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Research paper

The physical and non-physical factors that influence perceived access to urban parks

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HIGHLIGHTS

- This study empirically tests a multi-dimensional model of park access in two contrasting suburbs.
- Results indicate that park accessibility consists of physical and socio-personal dimensions.
- Physical dimension is the strongest dimension of the park accessibility construct.
- Non-physical variables such as safety and cultural similarity contribute to urban park accessibility.
- Increasing park infrastructure may not necessarily improve perceived access to parks.

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ABSTRACT

Access to urban parks and green space is purported to contribute to community well-being and inclusive neighbourhoods. While accessibility has been developed as a multidimensional construct in the literature, few studies have empirically investigated the mix of both physical and non-physical factors that influence self-reported access to urban parks. To fill this knowledge gap, we conducted community level surveys in Brisbane, Australia, to empirically test a multivariate model of park accessibility. We collected primary data in two suburbs with contrasting social economic status (SES) but comparable park infrastructure. Multiple regression models containing both physical and non-physical variables were developed and tested. Our findings concur with existing studies indicating lower perceived park accessibility in the lower SES neighbourhood. The most important factors influencing perceived accessibility to urban parks were physical and locational features such as proximity to the park, a pleasant walking experience, and a sufficient number of parks in the neighbourhood. Less important, but statistically significant social variables included cultural groups using the parks, shared activities, safety, and leisure time available. These findings provide empirical support for the multidimensional nature of the accessibility construct. We discuss the implications of our findings for park planning in metropolitan areas.

1. Introduction

Rapid urbanisation has converted more than half of the world's population to urban dwellers during the past few decades. This wave of rural-to-urban migration will continue into the future, with an estimated 70% of the world population living in urban areas by 2050 (UN, 2012; UNFPA, 2007). There are growing concerns about effective and equitable urban service delivery to meet the needs of this rapidly increasing urban population (Koehler & Wrightson, 1987; Talen, 1997). For example, parks and green spaces are considered therapeutic elements within an urban landscape and offer a variety of benefits to individual and community well-being, including physical and psychological health benefits as well as social and economic benefits (Bedimo-Rung, Mowen, & Cohen, 2005; Brown, Schebella, & Weber, 2014; Byrne & Wolch, 2009; Cohen et al., 2007; Ulrich & Addoms, 1981). Further, access to parks promotes the development of social capital and the fostering of sustainable urban livelihoods (Byrne & Wolch, 2009; Chiesura, 2004). And yet, these benefits can be only realized if parks can be reasonably accessed and used by urban residents.

The quality of urban life is closely associated with access to nature and recreational opportunities in cities (Nicholls, 2001; Pred, 1977). As a result, park accessibility and utilization are

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frequently investigated within leisure and geography disciplines (Byrne & Wolch, 2009; Scott & Munson, 1994; Wendel, Zarger, & Mihelcic, 2012). Park accessibility is identified as one of the major factors in influencing park utilisation. For example, Byrne, Wolch, and Zhang (2009) found that easy access is an important reason for the preferred use of local parks rather than large national parks, especially for people of colour. Similarly, Giles-Corti et al. (2005) found that distance and park size are two important factors associated with the likelihood of using public parks.

Accessibility refers to the ease with which a site may be reached, providing a measure that evaluates the relative opportunity for contact or use (Gregory, Johnston, & Smith, 1986). Traditional accessibility studies were founded in location theory with the aim to minimize operational costs of service distribution, making physical distance or proximity to the service the key variable in operationalizing accessibility (Gregory et al., 1986; Hass, 2009; Nicholls, 2001). However, distance-based analyses do not take into account the multidimensional nature of the accessibility construct. Conceptually, accessibility has been developed as a construct that encompasses both physical and non-physical dimensions (Aday & Andersen, 1974; Ferreira & Batey, 2007; Gregory, Johnston, Pratt, Watts, & Whatmore, 2009; Lindsey, Maraj, & Kuan, 2001; Wang, Brown, & Mateo-Babiano, 2013). For example, Aday and Andersen (1974) distinguished the social and geographic aspects of accessibility, arguing for the importance of non-spatial attributes (social accessibility) in influencing people's ability to obtain services such as parks and green spaces. Similarly, the Gregory et al. (2009) definition of accessibility emphasized the socio-personal aspects of the concept that include potential language and cultural barriers, gender ideologies, skills, information, and other socio-economic barriers.

