



Contents lists available at ScienceDirect

Transportation Research Part D

journal homepage: www.elsevier.com/locate/trd

Differences in behavior, time, location, and built environment between objectively measured utilitarian and recreational walking



Bumjoon Kang^{a,*}, Anne V. Moudon^b, Philip M. Hurvitz^b, Brian E. Saelens^c

^a Department of Urban and Regional Planning, University at Buffalo, The State University of New York, 114 Diefendorf Hall, 3435 Main St, Buffalo, NY 14214, USA

^b Urban Form Lab and the Department of Urban Design and Planning, University of Washington, TRAC UW, Box 354802, 1107 NE 45th Street Suite 535, Seattle, WA 98105, USA

^c Seattle Children's Research Institute and Department of Pediatrics, University of Washington, Child Health, Behavior and Development, 2001 8thAve, Seattle, WA 98121, USA

ARTICLE INFO

Keywords:

GPS
Accelerometer
Home and non-home based walking
Pedestrian
Active transportation

ABSTRACT

Objectives: Utilitarian and recreational walking both contribute to physical activity. Yet walking for these two purposes may be different behaviors. We sought to provide operational definitions of utilitarian and recreational walking and to objectively measure their behavioral, spatial, and temporal differences in order to inform transportation and public health policies and interventions.

Methods: Data were collected 2008–2009 from 651 Seattle-King County residents, wearing an accelerometer and a GPS unit, and filling-in a travel diary for 7 days. Walking activity bouts were classified as utilitarian or recreational based on whether walking had a destination or not. Differences between the two walking purposes were analyzed, adjusting for the nested structure of walking activity within participants.

Results: Of the 4905 observed walking bouts, 87.4% were utilitarian and 12.6% recreational walking. Utilitarian walking bouts were 45% shorter in duration (–12.1 min) and 9% faster in speed (+0.3 km/h) than recreational walking bouts. Recreational walking occurred more frequently in the home neighborhood and was not associated with recreational land uses. Utilitarian walking occurred in areas having higher residential, employment, and street density, lower residential property value, higher area percentage of mixed-use neighborhood destinations, lower percentage of parks/trails, and lower average topographic slope than recreational walking.

Conclusion: Utilitarian and recreational walking are substantially different in terms of frequency, speed, duration, location, and related built environment. Policies that promote walking should adopt type-specific strategies. The high occurrence of recreational walking near home highlights the importance of the home neighborhood for this activity.

1. Introduction

The recently published United States Surgeon General's *Call to Action to Promote Walking and Walkable Communities* identifies policy gaps and provides future strategies, recognizing the multipurpose nature of walking (U.S. Department of Health and Human Services, 2015). Walking is a complex behavior with diverse motivations including travel (utilitarian walking) and leisure and

* Corresponding author.

E-mail addresses: bumjoonk@bufflo.edu (B. Kang), moudon@uw.edu (A.V. Moudon), phurvitz@uw.edu (P.M. Hurvitz), brian.saelens@seattlechildrens.org (B.E. Saelens).

<http://dx.doi.org/10.1016/j.trd.2017.09.026>

exercise (recreational walking) (Tudor-Locke et al., 2006). While most researchers have recognized that different mechanisms may trigger and influence walking for these different purposes (Giles-Corti et al., 2005b; Lovasi et al., 2008; Saelens and Handy, 2008; Sugiyama et al., 2012; Tudor-Locke et al., 2006), many studies have treated walking as single behavior (Millward et al., 2013; Owen et al., 2004; Saelens and Handy, 2008). One review of studies on environmental correlates of walking argued that the lack of specificity in distinguishing between utilitarian and recreational walking weakens the predictive power of walking behavior models (Giles-Corti et al., 2005b). Effective interventions and policies to promote walking require specific understanding of why and where people walk.

A major challenge in distinguishing purposes of walking is the lack of standardized, objective, and robust methods to define walking behavior (Heath et al., 2006; Saelens and Handy, 2008; Sugiyama et al., 2012). In most studies stratifying utilitarian and recreational walking, data come from transportation and physical activity surveys or time diaries, in which respondents were asked to record perceived purpose or context of walking activity. The characterization of walking is inconsistent across studies (Kang et al., 2013). Dog walking was considered as utilitarian walking in one study (Agrawal and Schimek, 2007), recreational walking in another (Cutt et al., 2008), and as an independent category separate from recreational walking in yet another study (Yang and Diez-Roux, 2012). Some studies classified walking to a fitness facility as recreational walking (Agrawal and Schimek, 2007; Yang and Diez-Roux, 2012). Yet it could be argued that walking to a fitness facility has explicit transportation utility, because it replaces a trip by car or transit which would not be classified as driving or riding transit for recreation. The ambiguity between trip purpose and destination was also found in another study that defined walking while visiting historic sites as recreational walking (Tudor-Locke et al., 2007). Furthermore, self-reported data being subjective (Sugiyama et al., 2012) may lead to inconsistencies between or even within participants. Reported walking duration estimates are inaccurate. Recall bias in transportation surveys typically leads to underestimating the number of short walking trips, and social desirability bias generates average overestimation of physical activity in surveys making it difficult to quantify walking overall or by purpose (Lee et al., 2011; Wolf et al., 2003).

