



Urban greenspace for social integration: Which types of greenspace do new-Swedes prefer and why?

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ABSTRACT

Urban greenspace (UGS) is a key public resource offering a broad range of nature-based solutions and is increasingly looked to as a potential arena to promote social integration in Europe's increasingly multicultural urban and peri-urban areas. However, relatively little research has explored the preferences and perceptions of immigrants in relation to UGS, especially in European contexts. Without such knowledge, planners risk entrenching planning structures that inadvertently result in segregation and environmental injustice. Using survey and participatory mapping methods with 261 immigrants in eight sampled settlements across Sweden, this study explores which types of UGS foreign-born immigrants in Sweden (i.e., new-Swedes) prefer and why. We found that new-Swedes are frequent users of a wide spectrum of UGS types, with the most preferred types including forests, large parks and lakes. The majority of respondents were satisfied with the quality (73%), availability (68%) and accessibility (76%) of UGS in their hometowns. Our regression analysis identified 51 key factors that had a meaningful effect on preferences for different types of UGS. Key factors were distributed relatively evenly across blocks of predictor variables concerning characteristics of UGS, socio-demographic factors, activity preferences, and perceptions. Our results indicate that new-Swedes' UGS preferences are broadly comparable with those of the general population in Sweden. We found little evidence to suggest that ethnocultural factors played a major role in the preferences of our respondents. Furthermore, our results suggest that nature-connectedness might be an important determinant of new-Swedes' UGS preferences. Based on these findings, we highlight several opportunities to further develop UGS strategies to support different dimensions of social integration, e.g., using popular UGS as interactive spaces for cultural learning, as a platform for inter-cultural contacts and for maintaining cultural traditions, and to contribute towards a greater sense of social membership in their new country. A crucial implication of our study is that the use of UGS to support social integration may further contribute to the increasing complexity of the UGS planning and management challenge. This implies the need for a systems perspective in UGS research, policy-making, planning and management to consider UGS as part of an integrated urban social-ecological system and to coordinate measures across sectors.

1. Introduction

According to current trends, 68% of the global population will live in urban areas by 2050 (UN DESA, 2019). The share of foreign-born residents is growing faster in cities than in other areas and international migration accounts for roughly one third of urban population growth in developed countries (Skeldon, 2018, UN-Habitat., 2020). Europe is the destination for more than 30% of the global international migrant

population (IOM., 2021). In the European Union (EU), 13.1% of residents are born outside of the country in which they currently reside, i.e., *foreign-born*, of which the overwhelming majority are concentrated in urban and peri-urban areas (Eurostat., 2021).

Improved integration of immigrants into European societies has become a crucial policy issue during the recent decade. Large influxes of refugees have raised new challenges regarding the development of sustainable living environments in Europe's increasingly multicultural

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urban and peri-urban areas. In addition, poor social integration, not only of immigrants but of different social groups, is increasingly viewed as a long-term threat to social trust and democratic values and as a risk factor contributing to civil unrest (United Nations, 2017, MSB, 2022). The EU's approach to social integration is based on the core principle of "inclusion for all", which implies that policies need to be transformed to take into account the specific challenges and needs of different groups (European Commission, 2020). While EU integration policies have primarily emphasised fundamental rights, education, employment, housing and health, there are growing calls at the European and national levels for new tools and arenas to promote social integration of immigrant populations (e.g., European Commission, 2020, Cetrez et al. 2020). However, improved understanding concerning the goals, motivations and preferences of different groups is crucial to the efficacy of new approaches to facilitate social integration in migrant-receiving societies (Safdar et al. 2023).

A growing scholarship during recent decades has argued the potential utility of urban greenspace (UGS) as a key public resource offering nature-based solutions to a broad range of social and ecological challenges, including for supporting social integration (e.g., Jay and Schraml, 2009, Jennings and Bamkole, 2019, Edge et al. 2023). For example, studies show that UGS close to an individual's home facilitates the use of outdoor spaces for intra- and inter-group social interaction (Holtan et al. 2015, Hordyk et al. 2015), which is a key mechanism of social integration (Paolini et al. 2018). Similarly, supply of UGS facilities (e.g., benches, tables, playgrounds) has also been linked with various positive social processes and outcomes (Cattell et al., 2008, Kingsley and Townsend 2006). Further, the spatial distribution of UGS (Germann-Chiari and Seeland 2004), frequency of visitation (Elbakidze et al. 2022), the presence of other users (Picascia and Mitchell 2022), and subjective environmental factors like perceived greenness (de Vries et al., 2013), perception of safety (Hong et al., 2018), and other social, emotional, and normative dimensions of nature experience (Tedeschi et al., 2022) have been explored in relation to social integration. At the planning level, the participation of different ethnic groups in the design of UGS has been linked with improved social interactions in UGS (Peters et al., 2010, Teig et al., 2009) and in different Nordic countries organized forms of nature contact for immigrants have been framed as Nature Based Integration (Pitkänen et al. 2017, Gentin et al. 2018, Singleton, 2021).

