-0.95[†]	0.80	0.49-1.29	1.31	0.87-1.98
Model 4						
BMI*Year	0.81	0.52-1.28	1.18	0.73-1.90	1.06	0.70-1.61
Model 5						
Education*Year	1.06	0.68-1.65	1.94	1.22-3.09^{††}	1.01	0.68-1.51
Model 6						
Physical Activity Level*Year	1.29	0.83-1.99	1.67	1.05-2.65[†]	0.72	0.48-1.07

Each model contained the specified interaction term, as well as all main effects variables.

Reference groups for main effect variables were Year: 2000, Gender: Males, Race: White, Age: 18-39 years, BMI: Normal Weight, Education: 13 years or more, Physical Activity Level: Meets PA Recommendations.

†=p value ≤ 0.05, ††=p value ≤ 0.01

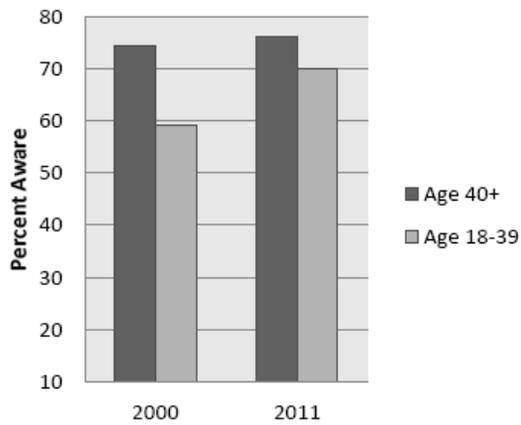


Figure 1a. Awareness of ORAs by Age

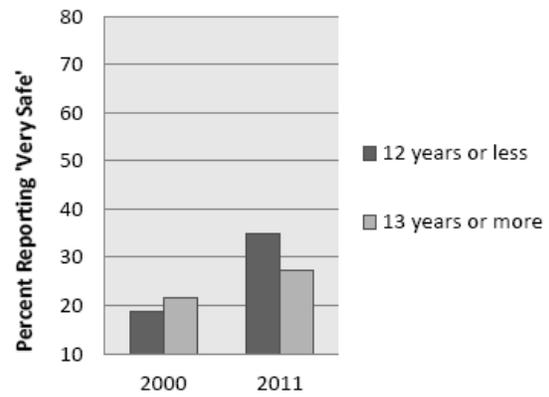


Figure 1b. Perceived Safety by Education

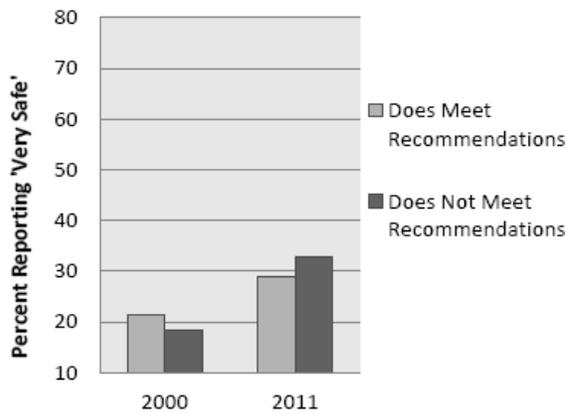


Figure 1c. Perceived Safety by PA Level

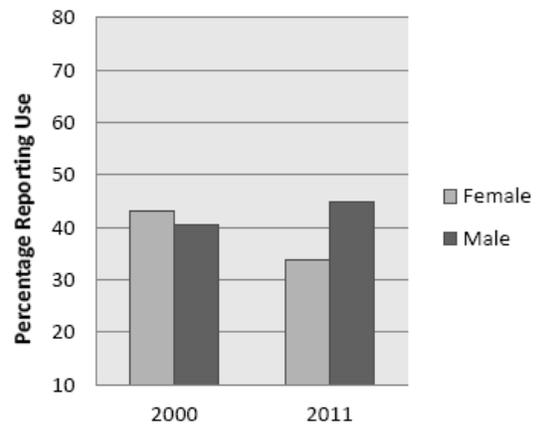


Figure 1d. Reported Trail Use by Gender



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(48) Identifying “Winnable” Policies for Obesity Prevention in Native American Reservations

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Focus Area: Research

Background and Purpose

Policy and environmental strategies to address and prevent obesity are increasingly recommended.^{1,2} However few or no studies have examined the feasibility of implementing such strategies in Native American reservations where structural conditions, including poor access to healthy foods and safe places to exercise, disproportionately expose community members to risk.³ Indeed obesity rates among Natives Americans are twice those of non-Hispanic whites.^{4,5} Further, the readiness of tribal communities to implement policy and environmental strategies – a key factor in the success of such strategies – is not well understood.

Objectives

This study examined the feasibility of, and readiness to implement three obesity prevention strategies recommended by the CDC’s Common Community Measures for Obesity Prevention¹ (COCOMO) within the Round Valley and Osage Indian Reservations in Northern California and Oklahoma – two geographically and economically diverse reservations located in equally diverse parts of the United States.

Methods

A quantitative survey was administered to 50 tribal member key stakeholders from each community (total n= 100) including tribal council members, school board officials, health planners, business owners, and lay community members. Respondents were asked to rate the feasibility and likelihood of success of each of the three COCOMO strategies given the community’s culture, infrastructure, extent of leadership support, and funding support. The average feasibility score for each of the three strategies was calculated and mean values were compared and ranked from highest score (most “winnable” strategy) to lowest score (least “winnable” strategy). Community readiness to act on obesity prevention was assessed using questions from the Community Readiness Handbook,⁶ adapted to focus specifically on obesity prevention in tribal communities, and measuring six dimensions of readiness: community efforts to address obesity, community knowledge of efforts, leadership, community climate, community knowledge about obesity, and resources. Responses were evaluated using means and standard deviations for the continuous variables and frequencies with percentages for categorical variables. Overall community readiness scores ranged from stage 1 to stage 9, with stage 1 being no awareness of obesity as a problem to stage 9 being a high level of ownership and detailed and sophisticated knowledge of the prevalence, causes, and consequences of obesity.

Results

Both communities identified “increasing availability of healthier food and beverage choices in tribally-operated venues” as the most “winnable” COCOMO strategy. Of the six dimensions of community readiness assessed, Osage rated “community knowledge about obesity” and “community efforts to address obesity” as the dimensions with the highest level of readiness, while “community knowledge of the efforts to address obesity” was rated the lowest. Alternatively, Round Valley rated “community knowledge of the efforts to address obesity” as highest – significantly higher than Osage – and rated “leadership” as the lowest. Overall, Osage scored a 4, in the “Preplanning” stage of readiness. Round Valley scored a 5, in the “Preparation” stage of readiness.



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Conclusions

Native American reservations experience critically high rates of obesity. Limited knowledge exists in how to successfully implement evidence-based obesity prevention strategies aimed at policy and environmental levels, within reservation settings. This study, the first of its kind, proposes that a community's culture, infrastructure, extent of leadership support, and funding support must be assessed to determine the most "winnable" obesity prevention strategies from key stakeholder perspectives, and a community's readiness to implement such strategies is also crucial. Further research is needed to examine the roles the dimensions of readiness may play in identifying and prioritizing strategies for tribal communities, and how statewide policies where Native American reservations are located may support the implementation of health enhancing policies in reservations.

Implications for Practice and Policy

The process of identifying and prioritizing "winnable" strategies, and assessing a community's readiness to implement these strategies, can be easily replicated by tribal leadership and public health planners nationally. The process may be an important first step in developing policy and environmental strategies to address obesity that are viewed as feasible and achievable, and which community members believe they are ready to implement. It may also help to shed light on developing a road map for translating evidence based policies into practice in reservation communities.

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Support / Funding Source

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Table 1. Identifying the most “winnable” Common Community Measures for Obesity Prevention (COCOMO) Strategy

Strategies:	1. Our tribe should increase availability of healthier food and beverage choices in tribally-operated venues (e.g. child care centers, community recreational facilities, tribal buildings, health care settings).		2. Our tribe should improve availability of affordable healthier food and beverage choices in tribally-operated venues.		3. Our tribe should improve geographic availability of supermarkets in our more rural areas.	
	Osage	RV	Osage	RV	Osage	RV
Overall mean score per strategy	2.74 (.809)	2.58 (.847)	2.68 (.761)	2.50 (.819)	2.45 (.827)	2.32 (.783)
a. How realistic given the tribal community culture?	2.86 (.855)	2.76 (.839)	2.86 (.855)	2.69 (.905)	2.73 (.871)	2.44 (.769)
b. How realistic given the tribal infrastructure?	2.76 (.760)	2.53 (.857)	2.75 (.732)	2.49 (.784)	2.49 (.853)	2.21 (.623)
c. To what extent do community leaders (e.g. tribal council members, elders) support this recommendation?	2.83 (.775)	2.60 (.881)	2.61 (.645)	2.45 (.832)	2.35 (.753)	2.46 (.898)
d. To what extent is there current funding for this recommendation?	2.50 (.845)	2.42 (.810)	2.50 (.811)	2.37 (.755)	2.22 (.832)	2.15 (.842)

Note. Mean values are compared and ranked from highest score (4=most “winnable” strategy) to lowest score (1=least “winnable” strategy).



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Table 2. Community Readiness by Dimension, Community Average Scores and Stages of Community Readiness for Osage Nation (n=37) and Round Valley (n=53).

Dimension	Osage Nation	Round Valley
Efforts	5.70	5.98
Community knowledge of efforts	3.08	6.14
Leadership	4.82	4.37
Community Climate	5.51	5.56
Community knowledge about the issue	5.70	5.78
Resources	4.82	5.00
Average score	4.94	5.47
Stage of readiness	Preplanning	Preparation



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(49) Environmental Influences on Health-Enhancing Social Interaction: Associations between Perceived Neighborhood Attributes and Social Environments

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Focus Area: Research

Background and Purpose

Positive attributes of the built and social neighborhood environment are associated with greater engagement in physical activity and better overall health.¹⁻³ While an extensive amount of data links the built environment to health,⁴⁻⁶ a small, but growing body of research has also linked neighborhood social environments to health through the provision of social support and cohesion.^{7,8} The recognition that social elements contribute to health reflects in one of the CDC's goals for creating healthy communities referred to as strengthening the social fabric.⁹

Despite a growing understanding of how built and social environmental factors shape health, few studies explore the interactions between these two levels of the environment,¹⁰ and how public health professionals might go about improving social environments in order to impact health. One study suggests that the physical environment drives or creates the social environment,¹¹ implying that efforts to improve health outcomes should focus on physical changes. However, much more evidence is needed to yield a clear understanding of this relationship, and more studies are warranted that examine the specific attributes that foster social connectedness. Understanding links between the physical and social environment will enable researchers to tailor structural interventions that aim to create healthy communities and eliminate health disparities in diverse populations.

Objectives

The primary objective was to examine the role of neighborhood attributes on social cohesion and support from friends and family for PA.

Methods

Data for this paper were collected from January 2012 through June 2013 as part of a baseline survey with participants in a walking intervention study. The broader project occurred in a central South Carolina county (pop. 108,052) which has a single urban center (pop. 40,836) and where the median household income (\$40,542) fell well below the national and state averages (\$52,762 and \$44,587, respectively) in 2011.¹² After study enrollment, a total of 294 participants completed baseline surveys that included questions about their perceptions of both the built and social neighborhood environment. The International Physical Activity Questionnaire Environment Module was used to capture 17 items about neighborhood attributes (Table 1), each of which was rated on a 4-point agreement scale and subsequently dichotomized (see Table 1 notes).¹³ Neighborhood social cohesion was measured using the mean of five items (e.g., "This is a close-knit neighborhood").¹⁴ Neighborhood social interactions were assessed by calculating the average reported number of days in the past month that participants engaged in nine different actions with their neighbors (e.g., "waved to a neighbor").^{4,15,16} Finally, social support from family and friends for PA were measured separately using the mean of 10 items each.¹⁷ Multiple regression models using SAS PROC GLM examined associations between each of the 17 neighborhood perceptions variables with social cohesion, neighborhood interactions, and social support from family and friends for physical activity. All models controlled for gender, age, education level, and

Results



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The sample was primarily female (85.7%), African-American (66.7%), married or cohabitating (56.1%), and had at least some college education (78.9%). The mean age of participants was 49.3 (± 13.3 SD) years.

Table 1 displays the associations between each of the 17 neighborhood attributes and the 4 social outcome variables. Disagreement about safety concerns from traffic and crime, and agreement with both the presence of active others and interesting aesthetics of the neighborhood environment were positively associated with social cohesion. Most of the neighborhood attributes within the 17 item scale were positively associated with neighborhood interactions.

The presence and maintenance of bicycle facilities, presence of active others and interesting aesthetics within the neighborhood were positively associated with social support from family. Presence of active others, interesting aesthetics within the neighborhood, bicycle facilities that were well maintained, and dense housing were associated with social support from friends.

Conclusions

These results highlight how key attributes of neighborhood environments are associated, and potentially intertwined, with the social context of such settings. Several of the attributes related to social cohesion were not associated with neighborhood interactions and friend or family social support, suggesting that separate mechanisms may explain the relationship between these different social outcomes. These data lend support for further testing of the interaction and potentially causal relationship between built environment attributes and neighborhood social environments.

Implications for Practice and Policy

Both physical and social environment variables have been shown to be related to physical activity,^{13,18,19} but few studies have examined the association between them. The observed relationship between neighborhood attributes and social environments suggests that social elements may partially or fully mediate the oft-reported association between built environments and physical activity. Thus, changing the built environment (e.g., modifying connectivity) without consideration for how the social environment is impacted may not provide an accurate estimate of subsequent changes in health outcomes and behaviors. Instead, as environmental adaptations become more commonplace in public health practice, this study supports recommendations for health interventions and policies that consider multiple levels of change at both the physical and social environmental scale.^{20,21}

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Table 1. Association of Perceived Neighborhood Attributes with Social Outcomes

IPAQ-EN Items	Social Cohesion	Neighborhood Interactions	Family Social Support	Friend Social Support
	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Accessibility				
Dwelling density ^a (primarily attached buildings)	-0.04 (0.12)	0.00 (0.64)	-0.12 (0.17)	0.38 (0.16)[†]
Destinations within walking distance from home	0.09 (0.09)	1.32 (0.47)^{††}	0.19 (0.13)	0.18 (0.12)
Access to amenities (stores)	0.07 (0.09)	1.04 (0.49)[†]	0.09 (0.13)	0.20 (0.12)
Access to transit stops	0.07 (0.09)	1.68 (0.46)^{††}	-0.03 (0.13)	0.14 (0.12)
No car within household ^b	-0.02 (0.28)	0.65 (1.50)	-0.07 (0.40)	0.16 (0.38)
Structural Support				
Presence of Sidewalks	0.05 (0.10)	1.47 (0.53)^{††}	0.02 (0.14)	0.17 (0.13)
Sidewalks are Maintained	-0.02 (0.10)	1.39 (0.54)^{††}	0.04 (0.15)	0.01 (0.14)
Presence of bicycle facilities	-0.01 (0.10)	1.19 (0.51)[†]	0.47 (0.14)^{††}	0.24 (0.13)
Facilities for Bicycling are Maintained	0.07 (0.10)	1.04 (0.52)[†]	0.43 (0.14)^{††}	0.30 (0.13)[†]
Presence of low cost recreation	0.05 (0.09)	1.13 (0.49)[†]	0.22 (0.13)	0.14 (0.12)
High street connectivity	0.01 (0.11)	1.34 (0.59)[†]	0.21 (0.16)	0.07 (0.15)
Safety^c				
Crime in day prevents walking	0.47 (0.11)^{††}	-0.17 (0.62)	-0.16 (0.16)	0.00 (0.15)
Crime at night prevents walking	0.37 (0.09)^{††}	-0.18 (0.48)	0.03 (0.13)	0.15 (0.12)
Traffic is a barrier to walking	0.26 (0.09)^{††}	-0.40 (0.49)	0.06 (0.13)	0.01 (0.12)
Traffic is a barrier to bicycling	0.08 (0.09)	-0.21 (0.48)	0.09 (0.13)	0.10 (0.12)
Cues/Motivators				
Presence of active others	0.34 (0.08)^{††}	1.03 (0.46)[†]	0.29 (0.12)[†]	0.29 (0.12)^{††}
Aesthetics of neighborhood	0.20 (0.09)[†]	1.10 (.049)[†]	0.26 (0.13)[†]	0.31 (0.12)^{††}

Reference Categories: a) Lived in neighborhoods with primarily detached housing, b) Did possess one or more vehicles c) Safety items have been reverse coded so that agreement with statement is the reference.

For all other items disagreement with statement is reference.

† Indicates $p \leq 0.05$, †† Indicates $p \leq 0.01$.



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(50) Development of a Survey Instrument for Measuring Organizational Member Involvement in Physical Activity Coalitions Throughout the United States

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Focus Area: Research

Background and Purpose

Coalitions are often comprised of organizations such as government agencies, for-profit corporations, and non-profit organizations. Member involvement is thought to be associated with a coalition's level of success. No instrument currently exists for evaluating organizational member involvement in physical activity coalitions. The purpose of this study was to develop a survey instrument for evaluating organizational member involvement in PA coalitions. The study was carried out in three distinct phases: 1.) Developing a draft survey; 2.) Assessing the content validity of the draft survey; and 3.) Assessing the underlying factor structure, reliability, and validity of the survey.

Objectives

Develop and test the psychometric properties of a survey instrument measuring organizational member involvement in PA coalitions.

Methods

A cross-sectional design was employed over the three phases of this study. In phase one, a team of individuals with expertise in survey development produced a draft survey based on results from a previously conducted qualitative study of a PA coalition. In phase two, the content validity of the draft survey was evaluated by a panel of individuals with expertise in physical activity coalitions and instrument development. In phase three, the survey was administered to 120 individuals representing the interests of organizational members on local-, state, and national-level physical activity coalitions across the United States. Responses from those 120 individuals were subjected to an exploratory factor analysis where the underlying factor structure for the survey and its internal consistency reliability and construct validity were determined.

Results

The result from phases one and two was a survey instrument with demonstrated content validity for measuring organizational member involvement in PA coalitions. The exploratory factor analysis conducted in phase three yielded a three-factor model with the following subscales: Strategic Alignment, Organizational Alignment, and Providing Input. Each subscale demonstrated high internal consistency reliability as follows: Strategic Alignment (Cronbach's alpha = 0.94); Organizational Alignment (Cronbach's alpha = 0.83); and Providing Input (Cronbach's alpha = 0.88). Each subscale also demonstrated construct validity.

Conclusions

The survey instrument developed in this study demonstrated sound psychometric properties and provides new insight into organizational member involvement in PA coalitions. This survey instrument may be an important tool in developing a more complete picture of coalition functioning in PA coalitions specifically, and health-based coalitions overall.



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Implications for Practice and Policy

Practitioners working with or on PA coalitions can use the instrument developed in this study to better evaluate and improve effectiveness of those coalitions. Given that many PA coalitions are focused on policy change, improving their effectiveness will likely yield meaningful policy change.

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Table 1. Means, Standard Deviations, Eigenvalues and Factor Loadings for Retained Items from the MIPAC survey.

