Factors influencing the use of green space: Results from a Danish national representative survey

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ABSTRACT

Policy makers in Denmark are increasingly recognising the potential health benefits associated with green space, in particular with the use of green space. Knowledge on how green space is used, why it is used, and which factors influence its use, is becoming interesting for researchers, city planners and managers of green space. The present study is based on data from a nationwide study of 11 238 randomly selected adult Danes. Respondents were asked about the distance to four different types of green space, their frequency of use of each of these types of green space, and the main reasons for visiting green space. Multiple logistic regression analysis was used to investigate the association between potential predictor factors and visits to green space at least a few times per week. Results show that 66.9% of the respondents live within 300 m of green space, 43.0% visit green space every day and 91.5% visit green space at least once a week. Only 0.9% never visit green space. To enjoy the weather and get fresh air is the most important reason for visiting green space for 87.2% of the respondents. Distance to green space is not a limiting factor for the majority of the Danish population and for that reason we recommend a thorough analysis of a neighbourhood or city, its population, and the available green spaces, before deciding on a viable strategy to increase the use of green space.

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1. Introduction

The importance of providing green space close to where people live is mentioned in various city planning and health policies (e.g. Stanners and Bourdeau, 1995; Harrison et al., 1995; Public Health Office Copenhagen, 2006; Aarestrup et al., 2007) as a short distance to green space is associated with increased use (Björk et al., 2008; Coles and Bussey, 2000; Giles-Corti et al., 2005; Grahn and Stigsdotter, 2003; Jensen and Koch, 2004; Nielsen and Hansen, 2007; Roovers et al., 2002). About 25% of the health policies in Denmark mention the importance of increasing the use of green space, primarily because they expect that this will have a positive effect on the health and well being of a large part of the population (Aarestrup et al., 2007).

1.1. Research on the use of green space

Studies on use of green space published in the past 10 years can be divided in three main groups. The first group of studies focuses on the use of one specific green space (e.g. Arnberger, 2006; Arnberger and Eder, 2007; Chiesura, 2004; Janowsky and Becker, 2003; Gobster, 2002; Payne et al., 2002; Roovers et al., 2002; Tinsley et al., 2002; Yilmaz et al., 2007). A second group of studies is focusing on regional or national samples of a particular type of green space, e.g. forests or national parks (e.g. Coles and Bussey, 2000; Hörnsten and Fredman, 2000; Jensen and Koch, 2004; Pergamsa and Zaradicb, 2006). And a third group of studies deals with the use of all types of green space close to respondents' home in one or more cities or neighbourhoods (e.g. Giles-Corti et al., 2005; Grahn and Stigsdotter, 2003; Hillsdon et al., 2006; Kaczynski et al., 2009; Neuvonen et al., 2007; Sanesi and Chiarello, 2006; Sasidharan et al., 2005; Tyrväinen et al., 2007). Finally, we also found one study with a regional focus on the use of all types of green space (Björk et al., 2008), and one national study focusing on the use of all types of green space (Nielsen and Hansen, 2006, 2007).

Several studies report significant differences in the use of green space for different population segments (Coles and Bussey, 2000; Galloway, 2002; Payne et al., 2002; Sasidharan et al., 2005; Sanesi and Chiarello, 2006; Tinsley et al., 2002; Yilmaz et al., 2007). Some

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studies report different characteristics of green space, such as size and the presence of facilities, to have an effect on its use (Coles and Bussey, 2000; Giles-Corti et al., 2005; Kaczynski et al., 2009). But distance to green space is commonly seen as the most important factor related to its use; the closer a green space is to each individual home, the more it is used (Björk et al., 2008; Coles and Bussey, 2000; Giles-Corti et al., 2005; Grahn and Stigsdotter, 2003; Jensen and Koch, 2004; Nielsen and Hansen, 2007; Roovers et al., 2002). A distance of 300–400 m is often mentioned as threshold after which use starts to decline more rapidly (Coles and Bussey, 2000; Giles-Corti et al., 2005; Grahn and Stigsdotter, 2003; Nielsen and Hansen, 2007). In the UK, Natural England recommends that everyone should have access to a green space of at least 2 ha within 300 m of their home (Harrison et al., 1995). The European Environment Agency (EEA) recommends that people should have access to green space within 15 min walking distance, roughly 900–1000 m (Stanners and Bourdeau, 1995). Denmark does not have national norms or recommendations in this field. However, the city of Copenhagen has recently adopted a new planning strategy that includes an aim of providing green space within 400 m for at least 90% of its population by 2015 (Public Health Office Copenhagen, 2006).