Despite this growing body of evidence, comparatively little empirical research has investigated the diversity of perspectives amongst and within different groups of immigrants concerning UGS preferences in European contexts (Gentin et al. 2019, Calderón-Argelich et al. 2021). Existing studies that consider the perspectives of immigrants tend to focus on specific types of UGS such as urban parks (e.g., Horolets et al. 2023), specific groups of immigrants (e.g., Jay and Schraml, 2009), small samples (e.g., Lorentzen and Viken, 2021), or on a limited geographical extent (e.g., specific cities) (e.g., Lisberg Jensen et al., 2014, Ono et al. 2023). Few studies have investigated which types of UGS immigrants prefer or the role of ethnocultural factors in these preferences (Kloek et al. 2013). This is a crucial gap because immigration is the key process driving ethnocultural diversity in Europe (Ordóñez-Barona, 2017). Given the role of ethnocultural factors in shaping individual and/or group identities, the lack of such knowledge limits the potential to leverage UGS to support social integration of people from different cultural backgrounds (e.g., Gentin et al. 2019) and increases the risk of urban planners relying on assumptions about immigrants and their preferences for UGS. Such assumptions include that ethnocultural factors play an important role in shaping lifestyle and recreational preferences and perceptions of nature (Byrne and Wolch, 2009, Ordóñez-Barona, 2017); that because they are related to ethnocultural factors, preferences and perceptions are homogeneous across ethnic groups, thereby ignoring the diversity of perspectives within groups (Kloek et al. 2013, 2016, Jay and Schraml, 2014); and that preferences and perceptions necessarily differ from those of established/

native groups (Byrne and Wolch, 2009, Kloek et al. 2016).

Many studies therefore recommend greater consideration of environmental justice perspectives in UGS planning (Timmons Roberts et al. 2018, Calderón-Argelich et al. 2021, Plüschke-Altöf and Sooväli-Seping, 2022). Such perspectives consider how social inequalities might influence a broad range of issues concerning UGS interactions, including for whom and for what purposes UGS is/isn't accessible, i.e., *distributive justice*; who is/isn't involved in decision-making processes concerning UGS, i.e., *procedural justice*; and who is/isn't able to express themselves in their own way and whose needs, values, preferences and identities are/aren't respected in relation to UGS planning, i.e., *recognitional justice*.

This study has three aims: 1) to explore the preferences of first generation immigrants in Sweden (i.e., foreign-born *new-Swedes*) for different types of UGS, 2) to understand the degree to which a variety of factors relating to both characteristics of UGS and to characteristics of individual users (including ethnocultural factors) might explain these preferences, and 3) to consider what this means for urban planning aimed at maximizing the flows of benefits from UGS in increasingly multi-cultural societies. Sweden is a useful case study in this regard, given its general abundance of high quality UGS, and its comparability with other Northern European countries both in terms of cultural background and UGS planning (Kloek et al. 2013, Randrup et al. 2017). In-migration, including the recent rapid influx of refugees from Syria and Ukraine, is a key factor in Sweden's rapid demographic and cultural change during recent years (Swedish Government., 2022). Socio-economic polarisation among new- and native Swedes and growing inequality raise spatial planning challenges regarding the development of inclusive living environments in increasingly multicultural urban areas (e.g., Sjöberg and Kings, 2022). We therefore discuss the implications of our study for UGS planning strategies to support the social integration of immigrants in Sweden and similar contexts.

2. Methods

2.1. Background: urban greenspace and immigration in Sweden

Swedish settlements typically enjoy some of the highest rates of available UGS per capita in Europe (European Commission, 2016). Nearly 90% of people in Sweden live in urban areas (SCB, 2018), including a majority of new-Swedes (SCB, 2020). Territorial UGS (i.e., excluding water objects) accounts for roughly 63% of urban land area in Sweden (SCB 2019a). Roughly 40% of this is publicly available, of which most is lawn (Hedblom et al. 2017), whilst 37% is linked to private gardens or is otherwise inaccessible to the public (SCB 2019a). Sweden's national urban development strategy emphasises the role of UGS in supporting a sustainable, healthy and attractive built environment (Swedish Government, 2018), and roughly 99% of urban residents live within 300 m of one or more green areas >0.5 ha (SCB 2019a), whilst 94% have access to a nature-protected area (e.g., nature reserve) within 5 km (SCB 2019b). Public access to nature is closely integrated with national environmental objectives and people have the right-to-roam across most lands (*allmansrätten*) (Naturvårdsverket, 2019). However, lower income groups and people born outside Sweden have been shown to visit UGS less often (Svenska Turistföreningen, 2017). Residents of larger cities also have much less publicly available UGS compared to residents in smaller towns (SCB 2019a).

In 2022, roughly 20% of the population was born outside of Sweden, compared to 11% in 2000 (SCB 2019c). This share is expected to increase to 23% by 2040 (SCB 2019c). Of these new-Swedes, slightly over 40% originated from other European countries, 39% came from Asia, particularly from Syria, Iraq, Iran, Afghanistan and India; and 12% are born in Africa (particularly Somalia and Eritrea). Only about 6% of new-Swedes came from Latin & North America, the Caribbean & Oceania (SCB 2019c). In 2021, more than 10% of new-Swedes were living in relative poverty, which was seven times more likely compared to

native-born Swedes (SCB, 2022a).

