

ACTIVE WHERE? PROJECT

RELIABILITY AND VALIDITY STUDY

METHODS

Setting

The Active Where? Study took place in San Diego, Boston, and Cincinnati. Neighborhoods selected for recruitment in San Diego and Boston were determined using census information for income and walkability. Walkability was determined in San Diego using maps and local knowledge. Cincinnati used a more complex system that incorporated land use and street network information to determine walkability. The neighborhoods selected were then categorized in one of four quadrants: low income and low walkability, low income and high walkability, high income and low walkability, and high income and high walkability.

Sample

Participants included adolescents age 12-19 years old and a parent of the adolescent. Both adolescent and parent completed the same surveys on two occasions approximately 2 weeks apart.

Recruitment

Data were collected from three cities to enable a range of environments, weather conditions, ethnic diversity and levels of neighborhood walkability. A sprawl score for each metropolitan area shows how much the housing is spread out, homes are segregated from other places, they have only weak centers of activity, and they have poorly connected street networks (McCann, Ewing, Smart Growth, 2003). A recent study found a correlation between BMI and sprawl indicating that people who live in more sprawling communities are more likely to be heavier than people who live in more compact communities (McCann, 2003 pg13). A higher sprawl index score indicates lower sprawl. The cities in this study received the following sprawl scores respectively; Cincinnati 96, San Diego 101.9, and Boston 126.9 (Smart Growth America). These differences highlight the variations between the cities included in this study, particularly the impact the variation may have on eating and physical activity, allowing for more generalizable results.

Slight variation also occurred in the recruitment methods used at each site. Each site obtained approval from the appropriate Institutional Review Board (IRB). Differences in the IRB approval process and resources of each site determined the methods used. The use of varying cities and recruitment methods ensured a wide range of participants in this study.

San Diego Recruitment

Community Centers and Events

One week prior to recruitment at community centers and local events fliers with information on the study, contact information, and dates when researchers would be at each location were hung in the participating centers. The researchers then attended local events and recreation centers in each of the four quadrants where they explained the study, answered questions, and gave participants packets with required materials. The packet included a survey for the adolescent and for the parent, assent and consent forms, contact information, information on the study, and a pre-paid return envelope. Participants were able to fill out the survey at their own convenience.

Phone Recruitment

Phone numbers of parents with adolescents' age 12-17 who lived in the pre-selected quadrant neighborhoods were obtained from a local marketing company. Participants were contacted without a letter and asked to participate in the study. Once

a person agreed to participate in the study the packet described in the previous section was sent to the participant by mail. They were then able to go over the information, fill out the survey, and return finished materials at their own convenience.

Cincinnati Recruitment Mail Recruitment

Using a list of phone numbers available to researchers, families who had an adolescent age 12-17 and lived in the pre-selected neighborhoods were sent letters with information on the Active Where? Study. A follow-up call was administered to the possible participants to determine their desire to participate in the study. Those who agreed to participate and were eligible were sent surveys and consent forms in the mail. At completion of each survey, participants returned surveys and consent forms in pre-paid envelopes.

Boston Recruitment On Site Recruitment

Researchers left information about the Active Where? Study for children and adolescents at local community centers to take home to parents. One week following, researchers came to the community center and administered surveys for the adolescents who agreed to participate and who had a signed consent form from parents. Parents returned completed survey by mail.

Mail Recruitment

A phone list provided by the YWCA Youth Voice Collaborative was used to contact possible participants in the study. A letter with information on the study was sent to each possible participant. A follow up phone call was then administered to determine interest in participation. Once a person agreed to participate in the study, a packet of materials was sent to the participant. The participant filled out the survey and consent forms and returned the survey in a pre-posted envelope.

Procedure

Both adolescent and parent completed the same surveys on two occasions to evaluate the test-retest reliability of the survey instrument over time. Physical activity, fruit and vegetable consumption and height and weight (used to calculate BMI and BMI percentiles) were also reported in order to assess survey validity. The parents and adolescents completed the same items in order to assess differences in perception and establish which group would be a more reliable source of data for perceived neighborhood environment. Approximately one week after receipt of the original survey a second survey was sent to each participant, to enable a 2 week test retest period. The dates of the first and second survey completion and receipt were recorded. After 10 days, the researchers placed a reminder call to participants for the second survey. Immediately following receipt of the retest survey, a gift card was sent to the participant. Upon receipt, the survey responses were received and a research assistant attempted to obtain missing information (if applicable) from participants by phone. Data were entered into an Access form. The data were then checked for correct entry by hand and by a double entry procedure.