In the context of urban park studies, Lindsey et al. (2001) observed that research has emphasized spatial–physical variables rather than the socio-cultural dimensions of park accessibility. More recent park research has continued to rely on measures derived from spatial–physical variables. For example, common criteria used to examine park accessibility include quantitative standard approaches such as distance to parks (Euclidean or network-based distance), park area per capita, and number of parks (Maruani & Amit-Cohen, 2007; Nicholls, 2001; Oh & Jeong, 2007). These indicators emphasize the spatial–physical aspects of accessibility but still require operational definitions and measurement protocols for empirical investigation. Variations in accessibility measurement can significantly influence research outcomes (Guy, 1983; Kwan, 1998; Neutens, Schwanen, Witlox, & De Maeyer, 2010; Nicholls, 2001; Talen & Anselin, 1998; Weber, 2003) and the ability to predict human behavioural changes (Joerin, Thériault, & Rosiers, 2005). Although physical standards provide a relatively simple means to operationalize accessibility, they do not address the complexity of the concept, excluding a more authentic and comprehensive representation that includes perceived access to parks. Recent accessibility literature has identified the need to integrate the physical and socio-personal dimensions into the operationalization of the accessibility concept (Brown, 2008; Nicholls, 2001).

Access to environmental benefits provided by urban parks and green spaces has emerged as an important theme in environmental justice research. Various studies have examined the implications of park distribution for population segments with different socio-economic or cultural backgrounds (Byrne & Wolch, 2009; Byrne et al., 2009; Tsou, Hung, & Chang, 2005). Some research has concluded that urban parks appear inequitably distributed within cites, with communities of lower social economic status (SES) and people of colour having inferior geographic access to parks, constraining the frequency of park use (Byrne et al., 2009; Estabrooks, Lee, & Gyurcsik, 2003; Sister, Wolch, & Wilson, 2010; Wolch, Wilson, & Fehrenbach, 2005). For example, in Los Angeles, low-income neighbourhoods and those dominated by ethnic minorities (e.g., African-Americans and Latinos) have significantly lower levels of access to parks (Wolch et al., 2005) and higher risk of potential park congestion (Sister et al., 2010). People of colour and the poor are largely excluded from accessing the city's largest urban national park as the park is surrounded by predominantly white and wealthy neighbourhoods (Byrne et al., 2009). Such uneven distribution of park spaces has raised compelling environmental equity concerns wherein park benefits are not equally distributed amongst population subgroups.

These findings contrast with other studies reporting that the distribution of green spaces has no significant association with deprivation (Jones, Hillsdon, & Coombes, 2009; Lindsey et al., 2001; Macintyre, Macdonald, & Ellaway, 2008; Nicholls, 2001). For example, in the UK, poorer neighbourhoods are not always subject to poorer access to urban resources such as parks (Macintyre et al., 2008). In Bristol, England, people living in more deprived areas were found to be closer to urban green spaces, but used parks less frequently than people in more affluent areas. Similar results were reported from the U.S. where less advantaged groups (ethnic minorities and people of lower incomes) were found to have better geographic access to public parks and green trails or be more likely to live in walkable neighbourhoods (Cutts, Darby, Boone, & Brewis, 2009; Lindsey et al., 2001; Nicholls, 2001; Wendel, Downs, & Mihelcic, 2011). However, the advantage of physical proximity to parks and green spaces may be offset by the quality, diversity, and size of the green spaces (Wendel et al., 2011) or by socio-personal characteristics including age, income, safety, and cultural concerns (Cutts et al., 2009).

Previous research has also revealed inconsistency between subjectively measured accessibility (perceived accessibility) and objectively measured accessibility (geographic accessibility) (Ball et al., 2008; Jones et al., 2009; McCormack, Cerin, Leslie, DuToit, & Owen, 2008; Scott, Evenson, Cohen, & Cox, 2007). Perceived accessibility does not equate with actual park provision or physical distance (Boehmer, Hoehner, Wyrwich, Brennan Ramirez, & Brownson, 2006; Scott et al., 2007). For example, an empirical study in Melbourne, Australia, confirmed that urban residents of lower income were more likely to have mismatches between their perceptions of the physical environment and objective measures (Ball et al., 2008). In the UK, residents of deprived neighbourhoods who lived closer to parks tended to report less perceived access to parks and less frequent use (Jones et al., 2009). These results indicate that people may have lower levels of perceived access even if the actual number of parks and facilities in their neighbourhoods is comparable to other areas. The disparity in these findings may result from variation in how accessibility is conceptualized and measured, suggesting that existing knowledge about accessibility is incomplete, especially at the individual perceptual level (Kruger, Carlson, & Kohl, 2007; Wang et al., 2013). For example, empirical studies found that the frequency of physical activity was closely associated with self-reported use but not with objectively measured environmental factors such as number of facilities (Hoehner, Brennan Ramirez, Elliott, Handy, & Brownson, 2005). A conceptual park use model developed by Byrne and Wolch (2009) posited that people's perception of park space (including accessibility) is the most influential factor in a park use decision. This argument supports other scholars who suggest that perceived accessibility is more important to understand and predict human behaviour (Kruger et al., 2007; Zondag & Pieters, 2005).

Both park-based and user-based factors may affect people's perception of park access and park use (Byrne & Wolch, 2009). Perceived park access can be explained by park-based factors (internal features that operate within park areas), including lighting, signage, locations of facilities, program and activities, landscape design, and maintenance frequency (Gobster, 1995, 1998; Reynolds et al.,