2.2. Data collection

We employed a structured questionnaire combined with a public participatory geographic information system (PPGIS) approach (e.g., Sieber, 2006) to collect the data across Sweden. The survey tool was developed considering the findings of previous studies concerning the influence of different factors on people's interactions with UGS (Ordóñez-Barona, 2017, Farahani and Maller, 2018, Elbakidze et al. 2022, Dawson et al. 2023). The survey tool included blocks of questions relating to: 1) respondents' *socio-demographic* profile, including age, gender, education level, employment status, self-reported health and economic status, marital status, number of children living in the household as well as respondents' ethnic background and immigration history, including country of origin, how long they had lived in Sweden, reasons for immigrating, experience of nature in their countries of origin and what type of settlement they had spent the most of their childhood in (e.g., city, suburb, small town, village, countryside); 2) *UGS characteristics* including respondents' general preferences for different types of UGS, and which modes of transport they used to access the UGS they used most frequently; 3) *activity preferences* in UGS, including how frequently they used UGS; 4) *perceptions*, including perceived functions, constraints and problems relating to UGS in and around towns where respondents lived, as well as their satisfaction with perceived quality, availability and accessibility of UGS in these areas (see Appendix 1 for the questionnaire).

Data was collected between August 2021 and January 2022 in nine urban settlements in Sweden (Fig. 1) – Malmö (n=28), Arlööv (6), Karlskrona (53), Växjö (11), Örebro (37), Västerås (39), Hällefors (7), Fagersta (39), and Umeå (41). Settlements were selected to represent a spectrum of settlement sizes and population densities, and to broadly reflect the country's south-north geographical disposition, variations in climate, and vegetation types. Malmö and Arlööv were later amalgamated into a single study area (n=34) due to their close geographical proximity and overlapping UGS surrounding these areas, which were frequently visited by respondents from both settlements.

Respondents were selected to obtain a gender-balanced sample of both women and men and to capture a gradient of ages from younger (18+) to older adults. We also iteratively adjusted our selection over time (Kloek et al. 2013) to ensure that our sample broadly reflected the current distribution of ethnic backgrounds (at regional scale) amongst foreign-born immigrants in Sweden (SCB, 2022b). Potential respondents were identified and contacted with diverse approaches, including via municipal work placement programs, ethnic associations, in adult education centres (e.g., Swedish language education programs for immigrants) and through private networks and social media. Respondents were also directly approached in public areas such as shopping centres, libraries, and public streets. However, we intentionally excluded UGS as places for interviews.

Survey data was collected face-to-face using SurveyMonkey software. Respondents were presented with a short project description prior to the survey and were given the opportunity to ask questions about the project. Respondents were informed that they could always skip a question or stop participating, even if they had given their consent, and that consent could be withdrawn at any time during the research process by contacting the researcher in charge. Respondents' names were not collected and all collected data was pseudonymized before it was processed and transferred to a secure storage, with each interview assigned a reference number.

Following our PPGIS approach, we asked respondents to identify (i) where they currently lived, and (ii) the location of three (or fewer) UGS which they liked to use the most in the Mergin interactive mapping tool (<https://merginmaps.com/>). If respondents were unable to localize a specific UGS on the map, they described it and interviewers helped to localize it for them. Interviewers asked whether they used specific places

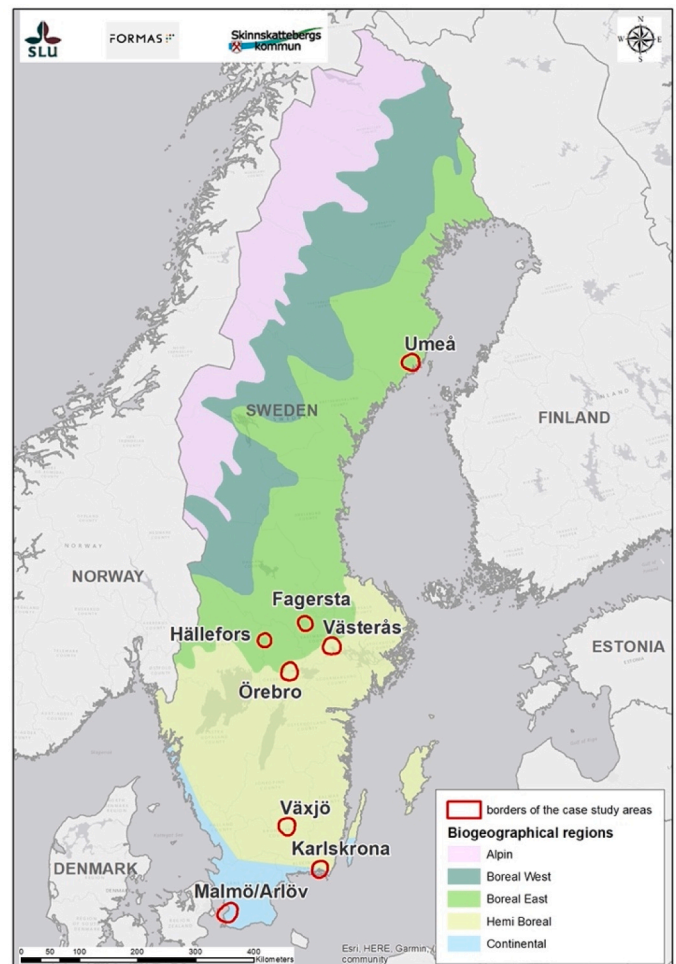


Fig. 1. New-Swedes were interviewed in nine settlements along a south-north gradient in Sweden. Two geographically proximate settlements – Malmö and Arlööv – were amalgamated into one study area.

