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In plain sight: Green views from the residence and urbanites' neighborhood satisfaction

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Research highlights

- Satisfactory green views positively associated with neighborhood satisfaction
- Green views found to matter more than general presence of greenery in neighborhood
- Beautiful buildings most strongly associated with neighborhood satisfaction
- Building envelope greenery has synergistic potential for neighborhood satisfaction

Abstract

Recent decades have seen theoretical and empirical support being generated for a positive relationship between exposure to nature and human well-being. However, exposure to nature is diverse. It can stem from spending time in green spaces, or simply from being able to observe greenery, such as from inside one's residence. The literature has devoted limited attention to the extent to which green views as a specific type of nature exposure contribute to satisfaction and well-being in urban areas. Therefore, this paper examines whether having satisfactory green views from within an urban residence is positively associated with the residents' neighborhood satisfaction. We use survey data from a large probability sample (n=32,552) of respondents from 13 cities in the Flanders region of Belgium to run four binary logistic regression models that estimate the probability of reporting specific levels of neighborhood satisfaction. Each model is weighted to be representative of the urban population in these cities (N=1,344,327) and statistically controls for the perceived presence of sufficient greenery in the neighborhood, 47 other self-reported neighborhood attributes, personal characteristics, and socio-demographic information. We find that urbanites who are more satisfied with the green views from their residence are more likely to report high neighborhood satisfaction. Our findings support the hypothesis that simply viewing greenery from within one's residence improves neighborhood satisfaction.

1. Introduction

1.1 Urban livability

As urbanization continues to intensify, it is increasingly important to know how to design high-quality, livable neighborhoods for the growing number of urban residents (Mouratidis & Yiannakou, 2022). Both urban planners and policy makers aim to shape livable cities (Mouratidis & Yiannakou, 2022; van Kamp, Leidelmeijer, Marsman, & de Hollander, 2003; Wu, Chen, Yun, Wang, & Gong, 2022). Urban livability has also received considerable academic interest (Mouratidis & Yiannakou, 2022; van Kamp et al., 2003), as studying and understanding how the urban environment influences health and well-being is essential in order to develop successful housing policies and improve urbanites' quality of life (Lu, 1999; Mouratidis & Yiannakou, 2022; van Kamp et al., 2003).

Urban livability has been defined as "the ability of urban spaces to [fulfill] the expectations of its inhabitants for quality of life and well-being" (Saitluanga, 2014, in Wu et al., 2022). Given that satisfaction can be defined as "the extent to which needs are met" (Lovejoy, Handy, & Mokhtarian, 2010), residential satisfaction is closely related to the concept of livability. It represents the connection between the social and spatial urban environment on one hand, and the needs and preferences of its inhabitants on the other (Moor, Hamers, & Mohammadi, 2022).

As a component of residential satisfaction, neighborhood satisfaction is a cognitive measure of urban livability at the neighborhood scale, which is among the most widely accepted scales for urban planning (Mouratidis & Yiannakou, 2022). Furthermore, neighborhood satisfaction represents a domain of general life satisfaction, and is associated with respondents' subjective well-being (Mouratidis, 2020; OECD, 2013).

1.2 Green views in urban landscapes

Among various livable city initiatives, greening of the urban landscape is a key dimension that has been consistently embraced and promoted (Wu et al., 2022). Evidence generally suggests that residential green space has beneficial health effects through three pathways: reducing the harm of environmental stressors, increasing opportunities for physical activity and social interaction (the so-called 'instoration'-pathway), and fostering psychological restoration (Daniels et al., 2022; Hartig, Mitchell, de Vries, & Frumkin, 2014; Markevych et al., 2017). However, urban nature is diverse and not all types of urban nature can be expected to contribute to human health through each of those three pathways. Whereas green spaces such as parks and gardens are suited for physical activity and social interaction, smaller-scale greenery, such as street trees and green façades, does not offer these opportunities for instoration. Nonetheless, theories such as the psychoevolutionary theory (also called stress reduction theory; see Ulrich, 1983), the attention restoration theory (Kaplan & Kaplan, 1989), and the biophilia hypothesis (Kellert & Wilson, 1993) suggest that simply being able to view greenery could be sufficient to benefit human well-being through psychological restoration. Given that individuals may spend 80-90 percent of their time indoors or in closed transit (US EPA, 1989), the role that having green window views may play for urban livability warrants specific attention.

Several studies have investigated the relationship between greenery and neighborhood satisfaction. Some of these studies have shown that objectively measured presence of greenery can be linked to neighborhood satisfaction (Ellis, Lee, & Kweon, 2006; Hur, Nasar, & Chun, 2010; Lee, Ellis, Kweon, & Hong, 2008; Wu, Yao, Song, He, & Wang, 2021), while others have examined which aspects or qualities of greenery were associated with neighborhood satisfaction (Bjork et al., 2008; de Jong, Albin, Skarback, Grahn, & Bjork, 2012; Jorgensen, Hitchmough, &

Dunnett, 2007; Ta, Li, Zhu, & Wu, 2021). Still others have assessed how the accessibility and use of green spaces relates to neighborhood satisfaction (Hadavi, Kaplan, & Hunter, 2018; Wu, Dong, Sun, & Yun, 2020; Zhang, Van den Berg, Van Dijk, & Weitkamp, 2017).

However, only a few studies have looked specifically at the relationship between natural views and neighborhood satisfaction. In the 1980s, Kaplan (1985) studied how natural and unnatural views (among other factors) were associated with four subdomains of neighborhood satisfaction. A notable result was that having views of open space (large mowed areas) was not related to any of the neighborhood satisfaction subdomains, whereas the other types of natural views (views of trees, woods, landscaped areas, and gardens) were found to be significantly associated with at least one neighborhood satisfaction subdomain. In a later study, Kaplan (2001) investigated whether window views, including views of natural elements, were associated with two neighborhood satisfaction subdomains (nature satisfaction and satisfaction with other neighborhood characteristics, which has unfortunately been labeled 'satisfaction with neighborhood'). Views of both landscaped and untended nature were found to be positively associated with the nature satisfaction subdomain, and views of landscaped nature were found to be positively associated with the remaining (not nature-related) neighborhood satisfaction subdomain.

Kearney (2006) found that natural views from one's home were associated with satisfaction with nearby nature, satisfaction with shared outdoor space, and concern about local density. Specifically, views of landscaping or a garden and views of a forest were found to be most consistently associated with higher satisfaction and lower concern. Finally, Van Herzele and de Vries (2012) surveyed a sample of respondents in two neighborhoods in Ghent, Belgium, that differed in terms of availability and accessibility of greenery. They found that having a green view from the living room was significantly positively associated with neighborhood satisfaction. In a separate regression model, the perceived presence of sufficient greenery was found to be positively associated with neighborhood satisfaction, alongside neighborhood safety, social cohesion, and well-maintained public spaces. However, the two greenery-related variables (having a green view from the living room and perceived presence of sufficient greenery) were not simultaneously included in one regression model, nor were any personal or socio-demographic variables.

