



A comparison of perceived and geographic access to predict urban park use



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ABSTRACT

Park use and accessibility have been the focus of research in many green space studies, but the psychological study of behavioural intentions to use urban parks has rarely been investigated. This study proposes and evaluates an expanded model of the theory of planned behaviour (TPB) that incorporates the variables of perceived park accessibility, geographic proximity, and past use behaviour. The expanded TPB model was empirically tested using primary data collected from community level surveys ($n = 319$) in Brisbane, Australia, from two suburbs with contrasting social economic status. We compared the explanatory and predictive quality of the expanded model for park use with the general model of TPB and a model operationalizing the theory of reasoned action (TRA). Results from structural equation modelling (SEM) indicate that the expanded model with perceived accessibility has the best model fit and highest explanatory power, while also enhancing prediction of park use intentions. Moreover, our results indicate that perceived access is more important than geographic access or proximity in predicting park use. These findings suggest that physical park provision is a necessary, but insufficient condition to encourage greater park utilization. Park management should account for differentiated preferences and perceptions of park access to increase the collective benefits of urban parks.

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Introduction

In recent decades, there has been unprecedented growth in urban populations, with over 70% of the world's population predicted to live in cities by 2050 (UNFPA, 2011). This dramatic demographic shift to urban areas has raised concerns about the increasing disconnect between urban dwellers and the natural environment (Maller et al., 2008; Maruani & Amit-Cohen, 2007). A widening range of competing urban land uses in modern cities exacerbates the challenge of meeting the demands for urban green infrastructure such as urban parks and open spaces. Green spaces, especially neighbourhood parks that provide convenient access, are purported to promote health for its urban population catchments by providing recreational opportunities that encourage active lifestyles (Cohen et al., 2007), reduce obesity-related diseases and combat mental stresses (Giles-Corti et al., 2005; Lee & Maheswaran, 2011; Maller, Townsend, Pryor, Brown, & St Leger, 2006; Pretty, Peacock, Sellens, & Griffin, 2005), and foster inclusive communities and the generation of social capital (Chiesura, 2004;

Jones, Hillsdon, & Coombes, 2009). However, the health benefits can only be realized if these parks and green spaces can be reasonably accessed by urban residents. Within this context, the study of access to, and use of urban parks, takes on increasing importance.

Researchers have identified access to parks as one of the important factors in shaping park utilisation. For example, Byrne, Wolch, and Zhang (2009) found that easier access was an important reason for a decision to use local parks rather than large national parks, especially for people of colour. Similarly, Giles-Corti et al. (2005) found that distance and park size were two important factors associated with the likelihood of using public parks. But other studies reported that variations in accessibility measurement could significantly impact the empirical results (Guy, 1983; Kwan, 1998; Neutens, Schwanen, Witlox, & de Maeyer, 2010; Talen & Anselin, 1998; Weber, 2003) and the ability to predict human behavioural changes (Joerin, Thériault, & Rosiers, 2005). Further, there have been extensive studies revealing inconsistencies between subjectively measured accessibility (perceived accessibility) and geographic measured accessibility based on quantitative standards (e.g., distance to parks and park area per capita) (Ball et al., 2008; Hoehner, Brennan Ramirez, Elliott, Handy, & Brownson, 2005; Jones et al., 2009; McCormack, Cerin, Leslie, Dutoit, & Owen, 2008; Scott, Evenson, Cohen, & Cox, 2007). Perceived access does not equate with geographic access (Boehmer, Hoehner, Wyrwich,

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Brennan Ramirez, & Brownson, 2006; Scott et al., 2007) and may be more important to understand and predict human behaviour (Kruger, Carlson, & Kohl, 2007; Zondag & Pieters, 2005). To date, quantitative criteria have been the predominant methods to measure accessibility in park-related studies (Murray, O'Kelly, Kwan, & Tiefelsdorf, 2003). However, it is unknown whether perceived accessibility and geographic accessibility play similar roles in explaining and predicting park use.

Poor access to environmental benefits such as urban parks and open spaces has emerged as an important theme in the environmental justice literature (Byrne & Wolch, 2009; Byrne et al., 2009) with research examining the implications of park distribution for population segments with different socio-economic backgrounds (Hung, Chang, & Tsou, 2005; Preston & Rajé, 2007; Wolch, Wilson, & Fehrenbach, 2005). In some studies, parks and open spaces appear inequitably distributed within cities, with communities of lower socio-economic status (SES) having inferior geographic access to urban parks, thus constraining park visitation and use (Byrne et al., 2009; Estabrooks, Lee, & Gyurcsik, 2003; Macintyre, Macdonald, & Ellaway, 2008a). Other studies contradict these findings, reporting that disadvantaged groups have higher levels of geographic access but less perceived access to parks, thus, resulting in less frequent use (Jones et al., 2009; Macintyre et al., 2008a). The conflicting findings may, in part, be attributed to the different measures used to quantify park access. However, the weight of the evidence from the different studies points to less frequent park use in communities with lower SES, suggesting that perceived accessibility may be a more reliable predictor of park use behaviour.