The number of studies we found that actually mapped the distance people have to travel to their nearest green space is relatively small (Barbosa et al., 2007; Comber et al., 2008; Kessel et al., 2009; Oh and Jeong, 2007; Van Herzele and Wiedemann, 2003). The results of these studies, all based on data from one or more cities, show that the majority of the population in these cities does not have access to green space within 300 m; however, at least 90% of the population does have access to green space within 900–1000 m. The European Environment Agency (EEA) reports similar findings for access to green space within 15 min walk in their 1995 assessment of a range of European cities (Stanners and Bourdeau, 1995).

1.2. Research priorities

The research priorities for green space in the UK were mapped by Bell et al. (2007) and they mention the *lack of baseline data on people's use of parks and other green space* as a first crosscutting theme that needs to be addressed by future research. They state that this is the kind of basic research upon which much else can be founded. It includes who does and does not use green space, categorised by social groups, age group, ethnic group and by the patterns of use over time and in relation to age/life stage (Bell et al., 2007). Bell and his colleagues furthermore state that little research is available on the access to green space. Our review seems to confirm this statement and information on the distance Danes have to travel to various types of green space is not readily available, and information on the availability of different types of green space across the country and across different socio-economic groups is also lacking.

1.3. Study aim

The aims of the current study are to describe and analyse the distance to green space in Denmark and the frequency of use of green space among different population groups, as well as describing and analysing the main reasons for using green space. Factors influencing the use of green space are also analysed.

Our study supplements earlier studies and will provide policy makers in Denmark with data from a large nationwide study on the use of green space, making it possible to argue constructively for further development and planning of green space. Furthermore, having better baseline data will enable urban planners and managers of green space to undertake targeted action to stimulate the use of green space.

2. Methods

The Danish National Institute of Public Health, University of Southern Denmark, has carried out national representative interview surveys since 1987. The purpose of these surveys is to describe the status and trends in health and morbidity in the adult population (16 years or older) and in the factors that influence health status, including health behaviour and health habits, lifestyles, environmental and occupational health risks and health resources; see Ekholm et al. (2009) for a more elaborate description. The data used in the present study were collected in the health interview survey of 2005 and are based on a regionally stratified random sample of 21 832 adult Danes. The sample was drawn from the Danish Civil Registration System in which each Dane has a unique personal registration number. All selected persons received a letter of introduction that briefly described the purpose and content of the survey, emphasising that participation was voluntary. The survey was approved by the Danish Data Protection Agency and data were collected by face-to-face interviews at the respondents' home, and following the interview, all respondents were asked to complete a questionnaire. The questions regarding distance to and use of green space that form the basis for this study were posed in this questionnaire. In all, 14 566 individuals (66.7%) completed a personal interview and 11 238 persons (77.1% of those who completed the face-to-face interview) returned the questionnaire.

The respondents were asked about the distance from their home to green space. The possible answer categories were: *less than 300 m*; *300 m–1 km*; *1–5 km*; and *more than 5 km*. The question was repeated for each of the following types of green space: *beach, sea or lake; parks; forests*; and *other open nature areas,* and the question included *agricultural fields*, but these have been excluded in the data analysis due to difficulties in assessing if and how agricultural fields can be used for outdoor recreation. The respondents were furthermore asked about the frequency of use of green space (*daily, several times per week, weekly, monthly, seldom or never*). Moreover, all respondents were asked about their main reasons for visiting green space. The respondents could choose from the following options: *to enjoy the weather and get fresh air*; *following the seasons and observing flora and fauna*; *to reduce stress, to relax*; *to exercise and keep in shape*; *to do something together with family or friends*; *to be in a peaceful and quiet environment*; *to have a job working with animals, agriculture or forest*; *other reasons*; and finally *do not visit green space at all*. Respondents could give more than one reason, but for the *do not visit green space at all* option answers were only included if no other categories had been mentioned.

