



Do adults like living in high-walkable neighborhoods? Associations of walkability parameters with neighborhood satisfaction and possible mediators

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ARTICLE INFO

Article history:

Received 20 December 2010

Received in revised form

21 March 2011

Accepted 10 April 2011

Available online 29 April 2011

Keywords:

Residential density

Walkability

Mediating analyses

PLACE model

ABSTRACT

The aims were to examine the associations between objective walkability characteristics and neighborhood satisfaction in adults, and the possible mediating effects of environmental perceptions and physical activity on these associations.

In total, 1391 adults completed a questionnaire on neighborhood satisfaction, physical activity, socio-demographics and environmental perceptions. Walkability characteristics were measured objectively using Geographic Information System databases.

Overall walkability and residential density were negatively related to neighborhood satisfaction, while connectivity and land use mix showed no significant associations. In total, 56.6% and 39.4%, respectively, of the negative associations of walkability and density with neighborhood satisfaction were mediated by perceptions of more esthetic-related problems, pollution, crime and less overall safety in highly walkable/dense neighborhoods. Moderate-to-vigorous physical activity was not a significant mediator.

Urban planners should not be discouraged to build high-walkable environments, but next to objective walkability, environmental perceptions should also be considered to achieve neighborhood satisfaction.

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1. Introduction

Despite the well-known health benefits of regular physical activity, the majority of adults in developed countries do not engage in sufficient physical activity (PA; Haskell et al., 2007). In order to develop interventions to enhance PA, it is necessary to define its most important multidimensional determinants. Recently, objectively measured neighborhood walkability (i.e. residential density, street connectivity and land use mix) has received much attention in research and has been identified as an important physical environmental correlate of PA. Many studies worldwide found that the adults living in neighborhoods with high residential density, well-connected streets and mixed land use were more physically active compared with the adults living in low walkable neighborhoods (Handy et al., 2002; Owen et al., 2007; Saelens et al., 2003; Sallis et al., 2009; Van Dyck et al., 2010).

Based on the consistent study results in adults, health researchers as well as urban planners emphasize on the importance of developing high-walkable environments to increase the physical activity and consequently to influence the population health (Michael et al., 2006; National Heart Forum, 2007). Nonetheless, before high-walkable neighborhoods are to be developed, it is necessary to examine how individuals feel about living in a high-walkable environment, since neighborhood satisfaction might play a key role in deciding whether or not to live in a particular environment. Moreover, neighborhood satisfaction has been shown to influence other factors like overall happiness, mental well-being and quality of life (Wilson et al., 2004; Phillips et al., 2005). More specifically, it is important to understand the relationship between walkability characteristics and neighborhood satisfaction and to gain an insight into the indirect pathways explaining this relationship. If adults do not like living in a high-walkable environment, initiatives to increase neighborhood walkability might not be effective in affecting the overall population health, even though physical activity levels increase.

Neighborhood satisfaction is a complex concept and can be defined in different ways, ranging from very general (i.e. satisfaction/happiness with the overall environment in which one lives)

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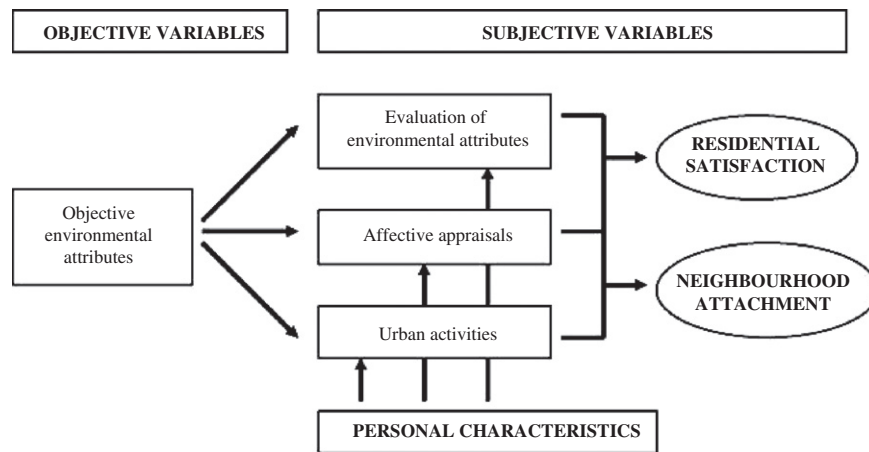


Fig. 1. Theoretical framework of the 'PLACE' theory (Canter, 1977; Aiello et al., 2010).

to more specific (i.e. satisfaction with specific environmental characteristics like activity-enhancing or social environmental attributes). According to Parkes et al. (2002), preference should be given to a more general approach, as specific definitions risks, confusing overall satisfaction with neighborhood attributes, are used to predict it.