To summarize, the existing literature suggests that having green views from one's residence may be positively related to that person's overall neighborhood satisfaction. However, certain modeling choices in the literature (namely, splitting up neighborhood satisfaction into several subdomains, running regression models with specific subsets of predictors to determine which ones to include in a final model) prohibit drawing clear conclusions about how strongly having green views from the residence is associated with overall neighborhood satisfaction – both in absolute terms and relative to other neighborhood characteristics associated with overall neighborhood satisfaction. Moreover, each of these studies was based on relatively small samples that are unrepresentative of the general (urban) population (the largest one being the sample of Kaplan's 1985 study (n=268), within which the majority of respondents were in their twenties and only 10 percent were over the age of 40).

1.3 Study objective

In this paper, we quantify the association between having satisfactory green views from an urban residence and the residents' overall neighborhood satisfaction, while controlling for the perceived presence of sufficient greenery in the neighborhood. Thus, we assess whether urban residents who feel the same about the general level of greenery in their neighborhood but differently about the green views from their residence are expected to differ in terms of their overall neighborhood satisfaction.

The present study contributes to the existing literature in three ways. First, we analyze data from a large probability sample (n=32,552) of respondents selected from 13 cities in the Flanders region of Belgium. Instead of being limited to a convenience sample collected in one specific geographical location, our weighted results are representative of the entire urban population of these Flemish cities in terms of the age and sex of the inhabitants. Second, by estimating models of overall neighborhood satisfaction instead of separate neighborhood satisfaction subdomains, we quantify how having green views from the residence relates to neighborhood satisfaction in its totality. Third, by simultaneously including satisfaction with green views from the residence, the perceived presence of sufficient greenery in the neighborhood, 47 other self-reported neighborhood attributes, personal characteristics, and socio-demographic variables into the regression models, we minimize omitted variable bias and enable a comparison of the practical relevance of specific neighborhood attributes in terms of their strength of association with overall neighborhood satisfaction.

2. Method

2.1 Data

The data of this study were collected by the Domestic Affairs Agency of Flanders, Belgium, in the context of a municipality and city monitoring program ("Gemeente- en Stadsmonitor") to support local governments' policy development. In May–June 2017, a questionnaire was distributed among residents of 13 Flemish cities aged 16 or above, according to a stratified sampling design (included as Supplementary Material). The questionnaire was designed to gauge how respondents feel about the city they live in and asked them to evaluate a range of neighborhood and city characteristics, as well as to report on aspects of their personal life, such as their housing situation, social life, health status, and personal and household characteristics. Of the 90,175 residents who were contacted, approximately 38% replied, resulting in a sample of 32,585 respondents after data cleaning. As this is a probability sample, the sample design can be accounted for during the data analysis and the weighted results are representative for the urban population of these 13 cities (N=1,344,327) in terms of age and sex of the inhabitants. A Dutch-language report with further details on the sampling design is available online (Agentschap Binnenlands Bestuur, 2018). Details about the cities' surface area, number of inhabitants, and availability and accessibility of urban greenery can be found in Appendix A.

Neighborhood satisfaction was measured on a five-point Likert scale, with answers ranging from "very dissatisfied" to "very satisfied". The core variable of interest – satisfaction with green views from the residence – was measured on the same scale. The other greenery-related neighborhood attribute – perceived presence of sufficient greenery in the neighborhood – was measured on a six-point Likert scale, with five options ranging from "completely disagree" to "completely agree", and "don't know/not applicable" being the sixth option. The survey did not give the respondents specific definitions of the neighborhood, green views, or greenery.

Respondents also evaluated 48 other neighborhood attributes (five-point Likert scales ranging from "never" to "all the time", "completely dissatisfied" to "completely satisfied", or "completely agree" to "completely disagree" – the latter sometimes expanded with a sixth option "not applicable/don't know/no opinion"). These 48 neighborhood attributes fall into three categories: neighborhood environment and services, nuisance in the neighborhood, and social cohesion in the neighborhood. One additional neighborhood attribute – ethnic makeup of the neighborhood – was also measured on a five-point Likert scale that ranged from “nearly all of the people who live in this neighborhood are of Belgian descent” to “nearly all of the people who live in this neighborhood are of non-Belgian descent”.

To avoid omitted variable bias, certain aspects of respondents’ personal lives that may be associated with their neighborhood satisfaction and their awareness of greenery in the neighborhood should be included in the regression analyses (see below) as statistical control variables. In line with Campbell’s model of residential satisfaction (Campbell, Converse, & Rodgers, 1976), the extent to which residents are aware of their neighborhood surroundings is expected to influence neighborhood satisfaction. Some variables in the data set could be indicators for residents’ awareness of their neighborhood surroundings: the number of years a respondent has lived at their current address, whether or not the respondent experienced hindrance during daily activities due to a chronic illness (which may indicate restricted mobility or specific mobility needs), and the frequency with which they used different modes of transportation (indicating how actively respondents move about in their neighborhood).

To further minimize the risk of omitted variable bias, we decided to include additional variables that are expected to be associated with neighborhood satisfaction (Lovejoy et al., 2010). These are the reported monthly housing cost and whether or not a respondent had trouble paying this cost (economic neighborhood environment), whether the respondent was involved in organizing and/or partook in neighborhood activities (community involvement), and their commuting time to work or school (in relation to traffic congestion/satisfaction with traffic).

Lastly, a set of socio-demographic variables was included in the analyses to control for individual differences in perceptions and, consequently, neighborhood satisfaction (Campbell et al., 1976). These variables are the respondent’s age and sex as officially registered, whether they have Belgian nationality and/or a migratory background, their household size, whether or not underage children were present in the household, the respondent's education and professional status, their perceived financial status, and their net monthly household income. In total, 73 variables were selected for subsequent analyses.

2.2 Imputing missing values

Across the above-mentioned variables, there was missing data in about two thirds of the observations in the data set. Multiple imputation was chosen as technique to deal with the missing data (for an introduction, see van Buuren (2018)). It is an advanced imputation method that yields unbiased estimates and accurate standard errors under the assumption that the missingness mechanism is MAR (missing at random; Newman, 2014). Diagnostic tests as proposed by Hair, Black, Babin, and Anderson (2018) indicated that the data satisfy this assumption.

As the multiple imputation procedure consists of a series of regression analyses, the categorical neighborhood attribute variables needed to be included in the multiple imputation model using dummy-coding. This would result in models consisting of well over 200 variables, which far exceeds the recommended maximum of 100 variables for multiple imputation models (Graham, 2009). Therefore, we decided to first run categorical principal components analyses on the neighborhood attribute variables (results included as Supplementary Material). Categorical principal components analysis (CATPCA) simultaneously performs optimal scaling – transforming the original categorical variables into metric variables – and applies principal components analysis to the transformed variables (Linting, Meulman, Groenen, & van der Kooij, 2007; Linting & van der Kooij, 2012). Including the metric transformations of the original categorical variables in the imputation model eliminated the need for dummy-coding.