(e.g., a beach, a playground) in the preferred UGS or larger areas (e.g., a whole park, a nature reserve). Locations were marked with points (Fig. 2).

2.3. Data analysis

2.3.1. Spatial data preparation and analyses

We combined Open Street Map (OSM, 2020) vector data, Swedish national landcover data (Nilsson et al. 2020) and spatial data received from case study municipalities to create a geodatabase of all UGS-relevant landcovers and waterbodies within a 10 km buffer zone around settlements in each of our eight case study areas. All land cover classes were categorized according to the UGS typology developed by Cvejić et al. (2015). This typology encompasses a wide range of vegetated (green areas) and water features (blue areas) of various sizes within urban and peri-urban areas. In addition, urban parks were further divided into three groups based on their size: small (0.1 – 0.5 ha), medium (0.5 – 3.0 ha), and large (more than 3.0 ha). This classification aligns with the standards used by municipal planners in Sweden. These operations resulted in a single geospatial layer comprised of 22 UGS classes and 1 class for built area. Subsequently, detailed maps of the distribution of UGS were used during field work to verify the spatial dataset, with any comments and inaccuracies noted within the Mergin application and subsequently corrected. The final layer within eight study areas was used for further GIS spatial analyses.

Locations identified through the interactive mapping protocol were

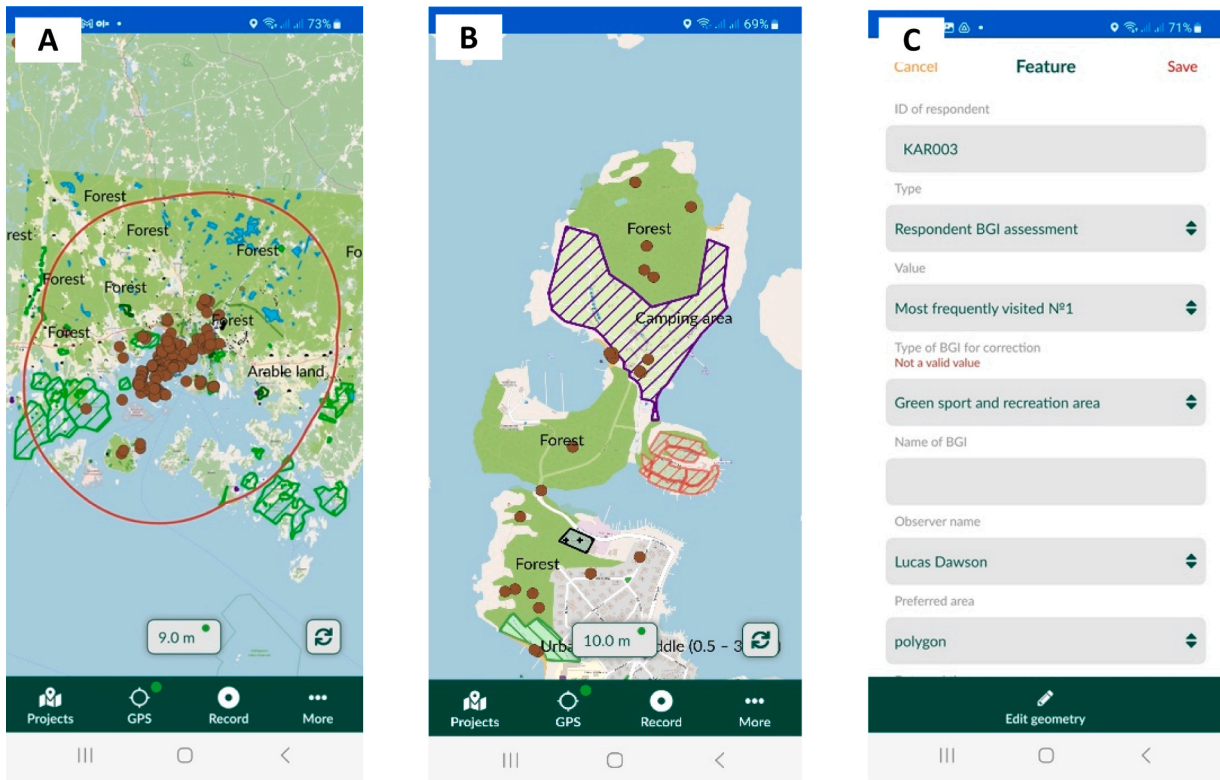


Fig. 2. The interface of Merpin Maps Input Mobile Application: A – Karlskrona case study, including a 10 km buffer (red ring) delimiting the extent of considered UGS in the case study area; B – UGS classes with respondents points; C – example of respondents data input.