The education status was classified according to The International Standard Classification of Education (ISCED), which combines school and vocational education. The interviewer recorded the type of accommodation at the time of the face-to-face interview, and the sizes of the Danish municipalities were obtained from Statistics Denmark. Ethnic background was based on the self-reported country of birth and parents' country of birth and categorised according to Statistic Denmark's definition of western and non-western countries. Citizens with a Danish background were defined as those with at least one parent born in Denmark and individuals with a non-western background were defined as persons born in a non-western country by parents who are not born in Denmark or persons born in Denmark by parents born in a non-western country. Furthermore, the respondents were asked about, e.g. their cohabitation status and number of children.

2.1. Statistical analysis

Multiple logistic regression analysis was used to investigate the association between potential predictors (gender, age, cohab-

Table 1
The distance between residence and different types of green space and frequency of visits to these areas. Percentage.

	Beach, sea, lake	Park, green space	Forest	Other open natural area	Total – all green space
Distance from residence					
<300 m	16.6	53.5	21.2	39.2	66.9
300 m–1 km	22.2	31.2	28.2	27.5	26.9
1–5 km	33.6	12.4	34.6	22.6	6.0
>5 km	27.6	2.9	16.0	10.7	0.2
Frequency of visits					
Daily	13.4	30.8	11.0	27.1	43.0
Several times a week	19.9	27.8	15.7	19.8	29.9
Weekly	28.3	23.1	22.6	20.8	18.6
Monthly	28.4	12.6	33.6	20.6	6.6
Seldom or never	10.1	5.8	17.1	11.8	2.0
Distance from residence for daily visitors					
<300 m	54.9	81.1	70.3	76.6	85.4
300 m–1 km	23.7	15.1	20.1	16.2	12.7
1–5 km	15.5	3.4	8.7	5.8	1.8
>5 km	5.9	0.5	0.9	1.5	0.1
Frequency of visits for respondents living within 300 m					
Daily	44.3	46.8	36.7	52.9	54.8
Several times a week	27.5	28.4	25.2	22.4	27.5
Weekly	17.7	15.9	20.1	14.8	12.8
Monthly	7.7	6.7	13.9	7.1	3.9
Seldom or never	2.8	2.2	4.0	2.8	1.0

itation status, ISCED, accommodation type, size of municipality, socio-economic position and ethnic background) and having less than 300 m to green space. Multiple logistic regression analysis was also used to examine the relationship between potential predictors and visits to green space at least a few times per week between April and October. Interaction terms were used to examine the relation between gender and each of the potential predictor variables in determining the outcome. The results are presented as odds ratios (OR) with 95% confidence intervals (CI). Goodness-of-fit of the models was assessed by the Hosmer–Lemeshow test (Hosmer and Lemeshow, 2000), and the tests indicated that the models fit the data adequately. All estimates presented in this study were weighted to take into account the complex sampling design of the survey. Statistical analyses were performed using SAS Version 9.1.

3. Results

3.1. Distance to green space and frequency of use

As can be seen in Table 1, 66.9% of the respondents live within 300 m of any type of green space, and 53.5% reside within 300 m of a park, which is the most common green space to have nearest to one's home. Only 15.3% have to travel more than 1 km to their nearest park. The average distances to water and beaches, as well as forests are considerably longer; e.g. 27.6% need to travel more than 5 km to reach the sea, a beach or a lake. The frequency of use for the different types of green space varies: 43.0% of the respondents visit green space every day, while only 2.0% visit it seldom or never. Forest is the type of green space with the lowest frequency of visits; only 11.0% visit it daily, while 17.1% stated that they visit it seldom or never. Of all daily users of parks, 81.1% live within 300 m, 70.3% of all daily forest users live within 300 m, 76.6% of the users of other open green space live within 300 m, and 54.9% of all daily users of the sea, lakes and beaches live within 300 m. This might indicate that the effect of distance is strongest for parks whereas it is less important for the use of the sea, lakes and beaches. Of those respondents living within 300 m of the different types of green space, forests seem to be less popular for daily visits than the other types of green space: 36.7% visit a forest daily, while between 44.3 and 52.9% visit other green space daily.

3.2. Relation between frequency of use and distance

The results clearly show a decay in use of all types of green space; the larger the distance, the lower the frequency of use. The distance decay has a similar pattern for all four types of green space with the percentage of daily users dropping between 28.8 and 36.9% when the nearest green space is more than 300 m from the home (from 36.7–52.9% down to 7.9–16.0% depending on the type of green space). If the nearest green space is located more than 1 km from home the percentage of daily users drops to between 2.8 and 8.5% of the respondents. An example of the distance decay on the frequency of use of parks can be seen in Fig. 1.