Before starting to generate imputed values, we removed cases with extremely large proportions of missing data (at least 80% of model variables missing) from the data set. Because multiple imputation imputes missing data using the predicted values of regression models, it is likely that the imputed values for these problematic cases would be unreliable. This reduced the number of observations available for further analyses by 33 to 32,552. The final survey weights provided with the data were adjusted so that they would still sum to the total age and sex subpopulations in each stratum.

We then applied multiple imputation and generated 50 completed datasets using the R package MICE (van Buuren & Groothuis-Oudshoorn, 2011). As shown by Graham, Olchowski, and Gilreath (2007), generating at least 40 completed data sets is sufficient, unless the fraction of missing information is very high (>0.5). All variables of the substantive model were considered for inclusion in the imputation model, but variables with a variance inflation factor of 2.5 or larger were excluded in order to avoid biased regression coefficient estimates due to problematic multicollinearity. An inspection of the convergence plots showed healthy convergence of the MICE algorithm (plots included as Supplementary Material).

After the multiple imputation step, the transformed neighborhood attribute variables were recoded to their original categorical coding scheme in each of the 50 completed data sets. While the use of the metric transformations of these variables in subsequent analyses would result in simpler models, it would be impossible to assign a meaningful interpretation to the results because the unit of measurement of the transformed variables is undefined. The original categorical neighborhood attributes, on the other hand, need to be dummy-coded in order to be used as predictors in the subsequent analyses, but do have a meaningful interpretation based on the labels of the Likert scales used to measure them.

2.3 Logistic regression models

Given that neighborhood satisfaction was measured using a five-point Likert scale, the common approach would be to use an ordered logistic regression model to estimate associations between neighborhood satisfaction and the predictors of interest. However, this type of model only applies if the data meets the proportional odds assumption, which assumes that the location component of the model – the linear combination of predictor variables and their respective regression coefficients – remains equal across all cumulative levels of the outcome variable, and that only the so-called thresholds (that is, constants) differ across levels (McCormick & Salcedo, 2017). We suspected that the variables of interest may violate this assumption: if neighborhood greenery is considered to be a non-essential neighborhood attribute that is "nice to have", the greenery-related variables may not be as strongly correlated with low levels of neighborhood satisfaction (that is, neighborhood dissatisfaction) as they are with high levels of neighborhood satisfaction. In order to lift the proportional odds assumption, another modeling approach can be used, in which one estimates a binary logistic regression model for each cumulative level of the outcome variable.

Taking the latter approach, we estimated four binary logistic regression models, accounting for the stratified sample design, weighting the results for representativeness, and pooling them across the 50 multiply imputed data sets. The dependent variables of the four models correspond to the cumulative levels of the outcome, neighborhood satisfaction: (M1) "Very dissatisfied", (M2) "At best rather dissatisfied", (M3) "At best neither satisfied nor dissatisfied", and (M4) "At best rather satisfied". The same set of predictor variables was used in each model. Given that the categorical neighborhood attribute variables were included in the substantive model as dummy-coded variables, we checked again for potential multicollinearity problems before estimating the regression models. Using a variance inflation factor threshold of 2.5, it was decided to remove five predictor variables from the analyses (availability of playgrounds, sufficient activities for teens, commuting time to work, nationality, and age). Most of the remaining 67 variables were categorical in nature, which, after dummy-coding, resulted in models with 271 predictor variables. For all categorical predictors, the population-level mode was chosen as the reference category.

Formally, the estimated models (M) can be written as follows:

$$M1{:}\ logit\big(P(Very\ dissatisfied)_j\big)$$
$$= \alpha + \beta_1\, GV_{1j} + \beta_2\, GV_{2j} + \beta_3\, GV_{3j} + \beta_4\, GV_{5j} + \beta_5\, SG_{1j} + \beta_6\, SG_{2j} + \beta_7\, SG_{3j}$$
$$+ \beta_8\, SG_{4j} + \beta_9\, SG_{6j} + \beta_{10}\, Pred_{10j} + \cdots + \beta_{271}\, Pred_{271j} + e_j$$

$$M2{:}\ logit\big(P(Very\ dissatisfied\ \cup\ Rather\ dissatisfied)_j\big)$$
$$= \alpha + \beta_1\, GV_{1j} + \beta_2\, GV_{2j} + \beta_3\, GV_{3j} + \beta_4\, GV_{5j} + \beta_5\, SG_{1j} + \beta_6\, SG_{2j} + \beta_7\, SG_{3j}$$
$$+ \beta_8\, SG_{4j} + \beta_9\, SG_{6j} + \beta_{10}\, Pred_{10j} + \cdots + \beta_{271}\, Pred_{271j} + e_j$$

$$M3{:}\ logit\big(P(Very\ dissatisfied\ \cup\ Rather\ dissatisfied\ \cup\ Neither\ satisfied\ nor\ dissatisfied)_j\big)$$
$$= \alpha + \beta_1\, GV_{1j} + \beta_2\, GV_{2j} + \beta_3\, GV_{3j} + \beta_4\, GV_{5j} + \beta_5\, SG_{1j} + \beta_6\, SG_{2j} + \beta_7\, SG_{3j}$$
$$+ \beta_8\, SG_{4j} + \beta_9\, SG_{6j} + \beta_{10}\, Pred_{10j} + \cdots + \beta_{271}\, Pred_{271j} + e_j$$

$$M4{:}\ logit\big(P(Very\ dissatisfied\ \cup\ Rather\ dissatisfied\ \cup\ Neither\ satisfied\ nor\ dissatisfied$$
$$\cup\ Rather\ satisfied)_j\big)$$
$$= \alpha + \beta_1\, GV_{1j} + \beta_2\, GV_{2j} + \beta_3\, GV_{3j} + \beta_4\, GV_{5j} + \beta_5\, SG_{1j} + \beta_6\, SG_{2j} + \beta_7\, SG_{3j}$$
$$+ \beta_8\, SG_{4j} + \beta_9\, SG_{6j} + \beta_{10}\, Pred_{10j} + \cdots + \beta_{271}\, Pred_{271j} + e_j$$

where subscript *j* represents the *j*-th respondent and GV_1 through GV_5 and SG_1 through SG_6 represent the dummy-coded levels of "satisfaction with green views from the residence" and "sufficient greenery in the neighborhood", respectively (GV_4 and SG_5 are the reference categories of these variables and are therefore not included in the model). The remaining 262 predictors in the model are represented by the "*Pred*"-terms (the full list of predictors can be found in the regression output included as Supplementary Material). Approximate separation was checked for each categorical predictor variable and the outcome of each of the four estimated models. As all cell frequencies were larger than five (Hair et al., 2018), we concluded that approximate separation was not an issue.

Goodness-of-fit of the estimated regression models was tested by applying the Hosmer-Lemeshow test to 1000 random draws of size 1000 from the larger data set, for each of the 50 multiply imputed data sets. As reported by Paul, Pennell, and Lemeshow (2013), the Hosmer-Lemeshow test is overpowered when applied to large samples. They suggest two potential solutions for data sets larger than 25,000 observations, one of which is to draw random samples of a standard size of 1000 from the data set, apply the Hosmer-Lemeshow test to these subsamples, and evaluate the resulting set of p-values to assess model fit. The null hypothesis of good model fit was not rejected at the 5% significance level in the majority of the random draws (69.8% for M1, 73.1% for M2, 83.0% for M3, and 85.8% for M4), so we concluded that model fit was acceptable.