			Factor		
			Strategic Alignment	Providing Input	Organizational Alignment
Eigenvalues			7.81	1.65	1.11
% of Variance			73.04	15.42	10.43
Cumulative %			73.04	88.46	98.89
Item	Mean	SD	Factor Loadings		
The strategic interests of my organization align with the purpose of this coalition.	4.47	0.79	0.53	0.09	0.11
The organization I represent and this coalition are trying to achieve the same things.	4.37	0.76	0.78	0.02	-0.01
My organization's mission aligns with the vision of this coalition.	4.35	0.71	0.82	0.07	0.03
My organization is a member of this coalition because we are working to achieve the same objectives.	4.44	0.68	0.81	0.11	-0.02
My organization and this coalition are working to achieve similar goals.	4.41	0.72	0.86	0.05	0.01
My organization and this coalition share a similar vision.	4.31	0.71	0.99	-0.08	-0.07
The mission of my organization lines up with the mission of this coalition.	4.30	0.73	0.80	-0.06	0.19
My organization has been able to do things more efficiently as the result of working with other organizations that are members of this coalition.	3.90	0.81	0.27	-0.01	0.44
Being a member of this coalition has allowed my organization to strengthen existing relationships with other organizations.	4.15	0.70	0.02	0.19	0.72
Being a member of this coalition has allowed my organization to build important new relationships with other organizations.	4.13	0.76	0.07	0.04	0.81
Working with the other organizations that are on this coalition has been beneficial to my organization.	4.21	0.68	0.20	0.10	0.75
My organization is a member of this coalition because the coalition has other well-respected organizations as members.	3.70	0.89	-0.01	0.19	0.58
My organization provides knowledge to this coalition.	4.34	0.73	0.13	0.76	-0.03
This coalition benefits from my organization's	4.38	0.72	-0.05	0.82	0.10



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expertise.					
My organization has expertise that is useful for this coalition.	4.49	0.60	-0.01	0.92	-0.06
My organization has skills that benefit this coalition's activities.	4.41	0.66	0.04	0.78	-0.08

Table 2. Internal Consistency Reliability, and Validity Assessment for the MIPAC survey's three subscales.

Factor	Correlations					
	Alpha	Strategic Alignment	Organizational Alignment	Providing Input	Satisfaction with the Coalition	Coalition Outcome Efficacy
Strategic Alignment	0.94	1			0.48*	0.61*
Organizational Alignment	0.83	0.60*	1		0.58*	0.59*
Providing Input	0.88	0.53*	0.58*	1	0.32**	0.41*

*p <.0001

** p<.0005



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(51) Collaborative Research as a Basis for Comprehensive Obesity Prevention Strategies for Latino Middle-School Children

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Focus Area: Practice/Policy

Background and Purpose

Interventions that address the physical, social, and environmental influences on physical activity and diet are needed to help reduce health disparities in Latino youth. However, there is often a lack of understanding among researchers about how to tailor interventions so that they are successful in these communities. Collaborative partnerships between academic researchers and community organizations can bridge this gap. This presentation will describe and highlight lessons learned from the translation of collaborative health research into an ongoing intervention to promote healthy nutrition, physical activity, and engagement in environmental change among Latino middle-school children. The Healthy Activities Partnership Program for Youth (HAPPY 2) is a community-academic partnership between the United Community Center (UCC) and the University of Wisconsin-Madison Environmental Design Laboratory. The UCC is a comprehensive social service agency invested in the health and well-being of the Latino community in Milwaukee (WI) and the Environmental Design Laboratory is a UW-Madison research lab whose focus is on community planning and design, active living, and participatory design.

Description

The HAPPY 2 intervention seeks to improve healthy eating and physical activity habits among Latino children (ages 10-14) through a comprehensive program targeting nutrition education, physical activity, media literacy and neighborhood change. The intervention was developed based on results from a collaborative pilot study (HAPPY 1) that examined individual, social, and environmental barriers to physical activity and healthy eating among Latino children enrolled in UCC's Bruce-Guadalupe Community School (BGCS).

Results indicated that there was a strong need for a multilevel intervention. The percentage of overweight or obese middle-school children (n=190) in the pilot study was 52%, significantly higher than the national average (39% for Latinos age 2-19). The study found that higher body-mass index (BMI) values were associated with higher sugar intake (as percentage of total calories) including higher consumption of sugary beverages. The built environment played a role in the outcomes as well; children living on streets with higher traffic counts had higher BMI than those living on quieter streets. Despite the availability of fresh-food alternatives, almost all food trips made by children in the qualitative study (n=32) were to corner and convenience stores. In interviews, the children explained the importance of snack foods for socializing with their families and friends. Children in the study whose parents paid more attention to their children's diet and physical activity had lower BMI values, indicating that family support for health and fitness is a crucial component of a successful intervention program.

UCC and the UW-Madison Environmental Design Lab worked together to develop a comprehensive, context-specific and culturally-appropriate intervention that addressed these results. The intervention consists of three components: enhanced physical activity curriculum, school and home-based nutrition education and a media literacy/neighborhood environmental assessment class. The components are designed to take into account the contextual and cultural factors shaping health behaviors by improving (1) individual knowledge, skill and self-efficacy, (2) peer and family support, (3) media literacy, and (4) neighborhood support.



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Lessons Learned

The process of forming a stable community-academic partnership takes time, work, and resources, and success hinges on the equal involvement of all parties during all phases of the research, implementation and evaluation. Successful interventions are built on research results (both quantitative and qualitative) that are analyzed and interpreted by both sides of the partnership. The HAPPY 2 intervention at BGCS is currently underway and confidence in its positive impact is high. Based on results from the research phase, the partnership was able to combine evidence-based nutrition and physical activity programs with a novel built environment and media literacy curriculum under development by the Environmental Design Lab.

Conclusions and Implications

Partnerships between community-based organizations and academic researchers have the potential to significantly increase the success of physical activity and healthy eating interventions for children. The HAPPY 2 intervention translates community-based knowledge and research results into informed and evidence-based interventions. This knowledge can then be scaled up in order to develop comprehensive and context-specific interventions in other Latino communities in the region and around the country.

Next Steps

The HAPPY 2 project will continue for two more years with successive grades of middle-school students. Findings will be disseminated through presentations, publications, and state and local education policy makers. Lessons learned from all three of the interventions will be incorporated into a HAPPY workbook that will serve as a blueprint for duplicating the project at other Latino community schools.

Support / Funding Source

HAPPY 1: 2010 Wisconsin Partnership Program (WPP); Partnership Education and Research Committee; University of Wisconsin School of Medicine and Public Health (PI: Aaron Carrol, MD and David Allen, MD)

HAPPY 2: 2012 Wisconsin Partnership Program (WPP); Community-Academic Partnership Implementation Grant; University of Wisconsin School of Medicine and Public Health (PI: Samuel F Dennis Jr, PhD, Community Partner: Al Castro, United Community Center).



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(52) **The Mid-South Regional Greenprint Health Impact Assessment: Collaboratively Translating Public Health Evidence into Recommendations for Green Infrastructure Planning in the Memphis, TN Region**

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Focus Area: Practice/Policy

Background and Purpose

In November 2011, the U.S. Department of Housing and Urban Development awarded Shelby County Government a Sustainable Communities Regional Planning Grant to develop a Mid-South Regional Greenprint & Sustainability Plan that covers the region centered around Memphis, TN. This plan is designed to enhance regional livability and sustainability by establishing a unified vision for a regional network of green spaces. As part of this planning process, the Georgia Health Policy Center was hired as a consultant to develop a Health Impact Assessment (HIA) that systematically incorporates an evidence-based health perspective into the regional planning process.

As the body of research connecting elements of the built environment to physical activity (and other dimensions of health and wellbeing) has grown over the last decade, HIA has emerged as an increasingly popular tool for informing decision-makers (and communities) about these connections in an actionable way. The Greenprint HIA offers an excellent example of using this tool to translate data and research into evidence-based recommendations to help decision-makers capitalize on the potential health benefits of a regional sustainability plan.

The Greenprint Plan activities are advanced by the Consortium—a volunteer group of individuals and organizations who support the plan's development and seeks to achieve strong representation from across the region, particularly from minority, low-income, rural, and traditionally underrepresented communities and residents. The Consortium includes representatives from each of the three states (Tennessee, Mississippi and Arkansas), all counties and incorporated communities within the region, and interested public agencies, planning organizations, nonprofit organizations, businesses, and citizen groups. The Consortium is organized into eight Working Groups, each focused on a specific dimension of the plan. Though the Community Health and Wellness Working Group is the only one with a stated focus on health, part of the HIA process was emphasizing that health is a concept that permeates the activities of all groups.

The purpose of this presentation is to describe how the HIA (which will be completed in early 2014) acted as a means for pulling together input from all eight Working Groups in order to develop strategies to enhance the potential health benefits of the Greenprint Plan.

Description

This presentation will cover the two major outputs of the Greenprint HIA process and how each contributed to the content of the final plan and the capacity of local stakeholders to incorporate evidence-based health perspectives into its ongoing implementation.

The first component of this work was the development of an HIA report intended to guide the Consortium toward a better understanding of the health implications of their vision for green infrastructure in the region. This work began with a preliminary report of baseline conditions in the region relevant not only to health outcomes, but also to a variety health determinants that would be impacted by the strategic



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directions developed by each Working Group. This preliminary report served as the data-focused conversation starter to engage champions from among the non-health sector stakeholders (e.g. transportation, parks and recreation, planning, economic development, etc.) as the process moved into the complete HIA, which focused on developing recommendations for specific actions to be included in the Greenprint Plan.

The second component of the HIA process was the development of an HIA toolkit to be used by consortium members and the public in future examination of potential health impacts from greenway, trail, and green infrastructure projects. The toolkit is based on evidence, reports, impact tables, and baseline conditions developed as part of the HIA report and translated for ease of use by non-health experts. By applying the tool, users will be able to assemble a rapid HIA for their given project relatively quickly and be well equipped to determine if further, more comprehensive HIA may be warranted. In this sense, the tool will serve a dual purpose of allowing for streamlined HIA of a variety of projects as well as a screening tool to identify projects that would benefit from more in depth examination from a public health perspective.

Lessons Learned

This work has demonstrated the need for the packaging of health-focused information in a way that is relevant and timely for decision-making processes controlled by non-health actors. Even within a collaborative project that set out to have an interdisciplinary focus from the start, challenges still arise in tailoring information from one sector (e.g. health) to an audience from another (e.g. workforce development).

Conclusions and Implications

HIA is a useful process for accomplishing the integration of health into non-health decision-making processes, but the practice needs to remain flexible and adaptable to the conditions within a given community or for a specific project.

Next Steps

Following the release of the Greenprint HIA report and toolkit, the implementation of projects that stem from the Greenprint Plan will be driven by a vision informed by health through the initial HIA work, and the toolkit will provide community stakeholders further means to ensure that this healthy vision is realized in these projects.

Support / Funding Source

This work was made possible by a US Department of Housing and Urban Development Sustainable Communities Regional Planning Grant.



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(53) Examining Environmental Supports for Physical Activity among Mexican-origin Women in Two Geographic Contexts

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Focus Area: Research

Background and Purpose

Epidemiological data and research findings indicate Mexican-Americans have higher rates of obesity, diabetes, and other chronic illnesses and are more sedentary than the general population. To date most physical activity (PA) research has focused on individual level correlates of PA. However, there is an increased recognition of the influence of the physical environment on PA behaviors. Understanding how environmental factors impact health and behavior is necessary in order to design and implement appropriate health interventions for diverse Latino populations.

Objectives

This study examines the relationship between self-reported PA and perceptions of environmental support for PA among Mexican-origin women in two diverse geographic contexts, the Texas (TX) Lower Rio Grande Valley and the South Carolina (SC) Midlands.

Methods

Adjusted regression modeling to evaluate the relationship between geographic context (TX vs. SC) and self-reported PA (International Physical Activity Questions Short Form) and the built environment (Environmental Supports for Physical Activity (ESPA) Questionnaire). The sample included 118 Mexican-origin women aged 19 to 56 years (mean 34.4 years; 59 in each state). The majority of participants had less than a high school diploma, a monthly family income between \$1,000 and \$1,500, and no health insurance.

Results

The analyses revealed significant differences in levels of physical activity and perceptions of environmental supports between Latina women in SC and TX. TX participants reported significantly less MET-minutes per week of moderate intensity PA and walking PA than SC ($p < .05$). No differences were observed in vigorous PA. TX participants reported on average significantly lower ESPA than SC ($p < .05$). Specific neighborhood characteristics that were significantly different by site included access to shopping and a transit stop within easy walking distance from home (SC > TX, $p < .001$) and the presence of free and low cost recreation facilities (TX > SC, $p < .001$).

Conclusions

Our findings indicate that characteristics of the built environment may explain observed differences in levels of PA by geographic context.

Implications for Practice and Policy

PA levels are higher in areas with public transportation and walking destinations, such as stores. Policies that promote the development of walkable communities may impact PA levels. In addition, culturally relevant strategies that enhance access, increase programmatic opportunities, and promote utilization of recreation facilities are needed to promote PA among underserved Latinas.



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Support / Funding Source

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(54) Using Assessment to Build Community Partnerships and Promote Active Living at Schools and Worksites: Evaluation Results from the Healthy Living Alliance

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Focus Area: Practice/Policy

Background and Purpose

Schools and worksites are common venues for delivering interventions aimed at increasing active living and healthy eating. They provide access to large segments of the population and the possibility of leveraging existing resources to improve access to healthy environments. Assessment has played a central role in the development and evaluation of these programs. For example, health risk and needs assessments have traditionally been used to develop targeted interventions for employees. Assessments of individual behavior and obesity have been used to evaluate the effectiveness of programs. More recently, environmental assessments have been used to gauge the level of social-ecological support for physical activity and healthy eating. However the role of assessment in building community partnerships and developing environmental and policy-based interventions is less well understood. The purpose of this study is to present evaluation results from the Healthy Living Alliance (HLA) which used the Community Healthy Living Index (CHLI) to build community partnerships and develop targeted interventions at six worksites and six elementary schools in Missouri.

Description

HLA was established in 2011 to increase physical activity, improve access to healthy food options and reduce tobacco use through enhanced collaboration between community partners. A key component during the initial two year period was HLA's use of the CHLI. The CHLI is a validated tool that brings together stakeholders to assess current support for healthy living, identify needs, and plan for improvement. It provides an overall score and subscale scores related to active living, healthy eating and general wellness support. School and worksite specific versions are available. HLA staff administered baseline CHLI assessments at 12 work and school sites. Results from these assessments were then used to: (1) engage stakeholders in developing site-specific improvement plans and (2) form connections with existing community partners that had the expertise and resources needed to help implement the improvement plans. Follow-up CHLI assessments were administered one-year later to examine changes at the sites. The evaluation also included cross-sectional surveys of employees and students were used to examine physical activity, healthy eating, and attitudes. Key informant interviews were used to gather qualitative information from sites and partners. The process evaluation for HLA combined information from the CHLI assessments with program implementation data to examine the development of partnerships, the fidelity of site-improvement activities related to identified needs and program reach.

Lessons Learned

Baseline CHLI assessments revealed variation in the level of support for active living and healthy eating across sites. However opportunities to enhance physical activity (e.g. policies to support flex time for activity) were lowest among worksites (median score 9.4%) and the environment for physical activity was lowest for school sites (median score 27.7%). Healthy eating opportunities and environments were also relatively low at both work sites and school sites. At each site, from three to eight obesity prevention and tobacco control activities were undertaken. These activities depended on both site needs and level of engagement. The majority of the activities (77%) were focused on physical activity and nutrition. The rest addressed tobacco or other concerns. Improvement activities involved changes to the built environment, developing policies and providing access to quality programming. Across the sites, 72% of the activities were aligned with needs identified in the CHLI assessment. HLA's activities reached approximately 1,256



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people during the first year. Follow-up CHLI assessments revealed overall improvement in environmental and policy support across work and school sites. However improvement in specific subscales was not consistent across all sites. Possible explanations for this finding include: (1) improvement would not be expected in cases where intervention plans did not target areas tapped a specific subscale; (2) the process of assessment and developing improvement plans could impact stakeholder's awareness and reporting on the assessment; and (3) random variation due to varied respondents, etc. In terms of building partnerships, HLA grew from the brainchild of three founding organizations into a network of more than 30 partners including non-profit, business, academic, government, and health-care partners. The majority of partners (>60%) were directly involved in improvement activities at sites.

Conclusions and Implications

Quantitative and qualitative data from this evaluation showed the CHLI assessment to be a useful tool for engaging sites, developing targeted improvement plans and building partnerships to enhance healthy living. Results also suggest it may be a useful tool for evaluating initial outcomes.

Next Steps

HLA's mission has evolved over the initial two-year period and is now more focused on community transformation than site-level interventions. However the CHLI assessment played an integral role in helping the Alliance to build partnerships and assess the community needs that are being targeted during the next steps of community transformation. Additionally some partners have requested to expand the use of the CHLI to additional sites. Community based participatory research projects and active living interventions aimed at developing community partnerships may be informed by the results of this case study.

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Support / Funding Source

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(55) The Built Environment and Walking Over the Adult Life Course: Results from 22 years of Follow-up in a Prospective Cohort of Female Adults

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Focus Area: Research

Background and Purpose

Research on the built environment and physical activity over the last decade is not entirely consistent. A recent review of the literature on the built environment and physical activity demonstrated that most studies were cross-sectional, and findings across studies varied widely (Durand et al. 2011). Heterogeneity of findings across studies may be due to the fact that the effect of the built environment on physical activity varies across the life course.

Objectives

We aimed to investigate whether the relationship between the built environment and walking differed across the life course of participants in a prospective cohort study.

Methods

We used 1986-2008 data from the Nurses' Health Study, a US-based nationwide prospective cohort of adult female nurses. Using Census and geographic information systems (GIS) data, we created measures of residential density, business counts (as a proxy for land use mix), and intersection counts (as a proxy for street connectivity) based on 1200m line-based buffers around the participant mailing address at each biennial questionnaire. Self-reported walking (converted to metabolic equivalent hours per week (MET hrs/wk)) was asked on each questionnaire. We ran repeated cross-sectional linear regression analyses at each questionnaire period on the relationship between built environment measures and walking. Built environment measures were categorized by quintile to allow for non-linear or threshold effects. Potential confounders included in analyses were age, race, smoking status and pack-years smoked, marital status, participant's highest degree earned, husband's highest degree earned, census tract median home value, and census tract median income.

Results

Participants were 40-65 years old at baseline. The relationship between built environment measures and walking varied widely over follow-up. For example, in 1986 individuals in the highest quintile of intersection counts walked on average 0.21 MET hrs/wk less (95% CI -0.42, -0.01) than those in the lowest quintile after full adjustment for potential confounders. In 2002, the individuals in the highest quintile of intersection counts walked 12.75 MET hrs/wk more (95% CI 5.70, 19.81) than those in the lowest quintile. In 1990 individuals in the highest quintile of business counts walked on average 0.62 MET hrs/wk less (95% CI -1.04, -0.20) than those in the lowest quintile in fully adjusted models. In 2006, the individuals in the highest quintile of business counts walked 0.54 MET hrs/wk more (95% CI 0.10, 0.99) than those in the lowest quintile. In 1988 individuals in the highest quintile of population density walked on average 0.44 MET hrs/wk less (95% CI -0.66, -0.22) than those in the lowest quintile after full adjustment for potential confounders. In 2006, the individuals in the highest quintile of population density walked 0.47 MET hrs/wk more (95% CI 0.01, 0.92) than those in the lowest quintile.