calibrated and edited before being used as input data for further spatial analysis in ArcGIS (<https://pro.arcgis.com>). Places selected by respondents were classified according to UGS type using our geospatial layer. To account for the potential impact of proximate types on selection of favourite places (e.g., if respondents chose a park that was bordering a lake or a forest; or where typically small types such as

playgrounds were situated within larger UGS) we calculated the area of all UGS types within a 100 m buffer around all points (Fig. 3). Favourite places were then attributed to all UGS types that satisfied the following criteria: 1) the UGS type with the largest area in each buffer, 2) any subsequent UGS type that accounted for >10% area of the buffer. Exceptions were made for some types due to their small surface areas and/

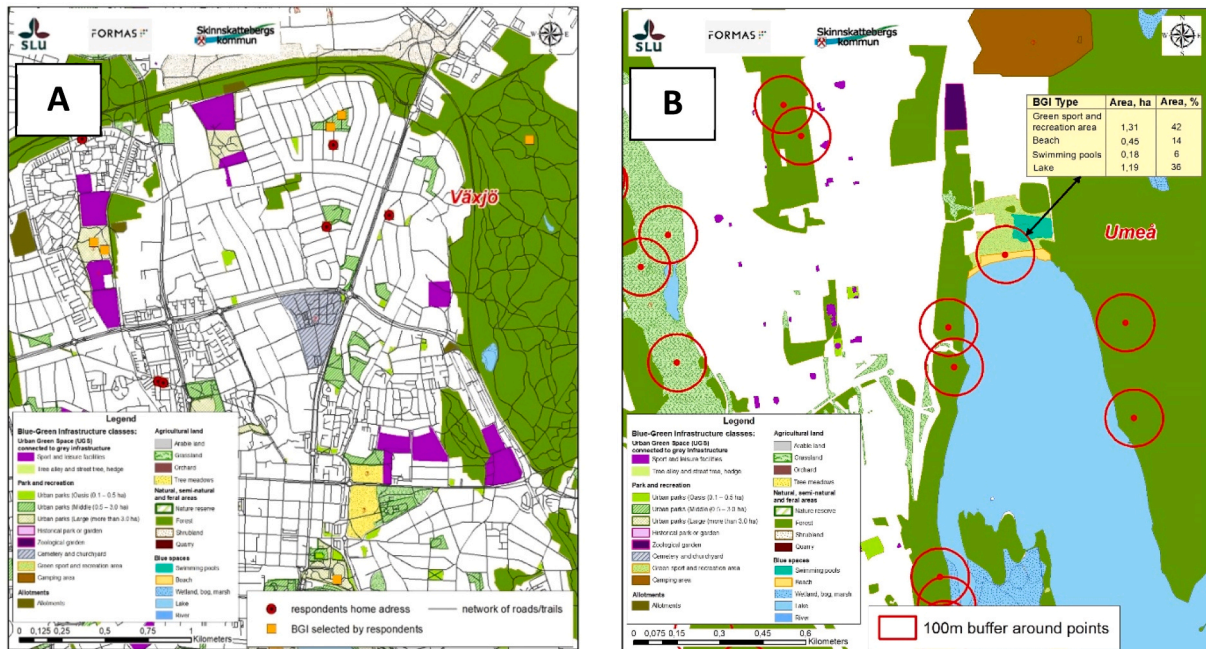


Fig. 3. Examples of UGS spatial data analysis. A - Distances between respondents homes and selected UGS points were calculated using a cost matrix to find shortest routes based on road and trail networks in each study area, e.g., in Vaxjö. B – example of a buffer around a point that was attributed to multiple types in Umeå.

or irregular shapes (rivers). Selected places were linked with rivers or small parks if they comprised >1% of the buffer zone around points, whereas beaches, playgrounds and swimming pools (which were typically very small polygons) were identified if they were found within buffers at all. Large parks (> 3 ha) were often disaggregated into complexes of several smaller polygons in the underlying OSM data. Where multiple types of park (i.e., large, medium or small) were found within the same buffer, we therefore aggregated these to the largest park category present in the buffer. Our logic was that it is unlikely that there are two independent parks of differing sizes within a 100 m buffer, and that these areas therefore likely belonged to the same park complex.

We also calculated distances between respondents homes and selected favourite UGS, taking into account existing road and trail networks. Available vector data were processed and transformed into a network dataset within the eight case study areas, which were validated using the Service Area tool in Network Analyst toolbox in ArcGIS. We then used Origin Destination cost matrix to calculate the shortest network distances between points (Fig. 3). Distances were used as a predictor variable in subsequent regression analysis.