While the primary output of logistic regression models indicates which predictor variables are statistically significantly associated with the outcome and whether the relation is positive or negative, interpreting the results is less straightforward given that the outcome is modeled on a log-odds scale. Therefore, in the results section, we first discuss the regression output (Section 3.2) and then provide an interpretation of the results by showing how the estimated probability of a modal Flemish city dweller to report a certain level of neighborhood satisfaction changes as their evaluation of the greenery in their neighborhood changes (Section 3.3). To further ease the interpretation, the estimated probabilities resulting from M3 and M4 are inverted and represent the neighborhood satisfaction levels "At least rather satisfied" and "Very satisfied", respectively.

Finally, we assessed the practical relevance of having green views from the residence in urban areas by comparing how strongly this variable is associated with neighborhood satisfaction relative to other neighborhood attributes. Given the broad scope of the estimated regression models, incorporating no fewer than 67 predictors of neighborhood satisfaction, we expected minimal omitted variable bias and assumed that the strength of association of predictor variables with neighborhood satisfaction can be reliably compared.

3. Results

3.1 Descriptive statistics

Figure 1 presents descriptive information of the variables of interest of this study: neighborhood satisfaction, satisfaction with green views from the residence, and perceived presence of sufficient greenery in the neighborhood. Descriptive statistics of all variables can be found in the Supplementary Materials.

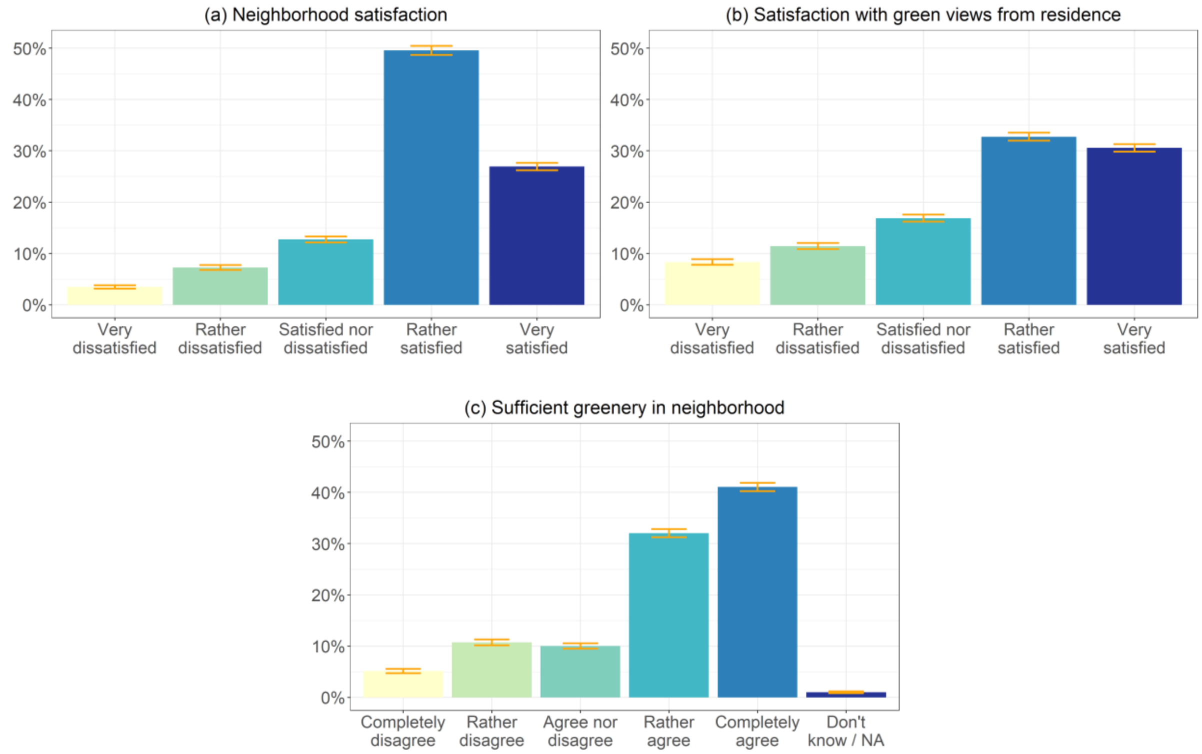
3.2 Binary logistic regression results

Regression results regarding satisfaction with green views from the residence and perceived presence of sufficient greenery in the neighborhood can be found in Table 1 (full regression results are provided in the Supplementary Materials). The significance of the regression results is evaluated at the 5% significance level throughout this paper.

Table 1 (a) shows the results of Model 1, estimating the log-odds of the probability of being very dissatisfied with the neighborhood: neither greenery variable has statistically

Figure 1

Estimated population totals for each level of the variables of interest, expressed as percentages of the total population of the 13 Flemish cities under study (N = 1,344,327).



Note. Error bars represent 95% confidence intervals.

significant regression coefficients in this model. The results of Model 2 are shown in Table 1 (b). Being very dissatisfied with the green views from one's residence is associated with an increased probability of being dissatisfied with the neighborhood compared to a modal Flemish city dweller who reports being rather satisfied with their green views from the residence. Reporting other levels of satisfaction with green views is not significantly associated with changing probabilities of dissatisfaction with the neighborhood. Table 1 (b) also shows an association between not agreeing to the statement that there is sufficient greenery present in the neighborhood and increased probabilities of reporting dissatisfaction with the neighborhood.

However, the differences between completely disagreeing, rather disagreeing, or neither agreeing nor disagreeing with that statement are not statistically significant.

Table 1

Regression coefficients and 95% confidence intervals of the four estimated models for the variables of interest, "satisfaction with green views from the residence" and "sufficient greenery in the neighborhood" (full output in Supplementary Materials).