Shortcomings aside, prior studies pointed to many behavioral differences between utilitarian and recreational walking. In the U.S., utilitarian walking trips were consistently found to be shorter in time but more prevalent than recreational walking. In the 2001 and 2009 National Household Travel Survey (NHTS), the average duration of utilitarian walking trips was less than half that of recreational walking (Agrawal and Schimek, 2007; Yang and Diez-Roux, 2012). In the 2010 National Health Interview Survey (NHIS), the average utilitarian walking trip was 20% shorter than the average recreational walking trip (Paul et al., 2015). The 2003–2005 American Time Use Survey (ATUS) and the 2010 NHIS reported prevalence rates of walking for transportation or utilitarian walking to be 70–160% higher than those of walking for exercise or recreational walking (Paul et al., 2015; Tudor-Locke and Ham, 2008). However, all of these estimates and thus differences between utilitarian versus recreational walking were based on self-report. Furthermore, the afore-mentioned national surveillance systems have different assessment techniques and construct definitions of walking measures, thus resulting in widely varying estimates (Whitfield et al., 2015).

The impact of built environment factors on walking may also differ by walking purpose (Owen et al., 2004; Saelens and Handy, 2008; Sugiyama et al., 2012). In one study, hilly terrain was a barrier to utilitarian walking but it was a facilitator for recreational walking, ostensibly because hills afforded enjoyable vistas that attracted recreational walkers (Lee and Moudon, 2006b). Another study showed that the presence of shops, or the availability of public transport were less important in predicting recreational walking than utilitarian walking (Pikora et al., 2006). Land use mix patterns differed in their association with utilitarian and recreational walking in one recent study (Christian et al., 2011). A review found consistent and significant associations between utilitarian walking and the presence of nearby routine destinations (e.g., shops, services, transit stops) in 25 of the 31 studies reviewed. For recreational walking, results were inconsistent; 17 studies had null associations and 2 had unexpected negative associations between recreational walking and nearby presence of recreation-specific destinations (e.g., parks, playgrounds, sports fields) (Sugiyama et al., 2012).

Associations between purpose-specific walking and the built environment could be inaccurate because of the spatial mismatch between where walking actually occurred and where built environment attributes were measured (Sugiyama et al., 2012). Because of a lack of information on where people actually walked, most prior studies examined associations between home neighborhood characteristics and walking outcomes (Perchoux et al., 2013). The spatial mismatch between walking activity and environment is beginning to be explored in studies tracking participants' GPS locations and accelerometer-based physical activity. In two studies, between 40% and 50% of moderate or vigorous physical activity (which may or may not include walking) occurred outside of participants' home neighborhoods, defined as buffers of 1666 m-to-1855 m radii from home locations (Hurvitz et al., 2014a; Troped et al., 2010). Notably, another study found that built environment features significantly differed between participants' home neighborhoods and their visited locations beyond home neighborhoods, in terms of neighborhood composition, utilitarian destinations, transportation infrastructure, and traffic conditions (Hurvitz and Moudon, 2012). The spatial mismatch between built environment and walking may be further confounded by walking purpose. However, studies with concurrent data on the location and purpose of walking are few (Spinney et al., 2012). To analyze the influence of the environment and inform interventions, it is important to identify the locations of walking activity by purpose.

The present study offers operational definitions and methods to classify the two walking purposes to address the issue of classification standardization. Second, the study explores the multidimensional properties of utilitarian and recreational walking regarding the duration, activity intensity, speed, and time and location distributions of the activity based on a large sample of participants living in a U.S. metropolitan area. Finally, it examines the built environment characteristics of where walking actually occurred.

Download English Version:

<https://daneshyari.com/en/article/5119308>

Download Persian Version:

<https://daneshyari.com/article/5119308>

[Daneshyari.com](https://daneshyari.com)