3.3. Relation between socio-demographic and socio-economic variables and distance to green space

After confirming that distance also in the Danish context and for the whole country is an important factor in explaining differences in the frequency of use of green space it becomes interesting to know more about the distribution of green space among the population. Are there certain population segments (e.g. elderly, or families with children) or certain socio-economic groups that live significantly further from green space than others? The results in Table 2 show the relationship between socio-demographic and socio-economic variables and having less than 300 m to green space. There were no statistically significant interaction terms
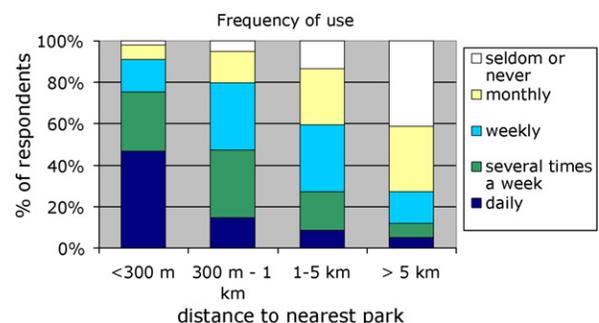

Fig. 1. Distance to the nearest park versus frequency of use, in percent of the respondents.

Table 2
Result from multiple logistic regression analysis showing the association between different socio-demographic and socio-economic variables and having less than 300 m to green areas.

	Crude %	OR	95% CI	N
Gender				
Men	67.8	1.06	0.98–1.15	5158
Women	66.2	1		5934
Age				
16–24 years	68.6	1.26	1.04–1.53	959
25–44 years	66.0	1.01	0.91–1.12	3617
45–64 years	68.2	1		4304
65–79 years	65.4	0.93	0.82–1.06	1850
80+ years	65.0	1.03	0.81–1.31	362
Combined school and vocational education[*]				
<10 years	65.0	0.82	0.72–0.93	1513
10–12 years	67.0	0.92	0.83–1.01	3010
≥13 years	67.1	1		6266
Cohabitation status[*]				
Married	69.1	1		6505
Cohabiting	63.5	0.86	0.76–0.97	1665
Single (divorced, separated, widowed)	64.5	1.01	0.88–1.16	1308
Single (unmarried)	63.9	0.85	0.73–0.98	1610
Accommodation type[*]				
Apartment building	56.5	0.74	0.66–0.82	2071
A single-, two-, three or four-family house, linked courtyard or townhouse	68.2	1		7830
Farm	87.0	2.77	2.22–3.45	923
Other (e.g. institution)	66.8	0.95	0.70–1.30	205
Size of municipality[*]				
≥100 000 inhabitants	59.9	0.54	0.47–0.63	2205
40 000–<100 000 inhabitants	60.2	0.50	0.44–0.58	2224
20 000–<40 000 inhabitants	67.3	0.66	0.57–0.76	2042
10 000–<20 000 inhabitants	72.8	0.81	0.70–0.93	2529
<10 000 inhabitants	77.4	1		2092
Ethnic background				
Danish background	66.9	1		10 895
Other western background	68.8	1.21	0.79–1.86	100
Non-western background	69.0	1.69	1.03–2.78	94

[*] $p < 0.05$.

between gender and any of the potential predictor variables (all *p*-values > 0.05). The table shows that there is no association between age and having less than 300 m to green space ($p > 0.05$). However, the analysis indicated that younger respondents (aged 16–24) were more likely to have less than 300 m to green space than individuals in the age group 45–64 years (OR: 1.26; 95% CI: 1.04–1.53). The table furthermore shows that respondents living in large municipalities (>100 000 inhabitants) have lower odds of living less than 300 m from their nearest green space than individuals living in small municipalities (<10 000 inhabitants). Individuals with a shorter education (less than 10 years) had lower odds (OR: 0.82; 95% CI: 0.72–0.94) of reporting a short distance to green space than individuals with a longer education (13 years or more).