Conclusions

In this prospective cohort of female adult nurses, the relationship between the built environment and walking varied widely over follow-up, with effect sizes growing stronger and more positive with changes in calendar time. This demonstrates that over time, the effect of the built environment on physical activity



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behaviors may change. Longitudinal studies are necessary to estimate the cumulative effects of the built environment on physical activity over the life course.

Implications for Practice and Policy

Further research is needed to estimate the cumulative effect of the built environment on behaviors over the life course. Additionally, policies should be crafted to optimize health benefits to populations at all age ranges.

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Support / Funding Source

This research was supported by the Harvard NHLBI Cardiovascular Epidemiology Training Grant T32 HL 098048 and NIH Grants P01 CA87969 and R01 ES017017.



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(56) **Developing and Sustaining a Community-Based Safety Net Fitness Program for Low-Income, Urban Residents**

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Focus Area: Research

Background and Purpose

Adults who reside in low-income, inner-city communities are less likely to meet the recommended guidelines of 150 minutes of moderate to vigorous physical activity (PA)/week. Factors associated with physical inactivity among the urban poor include sex, age, physical, psychosocial and environmental context (e.g. built environment). The odds of the urban poor becoming physically inactive are higher for female and older adults and for those with a higher BMI, poor self-rated health, lower self-efficacy for PA and those who do not use an exercise facility for PA participation.

Exercise deserts can be characterized as urban built environments with little access to green spaces and/or affordable facilities that promote physical activity and physical fitness among poor and underserved communities. In the greater Indianapolis area, GIS mapping demonstrates the geographic correlation of high rates of obesity and poverty with limited access to affordable exercise facilities for residents with limited resources (Figure 1). Areas highlighted in red outline contain a population where more than 35% of the residents are living in poverty and more than half are obese. In order to more completely address health disparities, there is a need to provide exercise outlets to address deficiencies in the built environment in poor neighborhoods and access to affordable health-fitness professionals and exercise opportunities that can promote both physical activity and physical fitness.

In 2001, the Physically Active Residential Communities and Schools (PARCS) program was founded in collaboration with the Indianapolis Public School System (IPS), Indiana University - Purdue University, Indianapolis (IUPUI) Department of Kinesiology and a community health center-based weight management program. The PARCS program was developed primarily for community members living in identified exercise desert areas of inner city neighborhoods to create a series of safety net fitness facilities. Partnerships resulted in 3 PARCS locations (shown in Figure 1). Figure 1 also illustrates the YMCA locations serving Marion County during the time of this study. Most locations required inner city residents to travel 10 miles or more to the closest facility. Two YMCA sites were centrally located (downtown) in a higher SES area with lower obesity rates. Although the YMCA provides sliding scale income-based memberships, many still cannot afford the fees. Approximately 150, faculty supervised IUPUI Kinesiology students served as fitness instructors for course credit and professional preparation. Activities included health and fitness assessments, exercise prescriptions, exercise programming, group exercise, or personal training. Equipment was acquired through grant funding or donated. Membership fees, \$20/year, were collected by host high schools for maintenance.

Objectives

To describe a community-based exercise program for adults living in lower income urban communities and to characterize program membership.

Methods

PARCS members > age 17 who self-reported being Black or White (N=679) were invited to participate in the study. Survey data included demographics and health history, exercise self-efficacy (ESE), PA, and quality of life (QOL) measures. Physical data included anthropometrics, resting heart rate (RHR), resting blood pressure (RBP), muscular strength and endurance (MSE), cardiovascular endurance (CVE), and



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flexibility. Data from the 2010 U.S. Census were used to provide a sociodemographic context for the neighborhoods from which PARCS members were drawn. Geocoding was used to identify participating PARCS members' census tracts. Analyses were conducted using R (R Core Team, 2013). Variables were assessed for normality and heteroskedasticity.

Results

Participant (N=170) demographic, survey, and physical data are presented in Table 1. Participants had moderate levels of confidence for exercise and low levels of physical fitness per ACSM age and gender guidelines. PA scores were highest for vigorous activity and lower for leisure walking, moving, standing, and sitting. Highest QOL ratings were in social functioning and role-emotional functioning. Mean scores for both physical and mental ratings fell below the 50th percentile of the U.S. population. Comparison of US Census data indicate that members were representative of their communities.

Conclusions

This study represents the first data collected from a successful 12 year old collaboration of multiple complex systems to form a public exercise safety net system. PARCS members learned of the program from safety net health centers in IPS neighborhoods or by word-of-mouth. Data from this study document the demographic, psychological and fitness characteristics of this 'natural experiment' that created a community based program designed to serve the needs of the community. Results demonstrate a need for low-cost fitness centers for both Black and White urban poor.

Implications for Practice and Policy

Member organizations (IPS, university, community health centers) have collaborated to offer facilities to the public over time. Public schools are infrequently used to promote adult PA, Yet partners worked to generate funding, equipment, student staff, and community member support to create a program which fulfilled their mutual and self-interests. PARCS was formed and sustained during economically uncertain times, especially for IPS. The enduring commitment to community health by multiple institutions serves as a model for what is possible in other communities where goals are shared and prioritized across institutions.

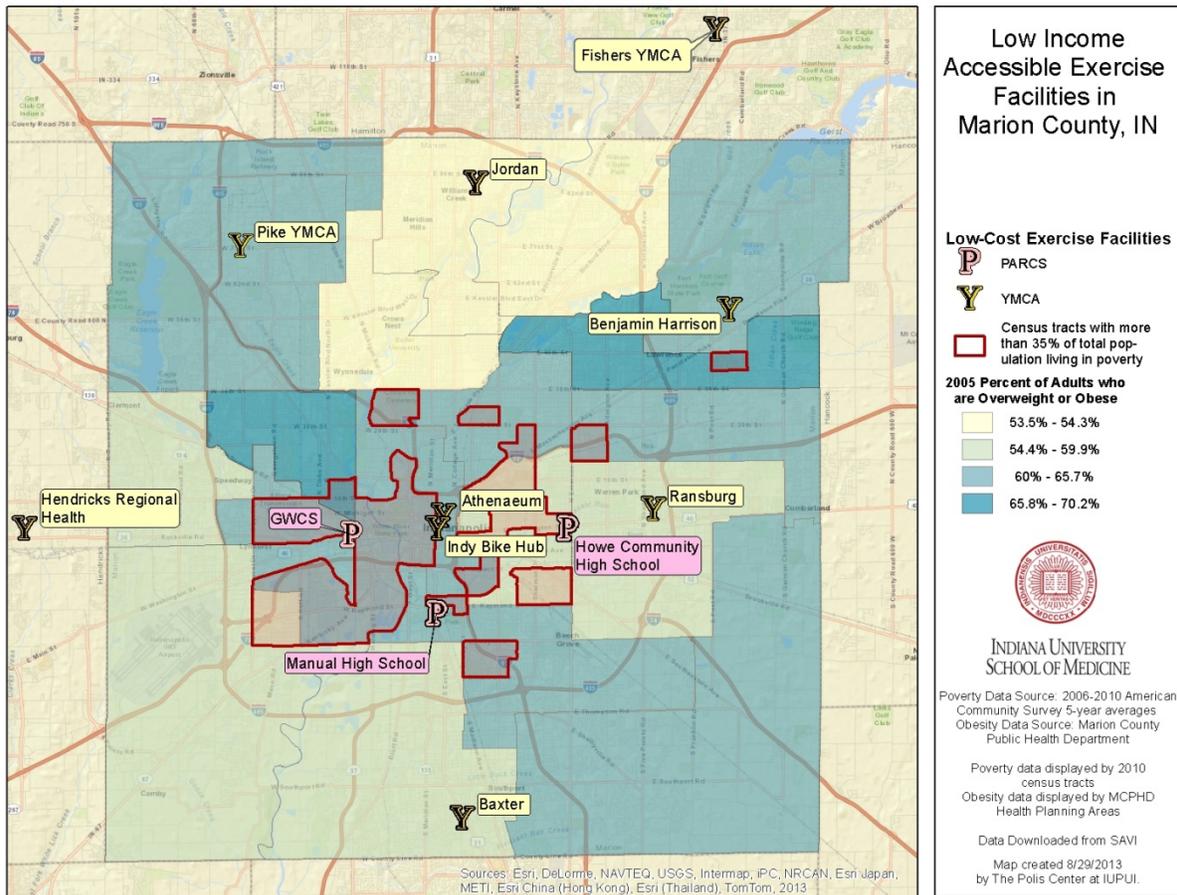
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Support / Funding Source

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Table 1: Characteristics of PARCS Participants

	PARCS Participants N=170		2010 U.S. Census Tract Data*
	N	%	
Demographic Characteristics			
Age (Mean, S.D.)	49.9	12.5	--
18-44 Years	53	31%	47.9%
45-64 Years	97	57%	32.8%
65 Years and Older	20	12%	11.1%
Gender			
Male	48	28%	48%
Female	122	72%	52%
Race			
White	57	34%	32.5%
Black	113	66%	48.8%
Marital Status			
Married	69	41%	36.3%
Widowed	13	8%	6.8%
Divorced	43	25%	14.7%
Separated	9	5%	--
Never Married	36	21%	42.5%
Education			
Without High School Diploma	13	8%	25.3%
High School Diploma Only	42	26%	36.3%
Some College or Trade School	56	34%	18.9%
Associate Degree or greater	53	32%	19.4%
Income			
<\$25,000	120	71%	40.9%
\$25,000-\$49,000	34	20%	30.6%
\$50,000-74,999	8	5%	16.0%
>\$75,000	6	4%	12.5%
Home Ownership			
Yes	69	42%	40.8%
Work Outside of the Home			
Yes	88	52%	84.9%
Number of Dependents	2.2	1.3	



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(Mean, S.D.)		
Difficulty Making Ends Meet		
Very Hard	43	25%
Hard	42	25%
Not Hard, Not Easy	0	0
Easy	81	48%
Very Easy	4	2%
Difficulty Paying Bills		
Yes	75	45%
Financial Situation in the Past Year		
Getting Better	48	29%
Staying the Same	90	54%
Getting Worse	29	17%
Financial Satisfaction		
Very Satisfied	5	3%
Somewhat Satisfied	27	16%
Neither Satisfied or Dissatisfied	46	27%
Somewhat Dissatisfied	56	33%
Very Dissatisfied	34	20%
Hopeful About Financial Situation		
Pretty Hopeful	91	54%
More or Less Hopeful	65	39%
Not Hopeful At All	11	7%
Health History		
Number of CVD Risk Factors	2.0	1.6
Psychosocial Characteristics		
Exercise Self-Efficacy (Mean, S.D.)	3.3	0.9
Yale Physical Activity Survey		
Vigorous Activity	28.9	20.7
Leisure Walking	10.5	8.26
Moving	10.7	4.54
Standing	3.7	2.85
Sitting	2.5	1.25
SF-36 Survey		
Physical Functioning	78.2	27.4
Role Physical	73.5	38.9
General Health Perception	69.2	19.8



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Mental Health Score	76.7	16.9
Vitality	62.4	19.8
Social Functioning	82.3	22.3
Role Emotional	73.4	38.9
Physical Component Score (PCS)	47.7	11.1
Mental Component Score (MCS)	51.3	9.9
<i>Physical Characteristics</i>		
BMI	35.0	7.6
Weight	96.6	22.3
<i>Fitness Characteristics</i>		
RHR	76.7	12.2
RSBP	125.8	13.0
RDBP	76.6	8.6
Partial Curl-Up	11.5	10.2
Sit-and-Reach Test	2.2	10.12
Back Scratch Test	-10.3	15.6



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(57) Physical Activity and the Built Environment: Which Characteristics Predict Behavior?

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Focus Area: Research

Background and Purpose

A challenge to improved understanding of the relationships between the built environment, physical activity and related health outcomes is a lack of studies that identify the precise geographic characteristics that affect physical activity behaviors. Common approaches used in previous studies to estimate geographic context of physical activity include defining buffers around study participants' homes or places of employment and asking participants to self-report locations of physically active behavior. An additional challenge is collecting detailed measures of the built environment across large areas, in multiple locations separated by large geographic distances, at multiple points in time. New methods using high-resolution omnidirectional imagery to assess the built environment have recently been established. Recent research by the authors found high agreement between built environment audits conducted with Street View and field audits, indicating that imagery is a reliable and potentially more efficient alternative to field audits for assessing many built environment features.

Objectives

The objective of this study was to assess the relationship between detailed built environment characteristics and observed physical activity. Built environment was assessed using both field and image-based methods. Physical activity was assessed using an objective measure (direct observation of behavior) to alleviate self-report biases.

Methods

Two hundred street segments in suburban and urban areas in Indianapolis, Indiana and St. Louis, Missouri were sampled for inclusion in this study. Segments in each city were randomly selected using a geographically stratified sampling design to ensure representation of neighborhoods with different land use and socioeconomic characteristics (race and income). Multiple teams of two research assistants in each city were trained to conduct built environment audits in the field and using Google Street View. Different teams of two observers in each city were trained to count individuals engaged in different types of physical activity (e.g., walking, running) using a reliable recording tool referred to as the Block Walk Method. Direct observation of behavior was conducted on each segment four times on varying days of the week and times of the day. Fifteen percent of streets were not audited due to safety concerns, problems identifying the specific segment in the field, or scheduling issues. The final analytical sample included 291 segments (153 in Indianapolis and 138 in St Louis) with all sources of data (i.e., field audits, imagery audits and direct observation of behavior). Segments were categorized as having a particular characteristic (e.g., sidewalk present or not present) based on field audit results and again based on image-based results. The Mann Whitney U test was used to compare median number of walkers, bikers, runners, people with a dog, and total behavior on segments with each built environment characteristics present to segments without such characteristics present. This was done for the results of the field audits as well as for the results of the image-based audits.

Results

The number of observed walkers on each street ranged from 0 – 210 (Mean = 3.7, Median =1.0). When summing across all behavior types, the total behavior on each street ranged from 0 – 219 (Mean = 5.3,



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Median = 2.0). Because the prevalence of bikers, runners, and individuals with a dog and in other activities on each segment was low (median = 0), they were not included as separate statistical analyses. However, they were included in the total physical activity behavior category. There was significantly more physical activity observed on segments with certain built environment characteristics including on segments with all non-residential land use, commercial or government buildings, schoolyards, schools, parks with exercise or sports equipment, public transportation, marked lanes, crosswalks, walk signals, sidewalks, buffers, continuous sidewalks within and between segments, and sidewalk width at least 3 feet. The results were similar for analyses of field audit with behavior and image-based audits with behavior.

Conclusions

One way to better understand how the built environment affects physical activity behavior and which characteristics are the most important predictors of behavior is to assess behavior unobtrusively and link that behavior with the characteristics of the geographic context in which it occurs. The results of the current study highlight several micro-level built environment characteristics associated with physical activity behavior.

Implications for Practice and Policy

These results are relevant to policymakers. Specifically, our results showed more physically active individuals were observed on segments with destinations (e.g., restaurants, stores, government offices, schools) than without destinations. These data provide support for policy changes in land use and transportation planning that encourage more walkable communities. Additionally, having public transit nearby (e.g., bus stops) and crosswalks, pedestrian signals and marked lanes is associated with higher counts of physically active individuals. Similarly, segments with continuous sidewalks, buffers between the street and sidewalk, and sidewalks that are at least 3 feet wide are associated with higher counts of physically active individuals. These data provide support for complete street policies and smart growth principles that make neighborhoods accessible for all modes of transportation.

Support / Funding Source

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Table 1. Total Behavior on Segments with Built Environment Characteristic Present

Built Environment characteristic	Total Behavior					
	Field-based Audits			Image-based Audits		
	Mean (SD)	Median	U (p-value)	Mean (SD)	Median	p-value
<i>Land Use</i>						
All non-residential	12.3 (24.9)	4.0	23.67 (0.00)	12.2 (24.5)	4.0	20.37 (0.00)
Commercial/ government	9.9 (28.3)	4.0	8080 (0.01)	10.7 (29.7)	4.0	5960.00 (0.00)
Schools	9.5 (8.8)	6.0	1306.00 (0.00)	7.8 (7.2)	7.0	1207.00 (0.01)
Parks	28.2 (67.2)	7.5	762.50 (0.00)	8.4 (5.0)	8.0	306.00 (0.02)
Single-family homes	3.3 (4.5)	1.5	5519.00 (0.00)	3.4 (4.6)	2.0	3857.50 (0.00)
<i>Public Transportation</i>						
Transit	18.3 (42.1)	6.5	2762.50 (0.00)	16.4 (46.0)	5.0	2052.00 (0.02)
<i>Street Characteristics</i>						
Median/Island	5.3 (5.9)	4.5	1524.50 (0.24)	9.7 (10.7)	6.0	867.50 (0.01)
Crosswalk	14.7 (36.8)	5.0	4233.00 (0.00)	17.4 (41.1)	6.0	2756.00 (0.00)
Traffic calming device	4.9 (5.1)	4.0	1966.00 (0.49)	4.2 (3.4)	5.5	744.00 (0.59)
Walk signal	24.8 (54.1)	6.0	1818.00 (0.00)	24.1 (50.2)	7.0	1227.00 (0.00)
Speed limited posted	7.0 (23.5)	3.0	9382.00 (0.11)	3.9 (3.5)	6.0	1378.00 (0.54)
Marked lanes	8.6 (26.2)	3.0	9061.50 (0.01)	9.3 (26.6)	4.0	7003.50 (0.00)
<i>Quality of Environment</i>						
Commercial building adjacent	11.0 (30.3)	3.5	7180.50 (0.01)	10.7 (29.4)	4.0	5831.50 (0.00)
Graffiti	6.7 (5.2)	6.0	3364.50 (0.00)	7.7 (6.4)	6.0	665.00 (0.01)
Litter	6.6 (6.2)	5.0	25.37 (0.00)	4.8 (4.9)	4.0	4.36 (0.11)
<i>Sidewalk Characteristics</i>						
Sidewalks	6.9 (18.0)	4.0	6649.00 (0.00)	7.0 (19.3)	4.0	5666.50 (0.00)
Sidewalk buffer	6.8 (18.5)	4.0	8057.50 (0.00)	5.8 (12.4)	3.5	9366.50 (0.00)
Sidewalk continuous within segment	7.4 (18.8)	4.0	6484.00 (0.00)	7.6 (20.4)	4.0	5755.50 (0.00)
Sidewalk continuous between segments	7.8 (19.4)	4.0	6708.00 (0.00)	7.8 (20.1)	4.0	5848.00 (0.00)
Sidewalk width 3 feet	2.6 (3.7)	1.0	6789.00 (0.02)	6.0 (4.8)	5.0	4118.00 (0.00)
<i>Shoulder Characteristics</i>						
Bike sign	13.4(11.0)	11.0	773.00 (0.00)	13.0 (12.1)	6.0	147.00 (0.04)



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(58) Environment Moderates the Relationship between Momentary Affective and Physical Feeling States and Physical Activity

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Focus Area: Research

Background and Purpose

There are a growing number of studies investigating the relationship between affective and physical feeling states and physical activity level in people's everyday lives. Preliminary evidence suggests that mood and feelings of energy and fatigue predict adults' subsequent activity level, and higher activity level also elevates subsequent mood and feelings of energy. However, little is known about how environmental factors might moderate the moment-to-moment bi-directional associations of affective and physical feeling states with physical activity level. A real-time data capture approach may help us to better understand the dynamic interplay among people's feelings, behaviors, and their immediate environments.