2.3.2. Statistical analysis

We used binary logistic regressions to assess relationships between several sets of predictor variables and the likelihood that specific types of UGS were associated with respondents' favourite places. Predictor variables were based on the survey questions above relating to socio-demographic profile, immigration, UGS characteristics, activity preferences and perceptions and were thematically grouped accordingly. The block of variables concerning *UGS characteristics* included additional spatially-derived population density data within relevant study areas, and distance from respondents' residence to favourite UGS points. Many studies identify distance as an important determinant of UGS usage (e.g., Wan et al. 2021, Elbakidze et al. 2022, Dawson et al. 2023), and increased population density is a core feature of many current urban development strategies (e.g., United Nations, 2017). Survey questions relating to respondents' satisfaction with the quality, availability and accessibility of UGS were measured using a 5 point Likert scale ranging from very satisfied to very dissatisfied. Having assessed the internal validity of these items using Cronbach's α ($\alpha = 0.7$) (Tavakol and Dennick, 2011), we calculated an average satisfaction score for each participant.

We were unable to conduct a multinomial logistic regression, as cross-tabulating the large number of predictor and outcome variables resulted in several events with a frequency of zero. We therefore transformed outcome variables into multiple binary variables representing whether respondents chose a certain type of UGS as a favourite place or not. Then we fitted binomial logistic regressions for each combination of predictor groups and outcome variables. We used the largest cohort of each predictor variable as the reference cohort except in the case of region of origin for which we used "Europe" as the reference cohort as we assumed that migrants from Europe would be the most similar to those of native Swedes. One predictor variable (distance to UGS) was specific for respondents' individual choices of favourite greenspace and was analysed separately. Furthermore, since respondents did not choose the same number of favourite places, we corrected for this using a mixed effect model.

We used a minimum number of 30 responses for UGS classes to avoid true probabilities in variables with low frequencies and to fit all regressions. As a result, the regression analysis only considers the eight most popular UGS types associated with respondents' favourite places: *forests, lakes, beach, river, grassland, large urban parks (>3 ha), medium-sized urban parks (0.5 – 3.0 ha), and sports, leisure and recreation areas*. We used a minimum events per predictor variable (EPV) of 10, excluding outcome variables with fewer than 10 selections, and applied Firth's correction to reduce bias due to small samples in some categories (van Smeden et al. 2016). We also merged or removed subclasses in some predictor variables to ensure a minimum EPV of 10. For gender, we

removed Other ($n = 1$); for marital status, we removed Other ($n = 4$), and combined Widowed ($n = 2$) and Divorced ($n = 20$) to "Widowed/Divorced" ($n = 22$); for number of children we combined Three ($n=28$), Four ($n=10$), Five ($n = 9$), Six ($n = 2$), Seven ($n = 2$), Eight ($n = 1$), and Nine ($n = 1$) to "Three or more" ($n = 53$); for level of education, we combined University ($n = 106$) and College ($n = 6$) to "University/College" ($n = 112$); for perceived health, we combined Poor ($n = 3$) and Rather poor ($n = 21$) to "(Rather) poor" ($n = 24$); for employment, we combined Long-standing sick leave ($n = 1$), Retired ($n = 7$), Self-employed ($n = 5$), and Other ($n = 5$) to "Other" ($n = 18$); For reason for migration, we removed Other ($n = 7$); for region of origin, we combined Latin America & The Caribbean ($n = 10$), North America ($n = 2$) and Oceania ($n = 3$) to "Other" ($n = 15$); and for frequency of use, we combined Never ($n = 1$) and Almost never ($n = 18$) to "(Almost) never" ($n = 19$). In total, 72 respondents were excluded from the regression analysis, including 53 due to minimum EPV requirements and 19 that were missing key responses.

Odds ratios were used to determine whether significant ($p < 0.05$) effects in the model were meaningful. We used the following classification to interpret odds ratios: > 1.5 (small effect), > 2 (medium effect), > 3 (large effect) (Sullivan and Feinn, 2012). For negative effects, the multiplicative inverse ($1/x$) of the classification was used. For continuous variables – including population density, distance to UGS and number of children – we calculated the largest possible effect size for an Odds Ratio across the full range of the variable. We identified any predictor variable that was significant and had at least a small effect to be a "key factor".

2.4. Analytical framework

In this study, building on Asselin et al.'s (2006) conceptualization, social integration is seen as a multidimensional and multilevel process in which immigrants and their activities intricately weave into social life, establishing mutually interdependent relations with the host society. This two-way process involves changes for both migrants and host societies and focuses on developing a sense of belonging and social relationships (Kearns and Whitley 2015; Klarenbeek, 2021).

Our study employed Esser's integration framework (1999; Gentin et al. 2019) to understand how our results concerning new-Swedes' UGS preferences could support four dimensions of social integration: structural, interactive, cultural, and identificational. Structural integration involves having rights and access to core institutions of the host society, including the labor market, education, housing, and healthcare (Gentin et al. 2019). In the context of this study, structural integration encompasses the access of new-Swedes to and availability of various types of UGC important for different cultural groups in a society (Leikkilä et al., 2013).

Interactive integration pertains to interactions and relationships between individuals and different groups within UGS (Gentin et al. 2019, Peters et al., 2010). Regarding interactive integration, we explored how new-Swedes's preferences related to perceived functions of different UGS types, with a particular focus on activities that require social interactions.