	(a) Model 1	(b) Model 2	(c) Model 3	(d) Model 4
Modal Flemish city dweller	-5.2131	-3.8100	-2.9003	0.8264
Satisfaction with green views from residence				
Very dissatisfied	0.3032	0.2803*	0.3126**	0.2176
	[-0.0299; 0.6363]	[0.0531; 0.5074]	[0.1150; 0.5103]	[-0.0333; 0.4684]
Rather dissatisfied	-0.0681	0.0091	0.1293	0.2224*
	[-0.5480; 0.4117]	[-0.2053; 0.2236]	[-0.0386; 0.2971]	[0.0230; 0.4218]
Neither satisfied nor dissatisfied	-0.0388	-0.0619	0.1272	0.0574
	[-0.3790; 0.3014]	[-0.2521; 0.1283]	[-0.0146; 0.2690]	[-0.0931; 0.2079]
Rather satisfied	-	-	-	-
Very satisfied	0.0340	-0.0790	-0.2089**	-0.5000**
	[-0.2367; 0.3048]	[-0.2620; 0.1041]	[-0.3509; -0.0668]	[-0.6028; -0.3973]
Sufficient greenery in the neighborhood				
Completely disagree	0.2819	0.3047*	0.2816*	0.0390
	[-0.1648; 0.7286]	[0.0228; 0.5867]	[0.0305; 0.5328]	[-0.3434; 0.4214]
Rather disagree	0.0064	0.3701**	0.2848**	0.1021
	[-0.3770; 0.3897]	[0.1596; 0.5806]	[0.1089; 0.4607]	[-0.1101; 0.3142]
Neither agree nor disagree	0.3090	0.3924**	0.3399**	0.1171
	[-0.0225; 0.6405]	[0.1777; 0.6071]	[0.1723; 0.5076]	[-0.0678; 0.3020]
Rather agree	-0.0866	0.1504	0.1023	0.1229*
	[-0.3426; 0.1695]	[-0.0166; 0.3173]	[-0.0255; 0.2302]	[0.0142; 0.2315]
Completely agree	-	-	-	
Don't know / NA	0.0187	0.2582	0.3510	0.0387
	[-0.6178; 0.6553]	[-0.3392; 0.8555]	[-0.1269; 0.8290]	[-0.4176; 0.4949]

Note. Model 1 estimates the log-odds of the probability of being very dissatisfied with the neighborhood. Model 2 estimates the log-odds of the probability of being at best rather dissatisfied with the neighborhood. Model 3 estimates the log-odds of the probability of being at best neither satisfied nor dissatisfied with the neighborhood. Model 4 estimates the log-odds of the probability of being at best rather satisfied with the neighborhood.

* p-value < 0.05; ** p-value < 0.01

Table 1 (c) shows the results of Model 3. We find that respondents who are very dissatisfied with the green views from their residence are significantly more likely to report a lack of neighborhood satisfaction (that is, being very dissatisfied, rather dissatisfied, or neither satisfied nor dissatisfied) than a modal Flemish city dweller who is rather satisfied with their green views. Moreover, respondents who are very satisfied as opposed to rather satisfied with the green views from their residence, are significantly less likely to report a lack of neighborhood satisfaction. Similar to the results of Model 2, not agreeing to the statement that there is sufficient greenery in the neighborhood is associated with an increased probability of reporting a lack of neighborhood satisfaction (no significant differences between completely disagreeing, rather disagreeing, or neither agreeing nor disagreeing).

Finally, Table 1 (d) shows the results of Model 4. Respondents who are very satisfied with the green views from their residence are significantly less likely to report not being very satisfied with their neighborhood (that is, being very dissatisfied, rather dissatisfied, neither satisfied nor dissatisfied, or rather satisfied) in comparison to a modal Flemish city dweller who is rather satisfied with their green views. In other words, those who are very satisfied with the green views from their residence are significantly more likely to be very satisfied with their neighborhood than their peers who are rather satisfied with their green views. On the other hand, respondents who are rather dissatisfied with the green views from their residence are significantly more likely to report not being very satisfied with their neighborhood. Regarding the general perceived presence of greenery in the neighborhood, those who rather agree instead of completely agreeing with the statement that there is sufficient greenery in their neighborhood are significantly more likely to report not being very satisfied with their neighborhood (Table 1 (d)).

As described in Section 2.3, we chose to estimate four binary logistic regression models instead of one ordered logistic regression model in order to lift the latter's proportional odds assumption. A comparison of the regression coefficients across the four estimated models shows that the proportional odds assumption was indeed violated for the variables of interest in this study (for example, the coefficient on being "very satisfied" with one's green views from the residence varies from +0.0340 in Model 1 to -0.5000 in Model 4).

3.3 Probability interpretation of logistic regression results

Table 2 shows the predicted probabilities for a modal Flemish city dweller to experience a certain level of overall neighborhood satisfaction, corresponding to the four estimated regression models (the predicted probabilities of Models 3 and 4 have been inverted to ease interpretation).

According to the regression models' predictions, a modal Flemish city dweller is extremely likely to be satisfied with their neighborhood (94.79%, of which 30.44% falls into the "very satisfied" category) and extremely unlikely to be dissatisfied with their neighborhood (bold-faced probabilities in Table 2). We find that reporting to be very satisfied with the green views from one's residence is associated to a statistically significant degree with increased probabilities of being (very) satisfied with the neighborhood compared to the modal response of being rather satisfied with one's green views (Table 2, Panel a). Moreover, we find that reporting dissatisfaction with green views from the residence is associated with lower probabilities of being (very) satisfied with the neighborhood and a slight increase in the probability of being dissatisfied with the neighborhood.

Regarding the perceived presence of sufficient greenery in the neighborhood (Table 2, Panel b), not agreeing to the statement that there is sufficient greenery in the neighborhood is

Table 2

Estimated probabilities of modal respondents of being very dissatisfied, dissatisfied, satisfied, or very satisfied with their neighborhood.

(a)	Neighborhood satisfaction							
Satisfaction with green views from residence	"Very dissatisfied"		"At best rather dissatisfied"		"At least rather satisfied"		"Very satisfied"	
Very dissatisfied	0.73%		2.85%	*	93.01%	**	26.04%	
Rather dissatisfied	0.51%		2.19%		94.11%		25.95%	*
Neither satisfied nor dissatisfied	0.52%		2.04%		94.12%		29.24%	
Rather satisfied	**0.54%**	ref.cat.	**2.17%**	ref.cat.	**94.79%**	ref.cat.	**30.44%**	ref.cat.
Very satisfied	0.56%		2.01%		95.73%	**	41.91%	**

(b)	Neighborhood satisfaction							
Sufficient greenery	"Very dissatisfied"		"At best rather dissatisfied"		"At least rather satisfied"		"Very satisfied"	
Completely disagree	0.72%		2.92%	*	93.21%	*	29.62%	
Rather disagree	0.54%		3.11%	**	93.18%	**	28.32%	
Neither agree nor disagree	0.74%		3.17%	**	92.83%	**	28.02%	
Rather agree	0.50%		2.51%		94.26%		27.90%	*
Completely agree	**0.54%**	ref.cat.	**2.17%**	ref.cat.	**94.79%**	ref.cat.	**30.44%**	ref.cat.
Don't know / NA	0.55%		2.79%		92.75%		29.63%	

Note. (a) Estimated probabilities for respondents with differing levels of satisfaction with green views from the residence, all else being equal. (b) Estimated probabilities for respondents with differing opinions on whether there is sufficient greenery in the neighborhood, all else being equal. Asterisks indicate a statistically significant difference with respect to the reference category at the 5% (*) and 1% (**) significance levels.

associated with a lower probability of being satisfied and a higher probability of being dissatisfied with the neighborhood compared to respondents who completely agree with that statement (the differences between completely disagreeing, rather disagreeing, or neither agreeing nor disagreeing are not statistically significant). Those who rather agree with the statement that there is sufficient greenery in the neighborhood are significantly less likely to be very satisfied with their neighborhood than those who completely agree with that statement, while we find no significant difference for those who do not agree that there is sufficient greenery in their neighborhood.