Objectives

The current study used Ecological Momentary Assessment (EMA) with mobile phones to explore how physical contexts, type of social company, and perceived environmental features may moderate the relationship between adults' current affective and feeling states and the prior and subsequent physical activity levels.

Methods

Adults (N=110) of a diverse sample (ages 27-73, 73% female, 30% Hispanic, 62% overweight/obese, 27% had annual household income \leq \$30,000) received and answered electronic surveys through mobile phones at random intervals throughout the day for four monitoring days. Questions about current positive affect, negative affect, tiredness, and energy level were asked up to four times each day. Participants also reported current physical context (Home [Indoors], Home [Outdoor], Outdoor [Park], Outdoor [Other], Other), social company (Alone, Spouse, Children, Friends, Others), and perceived environmental features (vegetation, safety, traffic, and litter) on each EMA survey. Physical activity level was measured by an accelerometer (Actigraph GT2M), which was worn by participants during the entire EMA monitoring period. Minutes spent in moderate-to-vigorous physical activity (MVPA) were calculated from accelerometer's activity count (>2020 counts per minute) for the 15 minutes before and after the electronic EMA survey questions were answered. Multilevel models were fit using prompt-level affect/physical feeling state as the predictors to predict (1) number of minutes spent in MVPA within 15 minutes before the prompt, and (2) number of minutes spent in MVPA within 15 minutes after the prompt, controlling for the person-level average affect/physical feeling. Physical context, social company, and perceived environmental features were entered as interaction terms to examine the moderation effects.

Results

Physical context moderated the effects of energy level on subsequent MVPA ($F=3.76$, $p=.005$) and the effects of MVPA on subsequent energy level ($F=5.90$, $p<.001$). Specifically, compared to other locations, feeling more energetic relative to one's usual (average) level led to higher subsequent MVPA when at home outdoors ($\beta=.67$, $p=.005$). Also, compared to other locations, performing more MVPA led to feeling more energetic relative to one's usual level when at home outdoors ($\beta=1.26$, $p<.001$) and outdoors at parks ($\beta=1.03$, $p=.03$). Further, physical context moderated the effect of MVPA on subsequent negative affect ($F=3.05$, $p=.02$). Compared to other locations, performing more MVPA led to less negative affect relative to one's usual level when at home outdoors ($\beta=-1.79$, $p=.001$). In addition, being with one's spouse moderated the effect of feeling of tiredness on subsequent MVPA minutes ($F=4.21$, $p=.04$).



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Compared to not being with one's spouse, feeling more tired relative to one's usual level led to less subsequent MVPA when with one's spouse ($\beta=-.31$, $p=.04$). The perceived environmental features did not have any significant moderation effects on the affective/physical feeling states and physical activity relationship.

Conclusions

The current findings indicate that environments may moderate the momentary relationships between affective/physical feeling states and adults' physical activity levels. Being in outdoor locations at home or parks could potentially boost the positive bi-directional relationship between feeling more energetic and engaging in more MVPA. Furthermore, being in outdoor home locations also strengthens the feeling of less negative mood resulting from engaging in more MVPA. Our results also show some preliminary evidence of social context as a moderator for the effect of physical feeling state on subsequent physical activity levels. Although our finding might be limited by the small sample size, it shows a promising direction for future research on the interactions between environment and mood in predicting daily physical activity among adults.

Implications for Practice and Policy

Results from this study suggest that the relationship between mood/feeling and physical activity may differ across contexts. For example, the emotional well-being results from physical activity might be the strongest when the activity was performed at outdoors. Our findings not only support parks as an important physical context for promoting physical activity as shown in previous research, but also highlight that being outdoors at home could also be another potential key context for encouraging daily activity levels. Residential communities might consider adding some activity-friendly features within the communities so that residents could utilize outdoor places at or near their home for a more sustainable and beneficial physical activity involvement.



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(59) Policies and Environmental Strategies to Promote Physical Activity: A Survey of Iowa Communities and Worksites

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Focus Area: Practice/Policy

Background and Purpose

The Community Transformation Grant (CTG), made possible by the Affordable Care Act, is intended to prevent leading causes of death and disability through evidence-based initiatives, environmental strategies, and strengthening the health infrastructure. In Iowa, 26 counties receive CTG funding. Fifteen are rural; rural was defined as counties with a population less than 50,000. The primary disparate populations in the Iowa CTG initiative include: rural residents, those with disabilities, and lowans of lower socioeconomic status.

Physical and social environments can limit or expand the choices and resources available to individuals. Social inequalities, such as poverty, are linked to unhealthy behaviors. Targeted policy and environmental strategies have the potential to reduce disparities and make it easier for people to engage in healthy behaviors. This study examines poverty and rurality as predictors of policy and environmental strategies supportive of physical activity.

The Centers for Disease Control and Prevention (CDC) Healthy Communities Program (HCP) developed the Community Health Assessment and Group Evaluation (CHANGE) tool (www.cdc.gov/Features/CHANGEtool).

The purpose of the present study is to explore the CHANGE assessment results related to physical activity in communities and worksites, plus evaluate the influence of poverty and rural-urban differences. Results will inform future state and regional planning and technical support to promote active living.

Description

The CHANGE assessment, comprised of five sectors, was implemented in communities and local worksites. For the purposes of this study, data were obtained from the physical activity section of each of these assessments.

County rural-urban status was classified according to The White House Office of Management and Budget (OMB) classification scheme. The OMB definition designates counties as Metropolitan, Micropolitan, or Neither. Using this definition, approximately 17% of the Iowa population in 2010 was considered rural while 74% of the land area was contained in rural counties. The OMB definition is easy to use since it designates all the land and population contained within a county as either Metropolitan or Non-Metropolitan (<http://www.hrsa.gov>).

Community-level poverty rates were obtained from the American Community Survey (ACS) (www.census.gov). Poverty levels are updated annually to allow for changes in the cost of living using the Consumer Price Index (CPI).

Lessons Learned

Most of the communities and worksites implemented some of the physical activity policies and environmental changes (Table 1). The most widely adopted community policy was sidewalk compliance with the Americans with Disability Act; the most widely adopted environmental strategy was maintaining



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parks. The most widely adopted worksite policy was providing access to an offsite workout facility or subsidized membership to a fitness facility; the most widely adopted environmental strategy was providing a safe outside area for employees to walk or be physically active. Areas identified as needing attention by communities were policies requiring bike facilities and complete streets plans; for worksites improvements were needed in implementing activity breaks for long meetings and policies to promote stairwell use. Rural-urban differences were noted.

Poverty rates and community rurality significantly impacted some policy and environmental scores, including requiring sidewalks in new developments and maintaining biking routes.

Conclusions and Implications

The Iowa CTG presents a promising opportunity to prevent behaviors contributing to many of the leading causes of death and disability through enhanced policy and environmental strategies. Many preventable behaviors are determined by policy and environment characteristics (Sorenson et al., 2003), as well as social determinants (e.g., poverty, urban-rural residence). This study examined the extent to which modifiable policy and environmental strategies that can enhance physical activity have already been implemented in rural and urban Iowa communities. Not surprisingly, strategies for which there may be more local demand (e.g., maintain parks) were identified as having been enacted.

Implications of this study relate to broader issues that shape such assessments in communities and worksites. For example, subtle differences in definitions of “community” or “worksite” may create varying assessment results. In addition, community-based studies involve collecting multiple types of data from multiple sources which may add complexity to data interpretation for many communities and worksites. While this study found few differences between results for rural and urban communities, it was clear that some strategies listed in the CHANGE tool were not relevant to rural communities (e.g., encouraging stair use), and it is possible other strategies that are more relevant to rural communities were not specifically identified (e.g., improve gravel roads). Communities may need to expand the scope beyond standardized data collection tools to collect locally meaningful data.

Next Steps

The CTG presents a unique five-year opportunity to conduct ongoing assessments of community and worksite policy and environmental strategies. The results presented represent only baseline assessments; future assessments will evaluate any changes that enhance physical activity policy and environment strategies and facilitating factors. This timeframe will also permit ongoing training and technical assistance to enhance the assessment

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Support / Funding Source

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Table 1: Overall Means and Standard Deviations of Policy and Environmental Strategies to Increase Physical Activity

	<u>Policy</u>		<u>Environment</u>	
	Mean	SD	Mean	SD
Require sidewalks for new developments	3.2	1.5	3.1	1.4
Adopt a land use plan	3.9	1.4	3.5	1.5
Require bike facilities	2.0	1.1	2.2	1.1
Adopt complete streets plan	2.1	1.2	2.1	1.3
Maintain walking routes	2.6	1.3	2.5	1.3
Maintain biking routes	2.2	1.2	2.3	1.1
Maintain parks	3.8	1.3	4.1	.9
Provide access to park	3.0	1.3	3.3	1.2
Institute mixed land use	2.5	1.5	2.5	1.6
Sidewalks comply with ADA	4.0	1.1	3.9	1.1
Provide access to public rec facilities	3.6	1.3	3.7	1.2
Enhance access to public transportation	2.8	1.5	3.0	1.3
Provide street traffic calming measures	2.2	1.3	2.2	1.2
Adopt strategies to enhance safety	2.3	1.3	2.9	1.2



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(60) **Listening to their Story: Use of Photovoice and Interviews to Develop an Individual- and Advocacy-based Health Behavior Intervention among Urban-dwelling, Low-income African Americans**

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Focus Area: Practice/Policy

Background and Purpose

Many Americans live in environments promoting access to unhealthy foods, excessive eating, and physical inactivity, contributing to the nationwide rise in obesity, especially in minority and low-income populations (F as in Fat 2012). This is especially true in Ohio where 34% of African-American adults are obese compared to 29% of White adults (F as in Fat 2012). The Center for Closing the Health Gap (The Center) developed the “Do Right! campaign”—a 12-week neighborhood resident-led, household focused program designed to improve diet and physical activity levels through didactic and experiential learning opportunities, and increase resident’s self-efficacy to advocate for changes in the built environment supporting healthy behavior. The program employs the “Neighborhood Watch” block model and Health Captains recruited from the neighborhood serve as group facilitators.

Description

Twenty three neighborhood residents—not currently meeting national recommendations for nutrition and physical activity—were recruited to participate in the program. Five neighborhood residents were recruited from among eligible participants and trained to serve as Health Captains. Health Captain training included 24 hours over seven sessions and included three major phases.

During training Phase I Health Captains participated in a 1-hour focus group and discussed: (1) personal health habits (2) perceived assets/barriers for healthy behaviors in the local community (3) motivation for being a Health Captain and perceived potential impact and (4) strategies for program success.

During training Phase II Health Captains conducted a community needs assessment of the local built environment to gain knowledge of the neighborhood and inform the delivery of the behavioral intervention using Photovoice. Photovoice is a CBPR methodology based on the premise that people are experts in their own lives. It involves taking pictures and writing brief descriptions to document the realities of an environment and to identify opportunities to advocate for change. Photovoice also recommends involvement of policymakers/community leaders. A neighborhood Community Council President was recruited to participate in the activities. Health Captains were trained using standard Photovoice curriculum including: (1) aims of the project and social action plan, (2) photography training, (3) future facilitated group discussion, (4) plan for exhibition and (5) future debrief. The training lasted approximately thirty minutes. Health Captains were divided into two teams, each led by a Center staff member. Teams were assigned specific areas of the community to assess using Photovoice methodology. Teams also used validated tools to rate the quality of the environment (e.g., Recreation Facility Evaluation Tool, Sidewalk Assessment Tool, and Walkability Checklist).

During training Phase III Center staff and Health Captains synthesized information and incorporated it into program materials.



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Lessons Learned

Salient themes from the focus groups included pride in the community and a desire to engage in activities to benefit it and a sense of community among residents, including families that had resided in the area for generations. Health Captains noted a lack of infrastructure and environmental supports for healthy living (e.g., limited access to and cost of healthy food options, lack of awareness of healthy food options among residents, limited resources for physical activity). They also indicated residents wanted to engage in health-related activities but lacked appropriate support/education for doing so; a strong desire for multi-generational and family-based education programs was also noted. During the Photovoice activity, Health Captains identified contradictions to healthy community/healthy behavior (e.g., community organizations that did not interact with community members; organizations that purchased land and removed residential housing but did not “give back” to the community, leaving generations of families with no place to go). Health Captains also identified community resources previously unknown to them (e.g., service agencies; green spaces) and opportunities to advocate for additional healthy lifestyle supports. As an unintended consequence, additional interest in participation in the program was generated when community residents saw Health Captains assessing the community.

Conclusions and Implications

The community assessment enabled the Health Captains to document and express perceptions of Mt. Auburn’s current ability to support healthy living. The assessment also increased Health Captain’s knowledge of the community and confidence in delivering program materials. Findings were compiled in a resource guide with pictures and descriptions of supports and barriers to healthy living in the community. Pictures and new knowledge from the Health Captains were incorporated into the program and influenced program delivery within Health Captains. Involvement of influential community leaders in the process was key to identifying specific opportunities to advocate for supports for healthy living in the neighborhood.

The Health Captains were excited to be given tools to assess and communicate their concerns about their community. The CBPR-based community assessment including Photovoice empowered them to become more engaged in their community and will assist them in advocating for changes in their neighborhood and leading others to make healthy lifestyle changes.

Next Steps

The Do Right! campaign is currently underway. We will evaluate pre-post outcomes for Health Captains and participants. Additional focus groups will be conducted at the end of the campaign.

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Support / Funding Source

Coco Cola & The Center for Closing the Health Gap



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(61) Community-based Mini-grants are Effective in Increasing Moderate to Vigorous Physical Activity in Youth

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Focus Area: Practice/Policy

Background and Purpose

The youth of today are insufficiently physically active (Troiano et al., 2008), with few meeting recommended levels of physical activity (PA) while engaging in excessive amounts of sedentary behaviors (Moore, Beets, Morris, & Kolbe, 2012). As a result, the prevalence of overweight in children has steadily increased in the last four decades (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). There is growing interest in environmental and policy interventions which may impact childhood obesity through changes in the physical and social environments (Brownson et al., 2008). Environmental and policy approaches are designed to provide opportunities, support, and cues to help people engage in higher levels of PA. The role of community-based interventions to promote physical activity has emerged as a critical piece of an overall strategy to increase PA (Kahn et al., 2002). A review of the literature indicates a lack of research related to the efficacy of policy interventions as a whole (Brownson et al., 2008) while the effectiveness of targeted grant funding for the implementation of interventions to increase the physical activity of youth has not been examined. Since approximately 15 states use taxpayer funds to distribute community-level grants to impact PA, it is critical that we test the assumption that a policy of providing funding for targeted community grants is effective in increasing PA among youth (Fielding & Briss, 2006).

For the present study, we evaluated the effectiveness of the Eat Smart, Move More Community Grants (ESMM-CG) program. The ESMM-CG program, administered by the North Carolina Division of Public Health, has been in existence since 2000, and is funded through a combination of state and Centers for Disease Control and Prevention (CDC) cooperative agreement funds. For the present study, the grants program was slightly modified, in that the funded projects were required to focus exclusively on increasing PA in 4th – 8th grade youth.

The objective of this project was to determine the efficacy of a policy of targeted grant funding for the implementation of multilevel community interventions to increase the physical activity in a large sample of 4th – 8th grade youth from North Carolina.

Description

For the 2010-2011 cycle, the ESMM-CG program consisted of 20 separate community interventions implemented by local grantees that target increasing physical activity and/or decreasing sedentary behaviors in disadvantaged youth populations. Local partnerships applied to receive funding through the ESMM-CG program in the spring of 2010 to implement projects in their communities. With the grant funds, grantees implemented multi-level interventions in a variety of settings (e.g., schools, faith communities). Interventions were required to address multiple levels of the Social-Ecological Model for the promotion of physical activity through policy, social, and/or environmental change. Communities were pair matched and randomized to receive funding either in year one (2010) or year two (2011). Data were collected in fall 2010, 2011, and 2012. Data collected included a questionnaire to assess demographics, perceptions of the physical and social environment, physical activity, and other health behaviors. A random subsample was asked to wear an accelerometer for seven days and will serve as the focus of this report. Statistical analysis consists of a combination of univariate, bivariate, and multivariate analysis.



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Multiple regression analyses on outcome variables MVPA and Sedentary time were conducted using gender, grade (4-8), race (white, black, other), and study year as predictors. Model quality was assessed using bootstrap replication and all significant factors were significant in at least 50% of 100 bootstrap replicates ($p = 0.05$). We assessed model fit with R-square statistics and examined the impact of each predictor using adjusted mean statistics.

Lessons Learned

In years 1-3, 3790 youth participated in the accelerometer data collection, with 3634 (96%) returning the accelerometer. Of these, 3,298(87%) participants provide at least 1 day of valid activity data. Of this number, 1114 individuals had less than four valid days of wear time, leaving 2,184 (58%) individuals with accelerometer and demographic data for further analysis. At baseline, participants averaged 364 minutes of sedentary time, 210 minutes of light physical activity, and 26 minutes of MVPA per day (unadjusted). Only 1.9% of individuals averaged >60 minute of MVPA across observed days. The regression model indicated that sex ($p < 0.01$), grade ($p < 0.01$), race ($p < 0.01$), and grant funding ($p < 0.01$) were all significant predictors of MVPA. Post hoc analyses indicated no differences between counties by funding status following the first year, but funding resulted in a significant increase of 2.07 min/d of MVPA over baseline following funding across all counties adjusted for covariates. No significant differences were observed for reductions in sedentary time or the percentage of children meeting recommended levels of MVPA.

Conclusions and Implications

Low cost, high reach mini-grants can have a small but meaningful effect on children's MVPA from low-resource communities.

Next Steps

Future studies should examine characteristics of mini-grants projects that are associated with the greatest increases in MVPA among youth.

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(62) Creating Conversation around Health in Policies and Practices

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Focus Area: Practice/Policy

Background and Purpose

Healthy policies and practices are moving from niche to norm in Arizona. The need for decision making to consider health is apparent; 9.7% of households with children in Arizona find it difficult to access fresh fruits and vegetables, ranking Arizona as 25th in the country with low access; and preschoolers from low-income families has hovered around a prevalence of 14.5% from 2008 to 2011.^{1,2} Additionally, health determinants, such as poverty, affect much of the population. Arizona is ranked as number 5 in the country for highest poverty rate, with 17.4% residing 100% below the Federal Poverty Level.³ While Arizona is home to numerous healthy urban planning and transportation grassroots, most initiatives reside in the two metropolises, Phoenix and Tucson. Local initiatives and foundations are doing great work to forward health policies and practices in the urban regions; yet a collective and coordinated approach is needed to expand the reach of healthy policies and practices. Health in Policy and Practice (HIP2) was formed to integrate health into community decision making and build statewide capacity to conduct health impact assessments (HIA).

