Measurement Issues; Health Promoting Community Design

Active Neighborhood Checklist: A User-Friendly and Reliable Tool for Assessing Activity Friendliness

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Abstract

Purpose. *To test the reliability of the Active Neighborhood Checklist (the Checklist), a user-friendly audit tool for assessing neighborhood environmental supports for physical activity.*

Methods. *Sixty-four street segments in St. Louis and southeastern Missouri were selected among diverse areas that varied with respect to socioeconomic levels, urbanization, and land use. Fifteen public health researchers and seven community stakeholders conducted audits in April 2005 following a two-hour training session. Interrater reliability was measured for the items in each section of the Checklist (land use characteristics, sidewalks, shoulders and bike lanes, street characteristics, and quality of the environment for a pedestrian) using observed agreement and the κ statistic.*

Results. *The mean observed agreement for 57 evaluated items was 0.87 (range, 0.61–1.00). The mean κ statistic was 0.68 (range, 0.21–1.00).*

Discussion. *With minimal training of the auditors, the Checklist demonstrated strong reliability. Future studies are needed to provide information about its usability for various stakeholders and across different settings. (Am J Health Promot 2007;21[6]:534–537.)*

Key Words: Walking, Environment, Physical Activity, Environmental Audit Instrument, Reliability, Community. Manuscript format: research, Purpose: instrument development, Setting: local community, Health focus: fitness/physical activity, Strategy: built environment, Target population: adults, Target population circumstances: geographic location

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This manuscript was submitted April 10, 2006; revisions were requested July 13 and September 3, 2006; the manuscript was accepted for publication September 14, 2006.

0890-1171/07/$5.00 + 0

PURPOSE

Assessment of environmental influences on physical activity is becoming increasingly important in identifying promising agents of change for the rising obesity and inactivity rates in the United States and abroad.[1] An environmental audit is a systematic observational assessment of factors in the physical and social environment (e.g., recreational facilities and sidewalks) that hinder or facilitate physical activity.[2] The number of audit tools being developed is mounting, with tools ranging in purpose, target population, and method of administration.[3–6] However, almost all tools known to date are geared for researchers, and these can be long and can require extensive training. A recent review of 31 audit instruments identified only two tools for laypersons (walkability and bikeability checklists),[3] both of which are subjective in nature and lack reliability testing results. The Active Neighborhood Checklist (hereafter referred to as the Checklist) was intended to be a short objective tool for assessing the activity friendliness of neighborhood streets. The Checklist was designed in a user-friendly format with lay terminology to make it useful for numerous audiences (e.g., community stakeholders, practitioners, and researchers), to reduce administration time, and to minimize the length of training. This study presents the interrater reliability of this tool.

METHODS

Design

The Checklist was designed as a refined version of existing audit tools,[5] with emphasis on capturing the community physical environment domain of the ecological framework. In the developmental phase, items for the Checklist were selected based on a systematic process of weighting quantitative and qualitative evidence from evaluations of existing audit tool items. Quantitative evidence consisted of interrater reliability between two

Table 1

Distribution of Audited Street Segments by Neighborhood Type

Predominant Land Use*	Lower Income		Middle Income		Higher Income			
	Urban	Suburban	Urban	Suburban	Urban	Suburban	Rural	Downtown
Commercial	4	2	6	5	5	4	4	6
Residential	6	2	6	4	4	4	2	0

* Some segments included a mixture of commercial and residential land uses.

researchers[5] and between researchers and community members,[7] as well as associations between audit-derived environmental measures and physical activity behavior.[8] Qualitative evidence included literature reviews[1,9] and key informant interviews. Six researchers and three practitioners from urban planning, transportation, or public health with experience in developing or using audit tools participated in a 1-hour telephone interview that assessed opinions about (1) the most important features of the environment for inclusion in a user-friendly audit tool and (2) the process of conducting audits, including the selection of street segments (area of the road between two consecutive intersections) to audit and the method of aggregating street-segment data. Detailed decision rules for selecting and modifying items from the existing tools for inclusion in the Checklist are available from the author. In brief, the qualitative evidence generally guided which items were included in the refined tool, while the reliability results determined which items required modification. Modified items were derived from the original St. Louis Analytic Audit Tool, as well as from the Prevention Research Centers' Healthy Aging Research Network Environmental Audit Tool, a detailed adaptation of the original St. Louis Analytic Audit Tool intended to assess environmental supports and barriers to physical activity among older adults.