The 'PLACE' theory, developed by Canter (1977), suggests that overall residential satisfaction is determined by evaluation of the perceived environmental attributes, affective appraisals and urban activities (Fig. 1). Furthermore, these three concepts are interrelated and are determined by objective physical environmental characteristics and personal characteristics (age, gender, socio-economic status, etc.). Perceived environmental attributes include neighborhood features like perceptions of aesthetics, natural areas, upkeep, safety and noise. Affective appraisals can be described as the first level of response to the environment, the direct emotional impact of the objective physical environment, and urban activities are the main transactions between people and their residential environments, including cultural activities, purchasing behavior, socialization, leisure/entertainment and physical activity. Based on this theoretical framework, it can be presumed that objective walkability characteristics are related to neighborhood satisfaction through indirect pathways like environmental perceptions and physical activity.

To our knowledge, no previous studies have investigated these indirect pathways between objectively assessed walkability characteristics and neighborhood satisfaction. However, some studies examined specific subcomponents of the 'PLACE' theory, such as the associations between physical environmental perceptions and neighborhood satisfaction (Guite et al., 2006; Leslie and Cerin, 2008; Parkes et al., 2002). Results of those studies showed that the perceptions of more aesthetics, more traffic safety, less crime, less noise, better access to green spaces, better walking infrastructures and more land use mix were associated with more neighborhood satisfaction. However, since some studies have shown that high objectively assessed neighborhood walkability is usually accompanied by poorer aesthetics, less traffic safety and more crime (Leslie et al., 2007; Van Dyck et al., in press), the indirect pathways between objective walkability characteristics and neighborhood satisfaction might be more complex than the direct associations found between several perceived environmental attributes and neighborhood satisfaction. The inclusion of both objective and perceived environmental attributes is an important strength of the PLACE theory because considerable discussion about the concordance between objectively assessed and self-reported physical environmental factors still exists. Some studies have found poor agreement between the

objective and perceived measures (Kirtland et al., 2003; Ball et al., 2008), while other study results showed high concordance between these two measurement modes (De Bourdeaudhuij et al., 2003; Leslie et al., 2005), indicating that it remains important to include both measures in research.

Next to investigating the relationship between perceived environmental characteristics and neighborhood satisfaction, some other studies examined the associations between urban activities and neighborhood satisfaction. Until now, no studies have investigated physical activity as an urban activity (although it is included in the theoretical framework), but other urban activities like social interactions (e.g. participation in neighborhood activities) and leisure activities (non-sport related) have been positively associated with neighborhood satisfaction in the previous studies (Amerigo and Aragonés, 1997; Aiello et al., 2010).

In summary, most previous studies examined only one sub-component of the PLACE theory and there is limited evidence on the mechanisms through which the associations between objectively assessed environmental characteristics and neighborhood satisfaction occur. Gaining insight into these mechanisms is important in order to inform policies regarding built environment planning. The main aim of the present study executed in Belgian adults was to examine the associations between objectively assessed neighborhood walkability characteristics and neighborhood satisfaction and to investigate whether physical environmental perceptions (aesthetics, crime, pollution and overall safety) and physical activity mediated the associations between walkability characteristics and neighborhood satisfaction.

2. Methods

2.1. Procedures

This study was conducted in Ghent (237 000 inhabitants, 156.18 km² and 1468 inhabitants/km²), Belgium. Data collection took place in 2009. In total, 59 sectors (neighborhoods) were randomly selected from the 201 existing statistical sectors in Ghent. Statistical sectors are the smallest units for which information on income, socio-economic status (SES) and other demographic factors is available. Every sector contains approximately 1000 inhabitants. For these 59 selected neighborhoods, walkability characteristics (residential density, land use mix and street connectivity) were measured objectively using the geographic information systems (GIS).

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