3.4. Factors influencing the use of green space

Considering that our earlier results (Table 1 and Fig. 1) indicate a clear distance decay effect it is not surprising that also the multiple logistic regression analysis reveals that the odds of using green space at least a few times a week (between April and October) were more than three times higher (OR: 3.26; 95% CI: 2.96–3.60) when respondents live within 300 m of their nearest green space compared with respondents living 300 m–1 km from green space (see Table 3). We furthermore found a statistically significant interaction term between gender and age. For men, the odds of visiting green space at least a few days a week increased with increasing age until the age of 80 years, thereafter it decreased. However, for women, no systematic pattern was found. Furthermore, the table

shows that individuals with a shorter education were less likely to visit green space at least a few times a week than individuals with a longer education (OR: 0.81; 95% CI: 0.70–0.95). The table also shows that individuals with a non-western ethnic background had lower odds (OR: 0.38; 95% CI: 0.24–0.60) of visiting green space at least a few times a week than individuals with a Danish background.

3.5. Main reasons to visit green space

As can be seen in Table 4, *to enjoy the weather and get fresh air* is an important reason for visiting green space for 87.2% of the respondents. A difference in gender can be observed especially among young respondents: 77.8% of men and 91.8% of women between 16 and 24 years state this as an important reason. A similar gender difference can be seen for the second most important reason *to reduce stress, to relax*; 51.8% of men and 70.9% of women aged 16–24, respectively. *Stress reduction* as the main reason for a visit is clearly less important for people over 65 years, possibly indicating a general lower stress level after retirement. *Exercising and keeping in shape* is an important reason for 54.7% of the population, with little variation between gender and age groups. *Doing something together with family or friends* is equally popular among men and women, but loses importance with increasing age. Also, *to obtain peace and quiet* becomes less important with increasing age. Contrary to this, *following the seasons and observing flora and fauna* becomes more important with increasing age. Only 0.9% of the respondents never visit green space, with people over 80 being an exception (4.0 and 5.6% for men and women, respectively).

Table 3
Results from multiple logistic regression analysis showing the association between potential predictor variables and visits to green space at least a few days a week (between April and October).

	Crude %	OR	95% CI	n
*Gender and age**				
Men				
16–24 years	64.5	0.43	0.32–0.58	397
25–44 years	66.3	0.52	0.44–0.60	1644
45–64 years	75.6	0.79	0.68–0.92	2019
65–79 years	77.7	1.03	0.84–1.26	920
80+ years	64.7	0.53	0.37–0.77	157
Women				
16–24 years	72.4	0.80	0.62–1.04	560
25–44 years	71.5	0.66	0.57–0.78	1965
45–64 years	78.1	1		2272
65–79 years	73.7	0.92	0.75–1.13	914
80+ years	54.9	0.40	0.28–0.55	198
*Combined school and vocational education**				
<10 years	70.6	0.81	0.70–0.95	1503
10–12 years	71.7	0.85	0.76–0.95	2995
≥13 years	73.8	1		6245
*Cohabitation status**				
Married	75.9	1		6474
Cohabiting	69.5	0.97	0.84–1.11	1656
Single (divorced, separated, widowed)	68.4	0.80	0.69–0.94	1308
Single (unmarried)	68.1	0.92	0.79–1.08	1604
*Accommodation type**				
Apartment building	64.8	0.90	0.79–1.02	2061
A single-, two-, three or four-family house, linked courtyard or townhouse	73.9	1		7795
Farm	88.0	2.11	1.66–2.67	919
Other (e.g. institution)	69.9	0.96	0.69–1.34	206
Size of municipality				
≥100 000 inhabitants	67.0	1		2189
40 000–<100 000 inhabitants	69.6	1.03	0.90–1.18	2213
20 000–<40 000 inhabitants	74.1	1.15	0.99–1.34	2032
10 000–<20 000 inhabitants	76.6	1.15	0.99–1.34	2528
<10 000 inhabitants	78.8	1.22	1.03–1.44	2084
*Distance to green space or natural areas**				
<300 m	82.3	3.26	2.96–3.60	7477
300 m–1 km	57.7	1		2831
>1 km	36.9	0.41	0.34–0.49	669
*Ethnic background**				
Danish background	73.0	1		10 848
Other western background	73.0	1.00	0.62–1.59	101
Non-western background	53.5	0.38	0.24–0.60	94

  * $p < 0.05$.

Table 4
The most important reasons for visiting green space by gender and age group. Percentage.