Description

In 2009, Arizona Department of Health Services (ADHS), in partnership with Maricopa County Department of Public Health, received a mini-grant to complete Arizona's first HIA. As a result, ADHS established a state leadership group, HIP2, to complete the HIA project and attend formal HIA training. Arizona's first HIA, the Tempe Modern Streetcar, was well received by both the City of Tempe and Valley Metro, and HIP2 secured additional funding from a local foundation, St. Luke's Health Initiative. In 2012, HIP2 received funding from Health Impact Project, the PEW Charitable Trust and Robert Wood Johnson Foundation to conduct two HIAs and establish an HIA program, confirming that Arizona was on the brink of change for health in policy and practice efforts. The goals of the HIP2, the HIA program, are to 1) provide education on health impact assessments and health in all policy initiatives 2) provide mentorship to external organizations looking to conduct their own HIA and 3) conduct pertinent HIAs which will influence the norm of silo-ed decision making. Partners include representation from state and local government, education, non-profit and private sector. A core HIP2 Leadership team will meet monthly, while quarterly meetings exist for a larger HIP2 Network. Both groups have statewide representatives. The group has successfully trained approximately 200 cross-sector professionals, completed two HIAs and is currently conducting two additional HIAs. The two HIAs currently underway are for transportation related projects; one is being completed in Flagstaff, AZ, for the Northern Arizona Interagency Transportation Authority. The other HIA is being conducted in Phoenix, AZ, alongside the local transit agency, Valley Metro. Methods being used for both HIAs include the creation of HIA Advisory Committees, community focus groups, key stakeholder interviews and GIS analysis.

Lessons Learned

Developing a statewide health policy and practices coalition requires resources, innovation and strong partnerships. Leveraging current resources and aligning efforts with concurrent initiatives reduces workload and establishes collective impact. Strong relationships with key partners are vital for future project opportunities and to frame healthy policy and practice as a mutual-benefit end goal. Additionally, stakeholder education on HIAs and healthy policy and decision making is an important first-step to ensure buy-in into the HIA process. Literature on effectiveness of healthy policy organizations would help guide HIP2's current programmatic efforts to guide programmatic efforts.



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Conclusions and Implications

A carefully-designed collaborative partnership has the ability to create systematic statewide change. The lessons HIP2 has learned and the model for the development of the program can provide guidance for similar efforts and to forward organizational research. Future research should center on collective impact of grassroots environmental and policy change groups, along with evaluation and monitoring strategies for HIAs and HIA programs.

Next Steps

HIP2 will continue working with Health Impact Project. In addition, their goals are to implement HIA related curriculum in higher education and establish a statewide network of HIA practitioners.

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Support / Funding Source

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(63) **Everyone Likes Green and Hates Trash: Common Perceived Pedestrian Environment Characteristics in Different Socio Economic Status Neighborhoods**

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Focus Area: Research

Background and Purpose

Socio economic status is one of the main determinants of public health, especially in the case of obesity, as it is connected to physical activity, and more specifically to recreational walking. Improving physical environment characteristics, and perceived pedestrian environment characteristics in particular, research suggests, might be the key to increasing recreational walking behavior. The purpose of this study is to identify the common pedestrian environment characteristics in different socio economic status neighborhoods for more effective short term intervention in the built environment which might increase the amount of recreational walking and help improve public health.

The importance of pedestrian environment characteristics is emphasized in the literature. For example, Frank et al. (2005) suggest that the untested environmental variables in their study (such as presence of sidewalks) could help explain the variation beyond the 10% variation in physical activity, which was explained by a composite measure including three of the objective neighborhood characteristics (land use mix, residential density, and street connectivity). Similarly, Sallis et al. (2011) argue that the macro scale variables (neighborhood characteristics) are insufficient to describe the physical activity supportiveness of a neighborhood without the micro scale variables (pedestrian environment characteristics).

Research shows that walking behavior is influenced by pedestrian environment characteristics. For example, pedestrian infrastructure (such as presence of sidewalks, crosswalks, street lights) (Saelens et al. 2003; Lin and Moudon 2009; Cervero and Kockelman 1997; Giles Corti and Donovan 2003; Kirkland et al. 2003), aesthetics (Saelens et al. 2003; Hoehner et al. 2005; Giles Corti and Donovan 2003), traffic safety (Craig et al. 2002; Saelens et al. 2003; Giles Corti and Donovan 2003), and crime safety (Kirkland et al. 2003; Saelens et al. 2003; Doyle et al. 2006) are influential on walking behavior.

Moreover, the perceived measures of pedestrian environment characteristics, which have associations with walking behavior, include perceived pedestrian infrastructure (such as presence of sidewalks, crosswalks, street lights) (Brownson et al. 2001; Kirtland et al. 2003), perceived aesthetics (Brownson et al. 2001; Humpel et al. 2004), and perceived traffic safety (Berry et al. 2010a; Kirtland et al. 2003; McGinn et al. 2007; Brownson et al. 2001).

Although the elements of objective and perceived measures are similar, there is a poor agreement between objective and perceived measures of physical environment characteristics in relation to physical activity (Kirtland et al. 2003; McCormack et al. 2008; McGinn et al. 2007; Ball et al. 2008; Gebel et al. 2011). The conflicting results in the literature for objective and perceived measures of physical environment characteristics have been identified as a major problem especially because it is unclear which measure should be used to identify the point of intervention in the physical environment – peoples' perception or objective data (Kelly et al. 2006). Recognizing that people's behavior (i.e. physical activity) will be affected by their perception of the built environment rather than the built environment itself (Rapoport 1982), interventions to improve perceived characteristics are recommended for improving health outcomes (Gebel et al. 2011).



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Objectives

The objectives are (1) to identify perceived pedestrian environment characteristics in different socio-economic status neighborhoods, (2) to search for patterns of commonalities among the best and worst perceived pedestrian environment characteristics among these neighborhoods, (2) develop recommendations across socio-economic status to improve pedestrian environment characteristics.

Methods

A questionnaire for assessing the perceived quality of pedestrian environment was developed. The questionnaire was designed to ask open ended questions identifying two best and two worst characteristics of sidewalks and streets in an area. Approximately 1300 questionnaires were administered in three sites with different socio-economic status in and around City of Los Angeles.

Results

The results show that despite the variety in income, education, age, race/ethnicity configuration, and household formation, there are patterns of similarities among best and worst characteristics of pedestrian environments in those three sites. For example cleanliness and landscaping are among the most liked characteristics, whereas trash and lack of landscaping are among the least liked characteristics in all three sites. Similarly, safety and traffic are mentioned in all three sites by the respondents.

Conclusions

Parallel to the literature a combination of pedestrian infrastructure, aesthetics, traffic safety, and crime safety is important to shape people's perception of their pedestrian environment. As it is also suggested in the literature, while neighborhood characteristics are crucial in defining the walkability of an environment, the pedestrian environment characteristics are equally important and more affordable short term solutions to improve walkability of an environment. The commonalities across different socio-economic status areas add to the rationale that improving the perceived pedestrian environment characteristics will benefit a large section of the population.

Implications for Practice and Policy

Corresponding local government agencies were presented the results of research conducted at their site responding to their requests. They are at different levels of pursuing funding for the small scale interventions included in the list of recommendations according to the findings of this research.

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(64) Development of a Physical Activity Plan Toolkit: Moving Physical Activity Research to State and Local Planning

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Focus Area: Practice/Policy

Background and Purpose

In 2010, the Physical Activity Policy Research Network (PAPRN) conducted a study to assess physical activity content in state health related plans and to make recommendations for future plan development. The study results found that most plans were lacking a physical activity focus as well as several key content areas such as needs assessment data, well written objectives data, and involvement of active living oriented groups. Most plans studied did not include sub-population targets (e.g., racially diverse or low income) or evaluation plans. During the same year of the state plan assessment, the National Physical Activity Plan (NPAP) was released, highlighting the importance of aligning physical activity objectives across the country. PAPRN took the results of the state plan study and the NPAP and created a guide to develop better physical activity plans for states and localities. The purpose of this toolkit was threefold: to provide a comprehensive resource to guide physical activity practitioners in developing a physical activity plan for their state or local area; to promote the NPAP guidelines; and to help move the research on the content of state plans to practice. The purpose of this presentation is to outline the steps of research to practice in the development and dissemination of this toolkit.

Description

The Physical Activity Plan Toolkit contains two main parts: the guide and the template. The guide is broken down into six steps: build a coalition; conduct a community assessment; develop goals and objectives; select evidence-based intervention strategies; create an evaluation plan; write the plan. These steps provide a clear path for practitioners to follow when creating a physical activity plan for their area and are based on the results from the aforementioned study. Each step contains a description of the content area, followed by a wealth of resources for deeper study. In addition, The National Physical Activity Plan's recommended strategies from the eight sectors are included: public health; health care; education; transportation, land use and community design; parks, recreation, fitness and sports; business and industry; volunteer and non-profit organizations; and mass media. The guide encourages practitioners to tailor the NPAP's strategies for their area.

The template was created at the request of physical activity practitioners. The template provides a starting point for practitioners and includes a layout and framework for a physical activity plan based on the six steps outlined in the guide. The template is highly adaptable and contains fill in the blank sections, optional wording and ideas for tables, graphs and photos.

Lessons Learned

First involving physical activity practitioners in the planning and development of a practice oriented toolkit is crucial to making it practical and useful. Their help and guidance helped tailor many aspects of the project, including effective dissemination. Also, we found that few of the state plans reviewed were reflective of a multi-disciplinary approach to physical activity (e.g., inclusion of land use/planning, transportation, and park/recreation representatives) therefore we included these disciplines in the toolkit to help ensure contribution in future physical activity plans. Dissemination to these groups is being planned.



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Conclusions and Implications

Physical inactivity is a complex problem that spans the nation. This toolkit and template is an example of taking research to practice and can help move the relatively new idea of a state or local stand-alone physical activity plan from niche to norm.

Next Steps

We will gather indicator data that meaningfully addresses our evaluation questions. For example, a link to a short survey will be provided when disseminating the physical activity toolkit to collect information on its applicability, usability and potential impact. We will also expand and target dissemination to a variety of transdisciplinary groups important to physical activity planning in states and communities.

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Support / Funding Source

This study was funded by the CDC's Physical Activity Policy Research Network.



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(65) Citizen Scientists Crowd-source Built Environment Data Using Innovative Technology to Advocate for Improvements in a Low-income Immigrant Neighborhood

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Focus Area: Practice/Policy

Background and Purpose

Racial/ethnic minorities, immigrants, and populations of low socioeconomic status are disproportionately represented among the 60 million Americans classified as obese.¹ Disadvantaged populations are often more likely to live in neighborhoods that provide little environmental support for physical activity.² Low income, immigrant Latinos report lower levels of activity than their non-Hispanic peers.³ Environmental and policy approaches to promote activity in these high-risk subgroups are needed.

Description

The Nuestra Voz (Our Voice) study used a multi-stage, community-embedded process to empower Latinos to: 1) “crowd-source” built environment data using the Stanford Healthy Neighborhood Discovery Tool (the Discovery Tool), 2) analyze these data collectively and identify barriers to active living, and 3) engage with community partners to improve the neighborhood environment.

The Discovery Tool is a tablet-based environmental assessment tool that uses geo-coded photos and audio narratives gathered by community residents to document features of the neighborhood that affect physical activity.

Participant characteristics and perceptions: The Nuestra Voz study was implemented in an unincorporated region of San Mateo County, California. Participants were all Latinos. Adolescent participants (N=11) were primarily male (70%), 12.1±0.88 years of age, and were all in middle school. Older adult participants (N=11) were all female, 67.91±11.31 years of age, and primarily with less than a 7th grade education (73%). At baseline, self-efficacy for using a computer tablet (1=not at all confident, 10=very confident) was perceived as lowest if participants felt they would not receive any help, mean=3.5±3.35, and highest if they could see someone else using the device before trying it themselves, mean=8.22±3.19. The most frequently perceived barrier to active living was poor lighting (59.1%). Only 15% of participants felt that by working together with others they could influence decisions that affect the community.

Crowd-sourcing Built Environment Data: Each participant gathered data once between January-June 2013. Participants were given a tutorial about how to use the Discovery Tool (5-10 minutes) and then a researcher accompanied them on a walk in their neighborhood, during which participants took pictures and recorded audio about neighborhood features they considered helped or hindered active living (20-30 minutes). Once all data had been gathered, researchers met collectively to code the data into representative elements using a previously developed coding protocol.⁴ Nine elements accounted for 80.2% of the crowd-sourced data: sidewalks, personal safety, trash, amenities/destinations, traffic volume, mobility access, crosswalk, private residence, and aesthetics. Less frequently noted elements were park/playground, street features (e.g., bike lanes), graffiti, parking, animals, traffic lights, and road safety. The 11 adolescents recorded, on average, 12.8±6.9 photo/audio combinations, 5.5±8.2 separate photos and 1.8±2.0 audios. The 11 older adults recorded, on average, 9.6±3.3 photo/audio combinations, 4.6±2.6 separate photos and 3±3.8 audio narratives.



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Determining neighborhood features to address: All participants were invited to a meeting to analyze the data and receive advocacy training. Seven older adults (64%) and 4 adolescents (34%) attended. Representative photos and audio transcripts of the identified elements were used to guide discussions. The older adults and adolescents first met separately and then together. Participants voted to determine the top three issues to address - trash, personal safety, and sidewalks - and then brainstormed potential feasible solutions. Three adolescents and 4 older adults were elected to represent the group moving forward. The elected leaders received further training and support from researchers.

Connecting with key community partners: A follow up meeting was held to connect the elected leaders with community partners who could potentially help them address identified concerns. Community partner attendees included representatives from the local waste management company, the Sheriff's Office, the Board of Supervisors, San Mateo County Health System, the Department of Public Works, a community based organization (RWC2020), a social entrepreneur, and media outlets.

Lessons Learned

With minimal training, low-income immigrant Latino adolescents and older adults can be empowered as citizen scientists to: 1) use innovative technology to gather data about features of their neighborhood environment that affect active living, 2) analyze their data and identify potential solutions, and 3) engage with public and private service providers and agencies to advocate for the development of healthier neighborhoods.

Recruitment of Latino participants for technology-related studies can be difficult. Potential benefits to participants may include learning transferable technology-related skills which may increase technology-related self-efficacy.

Conclusions and Implications

Using crowd-sourcing technologies, such as the Discovery Tool, allows members of disadvantaged communities to systematically record information about their neighborhood and disseminate these data in a way that harnesses the power of the collective human voice. Public and private decision makers are thus informed by the needs of their constituents and clients.

Next Steps

Providing advocacy and leadership training, electing participant leaders, and connecting them with community partners are strategies employed to ensure project sustainability. Building productive community relationships will require on-going commitment, so follow up meetings will be scheduled. A community resource guide is being prepared to assist community residents to connect with appropriate community partners in the future.

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Support / Funding Source

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(66) Adaptation of the Neighborhood Environment Walkability Scale (NEWS) in India

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Focus Area: Research

Background and Purpose

The prevalence of obesity is growing rapidly in low and middle-income countries (LMICs) like India. Physical inactivity has been described as a major risk factor to obesity and associated non-communicable diseases in countries of high income, and increasingly so in LMICs across the world.

Consistent studies have demonstrated associations between built environment (BE) features and physical activity (PA) levels for populations. However, most of this evidence has emerged from the developed high-income countries of North America, Australia and Europe. These findings may not generalize to other parts of the world. Evidence on the influence of the BE on PA is lacking in India. Further, the applicability of survey instruments constructed in developed countries to the local contexts in developing LMICs remains to be explored.

The Neighborhood Environment Walkability Scale (NEWS) is the most frequently used questionnaire for assessing perceived attributes of the neighborhood environment for physical activity. The International Physical Activity and Environment Network (IPEN) has used the NEWS as an instrument for evaluating cross-country analyses of BE and PA relationships. However, NEWS was developed in the USA, and its applicability to other LMICs like India may be limited due to differences in culture, context, and environmental features.

Objectives To address the applicability of existing measures, this study proposes to adapt the existing NEWS tool and tailor it to the Indian context. Urban BE's in India are distinct in terms of developmental patterns and are different from those in developed countries. Most Indian urban neighborhoods are characterized by diverse land use, infrastructure, transportation, and road patterns that may not be adequately captured by measures constructed in developed countries. Therefore, cultural adaptation of environmental measures constructed elsewhere is required as a first step before such measures can be used to adequately evaluate PA in India. The overall aim of this study is to develop a NEWS-India that can be used for research purposes throughout the Indian subcontinent.

Methods

We are currently collecting qualitative data about the physical/ built and social environment in Chennai, India, using methods such as unobtrusive field observations, structured participant and key informant interviews, mapping, and auto-ethnography. These methods will help to identify main themes related to the BE, supports and barriers to walking, biking, and transit use in Chennai.

All data is being coded and thematically analyzed using NVivo qualitative data analysis software. Comments and quotations from narrative data (interviews, field observations) are being grouped by common themes/ categories. These are organized in a hierarchical order with a primary parent node containing multiple secondary child nodes; major themes (e.g., healthy and active living) form parent nodes with sub-themes (e.g., walking, bicycling) as child nodes. Sections of visual data (photographs, maps) are also coded thematically. This analysis will enable identification of items on the NEWS that are not relevant to local environments in India and suggest equivalent, culturally appropriate items.



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Results

Emerging themes from on-going fieldwork highlight the lack of pedestrian infrastructure to support walking, particularly among women and older adults. Local residents discuss the desire to engage in everyday PA, but attribute the inability to do so to non-existent sidewalks, high volumes of unregulated vehicular traffic, and poor enforcement of traffic rules. A few long-term Chennai city residents recall engaging in outdoor recreation or leisure PA in local parks and playgrounds in the years before, but report being increasingly inactive or sedentary for leisure at present (watching TV, playing video games, sleeping, doing household chores, sitting at a desk, etc.). Reasons for this were cited as overcrowding and lack of existing opportunities or places for outdoor leisure-time PA.

Conclusions

Health-related planning recommendations for developed countries include higher density, mixed use planning, and transportation policies that favor active transport. While Indian cities are already characterized with these features, lack of regulation and enforcement of rules pose challenges to people's daily PA choices. Developing BE planning guidelines and recommendations for LMICs can play an important role in preventing obesity and non-communicable diseases.

A major goal of IPEN is to represent the worldwide variation in BE. The present study is being conducted in an understudied Asian region like India and has the potential to add to the international literature on worldwide relevance of the BE for promoting PA.

Implications for Practice and Policy

Several participants mention the need for greater collaboration among city departments and improved partnerships between the city and neighborhood associations for improvement and maintenance of pedestrian infrastructure. Overall, findings underscore the importance of a planned and structured BE as a channel to promote healthy and active living.

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(67) Physical Activity of 15-17 Year-old Adolescents in Different Educational Settings: A Polish-Czech Study

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Focus Area: Research

Background and Purpose

Physical Activity (PA) is considered a key factor for enhancing individual and public health especially during childhood and adolescence (Cox & Ullrich-French, 2010). Despite the importance of being active that is known worldwide, research has stated a continuous decrease of PA among youth in the last decades (Verloigne et al., 2012). Adolescence represents a critical point for structuring life-long behaviors (Hedman et al., 2007). Thus, schools are considered one of the most important environments for increasing PA levels and promoting healthy habits amongst adolescents (Bonell et al., 2013). Developing knowledge about the characteristics of school PA is necessary, as well as it is important to compare different educational systems. Consequently, governments could be able to enhance their national educational structure by adapting favorable features from foreign educational systems, avoiding drawbacks of their socio-economic, health and education policies.