Research has examined a wide range of factors that potentially influence park use, including park facilities and features, park maintenance, knowledge and awareness of parks, and alternative opportunities (Bedimo-Rung, Mowen, & Cohen, 2005; Byrne et al., 2009; Kaplan, Austin, & Kaplan, 2004; Loukaitou-Sideris, 1995; Loukaitou-Sideris & Stieglitz, 2002). In these studies, observed park visitation or repeated park use self-reported by park visitors were used to examine the relationships between park attributes and park utilization (see, e.g., Loukaitou-Sideris, 1995; Loukaitou-Sideris & Stieglitz, 2002; Reed, Price, Grost, & Mantinan, 2012). However, studies focusing on repeated park use were criticized for neglecting the complexity of decision making or evaluative processes that lead to future behaviour (Tepeci, 1999). The type of data collected has not generally focused on the motivations or behavioural intentions to use parks; they also fail to capture information from both park users and non-users.

This study seeks to understand park use behaviour of local residents by identifying the underlying social and psychological factors that inform their decision-making process to use (or not use) urban parks. To date, few studies have grounded their research in behavioural theories that investigate motivations and behavioural intentions to use parks. Park use intention describes an individual's attitudinal commitment to use park services in the future and thus provides the most immediate information about future park use behaviour (Ajzen, 1991). The theory of planned behaviour (TPB) provides a theoretical framework to examine how the multi-dimensional concept of accessibility potentially explains and predicts people's behavioural intention to use parks. We use empirical research conducted in Brisbane, Australia, to complete the following research objectives: (1) examine behavioural intentions to use local parks by comparing results from three alternative behavioural models: the theory of reasoned action (TRA), the theory of planned behaviour (TPB) and an expanded TPB model; (2) compare the predictive power of perceived accessibility (a psychological construct) and geographic accessibility on behavioural intentions to use parks; and (3) apply the model to examine its fit with population segments with different socio-demographic characteristics.

Theoretical framework and hypotheses

Theory of reasoned action (TRA) and theory of planned behaviour (TPB)

The theory of reasoned action (TRA) and its extension, the theory of planned behaviour (TPB), provide the most well-known theories to predict human behavioural intentions and subsequent actions in various disciplines including social psychology, marketing, and environmental research (Armitage & Conner, 2001; Rossi & Armstrong, 1999; Scherer, Welcomer, Parada, Cordano, & Pradenas, 2011). Hartwick, Sheppard, and Warshaw (1988), for example, conducted a meta-analysis of 31 studies using TPB, confirming the model's predictive capacity and versatility across different settings. In addition, TPB has also been applied to predict diverse leisure behaviours. For example, Ajzen, Nichols, and Driver (1995) used the model to explain people's intention to participate in six leisure activities, while Galea and Bray (2006) found TPB sufficient to predict human behavioural intention to participate in walking activities.

TRA posits that individuals are rational when deciding whether to perform a particular behaviour (Ajzen, 1991; Ajzen & Fishbein, 1980). Central to the TRA model is the concept of behavioural intention, the motivation that leads to engagement in the particular behaviour such as park use (Ajzen & Fishbein, 1980). Behavioural intention describes the immediate determinant of the subsequent behaviour: the stronger the behavioural intention is, the more likely a person would perform that particular behaviour (Ajzen, 1991; Bamberg, Hunecke, & Bl Baum, 2007).

Behavioural intention is postulated to be a function of two independent constructs: attitude (ATT) towards the behaviour and subjective norm (SN). ATT is defined as an individual's overall disposition/evaluation towards the possible outcomes of a specific act (Rossi & Armstrong, 1999), imposing a positive impact on the behavioural intention: the more positive the attitude towards an action, the more likely the behaviour. SN refers to the extent to which an individual perceives general social pressure towards the appropriateness to perform the behaviour (Rossi & Armstrong, 1999).

TPB was proposed by Ajzen (1988, 1991) to address the inadequacy of TRA in explaining behaviours that are not under complete volitional control (Han, Lee, & Lee, 2011; Lee & Choi, 2009; Rossi & Armstrong, 1999). Performing these non-volitional behaviours requires additional resources such as skills and money (Ajzen, 1991; Ajzen & Madden, 1986). As a reformulation of TRA, the TPB model includes an additional construct called perceived behavioural control (PBC) that describes the ease or difficulty of performing non-volitional behaviours. Based on the TPB model, we examine three relationships in this study: $ATT \rightarrow \text{park use intention (UI)}$; $SN \rightarrow UI$; and $PBC \rightarrow UI$.

Expanded TPB model

TPB provides an open-ended model that can be adapted to specific research contexts. Ajzen (1991) also claimed that TPB is a user-friendly model and open to modification where the base paths and variables can be rearranged and expanded to meet research needs. Thus, variables that have not been identified in previous literature can then be included to investigate the target behaviour. In this study, we included two additional variables (*accessibility* and *past use*) and paths in an expanded TPB model to examine their relative contribution to intention to use parks ($\text{accessibility} \rightarrow UI$ and $\text{past use} \rightarrow UI$).

Accessibility refers to the ease with which a resident can reach a service such as a park (Nicholls, 2001; Talen, 2003). Perceived

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