Cultural integration refers to how immigrants learn the cultural values and meanings associated with UGS, enhancing their navigation in the host society. In the opposite direction, it also refers to how members of the host society learn about the cultural values and traditions of newcomers. We aimed to understand how UGS, as public spaces, offer opportunities for leisure and participation in cultural events (Gentin et al., 2019; Stodolska et al., 2017). To explore the potential of UGS to provide a place for cultural integration, we compared the preferences of new-Swedes and the general population in Sweden for different types of UGS. Our assumption was that similarities in preferences for UGS might be an important precondition for providing space for cultural integration.

Identificational integration involves the sense of belonging a

newcomer feels in their living environment (Esser, 1999; Gentin et al. 2019). We sought to understand whether such a sense of belonging was linked to preferences for certain types of UGS by different groups.

3. Results

3.1. Overview

In total, 261 new-Swedes completed the combined survey and interactive mapping exercise across the eight study areas. Socio-demographic characteristics are further elaborated in Table 1.

In total, over 90% of respondents reported using UGS at least once per week, while only 9% used it once a month or less (Fig. 4). Aside from the group “Other” – which collected a relatively small group of

Table 1
Socio-demographic characteristics of respondents.

Variable	Subgroup	%
Gender	Female	56.5%
	Male	42.0%
Age	18–30 yrs	33.6%
	31–40 yrs	26.6%
	41–50 yrs	21.2%
	51–60 yrs	12.0%
	61–80 yrs	6.6%
Marital status	Married	51.3%
	Single	28.2%
	Co-habiting	10.0%
	Divorced/ widowed	8.5%
Number of children in household	Zero	46.7%
	One	14.3%
	Two	20.1%
	Three or more	18.9%
Education level	University/College	44.0%
	Secondary school	31.3%
	Primary school	18.2%
	No formal education	6.6%
Health status	Very good	39.8%
	Good enough	50.6%
	(Rather) poor	9.6%
Employment status	Employed full-time	32.8%
	Student	37.1%
	Unemployed	9.3%
	Employed part-time	8.5%
	Zero hour contract	4.6%
	Other	5.0%
Employment related to nature	Yes	23.9%
	No	76.1%
Economic status	Very comfortable	10.4%
	Reasonably comfortable	40.1%
	Getting by	31.3%
	Struggling to get by	16.2%
Region of origin	Western Asia & North Africa	42.4%
	Sub-Saharan Africa	19.5%
	Europe	15.6%
	Southern & Eastern Asia	14.1%
	Other (incl. Latin & North America, the Caribbean & Oceania)	8.4%
Time in Sweden	Less than 1 year	7.0%
	1–5 years	24.8%
	6–10 years	25.2%
	11–20 years	22.9%
	More than 20 years	20.2%
Reason for immigrating	Education 11%	10.6%
	Employment	5.5%
	Refugee	52.2%
	To join relatives/spouse already living in Sweden	28.6%
Childhood residence in home country	City	64.6%
	Suburb of a city	8.6%
	Small town	12.8%
	Village	9.7%
	Countryside	4.3%
Use of UGS in home country prior to moving to Sweden	Yes	77.6%
	No	22.4%

respondents from Latin & North America, the Caribbean and Oceania – respondents from Europe and Western Asia/ North Africa reported the most frequent use with 93% of respondents using UGS at least once a week. Respondents from sub-Saharan Africa reported the highest number of infrequent users, with 18% of respondents using UGS once a month or less.

The majority of respondents were satisfied or very satisfied with the quality (73%), availability (68%) and accessibility (76%) of UGS in the study areas (Fig. 5). Relatively few respondents stated that they were dissatisfied or very dissatisfied with the quality (9%), availability (14%), and accessibility (8%) of UGS in the study areas. The proportions of users who were satisfied were broadly similar across respondents’ regions of origin, as were proportions of dissatisfied users.

Three specific survey questions directly addressed aspects of social integration. In total, 33% of respondents stated that the UGS in their town were places where they felt “a part of the local community”, while 38% stated that these were places where they felt “a part of Swedish society” (Fig. 6). While the proportions of responses to these questions were broadly similar across most regions of origin, respondents from Southern and Eastern Asia had the highest proportion of answers for both questions (38% and 54% respectively). Aside from the group “Other”, respondents from Western Asia and North Africa (33%) and Europe (34%) had the lowest proportions of respondents who felt that UGS were places where they felt a part of the local community, and respondents from Europe were those who least felt that UGS in their towns were places where they felt a part of Swedish society (32%). In answer to a separate question relating to perceived constraints, only 2% of respondents stated that feeling that they “did not fit in” prevented them from using UGS in their town.

3.2. General preferences of new-Swedes for different UGS types

A block of closed questions in our survey assessed the general preferences of new-Swedes for different types of UGS. We asked “which type (s) of nature and green areas in and around your town do you like to use? (More than one choice is possible)”. Forests and large parks were the most popular types, with >55% of respondents from all regions of origin selecting these as UGS types that they liked to use (Fig. 7). Lakes were also popular, with 47–71% of respondents across the different regions of origin selecting them as a type they liked to use. Between 41% and 71% of respondents selected the sea as a type they liked to use, except for respondents from Sub-Saharan Africa, where only 18% of respondents selected this type. Allotments were the least preferred type across all regions. Wetlands, bogs and marshes were also a less preferred type amongst respondents from all regions of origin except Europe, where 20% of respondents selected them as a type they liked to use.