Objectives

To analyze the levels of adolescents' school PA in two different educational settings, one in the Czech Republic and the other in Poland; and to estimate the association between meeting PA recommendations, engagement in PA and participation in organized PA.

Methods

Secondary school students (aged 15-17) from the Czech Republic (n = 786) and from Poland (n = 673) were randomly selected for the study. Detailed information of the sample is shown in table 1. Students registered to the web page indares.com (<http://www.indares.com>), an Internet application created by the research team and previously used in other research. Indares.com collects data about sport preferences, motivation towards PA, amount and type of PA, active/passive transportation, and perception of the environment. Participants filled in the required information under supervision of the research team. European Union Physical Activity Guidelines (2008) were used as a reference for PA recommendations in youth.

Results

Polish adolescents were significantly more active in the school environment than their Czech peers ($p < .001$), as shown in Figure 1. In active transportation, there were significant differences as Polish individuals were more active than the Czech ones ($p < .001$). Participation in organized PA was found to be the most significant correlate of meeting PA recommendations both in Czech and Polish adolescents ($p < .001$), the latter engaging in these activities more than the former ones ($p < .001$).

Conclusions

The Polish educational system includes a higher number of PE lessons than in the Czech Republic, as established in its curricula (Jung-Miklaszewska, 2003). This difference can create a gap in the amount of PA carried out by the two samples. Moreover, Polish adolescents have more opportunities to engage in after-school PA, which was found to be the main correlate for achieving the recommendation for healthy PA. A wider offer of after-school activities could provide more favorable conditions for reaching higher PA levels.



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Our outcomes stress the need for empowering PE and after-school PA within the Czech educational environment. Though, it cannot be used as the only instrument for promoting youth's engagement in PA. Factors such as social context, psychological aspects and quality of teaching must be taken into account in order to plan adequate PA interventions in the school field.

Implications for Practice and Policy

This research provides with important evidence regarding a topic that lacks of literature, i.e. comparison of educational systems and their influence on youth overall PA. This study was supported and funded by the Czech Ministry of Education, Youth and Sport and by the European Union, thus future interventions will involve these institutions. The main implication will concern the modification of the current Czech educational policy in order to attribute more importance to PE and school PA offer (during recesses, breaks and after-school) and enhance higher levels of health in youth.

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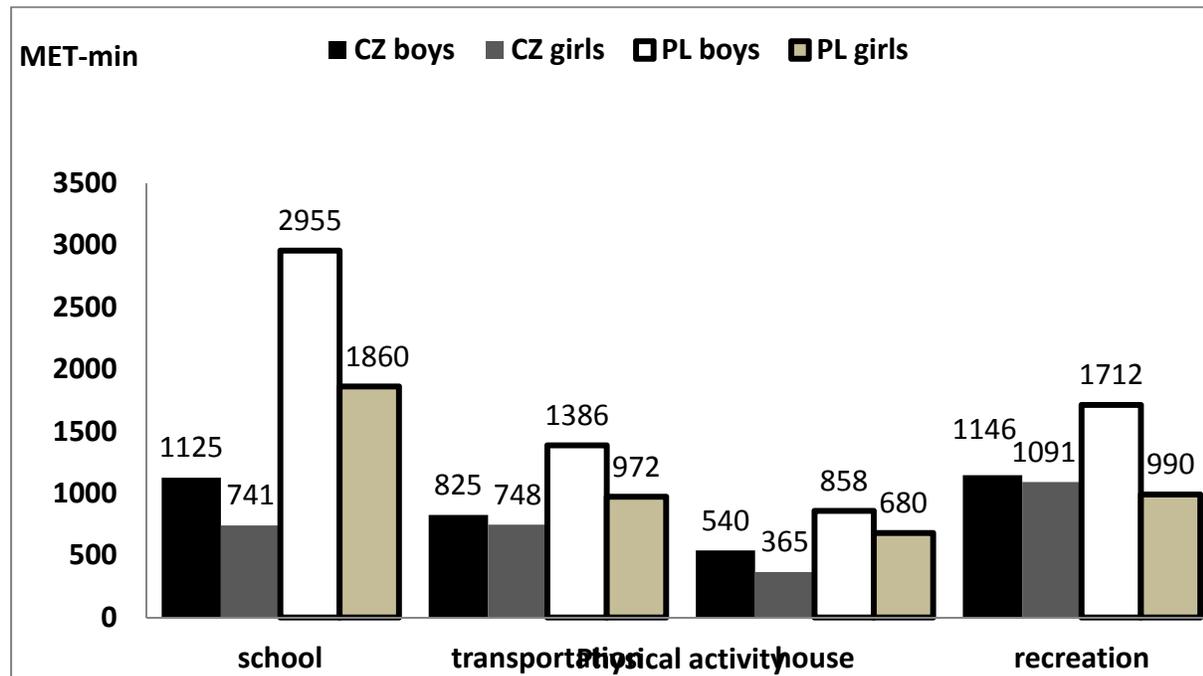
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Table 1: Descriptive analysis of the sample

Country	Gender	n	Age		Weight		Height		BMI	
			M	SD	M	SD	M	SD	M	SD
Czech Republic	Boys	449	15.80	1.06	68.62	10.51	178.62	7.52	21.46	2.69
	Girls	668	15.93	1.08	58.14	8.43	167.23	6.37	20.76	2.59
Poland	Boys	296	15.83	0.84	66.54	11.05	176.41	7.38	21.32	2.85
	Girls	433	15.92	0.81	56.33	8.54	165.50	6.15	20.54	2.75

Note. M - mean; SD – standard deviation; BMI – Body Mass Index

Figure 1: Physical activity levels in Czech (CZ; n=1117) and Polish (PL; n=729) adolescents (Metabolic Equivalents of Tasks [METs]·min·day⁻¹)





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(68) Reaching the Physical Activity Gate-keepers For After-school Programs: Physical Activity and Sedentary Behavior Guidelines and Practice

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Focus Area: Research

Background and Purpose

According to the American and Canadian physical activity guidelines, children between 5 and 11 years require a minimum of 60-minutes of moderate-to-vigorous physical activity (MVPA) daily^{1,2}. Currently, only 49% of American and 31% of Canadian children and youth meet these recommendations^{3,4}. In addition to physical activity guidelines, the Canadian Society of Exercise Physiology has developed sedentary behavior guidelines suggesting children should minimize time spent in sedentary activities by limiting screen time to less than 3 hours per day, passive transportation, extended sitting time and time spent indoors^{5,6}.

Provincially, schools have responded to the inactivity crisis among children by scheduling a minimum of 30-minutes of daily physical activity⁷. Unfortunately, this has not resolved the decrease in physical activity and increases in sedentary behavior. After-school programs (ASPs) may be a promising setting to increase physical activity levels of children. The purpose of this project was to explore the role of ASPs in physical activity and sedentary behavior among children.

Objectives

This study sought to: 1) examine ASP managers' awareness of physical activity and sedentary guidelines, 2) assess the amount of time scheduled for physical activities and sedentary behaviors in ASP, and 3) explore factors to increase physical activities and limit sedentary behaviors in ASPs.

Methods

Participants included 170 ASP managers working in Alberta, Canada. Program managers from across the province took part in an online survey examining physical activity and sedentary behavior of children in ASP. The survey included questions examining: 1) characteristics of the ASP, 2) the program managers' awareness of national physical activity and sedentary guidelines, 3) the amount of scheduled physical activity and sedentary behavior in the ASPs, and 4) the factors associated with increasing the amount of physical activity in the ASPs. Descriptive statistics were calculated using the survey data. Two follow-up focus group sessions (n=15) were conducted to further explore barriers and facilitators to MVPA and sedentary behavior in ASPs. Content analysis of the focus group transcripts was used to identify themes.

Results

Frontline staff are typically females between the age of 21 and 29 years, and have a college education with a mean of 7.6 (SD=6.9) years experience working with children. The primary objectives of ASPs were childcare (35%, n=61), to develop self-esteem, coping skills and self-efficacy (16%, n=27), and to support healthy development (12%, n=21).

Sixty percent of program managers were aware of the Canadian Physical Activity Guidelines with 43% being able to identifying the correct amount of physical activity required for health benefits. Furthermore, only 12% were aware of the Canadian Sedentary Behavior Guidelines, 11% were able to correctly identify them.



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On average, 54 minutes (SD=38) of MVPA and 60 minutes (SD=51) of sedentary behavior were scheduled in the ASPs. The standard deviation for sedentary behavior is high which indicates the amount of scheduled sedentary time varies greatly, with 68% of the respondents reporting a range of 9 to 111 minutes of scheduled sedentary time.

According to the survey, the following improvements could be made to increase physical activity in ASPs: provide training for frontline workers (41%, n=70), supply frontline workers with resource manuals (39%, n=65), have more indoor space that is appropriate for physical activity (37%, n=63), have portable equipment for physical activity (27%, n=45), and have more staff (21%, n=36).

According to the focus group data, barriers of MVPA in ASPs were related to multiple factors including: space, staff training, children's interests, equipment, time, childcare licensing and parents. Common determinants of time children spent in sedentary behavior include: activity preferences, logistics, purpose of program, and safety. The ASP community is divided as there seems to be programs that exceed the guidelines, and those that struggle to reach a minimum level of physical activity. The focus group sessions identified that ASPs have different focuses, many of which include providing homework help and improving academic achievement, which involve minimal or no physical activity. Another common barrier was that the licensing body for childcare encourages unstructured activity that is child driven, and frontline staff struggles to motivate children to choose to be physically active over other sedentary activities. Some parents and childcare licensors believe children get enough physical activity at school and don't need more physical activity in ASPs.

Conclusions

Very few ASP managers are aware of sedentary behavior guidelines. Strategies to increase the awareness of sedentary guidelines, increase scheduled MVPA and decrease sedentary behavior in ASPs are discussed.

Implications for Practice and Policy

Practitioners and policymakers can make use of ASP models (e.g., California After School Physical Activity Guidelines⁸) that have developed practices and policies to support physical activity. From a policy perspective, physical activity and sedentary behavior guidelines should be incorporated into ASPs licensing and accreditation. From a practitioner perspective, resources need to be developed and disseminated for frontline workers to assist them in engaging all children in structured and unstructured physical activity.

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Support / Funding Source

This project was funded by the Alberta Sport, Recreation, Parks and Wildlife Foundation.



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(69) Planning for Active Transportation to School in the Kanien'kehàka (Mohawk) Community of Kahnawáke, Quebec, Canada

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Focus Area: Research

Background and Purpose

Active transportation (AT) initiatives can contribute to children's daily physical activity levels¹⁻³, while at the same time can help in creating safe environments and opportunities for children to walk or cycle on their journey between home and school⁴⁻⁶. The Kahnawáke Schools Diabetes Prevention Project (KSDPP), in Kahnawáke Mohawk Territory, Canada, partnered with community schools since 1994 in designing, delivering and evaluating school-based health promotion intervention for grades one to six⁷⁻⁸. Between 2005-09 a coalition of community stakeholders including parents/guardians, teachers, school administrators, community hospital, dietitians, KSDPP staff and researchers developed a new nutrition component of a school-based wellness policy. With successful implementation in the 2009-10 school year, they moved forward with development and implementation of a supporting physical activity (PA) policy. This policy was implemented in 2012 and will be evaluated in 2013-14. The next PA policy phase involves school AT planning in two elementary schools using Active & Safe Routes to School (ASRTS) Canada's School Travel Planning (STP)-process as recommended by Active Healthy Kids Canada⁹. This process entails 5 collaborative phases: Setup; Data Collection & Problem Identification; Action Planning; Implementation; and Evaluation¹⁰. The overall aims of this project are: i) setup an STP-Committee to collaborate on the process; ii) to report on baseline findings from the environmental data scan; and iii) to report on two STP-action plans for future implementation. The research is being accomplished by a coalition of community partners working together with academic researchers within Kahnawáke Schools Diabetes Prevention Project (www.ksdpp.org), and under the guidance of the KSDPP Code of Research Ethics.

Objectives

The focus of this presentation is on 1) how the STP-Committee was formed and how they worked to refine baseline ASRTS environmental scan data collection activities; 2) baseline findings of the environmental scan; 3) action plans for future implementation; and 4) implications for research and practice.

Methods

This research is guided by principles of community-based participatory research (CBPR), which supports integrated knowledge translation. The STP-Committee works in a close and equitable partnership throughout the project. This project draws upon data from participant observation, field notes, STP meeting minutes, and a partnership progress evaluation, which includes a survey and focus group. To serve action plan formulation, data were drawn upon from the baseline environmental scan data including the family survey, in-class travel survey, pedestrian-traffic observations, the Pedestrian Environment Data Scan (PEDS) walkability checklist, and the school profile survey.

Results

In December 2012, the first author held a community presentation to present STP project and recruit stakeholders. The STP-Committee, formed in January 2013, meets monthly. The committee includes one teacher, school administrators, one parent, one school transportation representative, one community protection representative, and KSDPP staff. They were informed of the general STP purpose and



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process, and examples of action plans implemented across Canada. Terms of reference and project timeline document were developed and agreed upon. Over seven months, the STP-Committee refined ASRTS baseline data collection activities and procedures to serve their community schools' needs. This allowed for incorporation of local knowledge and expertise. For example, they decided each school needed its own action plan to serve unique needs. Data collection begins in the 2013-14 school year. Family surveys and school profile form will be conducted in October; in-class travel surveys and pedestrian-traffic observations are planned for each day for one week in October, February, and April to track seasonal trends; PEDS walkability checklist is being conducted with the first author and an STP-Committee member in August-September 2013. In accordance to CBPR, joint analysis and interpretation are planned for the 2013-14 school year. Findings and preliminary action plans are forthcoming.

Conclusions

CBPR combined with the STP-process allowed for merging of expertise from school and community stakeholders and researchers for school AT planning in Kahnawáke. In doing so, STP-action plans will be both evidence informed and responsive to local needs and circumstances. To date, an outcome of this research is the documented process for undertaking the baseline environmental scan that will serve to produce two STP-action plans. Except for limited time and meeting opportunities, few barriers have occurred. Commitment and on-going support from recognized community organizations and STP-Committee attendance have facilitated the process. Future steps include translation of baseline findings into STP-action plans, implementation, and evaluation with the same or similar baseline tools. Action plans are anticipated to include various program activities, school/community built environment changes, and incorporation of AT supportive policies in the PA policy.

Implications for Practice and Policy

CBPR is suitable when undertaking the STP-process as it sets the environment where key community issues can be played out. STP-Committee members gain new skills and insights about AT and STP, while researchers gain knowledge of local context. The project will contribute to evidence-informed practice for KSDPP's objectives to promote active living through school-based and community-wide interventions. Experiences and findings could benefit other Indigenous and non-Indigenous communities wishing to undertake the STP-process.

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Support / Funding Source

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(70) Correlates of School Travel Mode in One of North America's Most Walkable Cities

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Focus Area: Research

Background and Purpose

Active modes of travel to school, such as walking and bicycling, have received considerable research and policy interest due to well-documented associations with physical activity and health. However, over the past few decades, active travel has declined drastically in North America, with most of the mode share being replaced by car use. Distance to school is a barrier to active travel, but some research has also identified that perceived parental convenience is an important contributor to car use (1). While walking and cycling have had the most attention, we (2) and others (e.g. 3) have shown that transit use (school bus and/or public transit) also provides opportunity for physical activity. To promote healthy transportation choices for all students, there remains a need to better understand which factors influence travel to school mode choice. We sought to learn from the 'ideal' by exploring this notion in one of North America's most walkable neighbourhoods with good access to public transit: downtown Vancouver (WalkScore®: 96).

Objectives

To examine if personal (sex, age, BMI, perceptions of neighbourhood walkability) and environmental factors (distance to school, residential WalkScore®) differ by mode of transport to school in grade 8-10 students living in a highly walkable neighbourhood.

Methods

The Active Streets, Active People Junior study was initiated in Fall 2012, recruiting grade 8-10 students attending a public high school in downtown Vancouver, whose compact catchment (max. crow fly distance 2.5 km) encompasses the highly walkable downtown districts (West End and Downtown). 49 students completed comprehensive school-based physical assessments and surveys. Students self-reported their travel mode to and from school, which we recoded into main travel mode according to number of weekly trips. Students completed the Active Where Adolescent Survey, and we scored the NEWS-Y portion according to published guidelines (4); in brief, most subscales were scored on scales of 1-4, with a greater average score indicating higher walkability, except for Pedestrian and Automobile Traffic Safety and Crime Safety, where a lower score indicated greater perceived safety. We obtained each student's residential WalkScore® and calculated their distance to school along the street network using Geographic Information Systems. We calculated median (IQR) summary statistics and assessed between-mode differences via Kruskal-Wallis (MannWhitney U post hoc) or Pearson's chi-square tests (Stata v.10).

Results

We included 46 students in this analysis (61% male; 13.8 ± 0.6 yrs; 72% normal weight; 61% speak English at home). Just over half of students regularly walked to and from school (≥8 trips/week; "walkers"; n=25, including 1 cyclist). Approximately one third regularly used public transit (≥8 trips/week; "transiters"; n=14), and the median distance walked as part of the transit trip was 0.7 km (0.6-0.8 km). The remainder of students completed at least half their weekly trips by car (≥5 trips/week; "car-users"; n=7). Interestingly, the majority of the car users (n=6/7) typically walked home, indicating a shift in mode between to and from school. There were no differences between school travel mode in terms of sex, age or BMI. Distance to school differed significantly between modes (p<0.001): transiters lived further from school than the other two groups (2.7 km, 2.1-3.4 km), and walkers tended (p=0.08 unadjusted) to live



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closer (1.1 km, 0.7-1.2 km) than car-users (1.8 km, 1.0 – 2.0 km). Residential WalkScore® was no different between walkers (93, 93-97), transiters (92, 83- 98) or car-users (95, 93-97). Overall, students perceived high walkability in their neighbourhoods as measured by all NEWS-Y subscales, for example Land-Use Mix Access (3.5, 3.2-3.7), Street Connectivity (3.3, 3.0-3.7), Walking/Cycling Facilities (3.3, 3.0-3.7), Aesthetics (3.3, 2.8-3.5), Pedestrian and Automobile Traffic Safety (2.1, 1.7-2.4), and Crime Safety (1.3, 1.0-1.8). None of these perceived neighbourhood walkability ratings differed between travel modes. In terms of perceived barriers to walking and biking to school (Active Where, section V), significant between-mode differences ($p < 0.05$) were observed only for convenience of being driven, with more car-users agreeing that being driven to school was easier (3.0, 3.0-4.0) compared with walkers (1.0, 1.0-3.0) or transiters (3.0, 1.0-3.0).