For the evaluation phase of the Checklist, fifteen public health researchers and seven community stakeholders (advocates, public health practitioners, urban planners, and community organizers) volunteered to participate in the training and testing of the Checklist in April 2005. A 2-hour slide presentation introduced participants to the protocol of the audit tool. This training was followed by data collection, after which participants reconvened to provide informal feedback concerning the process of auditing, as well as the content and usability of the tool for research, advocacy, and practice. To test interrater reliability of the items, the 22 auditors organized into 15 pairs, with some auditors serving in more than one pair, and the pairs were assigned to different street segments. The mean administration time was 11.7 minutes (range, 3–25 minutes) per segment, and the mean number of segments audited per person was 5.9 segments (range, 2–17 segments).

Sample

This reliability study included 64 street segments in the St. Louis, Missouri, metropolitan area and in southeastern Missouri. All segments were selected in advance by one of us (C.M.H.) among areas that varied by socioeconomic level (lower, middle, and higher), urbanization (suburban, urban, and rural), and land use (residential and commercial) (Table 1).

Measures

The Checklist was composed of five sections. Each section had a set of questions, some with multiple items (e.g., items for specific destinations under the question about the presence of nonresidential land uses). The Checklist assessed *land use characteristics* (46 items pertaining to predominant land use, land use mix, specific residential and nonresidential land uses, parking, and recreational facilities), *sidewalks* (13 items pertaining to sidewalk presence, buffers, continuity, width, curb cuts, misalignments, and obstructions), *shoulders and bike lanes* (eight items pertaining to shoulder presence, width, continuity, designated bike signs, and obstructions), *street characteristics* (13 items pertaining to transit stops, number of lanes, crossing aids, traffic-calming devices, speed limit, and cul-de-sacs), and *quality of the environment for pedestrians* (nine items pertaining to building setback, pedestrian amenities, litter or broken glass, shade trees, and slope). The response options consisted of (1) dichotomous choices (yes and no or yes alone), (2) categorical choices (none, one side of the segment, or both sides of the segment), and (3) ordinal choices (e.g., none or a little, or a lot). The tool comprised the front and back of one page.

Statistical Analysis

Interrater reliability was assessed using observed agreement and Cohen κ statistic. As a guide for interpreting results, we used the following adjectival ratings of Landis and Koch[10]: 0.80 to 1.00 (almost perfect agreement), 0.60 to 0.79 (substantial agreement), 0.40 to 0.59 (moderate agreement), 0.20 to 0.39 (fair agreement), and 0.00 to 0.19 (poor agreement). To ensure robust κ statistics, only those items in which the features were observed on at least 5 segments were included in this reliability study. Thirty-two of 89 total audit items were excluded from the analysis; all but four had an observed agreement exceeding 0.90. The audit tool and protocol are available at http://prc.slu.edu/iafc.htm.

RESULTS

The mean (SD) observed agreement for all items in the Checklist was 0.87 (0.10) (range, 0.61–1.00). Twelve of 57 items had substantial reliability, while 45 had almost perfect reliability.

Table 2

Agreement Between Auditors, as Measured by the κ Statistic, for Items in the Active Neighborhood Checklist*

	κ		No. of Audit Items Within κ Statistic Range[10]					
Audit Tool Section	Mean (SD)	Min, Max	0.00–0.19 (Poor)	0.20–0.39 (Fair)	0.40–0.59 (Moderate)	0.60–0.79 (Substantial)	0.80–1.00 (Almost Perfect)	Total
Land use	0.74 (0.15)	0.43, 0.93	0	0	5	9	12	**26**
Sidewalks	0.58 (0.20)	0.21, 0.89	0	2	4	4	1	**11**
Shoulders and bike lanes	0.58 (0.28)	0.27, 1.00	0	2	1	2	1	**6**
Street characteristics	0.69 (0.22)	0.31, 1.00	0	1	2	3	2	**8**
Quality of the environment	0.66 (0.22)	0.32, 0.88	0	1	1	2	2	**6**
Total	0.68 (0.20)	0.21, 1.00	**0**	**6**	**13**	**20**	**18**	**57**

* Interrater reliability was assessed for 64 street segments by 15 pairs of auditors.

The mean (SD) κ statistic, which accounts for chance agreement, across all items was 0.68 (0.20) (range, 0.21–1.00) (Table 2). The land use items exhibited the highest interrater reliability, with 21 of 26 items having substantial to almost perfect reliability. Items in the sidewalks and the shoulders and bike lanes sections had the lowest mean interrater reliability, with eight of 17 items having substantial to almost perfect reliability. Three of six items with fair reliability were somewhat subjective in nature (e.g., ''If a paved shoulder is not present, do you have another safe place to bicycle?'' [with ''street'' and ''wide outside lane'' as response choices]; and ''Litter or broken glass'' [with ''none or a little,'' ''some,'' or ''a lot'' as response choices]). The remaining three items with fair reliability required slight modification to the tool or the protocol to improve reliability (''Off-road walking, bicycling, or multiuse trail''; ''[Sidewalk] width <3 feet for any part of the sidewalk''; and ''Traffic-calming device'').