Measures

The survey was developed through formative research (i.e., phone interviews and in vivo interviews with a different sample of children and adolescents and their parents) and adaptation of previous measures. Items were discussed with experts for face validity. The survey was pilot tested in all sites among parents and adolescents and amended to improve understanding and readability. Surveys took 30-45 minutes to complete.

Following the survey introduction, age, gender, height and weight were reported.

The survey(s) included the following sections:

Section A has 13 items assessing the number of electronic devices in the home and in the child's bedroom.

Section B has 20 items assessing the time to walk to various commercial and public destinations. Based on a five point scale, ranging from 1-5 minutes to 30 minutes or more.

Section C has 14 items assessing the time to walk to recreation locations. Based on a five point scale, ranging from 1-5 minutes to 30 minutes or more.

Section D has 17 items assessing a) the frequency of activity in recreation locations and b) whether the child usually walked or biked to that location. A is based on a four point scale, ranging from Never to Once a Week or More. B is based on a two point scale, ranging from Yes to No.

Section E and F have 18 items assessing the barriers to walking or biking to the local park and to shops and restaurants. Based on a four point scale, ranging from Strongly Disagree to Strongly Agree.

Section G has 21 items assessing barriers to activity in parks and the local neighborhood. Based on a four point scale, ranging from Strongly Disagree to Strongly Agree.

Section H has 4 questions assessing types of homes in the neighborhood. Based on a five point scale, ranging from None to All.

Section I has 6 items assessing ease of access to local services. Based on a four point scale, ranging from Strongly Disagree to Strongly Agree.

Section J has 3 items assessing aspects of streets in the neighborhood. Based on a four point scale, ranging from Strongly Disagree to Strongly Agree.

Section K has 3 items assessing the different places for walking. Based on a four point scale, ranging from Strongly Disagree to Strongly Agree.

Section L has 4 items assessing the aesthetic features of the neighborhood. Based on a four point scale, ranging from Strongly Disagree to Strongly Agree.

Section M has 13 items assessing the safety of the neighborhood. Based on a four point scale, ranging from Strongly Disagree to Strongly Agree.

Section N has 2 items assessing the impact of bad weather on physical activity. Based on a four point scale, ranging from Strongly Disagree to Strongly Agree.

Section O has 5 items assessing how often the child is active in the local neighborhood. Based on a four point scale ranging from Never to Once a Week or More.

Section P has 14 items assessing how often objects promoting physical activity are used in the child's home environment. Based on a five point scale, ranging from Not Available to Use Once a Week or More.

Section Q has 9 items assessing the time the child spends in physical activity.

Section R has 23 items assessing the amount of time spent during sedentary behavior. Based on a seven point scale, ranging from None to 4 hours or more.

Section S has 38 items assessing rules for: playing outside, TV and related behaviors, and for eating. Based on a 3 point scale, ranging from Yes to Sometimes.

Section T has 18 items assessing the availability of specific types of food in the adolescent's home. Based on a five point scale, ranging from Never to Always.

Section U has 23 items assessing different aspects about the physical activity environment in the adolescent's school.

Section V has 18 items assessing the barriers to walking and biking to school. Based on a four point scale, ranging from Strongly Disagree to Strongly Agree.

Section W has 20 items assessing specific food availability at the adolescent's school and the surrounding areas, and days per week eating specific food or at specific places. Availability was assessed by Yes, No. If yes was selected adolescent was then prompted to answer how many days a week of use, ranging from 0 to 5.

Section X has 13 demographic items.

Psychometric analysis strategy

The following analysis plan is proposed for the Active Where? survey:

1. Item analysis – examine variance, range and test-retest intra-class coefficients of each item to identify potentially poor items, including tests of both absolute agreement (e.g., intra-class correlation) and relative agreement (e.g., Chronbach alpha).

2. Factor Structure

Assess factor structure for each set of items to determine subscales. This will be accomplished by splitting the sample into exploratory and confirmatory subsamples and conducting a principal components analysis (PCA) on the exploratory sample and a confirmatory factor analysis (CFA) on the confirmatory sample. If our sample size is insufficient to perform such analyses, we use the whole sample for factor analysis (with varimax rotation, and parallel analysis to determine number of factors).

From factor analysis, we will report the number of factors retained, give names to each factor, items per factor, percent of variance accounted for by factor solution, and range of factor loadings. We will report number of items dropped from scale because of low loadings or loading on more than one factor.

4. Scale Construct Validity

We will report correlations among scales and examine relationship of scales to measures of physical activity, sedentary behavior, and other pertinent variables. Relationships will be reported as correlation coefficients or as group difference tests by creating category measures of physical activity (e.g., tertiles of activity) and other measures (e.g., dividing sample into overweight and non-overweight adolescents).