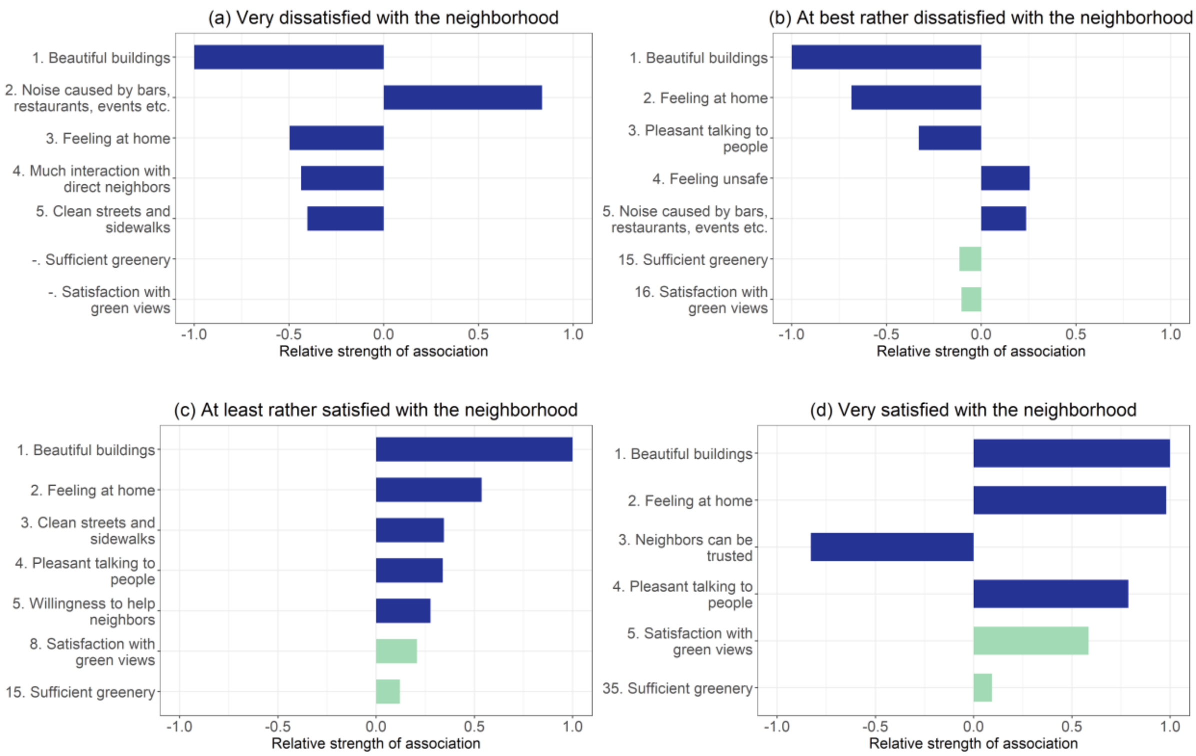
3.4 Ranking statistically significant predictors of neighborhood satisfaction

To determine how strongly the dummy-coded predictor variables are associated with each of the four cumulative levels of neighborhood satisfaction (the outcome variables of the four estimated models), we first adjusted the regression results for non-significant differences between levels of the categorical predictor variables and then calculated the range of estimated probabilities across the levels of these predictor variables. For example, the estimated probability of being satisfied with the neighborhood (Model 3) for someone who completely agrees with the statement that buildings in the neighborhood are beautiful is 95.68%, while the estimated probability for someone who completely disagrees with that statement is 82.60%, resulting in a probability range across variable levels of about 13.08 percentage points. Predictor variables with larger probability ranges are considered to be more strongly associated with the cumulative neighborhood satisfaction outcome variables.

Figure 2 shows the five predictors with the largest probability ranges for a modal respondent in each of the estimated models, as well as the core variables related to neighborhood greenery. Positive and negative values indicate positive and negative association with the outcome, respectively. Satisfaction with green views from the residence is only relatively weakly associated with neighborhood dissatisfaction, as this predictor is not statistically significant in Model 1 and ranks sixteenth out of 22 statistically significant variables in Model 2. However, Models 3 and 4 show that it is rather strongly associated with neighborhood satisfaction, ranking eighth out of 31 and fifth out of 36 statistically significant variables in these models, respectively. As is the case with satisfaction with green views from the residence, perceived presence of sufficient greenery in the neighborhood is only relatively weakly associated with neighborhood dissatisfaction (not significant in Model 1, ranking fifteenth out of 22 significant variables in Model 2). In contrast to satisfaction with green views from the residence, however, the perceived presence of sufficient greenery in the neighborhood is also only relatively weakly associated with neighborhood satisfaction: it ranks fifteenth out of 31 significant variables in Model 3 and only 35th out of 36 in Model 4.

Figure 2

Strength of association of predictor variables with specific levels of neighborhood (dis)satisfaction.



Note. Strength of association expressed relative to the variable with the largest difference in predicted probabilities across its range (that is, the variable with the strongest association with the outcome). Numbers indicate variables' ranks among statistically significant predictor variables. "Sufficient greenery" and "Satisfaction with green views" were not significantly associated with being very dissatisfied with the neighborhood, so panel (a) shows no association strength for these variables.

With respect to the non-greenery-related variables, the perceived presence of beautiful buildings in the neighborhood is most strongly associated with neighborhood satisfaction across all models, followed by the extent to which people feel at home among their neighbors. Overall, aesthetic neighborhood attributes – beautiful buildings, clean streets and sidewalks, and green views from the residence – are relatively strongly related to neighborhood satisfaction, along with social cohesion (feeling at home, pleasant talking to people) and perceived safety (the full list of ranked predictor variables is available as Supplementary Material).

3.5 Robustness checks

After estimating the full model described in Section 2.3, we checked the robustness of the results by evaluating several alternative model specifications. A visual summary of this robustness check can be found in the Supplementary Materials. First, we estimated four alternative models (1-4) with subsets of control variables included in the full model (5). We also re-estimated the full model on 10 imputed data sets resulting from an alternative imputation model to check robustness to the choices made in the imputation procedure (6). Furthermore, we estimated two models with slightly different specifications based on the results of the CATPCA procedure. One of these models included a more restricted set of dummy-coded control variables which were selected as surrogate variables to cover all of the components that were derived in the CATPCA procedure (7). In the other model (8) the individual dummy-coded neighborhood attributes were replaced with component scores derived from the CATPCA procedure (except for the greenery-related variables of interest and the other neighborhood attributes in the same component, which were still included as individual dummy-coded variables; see also the CATPCA results in the Supplementary Materials). The component scores were calculated by multiplying the metric transformations of the categorical neighborhood attribute variables by their respective component weights (being the fraction of a variable's component loading and the square root of that component's eigenvalue). To evaluate the goodness-of-fit of these alternative model specifications, we used the same procedure as for the full model (Section 2.3). Model fit was acceptable for all alternative model specifications.