Following testing of the Checklist, select sections of the tool were made optional. Land use items of specific destinations (e.g., library and strip mall) were made optional because this information may be available from existing sources and can be time-consuming to audit. In addition, the road shoulder items were made optional because they tended to have lower reliability and may be infrequent or a lower priority in some communities.

DISCUSSION

Summary

The Checklist demonstrated high reliability when completed by researchers and community stakeholders across diverse street segments. Its reliability was comparable to the reliability reported for other audit tools[2,4] and was generally higher than that of the original tools on which the Checklist was based.[5] Moreover, its required training time and number of items were less than those of comparable research tools, such as the original St. Louis Analytic Audit Tool[5] and the Irvine-Minnesota Inventory.[4] The administration time of the Checklist may also be shorter than that of other instruments, particularly as auditors gain experience using it.

Aggregating the street-segment data to create meaningful characterizations of a neighborhood environment may be achieved in multiple ways. The data may be summarized across a route (e.g., home to neighborhood) or area (e.g., around a school), depending on user preferences. Moreover, selection of segments to be audited may vary. Options include auditing all segments in an area or route or identifying a simple, proportionate, or stratified random sample of segments.[4] A variety of useful measures may be computed from the street-segment data. Neighborhood measures may be provided for specific types of street segments, such as those with residential land uses, commercial land uses, schools, and parks. Examples of measures include the number (or percentage) of the following: segments without continuous sidewalks, segments with exemplary sidewalks (continuous, no misalignments or obstructions, width always ≥3 feet, and containing curb cuts and buffers), four-lane segments without crosswalks, medians or traffic-calming devices, and automobile-oriented commercial segments (e.g., building setback, parking lot as predominant land use, four-lane road, and containing strip malls, big-box stores, or malls).

Limitations

Although the Checklist was tested by a small multidisciplinary group of community stakeholders in St. Louis, its usability as an advocacy or planning tool was not formally examined. Data aggregation across routes or areas requires some analytic expertise to create composite measures for reports. Also, although the reliability of the tool was tested across diverse environments, its reliability in any single type of setting (e.g., rural) was not assessed. Therefore, future studies are needed to provide information on its usability for various stakeholders and across various settings.

The Checklist was developed to include the most important physical environment features believed to be associated with physical activity that could be reliably measured. However, the items of the tool have not been correlated with physical activity behavior. Some important features potentially related to walking and bicycling were excluded from the tool, including street connectivity, characteristics of

intersections, traffic volume, qualities of recreational facilities, lighting, architecture, and social environment. These characteristics were omitted because they could be assessed from existing data or street maps (e.g., street connectivity) or by existing audit instruments (e.g., recreational facilities),[4,6] they vary by time of day (e.g., traffic speed and volume), or they require alternative assessment methods (e.g., social environment). An area for note-taking follows each section of the tool to allow auditors to describe features or perceptions that may not be captured in the tool. Qualitative feedback from neighborhood residents should provide an important complement to the quantitative results obtained from the Checklist.

Significance

The Checklist is among only a few reliable audit tools for assessing neighborhood activity friendliness that may be useful for community members and stakeholders because of its simple format, lay terminology, item specificity, and short length. Moreover, it requires limited training of auditors to yield reliable results. The variety of specific measures that can be generated from it can be used for identifying targets of change in a neighborhood, raising awareness among community members or mobilizing communities to advocate for improving the activity friendliness of their neighborhoods.

Acknowledgment

This study was funded by contract 051603 from the Robert Wood Johnson Foundation and by contract U48/DP000060-01 (Prevention Research Centers Program) from the Centers for Disease Control and Prevention. We are grateful for the valuable input of Ann Forsyth, Cheryl Kelly, Mariela Alfonzo, Terry Pikora, Phil Bors, and Mighk Wilson in the key informant interviews. For their participation in the data collection and review of the Checklist, we thank Tom Shrout, Reyna Spencer-Gurly, Dan Lehocky, Dale Brigham, Emily Andrews, Tegan Boehmer, Borsika Rabin, Leslie McIntosh, Beth Dodson, Rebeka Cook, Karrisa Weidinger, Byron Yount, Tonie Covelli, Julie Bender, Colleen Casey, Ellen Barnidge, Marjorie Sawicki, and Mike Elliott.

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