

# **Which Park Characteristics Influence The Invitingness For Park Visitation And Park-based Physical Activity In Adolescents? A Choice-based Conjoint Analysis Using Photographs**

Delfien Van Dyck, Linde Van Hecke, Ariane Ghekiere, Jelle Van Cauwenberg, Jenny Veitch, Ilse De Bourdeaudhuij, Peter Clarys, Nico Van de Weghe, Benedicte Deforche

## *Aim of the research*

The aim of this study is to examine the relative importance of ten park characteristics on park visitation and park-based physical activity (PA) among adolescents, using choice-based conjoint (CBC) analysis with manipulated photographs of parks. The following park characteristics were included in the study: upkeep, presence of play/exercise features, presence of a sport field, presence and activities of peers, walking paths, presence of homeless persons, naturalness, presence of benches, a drinking fountain and presence of a mother with a child.

## *Theoretical background*

Worldwide, almost 50% of all adolescents (12-18 years) does not meet the health guidelines for PA, recommending to engage in 60 minutes of moderate-to-vigorous PA daily [1]. Therefore, adolescents' PA should be promoted at population level. Socio-ecological models of health behavior emphasize the importance of the environment, including parks, to stimulate PA [2]. Parks and green spaces have great potential as environments to be active, especially in urban settings where outdoor PA possibilities are limited. Nonetheless, park planning is complex and combines physical, functional, social, administrative and economic environments. John Bale also described the complexity of landscapes becoming 'sportscaapes' and emphasized the importance of taking into account the multiple functions of landscapes (e.g. social, natural or ideological function) [3]. In this study, we mainly focus on the social and physical function of parks as 'sportscaapes' for adolescents.

Previous qualitative research identified important park characteristics (e.g. sport facilities, maintenance) but until now, quantitative research is lacking. Since organizational and financial challenges limit the possibility to conduct natural experiments, new methodologies such as virtual experiments have been developed. One such design is online CBC analysis using manipulated photographs. This analysis allows to define how people value different attributes (e.g. upkeep) of a product (e.g. a park) and which characteristics are most influential on respondent choice (i.e. which of two manipulated park photographs does the respondent prefer). CBC exercises are frequently used in marketing research to study consumer preferences [4]. In PA research, CBC analyses are relatively novel, but have been used before to examine for instance older adults' [5] and adolescents' [6] preferences for public open spaces.

## *Methodology, research design and data analysis*

Participants were recruited at schools in Flemish-Brabant and asked to fill in an online questionnaire and two sets of choice tasks. Ten schools near Brussels participated and in total, 1197 students from grade one to four (12-16 years) provided valid data. All participants provided written consent and the research protocol was approved by the Ethics Committee of the Ghent University Hospital. For each of the two sets of choice tasks, respondents had to

make a choice between two photographs of a park with ten characteristics manipulated on two to four levels (e.g. no/unpaved/paved walking paths). The first set of choice tasks asked to select the park most supportive for visitation, the second set to select the park most supportive for PA. In total, 6912 photographs of parks were developed and manipulated; all photographs differed in at least one manipulated factor and in each set, respondents received 10 choice tasks, each with two randomly selected photographs. In the online questionnaire, socio-demographic information, park use and PA levels were assessed using valid questions. Hierarchical Bayes Estimations were used to calculate relative average utilities that represent the desirability of each level within a characteristic and to calculate importance scores which reflect the effect of each park characteristic on the choice. Analyses were performed using Lighthouse Studio 9.2.0. (Sawtooth Software).

### *Results, discussion and implications/conclusions*

The most important park characteristic influencing the choice to visit a park was upkeep (40.8%; 95% CI=40.0, 41.6). The presence of play/exercise features was the second most important (16.1%; 95% CI=15.7, 16.5) followed by presence of a sport field (11.2%; 95% CI=10.7, 11.8). Similar to the results for park visitation, upkeep was the most important factor influencing the choice to be active in a park (34.5%; 95% CI=33.8, 35.2), followed by the presence of play/exercise features (18.2%; 95% CI=18.0, 19.1) and the presence of a sport field (13.4%; 95% CI=12.8, 14.0).

This study showed that upkeep is the most important characteristic for (active) park use in adolescents. Future studies should examine if similar characteristics are important in other age groups, and natural experiments should confirm the results of the virtual experiments. The main limitation of this study was that no actual behavior was studied, only intentions for a behavior were examined. Nonetheless, this study provided important information for policy makers and researchers, and can be used to plan future park renovations.

### *References*

1. Van Hecke L, Loyen A, Verloigne M, van der Ploeg HP, Lakerveld J, Brug J, et al. Variation in population levels of physical activity in European children and adolescents according to cross-European studies: a systematic literature review within DEDIPAC. *Int J Behav Nutr Phys Act* 2016, 13: 70.
2. Sallis JF, Cervero RB, Ascher W, Henderson KA, Kraft MK, Kerr J. An ecological approach to creating active living communities. *Ann Rev Public Health* 2006, 27: 297-322.
3. Bale J. *Landscapes of modern sport*. 1994, Leicester: Leicester University Press.
4. Orme B: Sawtooth Software: SSIWeb v8.3 Manual; 2014.  
<http://www.sawtoothsoftware.com/support/manuals/ssi-web-help>
5. Aspinall P, Thompson CW, Alves S, Sugiyama T, Brice R, Vickers A. Preference and relative importance for environmental attributes of neighbourhood open space in older people
6. Veitch J, Salmon J, Parker K, Bangay S, Deforche B, Timperio A. Adolescents' ratings of features of parks that encourage park visitation and physical activity. *Int J Behav Nutr Phys Act* 2016; 13: 73.