All regression coefficients that were previously reported as being statistically significantly different from zero consistently have the same sign across all alternative model specifications. Moreover, there are only two instances where a statistically significant coefficient becomes insignificant in an alternative specification, while remaining statistically significant in all other specifications. These slight deviations do not affect the main finding of the study: satisfaction with green views from the residence is found to be positively associated with overall neighborhood satisfaction, independently of the perceived presence of sufficient greenery in the neighborhood. Some alternative model specifications produce statistically significant regression coefficients that are not significant in the results reported in this paper. Thus, the reported results can be deemed conservative estimates.

4. Discussion

We find that satisfaction with green views from the residence is statistically significantly and positively associated with neighborhood satisfaction, independent of the perceived presence of sufficient greenery in the neighborhood. In other words, between two Flemish urbanites who feel the same way about the overall level of greenery in their neighborhood (whether it is sufficient or insufficient), the one who is more satisfied with the green views from their residence has a higher likelihood of being (very) satisfied with the neighborhood. Moreover, the association between satisfaction with green views from the residence and neighborhood satisfaction becomes stronger for higher levels of neighborhood satisfaction. Especially, the probability of being very satisfied with the neighborhood is predicted to be much higher for those who are very satisfied instead of rather satisfied with the green views from their residence (+11.47 p.p. for a modal urbanite).

We also find that satisfaction with green views from the residence is of potential practical relevance when compared to other neighborhood attributes, particularly in relation to neighborhood satisfaction (Models 3 and 4) as opposed to neighborhood dissatisfaction (Models 1 and 2). While our results indicate that neither of the greenery-related variables is strongly associated with neighborhood dissatisfaction, we find that satisfaction with green views is a relatively strong predictor of (high) neighborhood satisfaction. On the other hand, the general perceived presence of sufficient greenery in the neighborhood is only of moderate to low relevance for neighborhood satisfaction when compared to other neighborhood attributes.

Our findings are in line with the results of earlier studies linking green views to neighborhood satisfaction (Kaplan, 1985, 2001; Kearney, 2006; Van Herzele & de Vries, 2012), which also found evidence for a positive relation between (specific types of) green views and subdomains of neighborhood satisfaction. However, instead of investigating subdomains of neighborhood satisfaction, our study quantifies how having green views from the residence relates to neighborhood satisfaction in its totality. This is useful because finding a statistically significant relation between a neighborhood attribute and a subdomain of neighborhood satisfaction (for example, green views and satisfaction with nature in the neighborhood) does not mean that that neighborhood attribute is also significantly associated with overall neighborhood satisfaction. Moreover, linking neighborhood attributes to neighborhood satisfaction in its totality makes it possible to compare the strength of association of different neighborhood attributes, thus providing a better understanding of which attributes are most relevant in relation to overall neighborhood satisfaction.

Lu (1999) argued for the use of regression models that are appropriate for the measurement level of the outcome variable. Given that neighborhood satisfaction – the outcome variable of this study – was measured on an ordinal scale, ordered logistic regression would be a common modeling choice. However, we hypothesized that the proportional odds assumption of the ordered logistic regression model could be violated, so we chose to estimate binary logistic regression models for each of the four cumulative levels of neighborhood satisfaction. Our results (Section 3.2) show that the proportional odds assumption is indeed violated for the core variable of interest – satisfaction with green views from the residence – which highlights the importance of carefully evaluating the appropriateness of a modeling approach. Moreover, estimating a separate model for each cumulative level of neighborhood satisfaction makes it possible to observe differences in the strength of association of the predictor variables across levels of neighborhood satisfaction. For example, the perceived presence of sufficient greenery in the neighborhood was found to be a differentiating factor between reporting neighborhood satisfaction and dissatisfaction (Models 3 and 2, respectively), while satisfaction with green views from the residence was mainly associated with reporting (high) neighborhood satisfaction (Models 3 and 4; see also Table 2).

Given that mental health conditions are highly prevalent and largely undertreated worldwide (WHO, 2022), it is relevant to study the well-being enhancing effects of nature experience. Our findings provide additional empirical support for green views as a valuable type of nature experience, which is in line with theory suggesting that green views may provide psychological restoration by reducing stress levels (Ulrich, 1983), alleviating mental fatigue

(Kaplan & Kaplan, 1989), and fulfilling a basic human need for contact with nature (Kellert & Wilson, 1993), which ultimately improves residents' mental well-being (Hartig et al., 2014; Markevych et al., 2017). Previous research has linked green window views to relaxation and improved mood states (Elsadek, Liu, & Xie, 2020), a reduced risk of anxiety and depression (Braçe et al., 2020), student performance (Matsuoka, 2010), employee well-being (Gilchrist, Brown, & Montarzino, 2015), and general life satisfaction (Chang et al., 2020), whereas the present study has focused on neighborhood satisfaction as an indicator of urban livability.

In an increasingly urbanized world, it is challenging to preserve and enhance opportunities for nature experience (Bratman et al., 2019). Mouratidis (2021) proposed to "integrate various forms of urban nature as much as possible" as a strategy for improving subjective well-being through urban planning. While some research has indicated that accessible and usable neighborhood green spaces are related to neighborhood satisfaction (Wu et al., 2020; Zhang et al., 2017), our results show that visibility of urban greenery may also be a contributing pathway to urbanites' neighborhood satisfaction. In densely built-up city areas, where it may be difficult to introduce new green spaces such as parks or private gardens, smaller-scale greenery such as street trees and green façades (Elsadek, Liu, & Lian, 2019) could present a flexible solution to increase the number of natural views. This is especially relevant in light of a recent finding that dynamic green exposure during active travel does not compensate for a lack of static exposure in one's neighborhood (Wang et al., 2021). Some evidence suggests that street trees contribute to landscape preference and reduce the oppressiveness of streetscapes (Asgarzadeh, Lusk, Koga, & Hirate, 2012; Jiang, Larsen, Deal, & Sullivan, 2015). The study by Suppakittpaisarn, Larsen, and Sullivan (2019) provides a preference ranking of several urban green infrastructure types and indicates that flowers, trees, and well-maintained but structurally diverse roadside greenery are most preferred. However, research should go beyond types of urban greenery and also investigate whether specific characteristics of urban green infrastructure types matter for viewers' satisfaction. For example, Loder (2014) found that views of prairie-style green roofs were not always well-liked by office workers, but were more likely to be associated with fascination and well-being than sedum green roofs.

In line with previous research (Lovejoy et al., 2010; Mouratidis & Yiannakou, 2022), neighborhood aesthetics and upkeep, social cohesion, and perceived safety were found to be most strongly associated with neighborhood satisfaction. The aesthetic neighborhood attributes associated most strongly with neighborhood (dis)satisfaction were beautiful buildings and clean streets and sidewalks, followed by satisfaction with green views from the residence. These findings offer some opportunities for urban planners to play into synergies between urban greening and other neighborhood attributes that are strongly associated with neighborhood satisfaction. As Smardon (1988) pointed out, "the particular promise of urban vegetation is that it can be one of the most cost effective and rapid improvements in the aesthetic quality of degraded urban environments". Specific types of green infrastructure, such as green façades, living walls, or green roofs, can be used to simultaneously beautify buildings and increase the number of green views in the neighborhood, even in densely built-up city areas. Moreover, urban green spaces could be designed to facilitate social interaction and contribute to social cohesion and feelings of safety in the neighborhood. However, while designing for enhanced livability, urban planners and designers should be mindful of the potential gentrification-inducing effects of greening urban neighborhoods (Wolch, Byrne, & Newell, 2014), in order to avoid displacing vulnerable groups of urbanites as their neighborhood gets upgraded.