	Men						Women						Total
	16–24	25–44	45–64	65–79	80+	Total	16–24	25–44	45–64	65–79	80+	Total	
To enjoy the weather and get fresh air	77.8	83.1	83.9	85.7	77.9	83.3	91.8	92.5	91.0	87.4	77.9	90.6	87.2
To reduce stress, relax	51.8	63.9	55.8	31.0	25.9	52.8	70.9	72.9	65.9	39.0	22.9	63.1	58.3
To exercise, keep in shape	57.4	48.2	48.6	59.4	50.4	51.1	58.3	53.7	60.9	61.7	46.9	57.8	54.7
To do something together with friends and family	66.1	61.5	41.9	35.1	28.1	48.6	68.9	67.5	44.9	39.7	36.3	53.7	51.3
To follow the seasons, flora and fauna	12.4	33.4	48.7	55.1	58.0	42.3	22.4	40.0	57.6	58.7	46.8	48.1	45.4
To obtain peace and quiet without noise	33.4	32.3	30.3	23.4	24.6	29.8	44.3	32.6	32.6	23.0	14.5	31.6	30.8
Other reasons	21.5	23.2	27.0	26.6	25.0	25.2	17.0	20.3	22.5	21.4	15.9	20.8	22.9
Never visit green space	0.5	0.4	0.6	1.6	4.0	0.8	0.1	0.4	0.7	1.8	5.6	0.9	0.9
n	396	1645	2016	930	158	5145	560	1966	2278	924	205	5933	11 078

4. Discussion

To our knowledge, this study is the first to examine factors influencing the use of green space based on such a large national representative sample. The results presented in this paper are part of a larger study investigating the relationship between health and green space and the possible health implications of our findings will be discussed in other publications.

4.1. Factors influencing the use of green space

Our results show that 66.9% of the population has access to a green space within 300 m; so for the majority of Danes distance is not likely to be a limiting factor for use of green space. This confirms earlier results of a Danish study by Nielsen and Hansen (2006) where only 3% of respondents considered distance to be a barrier for use. Accessibility to green space seems to be relatively good in Denmark, compared to results from two studies from the UK. Barbosa et al. (2007) found that 64% of the population in Sheffield lived more than 300 m from their nearest green space (of any size) and Comber et al. (2008) found that 89.7% of the population in Leicester did not have access to a green space of at least 2 ha within 300 m. We did not find studies from other countries that allowed a detailed comparison.

We did find a significant correlation between the use of green space and distance in our study, indicating that reducing the distance to green space for the remaining 33.1% of the population may increase their use of green space. Especially in the largest Danish municipalities (>100 000 inhabitants) this strategy seems valid as the odds of having less than 300 m to a green space are significantly lower (OR: 0.54; 95% CI: 0.47–0.63) compared to small municipalities (<10 000 inhabitants). The larger Danish cities seem to be aware of this already, e.g. in Copenhagen, the capital of Denmark, the *Health Policy 2006–2010* states that all citizens should have access to parks and other green space within 400 m of their home (Public Health Office Copenhagen, 2006).

For the majority of Danes, distance does not seem to limit the use of green space which makes it even more relevant to realise that gender, age, education, marital status and ethnic background all have a significant association with the use of green space. Similar differences were found in other studies (e.g. Payne et al., 2002; Roovers et al., 2002; Yilmaz et al., 2007). Different groups within the Danish society have different patterns of using green space and are likely to have varying constraints and facilitators for the use of green space, suggesting that there might be a need for multiple strategies, each focusing on a specific target group, to help increase the overall use of green space. Giles-Corti (2006) gives a similar recommendation based on results from a large study in Perth, Australia.

4.2. Use of green space compared to other cultural and recreational activities

Comparing the use of green space with other cultural, recreational and leisure activities that receive public funding in Denmark, it becomes clear that green space is very much used. Statistics Denmark has a comprehensive list of cultural activities with percentages of the population visiting or taking part in the activity at least once a year. Visits to a library are the most common cultural activity with approximately 64% of the population visiting at least one time a year (Bille et al., 2005), but only around 10% of the population visits a library at least weekly (Bille et al., 2005). Our study shows that nearly 82% of the Danish population visits a park at least once a week. Taking all types of green space together this increases to about 92%. However, many green spaces are used as a route for transport, and these 'passing through' visits are included.

Visits to a park or a library are not in any way equal or substituting each other, but compared to the use of other cultural, recreational and leisure opportunities our study shows a high frequency of use of green space.

4.3. Future perspectives

Our results show a different use of green space, and various reasons for this use, for diverse groups of people. An interesting perspective for future research could be to explore these differences further and discover if it is possible to construct a number of typologies of users identifying their motivations, the activities they undertake in green space, as well as the facilitators and constraints that influence their use of green space. From a planning perspective this thought is especially interesting if these groups can be identified geographically, i.e. determine how many people of each typology live in a certain neighbourhood. Having this information would make it possible to design and manage green space according to what the expected local user wants.

