Evaluating novel and traditional survey methods for the construction of a behavioral founded walkability index

Other Conference Item

Author(s):
Erath, Alexander; van Eggermond, Michael A.B.; Axhausen, Kay W.

Publication date:
2014

Permanent link:
https://doi.org/10.3929/ethz-b-000091821

Rights / license:
In Copyright - Non-Commercial Use Permitted
Evaluating novel and traditional survey methods for the construction of a behavioral founded walkability index

Alex ERATH
Future Cities Laboratory (FCL),
Singapore-ETH Centre for Global Environmental Sustainability (SEC), Singapore
Email: alexander.erath@ivt.baug.ethz.ch

Michael VAN EGGERMOND
Future Cities Laboratory (FCL),
Singapore-ETH Centre for Global Environmental Sustainability (SEC), Singapore
Email: eggermond@ivt.baug.ethz.ch

Kay AXHAUSEN
Institute for Transport Planning and Systems (IVT),
Swiss Federal Institute of Technology Zurich (ETH), Zurich, Switzerland
Email: axhausen@ivt.baug.ethz.ch

Abstract

Transportation planners have traditionally focused on different aspects of motorized transport. More recently, the importance of walking is being realized. Not only does every public transport trip start and end with a walking journey, walking as a main mode can reduce the number of motorized trips and reduce the accompanying negative externalities, such as road congestion, emissions and public transport overcrowding. Additionally, it has social and recreational value, and promotes physical and mental health (Southworth, 2005).

For walking to be considered as a main mode, with the attractiveness of walking being dubbed walkability, several prerequisites are necessary. For instance, Speck (2012) puts forward that for a city to be walkable several prerequisites should be met. A walk should be useful (e.g. mixed use), safe, comfortable and interesting.

In addition to this qualitative approach of describing walkability, approaches to quantify walkability have emerged. Walk Score, and other indices for walkability proposed so far are mostly ad-hoc, somewhat informative and refer generally to the closest amenities/public transport stops and the existing network structure. The weights of the attributes of the indices are generally arbitrary and do not reflect the independently measured preferences of the users and residents. Furthermore, they usually employ beeline distance measures instead of pedestrian network distances and do not include design attributes such as the layout of sidewalks, noise and speed level of traffic or street width, which are very relevant for actual planning decisions.
As outlined, walkability consists of more than the mere presence of a sidewalk; it consists of both the quality and topology of the walking environment and how pedestrians’ evaluate those characteristics. In this study we aim to formulate a behavioral founded walkability index, which incorporates pedestrian’s preferences and design attributes. In order to calculate a walkability index, both the walking environment will be mapped and pedestrians preferences will be estimated with a discrete choice models.

In the paper we will present our experiences and outcomes of measuring users’ preferences of the walking environment in two districts in Singapore, in total measuring approximately 4 by 4 kilometers. The study will be carried out between January and July 2014 and will use three approaches: detailed mapping of the pedestrian network and description of destinations, analysis of reported/tracked walks indoors/outdoors (revealed preference) and of stated choice experiments.

With the revealed preference approach, we aim to measure users’ preferences by means of their route choice and destination choice. In the technology enabled approach 250 individuals, quota sampled based on age, gender and main mode used will be asked to install a smartphone application, making it possible to track individuals by means of GPS and WiFi spots. The survey area consists of high rises, indoor and underground pedestrian throughways. First tests however have shown this built environment can pose challenges for pedestrian position tracking by a combined GPS / WiFi approach, especially as we are not only interested the road being traversed, but also which side of the road and which crossings are used. Therefore, a second, traditional approach will be pursued additionally: random pedestrians will be followed by research assistants, and their origin, destination as well as traces and intermediate stops, will be noted, in addition to person characteristics, such as age category and gender. Based on the observed routes, choice sets will be generated and route choice models will be estimated.

In the stated preference survey, the same 250 individuals will receive two different SP experiments, focusing on route choice (link properties, intersection characteristics) and destination choice by type of destination.

This paper will focus on several aspects of the walkability study of relevance, namely:
- The experiences with using combined GPS / WiFi in a dense urban environment;
- Differences in data quality and resulting route choice models using GPS / WiFi trackers and ‘traditional’ following of individuals;
- The comparison of behavioral parameters concerning walkability based on revealed preference respectively stated preference data.

**Literature**