The main limitations of this study are related to the nature of the available data. While the data set underlying this study is relatively rich in terms of both variables and observations, it is cross-sectional in nature, which prevents us from making causal claims about the effects of greenery on neighborhood satisfaction. Also, the data set does not include detailed geolocational data, which precludes complementing the available survey data with objective measures of neighborhood greenery. Moreover, respondents were not asked to report on their preferences for or satisfaction with specific types of green views, as the primary purpose of this government-collected data set was to support local governments' policy development in several domains, not just regarding urban green infrastructure. While studies like the ones by Loder (2014) and Suppakittpaisarn et al. (2019) provide some insight, future work should further assess which types and characteristics of urban green infrastructure afford beneficial viewing experiences to urbanites (Ko et al., 2022). Lastly, because most predictor variables were measured on an ordinal scale, we could not pursue an investigation into moderation effects between satisfaction with green views and other predictor variables in the model. This remains an avenue for future research to explore. Longitudinal studies would also contribute to a better understanding of the role that green views can play for neighborhood satisfaction and well-being in urban environments. Such studies could follow up on whether the neighborhood satisfaction of urbanites changes when greenery, such as street trees or green façades, is added in view of their residence, or compare the neighborhood satisfaction of people who move between locations with different types of views while controlling for confounding neighborhood characteristics.

5. Conclusion

The results of this study indicate that urbanites who are more satisfied with the green views from their residence are more likely to report high neighborhood satisfaction, independently of their perception of the general level of greenery in their neighborhood. In contrast to existing studies, we used a large probability sample (n=32,552) and obtained weighted results representative of the urban population of 13 cities in the Flanders region of Belgium. Our findings imply that greenery that can be seen from the residence is valuable to urban residents. Greenery that can be flexibly introduced into the existing urban landscape, such as street trees and green façades, presents urban planners and designers with a way to leverage this finding and contribute to meeting the need for livable neighborhoods in an increasingly urbanized world.

CRediT author statement

Pieter Fonteyn: Conceptualization, Investigation, Data curation, Methodology, Formal analysis, Visualization, Writing – Original draft, Writing – Review & editing; **Silvie Daniels:** Writing – Review & editing; **Robert Malina:** Conceptualization, Funding acquisition, Writing – Review & editing; **Sebastien Lizin:** Conceptualization, Funding acquisition, Supervision, Writing – Review & editing.

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d=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C86thru90%5CTxt%5C00000022%5C9100MFRK.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL.

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Appendix A: City characteristics

Table A.1

Characterization of the 13 cities where data has been gathered.

City	Antwerp	Ghent	Bruges	Leuven	Aalst	Mechelen	Hasselt
Surface area in km²	204.32	157.77	140.99	57.51	78.65	65.79	102.69
% residential greenery [a]	31.1	33.1	31.2	44.1	39.9	39.1	44.3
% neighborhood greenery [b]	15.2	14.0	19.2	27.1	29.2	30.1	39.1
% ward greenery [b]	12.0	9.2	15.2	21.2	24.1	25.1	34.1
% district greenery [b]	9.0	6.1	13.0	18.1	20.1	20.1	32.9
% city greenery [b]	8.1	4.1	12.1	16.9	19.0	19.0	30.0
% urban forest [b]	3.0	2.1	11.0	11.0	12.1	16.0	27.0
Inhabitants	414,540	213,486	100,519	84,188	70,281	68,577	65,548
% within 150m walking distance of residential greenery	99.9	100.0	100.0	100.0	100.0	100.0	100.0
% within 400m walking distance of neighborhood greenery	86.9	94.3	97.3	98.1	98.6	94.1	97.7
% within 800m walking distance of ward greenery	57.7	51.1	53.5	52.3	80.7	78.5	65.0
% within 1600m walking distance of district greenery	59.0	60.8	62.9	67.6	98.2	97.3	92.1
% within 3200m walking distance of city greenery	94.0	89.9	83.8	98.9	99.1	98.2	99.0
% within 5000m walking distance of urban forest	68.7	79.4	94.9	98.9	99.1	98.2	99.0

Note. Sources: STATBEL via Statistiek Vlaanderen (surface area in 2020; Statistiek Vlaanderen, n.d.) and Stadsmonitor 2017 (number of inhabitants, availability and accessibility of urban greenery; Agentschap Binnenlands Bestuur, 2018a).

[a] Any type of urban greenery of any size. [b] Publicly accessible urban greenery or nature area of a minimal size of 0.002 km² (neighborhood greenery), 0.1 km² (ward greenery), 0.3 km² (district greenery), 0.6 km² (city greenery), or 2 km² (urban forest).

Table A.1 Continued

Characterization of the 13 cities where data has been gathered.

City	Kortrijk	Sint-Niklaas	Oostende	Genk	Roeselare	Turnhout
Surface area in km²	80.69	84.20	40.95	87.57	60.40	56.71
% residential greenery [a]	24.1	30.1	38.1	65.2	23.1	39.9
% neighborhood greenery [b]	9.2	17.2	27.1	48.1	6.2	38.1
% ward greenery [b]	4.2	12.0	24.1	46.1	2.2	36.1
% district greenery [b]	3.0	11.0	23.0	45.0	2.1	34.9
% city greenery [b]	2.1	9.0	22.0	42.9	1.0	34.1
% urban forest [b]	0.0	6.1	14.0	42.0	0.0	34.0
Inhabitants	62,802	61,970	61,092	54,313	51,016	35,995
% within 150m walking distance of residential greenery	100.0	100.0	98.5	100.0	100.0	100.0
% within 400m walking distance of neighborhood greenery	96.7	95.1	95.8	98.6	95.8	97.5
% within 800m walking distance of ward greenery	32.1	41.7	89.8	98.7	24.8	73.6
% within 1600m walking distance of district greenery	21.8	66.0	98.2	98.8	34.2	99.1
% within 3200m walking distance of city greenery	77.7	84.9	98.6	98.8	64.8	99.5
% within 5000m walking distance of urban forest	0.0	69.5	98.6	98.8	0.0	99.5

Note. Sources: STATBEL via Statistiek Vlaanderen (surface area in 2020; Statistiek Vlaanderen, n.d.) and Stadsmonitor 2017 (number of inhabitants, availability and accessibility of urban greenery; Agentschap Binnenlands Bestuur, 2018a).

[a] Any type of urban greenery of any size. [b] Publicly accessible urban greenery or nature area of a minimal size of 0.002 km² (neighborhood greenery), 0.1 km² (ward greenery), 0.3 km² (district greenery), 0.6 km² (city greenery), or 2 km² (urban forest).