RESULTS

Response rates

Using the “cold calling” method, San Diego had an 11% agreed to participate rate. At the Cincinnati site, families received a study introductory letter and at least one telephone call to assess their interest and eligibility. 24.6% had a working telephone number, were eligible, and agreed to participate. 69% of these families consented to participate. In Boston the agreed to participate rate following face to face contact and phone prompting was 52%.

Table 1 shows the number of parent and adolescent pairs who returned test and retest surveys in each study city.

Table 1 Recruitment by city

Site	Survey1 adolescent parent pairs	Survey 2 adolescent parent pairs	% retest return
San Diego	92	57	62%
Cincinnati	48	47	97%
Boston	43	33	77%
	183	137	75%

Reliability and validity testing

As the final Active Where? participants just recently completed their surveys, we have only started the process of reliability and validity analyses. To date, test-retest analyses and some validity testing have been conducted for the adolescent surveys and the findings look promising.

Table 2 Sample Test Retest Reliability

Section	Items	Construct	ICC	α	r
A	8	Total home electronic equipment	.861	.925	.181* ^c
A	4	Total in-bedroom electronic equipment	.898	.946	.154* ^c
B	20	Walk time to commercial & public destinations	.891	.942	-.283* ^b
C	14	Walk time to recreation places	.831	.907	-.421* ^b
D	17	Frequency of activity at various recreation places	.738	.855	.354* ^a
D	17	Proportion of trips by walk/bike to recreation places	.657	.792	.134 ^a
E	18	Barriers to walk/bike to local park	.727	.841	.343* ^b
F	18	Barriers to walk/bike to local retail and restaurants	.687	.816	.330* ^b
G	11	Barriers to being active at local park	.602	.751	-.318* ^b
G	10	Barriers to being active in local streets	.717	.835	-.289* ^b
H	4	Residential density	.645	.784	.201* ^b

I	6	Land use mix – access	.693	.818	.377* ^b
J	3	Street connectivity (parent report)	.611	.757	-.294* ^b
K	3	Walk/bike infrastructure (parent report)	.673	.803	.300* ^b
L	4	Neighborhood aesthetics (parent report)	.678	.811	.230* ^b
M	7	Traffic safety	.685	.818	.170* ^b
M	4	Crime safety	.776	.876	.146 ^b
O	5	Frequency of home & local activity (parent report)	.746	.853	.390* ^a
P	14	Home physical activity equipment availability & use	.713	.831	.352* ^a
S	18	Rules about being active outside	.710	.832	.216* ^b
S	7	Rules about TV and other screen activity	.667	.800	.242* ^d
S	11	Rules about eating	.671	.808	.142 ^e
T	16	Food availability in home (parent report)	.788	.881	.244* ^e
U	8	School physical activity environment	.743	.855	.124 ^a
V	16	Barriers to walking/biking to school	.784	.880	-.437* ^b
W	9	School food environment, access	.684	.814	.066 ^c
W	11	School food environment, use	.648	.785	.222* ^c

*p<.05, r=correlations with a=total physical activity, b=transport physical activity, c=BMI, d=sedentary behavior, e=fruit & vegetable consumption

Active Where survey scales: correlations with self-reported physical activity

Adolescents' self-reported physical activity was related to the frequency of being active at a greater number of recreational places away from home and within and immediately around their home (see table). Adolescents' with greater physical activity equipment in their homes also reported being sufficiently active more days of the week. Greater physical barriers to walking/biking to school was related to lower physical activity, whereas greater parental rules about TV and other screen time was related to greater physical activity. Neighborhood aesthetics and enjoyment of walking to school were also positively related to physical activity.

Differences between non-overweight and overweight adolescents

There were differences in various barriers to physical activity resources, availability of physical/sedentary activity equipment, and eating behaviors in school between Active Where sample adolescents classified as non-overweight (<85th BMI percentile; 68.3% of sample) versus overweight (\geq 85th percentile; 31.7% of sample). In terms of availability, overweight adolescents reported more total home and in-bedroom electronic equipment (i.e., equipment promoting sedentary activity; p=.071 and p=.003, respectively) and farther average distance from home to recreation places (e.g., parks, private recreation facilities; p=.087) than non-overweight adolescents. Also in comparison to their leaner counterparts, overweight adolescents reported greater frequency of barriers (e.g., route problems) to walking/biking to local parks (p=.005) and local shops and restaurants (p=.013), as well as greater barriers to being active in local parks (p.015). Overweight adolescents also reported greater use of various school food purchase options/facilities than non-overweight adolescents (p=.012).

The correlations between some Active Where survey scales and adolescents self-reported physical activity, as well as the ability of these scales to distinguish between overweight and non-overweight adolescents, supports the scales' validity and

importance in use for the evaluation of environmental correlates of adolescents' weight, eating, and physical activity.