Conclusions

The high proportion of walkers was likely explained by a compact school catchment and high walkability of the area, both real (WalkScore®) and perceived (Active Where). Amongst students living further from school, an encouraging finding was the high proportion of regular transiters, and relatively low car use. That many car users shifted to walking for the trip home suggests that car use was for convenience rather than necessity – this was corroborated in the perceptions of barriers result. This group will be particularly interesting for future study to understand if adequate physical activity is achieved on the walking trip home.

Implications for Practice and Policy

Undoubtedly, an area's high walkability (both real and perceived) contributes considerably to rates of walking to school. Transit can also play a role in accruing physical activity during travel to school, especially for those living further distances, and should be considered in school transportation planning.

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(71) The Effectiveness and Cost-effectiveness of Free Swimming (FS) at a Population Level

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Focus Area: Research

Background and Purpose

In June 2008, the UK Labour government announced a £140 million investment in the Free Swimming Initiative (FSI); a cross-government intervention designed to increase participation in, and frequency of, swimming in England and subsequently improve health and economic outcomes (DCMS, 2010; PricewaterhouseCoopers, 2010). However, little is known about the impact of making leisure free for all on leisure participation and health gain (Coalter, 2003, 2006), or if this investment is cost-effective. The research was undertaken during a period of extensive recession across the UK: recession is known to impact on consumer leisure habits with 59% spending less on leisure activity (Mintel, 2011).

Objectives

This paper documents the results of a four year evaluation study (2008-2011) which measured the effectiveness, cost benefit and cost-effectiveness of the Free Swimming Initiative in increasing swimming participation, on a population of approximately 300,000 (children and adults), living in a deprived, urban borough in the North West of England, UK.

Methods

The study employed a mixed-methods research design including; analysis of 'swipecard' public pool entry data (n=79,393 members) and economic data relating to programme implementation. This project related to statutory pool provision only (provided by the local authority) and not private sector provision in the borough. Swipecard data was extracted from the leisure management database (all public pools) in the borough and included over 800,000 individual swims over the four year period. Individual postcode data for each swimmer was matched to the Index of Multiple Deprivation, in order to enable analysis of participation across deprivation quintiles. Data was cleaned for duplicate swimming events. A limitation of this type of data is that it does not give detail of the quality of the swimming events (e.g. energy expended).

Results

Key findings included an increase in total visits (swimming volume) of 15.1% across the entire population, in the year following the introduction of Free Swimming for all. This increase was seen against a general decrease in swimming in the North West of England from 8.2% of the adult population in 2007-8, swimming at least 1 session per week of at least moderate intensity compared with 7.2% in 2010-11, as measured in the national Active People Survey. However average monthly swims per individual, in this study, were relatively low (e.g. 1.1 swims/month for those who swam across all four years of the evaluation). Older people swam the most frequently (e.g. those over 80 years averaged more than 3 swims/month). Free Swimming increased membership of pools and frequency of swimming for people living in areas of higher deprivation, but at a rate proportionate to underlying population values, suggesting equitable access to Free Swimming had been achieved in the borough. Social cost benefit analysis reported that Free Swimming across the entire population represented value for money: with every £1 spent resulting in £1.30 in benefits to society. Cost-effectiveness analysis (cost per Quality Adjusted Life Year (QALY) gained) reported that for each QALY gained as a result of Free Swimming for the adult group (17-59 year group) the cost was £24K – which concurs with the £20-£30K threshold



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advocated by NICE (National Institute for Health and Care Excellence, UK) as being cost-effective in public health terms.

Conclusions

Making swimming free can increase volume of swimming across an entire population, although increasing frequency of swimming is more challenging and may require different strategies to improve the quality and variation of the swimming experience. This research is one of the first studies to report on the cost outcomes of making the entry fee for swimming free, - and for Free Swimming to be reported as being both cost beneficial across the entire population and cost-effective, for adults (17-59 years), in public health terms.

Implications for Practice and Policy

Manipulating entry cost is an important component of pricing strategy when trying to increase leisure participation. This type of study needs to be replicated utilising a broader portfolio of leisure activities in order to fully explore the economic and health implications of investing public funds in leisure in the future.

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(72) **Adapting the Physical Activity Resource Assessment (PARA) Instrument to Evaluate Type, Access, Size and Quality of Physical Activity Resources in Mexico**

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Focus Area: Research

Background and Purpose

Access to quality physical activity (PA) resources is important for increasing and maintaining PA.^{1,2} The Physical Activity Resource Assessment Instrument (PARA ©2010) was developed for use in American cities as a reliable and valid, rapid and user-friendly, environmental audit tool with both scientific and practical applications.³ To date, few studies have investigated the utility of applying the PARA in countries that are socioeconomically and culturally distinct from the US.

Objectives

This study aimed to adapt the PARA for use in Mexico and to define and document the quality, accessibility and size of PA resources in three Mexican cities.

Methods

The PARA was adapted to measure all publicly available PA resources in neighborhoods surrounding 32 public schools in three cities in Mexico: Guadalajara (n=11), Mexico City (n=14) and Puerto Vallarta (n=7). The PARA provides a count and quality evaluation of PA resource features, amenities and incivilities, along with an overall quality index (QPAR).^{2,3} Minor adaptations were made to the PARA to add items measuring plazas and open green or beach spaces based on previous, formative research in Mexico to reflect cultural differences. The PARA was translated and back translated to Spanish by a team of Latin American native bilingual speakers. A final review of the PARA was completed by native Mexicans to verify correct translation. Neighborhoods were defined as an 800-meter buffer circumscribed around the school centroid.^{3,4} Neighborhood school locations were identified in advance using Google Mexico searches and Google Earth verification of their location. Field assessors verified location of neighborhoods and identified PA resources while in the field on pre-printed neighborhood maps to collect data on all publically available PA resources. American and Mexican field assessors completed a day long classroom training reviewing standardized materials in English or Spanish and completed four hours of field training.³ Data were analyzed with Chi Square, t-tests and Analysis of Variance with Tukey post hoc tests to compare features, amenities and incivilities and QPAR by resource accessibility (free or pay), size and city.

Results

The final sample included 135 PA resources: 49 parks (36%), 32 combination resources of more than one type (24%), 26 sport facilities (19%), 8 plazas (6%), 9 fitness clubs (6%), 7 schools (5%), 2 open or beach spaces (2%), 1 trail (<1%), 1 community center (<1%) and no faith based organizations; 49 (36%) were assessed in Guadalajara, 67 (50%) in Mexico City, and 19 (14%) in Puerto Vallarta. Guadalajara (M=4.4±3.0) and Mexico City (M=4.9±3.6) neighborhoods had more resources on average than Puerto Vallarta (M=2.7±1.8). Assessors reported 44 small (37%), 40 medium (33%), and 36 large (30%) resources, and over 80% were free for use; type, accessibility and size did not vary by city. The average PA resource had two features (M Count=2.6±1.5; M Quality=4.9±3.6), four amenities (M Count=4.3±1.9; M Quality=9.8±5.1) and four incivilities (M Count=3.6±2.3; M Severity=6.1±4.3) with a range of overall



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quality (M QPAR= 9.4 ± 9.4 , range=-13 to 34). Free for use PA resources had significantly more incivilities [$M=3.8 \pm 2.3$ vs. $M=1.8 \pm 1.7$, $t(110)=2.898$, $p=.005$] and greater severity of incivilities [$M=6.5 \pm 4.3$ vs. $M=3.5 \pm 3.5$, $t(110)=2.400$, $p=.018$] compared to pay resources. As presented in Figure 1, large PA resources had significantly more and higher quality features and amenities and QPAR scores compared to small resources ($ps=.000-.031$). Mexico City had significantly fewer and lower quality of amenities, more incivilities and a lower QPAR score compared to Guadalajara and Puerto Vallarta ($ps=.000-.043$).

Conclusions

Similar to US reports, the most common PA resources in Mexico were parks; however, unlike US studies that have reported schools and faith based organizations being used as PA resources, 3,5 these represented only 5% of the Mexican sample. Nearly all resources were freely accessible, and, consistent with US reports,5 free resources were less likely to be maintained and the incivilities were more frequent. Larger resources tended to be better maintained and of higher quality across the board, and resources in the larger City of Mexico had poorer quality PA resources compared to Guadalajara and Puerto Vallarta. Challenges to this research included a need for precise translations to account for country-specific idiomatic language use and lack of widely available information describing municipal PA resources.

Implications

PA promoters and policy makers should recognize that available and accessible PA resources differ along multiple dimensions by culture and country; effective PA promotion and research strategies may differ to account for these novel dimensions. Previous scholars in high income countries have suggested that improving access to existing PA resources can help to increase PA, even in impoverished neighborhoods.1,2,5 Practical and policy strategies should focus on increasing public awareness of municipal resources and improving access to a greater variety of high quality PA resources in Mexico. With the exception of parks, common types of PA resources in Mexico may reflect a tradition of promoting sports over promoting lifestyle PA and may have limited use for many children and families or the general public.

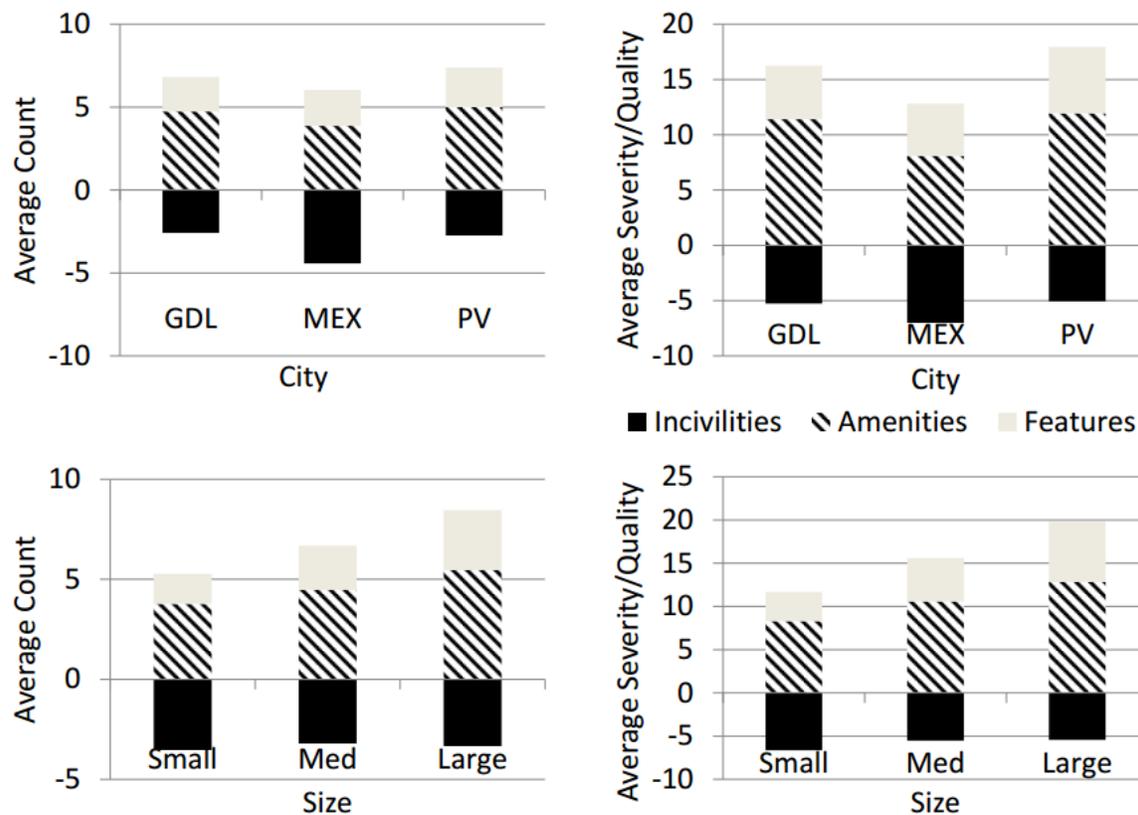
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Support / Funding Source

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Figure 1. Distribution of features, amenities and incivilities by city and size of physical activity resource





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(73) POS Tool: An Interactive Database on Public Open Space for Perth, Western Australia

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Focus Area: Practice/Policy

Background and Purpose

Australian cities are growing rapidly and the need to curtail urban sprawl whilst maintaining high standards of liveability and sustainability are critical issues for Federal, State and Local Governments as well as for the planners and developers integrally involved with the on-ground interpretation and implementation of our planning policies. An important feature of liveable, sustainable communities is their “green infrastructure”. This includes all areas of POS and parks which provide communities with a range of physical, social and mental health benefits for all ages. However, there is pressure on the provision of POS because of the need to accommodate an increasing population through densification, urbanisation and infill. Moreover, there is growing concern regarding equity of access to POS facilities and amenities, POS quality, amenity, attractiveness and safety as well the need to balance competing environmental demands and benefits.

Whilst many Local Government Authorities (LGAs) in Perth (Western Australia) hold data on their parks, reserves and public open spaces, the quality and form of these data varies. Additionally, a lack of consistency in definitions, terminology and descriptions of POS has prevented comparable classifications and amalgamation of the various data sources for regional analysis. Therefore, there is a paucity of accurate and consistent data on the provision and spatial distribution of POS, including parks of various sizes and types (in terms of their size or form, function and facilities), across LGA and suburb boundaries.

Description

In response to the lack of a comprehensive and consistent digital dataset of public open space across Perth, the Centre for the Built Environment and Health (CBEH) commenced the development of POS Tool - to provide a spatial database of the public open spaces and their amenities across metropolitan Perth. The completion of the two year project has produced a unique public open space GIS layer spanning across the Perth Metropolitan and Peel region and which contains a total of 7264 areas (i.e. polygons) of POS of which; 3813 are parks; 820 are school grounds / playing fields; 1860 are natural and conservation or bushland areas and; 771 are areas of residual green space. Each of the 3813 parks have been audited for their the provision of up to 43 different facilities and amenities using POSDAT.1

POS Tool represents an original concept, integrating a uniquely compiled spatial dataset mapping the location and content of POS and parks across Perth and Peel with a user friendly web interface to maximise access to the data and its use and application to the important issues of POS planning and provision. POS Tool provides planning professionals in Western Australia with a unique tool, for easy access to an extensive, accurate and unrivalled spatial database with a level of detail which has previously been unavailable for POS information in WA.

The basic functions of POS Tool allow users to:

1. Search by an address to find information on nearby parks in surrounding area;
2. Search for a park by park name to get information on the available facilities and amenities in a specific park;



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3. Search by Suburb or LGA to source summary statistics on the number and types of POS and park facilities within the chosen administrative boundary and population access to different POS and park types.

The advanced functions of POS Tool enable end users to:

1. Define an area of interest by either drawing or uploading an area of interest (provision for end users with and without GIS skills) and generate summary descriptive statistics on the POS provision and population access to POS within that area;
2. Undertake 'future scenario testing' by entering changes to the population size and structure and/or changes to the POS provision and thus test the impact of population growth and demographic changes on current provision of parks and requirements for park amenities.

Lessons Learned

POS Tool was shown to the planning community in June 2013 and was met with immediate and overwhelmingly positive and favourable reactions from a wide range of audiences including private sector consultants, government land agencies, parks and leisure professionals, local government planners and private sector developers.

Conclusions and Implications

The feedback from end users to date has revealed a strong consensus that POS Tool has the potential to create a fundamental change to planning practice around POS. POS Tool and the underpinning database provides immediate information that can be used to inform and assist improving planning practice by creating highly informed decision making about future POS provision and forecasts. This has been previously unavailable, limited in scale and scope, thus the potential applications in WA is timely.

Next Steps

While initially developed with a focus on WA, POS Tool has potential applications in other states and at the national level. It already provides a template for how POS data made available at the fingertips of planners can improve the provision of POS information across the nation.

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Support / Funding Source

POS Tool was developed by a multidisciplinary team at the Centre for the Built Environment and Health (CBEH) at the University of Western Australia and with extensive end user consultation. POS tool was funded by the Australian National Data Service with funds provided by the Commonwealth Government under the Education Investment Fund. Data collection was supported by the West Australia Health Promotion Foundation (Healthway).



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(74) **Are Walkable Environments Also Bikeable for Children? Identifying Environmental Correlates of Children's Walking and Biking**

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Focus Area: Research

Background and Purpose

Children's physical inactivity is a major burden on public health worldwide, due to its established association with current escalating trends of childhood and adolescent obesity. Previous studies examined environmental correlates of children's physical activity. While most of these studies used aggregated physical activity measures (i.e. overall physical activity, active travel), little is known about the contribution of specific environmental attributes to specific types of physical activity.

Objectives

The main objective of this study is to examine the associations between specific measures of the built environment with walking and biking for travel and/or leisure, among children (aged 10-12) in an urban setting in Israel. Specifically, this study aims to match specific built environmental attributes (i.e. residential density, street connectivity) with specific components of active living (i.e. walking, biking for travel/leisure).

Methods

This study employs a cross-sectional design, including an environmental sampling approach according to environmental attributes. Based on GIS analysis, 7 neighborhoods in the city of Rishon LeZion were selected to include two types: "traditional neighborhoods" (N=4), characterized by high density, land-use mix and grid street network, and "suburban neighborhoods" (N=3), characterized by low density, land-use segregation, and cul-de-sac streets. GIS analysis was conducted to obtain objective measures of the built environment. Data on children's physical activity and psycho-social factors was obtained through a school survey (among 5th and 6th graders). Overall, 573 children participated in the survey.

Results

Walking was more common in traditional neighborhoods, while biking was more common in suburban neighborhoods. Specifically, walking to school was significantly more common in traditional neighborhoods, while afternoon biking to neighborhood destinations and for leisure was significantly more common in suburban neighborhoods. No differences were observed between the neighborhoods in afternoon walking to neighborhood destinations.

Among the built-environment variables, urban form measures (including street connectivity, residential density, and built coverage) were more commonly associated with walking and biking than accessibility measures (including the route distance from the respondent's home to neighborhood destinations, including the respondent's school and the nearest store and park). Interestingly, the associations observed between urban form measures and physical activity were not unidirectional, as urban form measures were significantly positively related to walking (to school and to neighborhood destinations) and significantly negatively related to biking (to neighborhood destinations and for leisure). The findings regarding accessibility measures and walking and biking are also not unidirectional. Short route distances to school and to the nearest park seemed to enhance walking to school and biking for leisure, irrespectively. However, this was not the case for biking to neighborhood destinations, which was more common as the route distance to the nearest store increased. In addition to environmental factors,



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several psychosocial variables were found related to children's physical activity, such as social-community factors and independent mobility.

Conclusions

Urban form measures were found to have stronger influence on children's physical activity than did accessibility measures. Children's walking was associated with compact urban form, while children's biking was associated with sprawling urban form.

Implications for Practice and Policy

These findings suggest that certain environments may encourage children's walking and hinder their biking at the same time (and vice versa), and therefore raise the need for a more clear distinction between children-related walkability and bikeability.

Support / Funding Source

This research was funded by the Technion's scholarships fund ("Miriam and Aaron Gutwirth memorial fellowship" and "Irwin and Joan Jacobs Fellowship"), and by a grant from "the Foundation for collaborative research.