We briefly explored the distribution of green space in relation to socio-economic variables in this paper, but a more detailed study seems relevant in the future as different authors come to different conclusions. Some North American studies (e.g. Heynen et al., 2006; Wolch et al., 2005) conclude that deprived areas have less green space whereas Barbosa et al. (2007) and Kessel et al. (2009) found that areas with a lower socio-economic status have better access to green space in two UK cities and the same was found in Perth, Australia, by Giles-Corti and Donovan (2002).

In the present study, we had no information about which green space the respondents were thinking of when they answered the questionnaire, which means that we can not draw conclusions about the effect of the quality of a green space on the frequency of use. It seems logical to assume that people are willing to travel a bit further to a very attractive green space and a relevant topic for further research would therefore be to find out if and how the attractiveness of green space affects the frequency of use. Developing a method to assess the attractiveness of green space as experienced by the users, is another issue worth exploring. Inspiration can most likely be found in the Spaceshaper approach developed in the UK by the Commission for Architecture and the Built Environment (2007). The Spaceshaper approach includes, e.g. a standardized quality assessment to be conducted jointly by all stakeholders that utilise and manage green space.

Green space is clearly a much used leisure opportunity, but how does it compare to other leisure opportunities when it comes to public funding? Calculating 'costs per visit' to a green space, paid by the tax-payer, would be an interesting next step that could further qualify a policy debate on spending of public funding on leisure and cultural activities.

4.4. Discussion of methodology

A major strength of the present study is that it is based on a large national representative sample. We have no knowledge of other nationwide studies looking into the use of green space with such a large number of respondents. The present study makes it possible to draw general conclusions about the use of green space of the entire adult Danish population, and the factors influencing this use.

In the current study we have chosen to ask respondents to estimate the distance to their nearest green space, which seems to be a better predictor for the frequency of use than the objectively measured distance (e.g. Scott et al., 2007), most likely because it reflects the respondents' opinion and knowledge of the green space. If a green space is well-known and well-liked, respondents are likely

to underestimate the distance, if it is less-known and disliked, distance is likely to be overestimated (Scott et al., 2007).

A possible limitation of this study could be the relatively high non-response rate (48%) and, for that reason, non-response analyses were carried out. The analyses showed that the non-response was particularly high among young men and among the elderly. In order to evaluate the effects of non-response on the estimates in the present study, some central indicators (combined school and vocational education, long-standing disease and self-rated health) from the personal interview questionnaire were selected to compare the individuals who completed the self-administered questionnaire with those who did not complete the self-administered questionnaire. The analyses showed that the frequencies (prevalence) are, overall, similar in the two groups and the small differences do not seem to alter the total prevalences substantially (data not shown). However, the prevalence of individuals with a high education and a very good or good self-rated health was somewhat lower among individuals that did not return the self-administered questionnaire. Overall, there is no indication that non-response has seriously biased the results of the present study.

Another possible limitation of our questionnaire could be the use of different types of green space without presenting the respondents with clear definitions of these different types. This means that we do not exactly know when respondents identified a green space as being a certain type; i.e. we do not exactly know when is a park seen as a park, or a forest as a forest.

5. Conclusions and recommendations

Distance to green space is not a limiting factor for 66.9% (about 3.6 million persons) of the Danish population and for that reason a general strategy aimed at providing more green space close to people will probably not increase the use of green space. We therefore recommend a more site specific approach that builds on a thorough analysis of a neighbourhood or city, its population, and the available green spaces, before deciding on a viable strategy to increase the use of green space. A more active use of population demographics and background characteristics for surrounding neighbourhoods could be helpful when planning and managing green space.

However, city planners should continue to take the distance to green space into consideration, especially for new residential areas, in areas with many residents with limited mobility, and in larger cities where distance is more likely to be a limiting factor. In existing neighbourhood innovative solutions are needed as adding more green space is often impossible, but more knowledge on possible solutions still needs to be gained.

Green space is a relatively cheap and much used cultural and leisure facility to the Danish population compared to other leisure and cultural opportunities. Calculating more precise cost per visit could be a relevant input to budget negotiations in any city as this could demonstrate that green space often delivers a lot for a relatively small budget.

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