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(75) **Healthy Active by Design: Translating Evidence into Day-to-Day Planning Practice**

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Focus Area: Practice/Policy

Background and Purpose

Effective design can make a difference to how people use buildings, open spaces and move around communities and can provide much needed solutions to getting more people more active and deliver lasting benefits for community health and wellbeing. Physical inactivity remains at approximately 40% across the Australian adult population and higher in some states and some sub populations. Given the strong evidence showing how urban planning and community design can either facilitate, or be a barrier to, physical activity, there is a clear need for the health sector to make better links with urban planners to advocate for the provision of environments that encourage people to be more active. To date, a key limitation has been the absence of guidance and practical tools to assist local government planners, designers and developers in how to integrate evidence on health impact into the master planning and design process.

Description

Healthy Active by Design (HABD) is a web-based strategic planning tool providing end users with access to the latest scientific evidence on the health impact of the built environment combined with design specifications and case studies showing how key design elements that promote physical activity can be integrated into the master planning process. HABD was developed in three phases: (1) Policy scoping and desktop review and consultation with key stakeholders; (2) Design, development and production; and (3) Implementation, dissemination and evaluation.

The final HABD tool covers nine design features which were selected based on available evidence and alignment with existing local planning policies. There are: 1) mixed use; 2) town centres; 3) movement networks; 4) public open space; 5) housing diversity; 6) sense of place; 7) shared facilities; 8) schools; and 9) buildings.

Lessons Learned

In response to stakeholder (end user) feedback, the HABD tool provides several key components. Firstly, end users requested the latest scientific evidence relating to each of the nine design features and its impact on health in an easy to access format. Secondly, end users wanted practical guidance (not 'motherhood' statements) on how to implement each of the nine features as well as quick links and 'signposting' to relevant existing policy. Thirdly, they requested examples and case studies to illustrate and inform their decisions and design of new developments, retrofitting ('urban infill') communities and infrastructure planning. Lastly, there was interest in the production of a user friendly check list.

Conclusions and Implications

As a design tool, HABD is practical application of evidence to practice and of high relevance to the primary end users across the built environment professions (including planners, designers and developers). Identified secondary users include professionals from health, community development and sport, recreation and leisure as well as other advocates who wish to promote health and wellbeing through good design and supportive environments.

HABD was developed in partnership with the Heart Foundation and the Western Australian Government Departments of Planning, Transport, Sport and Recreation and Health, Metropolitan Redevelopment



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Authority, LandCorp and the Planning Institute of Australia in conjunction with Hassel Design Studio and The Centre for the Built Environment and Health at The University of Western Australia.

Next Steps

Phase 3 launch and dissemination activities for HABD is scheduled for late 2013 and through 2014. A key priority for ensuring adoption and implementation will be ongoing advocacy combined with professional development and training opportunities with primary and secondary end users. An evaluation of the diffusion of HABD within the planning sector will be assessed as part of future work plan.

Support / Funding Source

HABD was developed in partnership with the Heart Foundation and the Western Australian Government Departments of Planning, Transport, Sport and Recreation and Health, Metropolitan Redevelopment Authority, LandCorp and the Planning Institute of Australia in conjunction with Hassel Design Studio and The Centre for the Built Environment and Health at The University of Western Australia.



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(76) The Experience Sharing of Environment Measurements for the Aged in Taipei World Design Capital (WDC) Project

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Focus Area: Practice/Policy

Background and Purpose

The population over age 65 in many countries is increasing rapidly in 20 years (1). Inactive older adults experience significantly worse function and physical condition than their active peers to make them become more vulnerable to environmental challenges and sensitive to environmental limitations (2, 3, 4). For this concept we need to have a measurement to assess and help us to create an age-friendly environments for elderly physical activity and health. World Design Capital (WDC) designation is a biennial selection of a city hosted by the International Council of Societies of Industrial Design (Icsid) starting in 2006. "The vision of this designation is to promote and encourage the use of design to further the social, economic and cultural development of the world's cities." Taipei city government is presently working on proposals to bid for the "2016 World Design Capital". Combination these purposes of WDC and environmental issue is in aspects of physical activity and environments to propose feasible designs dealing with the increased population aging situation in Taipei, so as to make Taipei age-friendly and adaptive. We appreciate to have Dr. Sallis (UCSD) and Dr. Cerin (HKU) to help and authorize us using the research measurements of IPEN-Senior and NEWS (Chinese Senior version) in our WDC project and we can share our experience in Taipei to the participants.

Goal(s)

Share the investigation experience of built environment parameters and invite participants to brainstorm about the potential implementations of the measurements' results and strategies in any possibility.

Learning Objectives

1. Describe the purposes, considerations, challenges and potential benefits of conducting GIS & NEWS.
2. Identify and be familiar with the core steps of the IPEN-seniors.
3. Understand the available resources that exist for those wishing to learn more about IPEN-seniors.

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(77) Relationships between Physical Activity and Physical Function among the Elderly Living in Different Neighborhood Environment in Taipei City

Ian Jen, MD, MS¹, Jin-Jong Chen, MD, PhD¹, Kent-Rung Tu, MS¹

¹National Yang-ming University

Focus Area: Research

Background and Purpose

It has been indicated that physical function (PF) measures predict subsequent disability and mortality and are associated with lifestyle physical activity (PA). However, little is known about the elderly living in different community neighborhood build environments (NBE), a well documented influential factor of physical activity. The purpose of this study was to investigate the relation of PF to PA and other health outcomes among the elderly living in different NBE in Taipei City, and to provide tangible evidence for policy advocacy on activity-friendly environments.

Objectives OR Description

The objectives of the present study are:

1. to measure physical function by using Short Physical Performance Battery (SPPB)
2. to assess objectively moderate-to-vigorous physical activity (MVPA) by using Actigraph accelerometers;
3. to collect NBE data by using face-to-face interview questionnaire and archival data sets analyzed with geographic information systems (GIS);
4. to collect BMI, quality of life, psychosocial variables, past history, falling history and other covariate.
5. to examine associations between PF, PA and health outcomes.

Lessons Learned

This study was a cross-sectional study of 20 neighborhoods in Taipei City, stratified by averaged census income and walkability characteristics, conducted between May and December, 2013. 300 Participants aged more than 65 were invited to joint this study. Physical function was measured by the Short Physical Performance Battery (SPPB, a standardized measure of lower extremity physical function comprising a timed usual pace 8-foot walk, repeated chair stands, and a balance test). Physical activity was measured by weekly minutes of moderate-to-vigorous physical activity (MVPA) from accelerometer monitoring (Actigraph, Inc; Fort Walton Beach, FL). NBE data was collected by using face-to-face interview questionnaire (Neighborhood Environment Walkability Scale, NEWS) and archival data sets analyzed with GIS. Two types of objective NBE measured by GIS were used, block NBE (same neighborhood same score) and individual NBE (different address different score). The major outcome variables were body mass index (BMI), mental and physical quality of life (QoL) assessed with the SF-12, past medical history and other psychosocial covariates. Multiple linear regression modeling was used to determine the association between PF, PA and NBE, after controlling for age, gender and income. This study was approved by Institutional Review Board at Taipei City Hospital. All participants gave written informed consent.

Conclusions and Implications

The statistical tables presented in this abstract are based on the preliminary results from 109 participants and will be updated when the study is completed by the end of 2013.

Study participants were mainly female and the average age was more than 70 in each group. The elderly living in high-income neighborhood tended to report higher walkability score—measured by subjective NEWS questionnaire—compared with those live in low-income area. However, those older adults living in



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high-income area were more likely to be physically inactive and obese—measured by objective accelerator and body weight scale—than their low-income counterparts.

In multiple regression analysis, unexpectedly, increased age and female were not related to decreased MVPA after adjusting physical function batteries. Regarding the relation between physical function and physical activity, interestingly, only grip strength is strongly associated with MVPA. There is no significant relation between MVPA and lower extremity function, such as chair rise, 8-foot walk, and 8-foot walk and return.

Next Steps

Two controversial findings emerged from this ongoing study. First, we found that higher grip strength was related to higher physical activity among the elderly living in Taipei City, regardless of age, sex and walkability environment. Surprisingly, other physical function tests such as chair rise, 8-foot walk, 8-foot walk and return—all are lower extremity tests—are not associated with MVPA. Grip strength might be an early indicator for deteriorating physical function. Second, higher income was related to higher subjective walkability score. Block GIS walkability index was not associated with physical activity after adjusting for age, gender and other covariates.

The preliminary results of our ongoing study showed some intriguing findings not compatible with previous studies. Small sample size and lack of statistical power are part of the reasons. Different conclusions could be drawn when the study is completed.

Implications for Practice and Policy

The findings of this study may provide tangible evidence for policy advocacy on activity-friendly environments.

Support / Funding Source

This study was supported by grant from the Department of Health, Taipei City government. The funder was not involved in the design and conduct of the study.



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Table 1: Demographic Characteristics, physical function, physical activity and walkability of Participants

	means (SD)			
	Low-WI x Low-income		High-WI x High-income	
	Low-WI x Low-income	Low-WI x High-income	High-WI x Low-income	High-WI x High-income
Sample size, n	56	19	15	19
AGE,	70.64(4.40)	71.42(5.64)	73.00(5.01)	73.57(6.65)
SEX, male %	44.64(50.16)	42.11(50.73)	46.67(51.64)	31.58(47.76)
MVPA (min per week)	211.5 (181.3)	165.3 (168.6)	208.5 (193.3)	181.2 (170.5)
MVPA>=150, %	60.71(48.28)	36.84(49.56)	66.67(48.80)	31.57(47.75)
NEWS WI*#	14.8 (1.5)	15.2 (2)	15.6 (1.6)	17 (1.3)
BMI	25.3 (2.9)	25.9 (3.7)	23.4 (3)	24.1 (4.1)
8-f walk	2.1 (0.7)	2.5 (1.3)	1.9 (0.6)	2.1 (1.5)
Chair rise	16.5 (4.7)	15.8 (5.5)	18.7 (6.2)	15.6 (5.3)

Note:

1. WI= walkability index, defined by GIS block walkability; MVPA=moderate to vigorous physical activity; BMI=body mass index; CI=confidence interval.
2. * GIS block walkability effect, statistically significant; # income effect, statistically significant;



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Table 2: Association between physical function and physical activity with adjustment for different covariates

	Model 1		Model 2	
	Estimate	P-value	Estimate	P-value
Physical function				
Chair rise, 5 times	5.76	0.38	7.57	0.22
8-foot walk	-12.27	0.58	-15.95	0.45
8-foot walk and return	-10.67	0.21	-13.58	0.09
Chair rise, 30 sec	5.00	0.22	5.78	0.14
Grip strength	4.76	0.02	5.12	0.01
Gender				
male	1.00			
female	-7.09	0.85		
Age				
	-3.31	0.23		
Income				
high	1.00			
low	20.07	0.51		
BMI				
	-10.12	0.13		
Walkability, GIS				
high	1.00			
low	-2.88	0.93	-9.30	0.13

Note:

1. GSsc=Block GIS, street connectivity; Gspvra=individual GIS, private recreation amenities.
2. model 1: adjusted for age, gender, Income, BMI and Walkability; model 2: adjusted for walkability



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(78) The Improvement Plan of Taipei City Age-friendly Walkable Environments

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Focus Area: Practice/Policy

Background and Purpose

Inactive older adults experience significantly greater health problems and costs than their active peers. Many city authorities around the world are enhancing infrastructures and services to make their cities age-friendly. The process of creating age-friendly environments is a key challenge for international policy makers. The purpose of this project plan is in aspects of physical activity and environments to propose feasible designs dealing with the increased population aging situation in Taipei, so as to make Taipei age-friendly and adaptive.

Description

We started with a cross-sectional observational study in older adults (>60, target N=300) in Taipei, which is based on the design of "IPEN Senior(International Physical Activity Environmental Network Senior): International Study of Built Environments and Physical Activity." First, we applied the GIS-based (Geographic Information Systems) built environment measures to assess the walkability of the whole city and individual village by walkability index. Then, according to a household income report of Taipei City, we selected Daan District (the highest) and Wanhua District (the lowest) as our survey areas. Participants were recruited from villages selected to vary in walkability. They completed a survey that assesses environments, other PA outcomes, health and functioning, and demographics using comparable measures, and wore accelerometers for 7 days, and GIS-based environment variables will be computed around participants' residential addresses. Data will be pooled for multi-level analyses.

Lessons Learned

The relationship among PA, GIS-bases indexes and fitness indexes have been tested to determine the effects of environment variables and fitness variables on PA behaviors. We expect both personal environment indexes and lower extremity fitness indexes have significant effects on PA behaviors. There should have significant interaction among personal environment indexes, lower extremity fitness indexes and Actigraph PA outcomes.

Conclusions and Implications

With the results of our study, we will commence with another focus of the plan, i.e., designing for aging residents, built environments focusing on improving physical activity and positively affecting health, aiming to make city services and facilities more accessible to an ageing population and increase opportunities available to older residents. The research will select two villages with lower quality of walkability in Daan and Wanhua District to assess how the physical environment impacts on the walking quality. According to the survey, this study will offer planning ideas of pedestrian environment for these two villages. Furthermore, we will also provide suggested programs for establishing exercise service center for the elderly.

Next Steps

Applying visualization technology and interactive multimedia, we will prototype a smart information kiosk for senior citizens to provide life, health and walkability services in the local community. The design and planning of "geographic information auxiliary system" is to provide a visualized presentation of relevant



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values. This system can also provide functions including various numerical inquiries, simulation adjustment and result predictions for all application fields.

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Support / Funding Source

This study was supported by grant from the Department of Health, Taipei City government. The founder was not involved in the design and conduct of the study.



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(79) Relationships between Neighborhood Built Environment and Physical Activity among the Elderly in Taipei City

Ian Jen, MD, MS¹, Jin-Jong Chen, MD, PhD¹, Kent-Rung Tu, MS¹

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Focus Area: Research

Background and Purpose

Physical inactivity (PA), associated with major adult health risks, is one of the most important public health issues in the world and is influenced by neighborhood built environments (NBE). However, little is known about the elderly in Asia. The purpose of this study was to investigate the relation of NBE to PA and other health outcome among the elderly living in Taipei City and to provide tangible evidence for policy advocacy on activity-friendly environments.

Objectives

The objectives of the present study are:

1. to collect NBE data by using face-to-face interview questionnaire and archival data sets analyzed with geographic information systems (GIS);
2. to assess objectively moderate-to-vigorous physical activity (MVPA) by using Actigraph (Actigraph, Inc; Fort Walton Beach, FL) accelerometers;
3. to measure BMI, The Short Physical Performance Battery (SPPB), quality of life, psychosocial variables, past history, falling history and other covariate.
4. to examine associations between NBE, PA and health outcomes.

Methods

This study was a cross-sectional study of 20 neighborhoods in Taipei City, stratified by averaged census income and walkability characteristics, conducted between May and December, 2013. 300 Participants aged more than 65 will be invited to joint this study. NBE data was collected by using face-to-face interview questionnaire (Neighborhood Environment Walkability Scale, NEWS) and archival data sets analyzed with GIS. Two types of objective NBE measured by GIS were used, block NBE (same neighborhood same score) and individual NBE (different address different score). The major outcome variables were weekly minutes of moderate-to-vigorous physical activity (MVPA) from accelerometer monitoring, body mass index (BMI), mental and physical quality of life (QoL) assessed with the SF-12, The Short Physical Performance Battery (SPPB, a standardized measure of lower extremity physical function comprising a timed usual pace 4-m walk, repeated chair stands, and a balance test), past medical history and other psychosocial covariates. Multiple linear regression modeling was used to determine the association between NBE, PA and physical function, controlling for age, gender and income. This study was approved by Institutional Review Board at Taipei City Hospital. All participants gave written informed consent.

Results

The statistical tables presented in this abstract are based on the preliminary results from 109 participants and will be updated when the study is completed by the end of 2013.

Study participants were mainly female and their average age were more than 70 in each group. Interestingly, the elderly living in high-income neighborhood tended to report higher walkability score—measured by subjective NEWS questionnaire—compared with those live in low-income area; they were more likely to be physically inactive and obese—measured by objective accelerator and body weight scale—than their low-income counterparts. In multiple regression model, increased age and female were



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significantly with decreased MVPA. MVPA was higher in low- vs high-income neighborhoods but did not differ by block GIS neighborhood walkability. One of the individual GIS walkability index, private recreation amenities, shows positive association with MVPA, although without statistical significance.

Conclusions

In this ongoing study, we found that higher income was related to lower level of physical activity and higher risk of being overweight or obese among the elderly people living in Taipei City. Higher income was also related to higher subjective walkability score. Block GIS walkability index was not associated with physical activity after adjusting for age, gender and other covariates. Individual GIS walkability index, private recreation amenities, shows positive association with MVPA, although without statistical significance.

The preliminary results of our ongoing study showed some intriguing findings not compatible with previous studies. Small sample size and lack of statistical power are part of the reasons. Different conclusions could be drawn once we complete the study.

Implications for Practice and Policy

The finding of this study may provide tangible evidence for policy advocacy on activity-friendly environments.

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Table 1: Demographic Characteristics, physical activity, walkability and physical function of Participants

	means (SD)			
	Low-WI x Low-income	Low-WI x High-income	High-WI x Low-income	High-WI x High-income
Sample size, n	56	19	15	19
AGE,	70.64(4.40)	71.42(5.64)	73.00(5.01)	73.57(6.65)
SEX, male %	44.64(50.16)	42.11(50.73)	46.67(51.64)	31.58(47.76)
MVPA (min per week)	211.5 (181.3)	165.3 (168.6)	208.5 (193.3)	181.2 (170.5)
MVPA>=150, %	60.71(48.28)	36.84(49.56)	66.67(48.80)	31.57(47.75)
NEWS WI*#	14.8 (1.5)	15.2 (2)	15.6 (1.6)	17 (1.3)
BMI	25.3 (2.9)	25.9 (3.7)	23.4 (3)	24.1 (4.1)
Waist circumference	89.6 (9.6)	87.8 (11.5)	86.6 (8.5)	86.9 (10.8)
Hip circumference	97.2 (6.4)	96.1 (7.7)	94.9 (6)	97.1 (8)
	Adjusted Odds ratios** (95%CI)			
BMI>=25	1.86 (0.82,4.24)	4.79 (1.52,15.12)	0.66 (0.25,1.77)	1 (ref)
% overweight or obese	41.50%	21.50%	13.80%	23.10%
BMI>=30	0.44 (0.07,2.59)	0.59 (0.06,5.71)	0.23 (0.02,2.29)	1 (ref)
% obese	25%	12.50%	12.50%	50%

Note:

1. WI= walkability index, defined by GIS block walkability; MVPA=moderate to vigorous physical activity; BMI=body mass index; CI=confidence interval.
2. * GIS block walkability effect, statistically significant; # income effect, statistically significant; ** results from multiple logistic regression.



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Table 2: Association between Walkability and Physical activity with adjustment for different covariates

	Model 1:		Model 2:	
	Estimate	P-value	Estimate	P-value
GSsc	274.74	0.045	63.59	0.50
Gspvra	7.42	0.96	256.02	0.09
Gender				
male	1.00			
female	-79.94	0.009		
Age	-6.35	0.008		
Income				
high	1.00			
low	464.27	0.008		
Walkability				
high				
low	-92.60	0.55		

Note:

1. GSsc=Block GIS, street connectivity; Gspvra=individual GIS, private recreation amenities.
2. model 1: adjusted for age, gender, and Income; model 2: GIS