3.3. Favourite types of UGS for new-Swedes

Interactive mapping protocols identified 614 individual points describing the location of respondents’ favourite UGS across the eight study areas. Many points referred to the same UGS as different respondents often chose the same places as favourite locations in each study area. Forests (44%) and large parks (25%) were the most common types of UGS associated with favourite places, followed by lakes (20%), medium-sized parks (15%), beaches (10%), sport, recreation and leisure areas (9%), river (9%) and grassland (6%) (Fig. 8). The least common types of UGS associated with favourite places, selected by 5% of respondents or fewer, included camping areas, tree alleys and street trees, arable land, wetland/bog/marsh, small parks (0.1–0.5 ha), tree meadows, cemeteries/churchyards, historical parks/gardens, shrubland, and allotments.

3.4. Key factors explaining the selection of new-Swedes’ favourite UGS

In total, 51 unique key factors were found amongst predictor

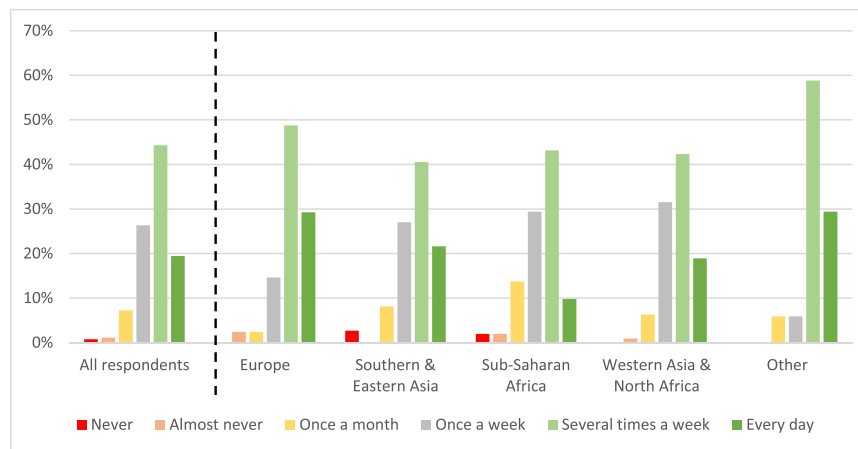


Fig. 4. Frequency of UGS use amongst interviewed new-Swedes according to their region of origin (N=261). Most respondents were frequent users of UGS, regardless of region of origin.

variables linking respondents' selection of favourite places with different UGS types (Table 2). The greatest number of key factors were linked with lakes, beaches, medium-sized parks and rivers, whilst large parks, sports, leisure and recreation areas, and grasslands were linked with the fewest number of key factors. See Supplementary Materials for more detailed tables concerning regression results for each UGS type, including reference cohorts, coefficients, odds ratios and confidence intervals.

3.4.1. Forest

Our regression analyses identified seven key factors explaining the selection of forest as favorite UGS in our study areas (Table 2). Students were more likely to select a forest compared to those with employment status "other", which included those on long-standing sick leave, retired people, and the self-employed. Respondents who usually cycled to UGS were more likely to select forests compared to those who did not. Those who lived in more dense settlements were less likely to select forests, as were those who associated UGS with making the town they lived in more attractive. Every day users of UGS were also less likely to identify forests as a favourite place compared to those who used UGS several times per week. On the other hand, respondents who perceived litter to be a problem in UGS and those who like to use UGS to pick plants, berries and mushrooms were more likely to select forests as favourite UGS.

3.4.2. Large parks

New-Swedes' selection of large parks (>3 ha) was explained by four key factors (Table 2). Respondents who had lived in small towns as children were more likely to identify a large park as a favorite UGS compared to those who had grown up in cities. Those who lived in more densely populated settlements were more likely to choose large parks, with meaningful effects observed from differences of 1398 persons per km². Respondents who perceived noisy people as a constraint to visiting UGS were also more likely to choose a large park, as were those who saw UGS as a place for hanging out with friends and family.

3.4.3. Lakes

A total of 16 key factors were identified relating to the selection of lake as a favourite UGS (Table 2). Respondents who had moved to Sweden for education or employment reasons were less likely to choose a favourite place with a lake compared to asylum-seeking refugees. Respondents from sub-Saharan Africa were also less likely to select lakes compared to European respondents. However, respondents who stated that they used nature before moving to Sweden were more likely to select favourite places containing lakes compared to those who did not. Respondents aged 51–60 years were more likely than those aged 18–30 years to choose a favourite place with a lake, as were those who reported

their economic status as being "very comfortable" compared to those who were "reasonably comfortable".

Respondents were more likely to select a lake as a favourite UGS the further it was from home (compared to the reference cohort, forest), although meaningful effects were only found for distances greater than 15.8 km. Respondents who expressed a general preference for allotments and lakes were more likely to select a lake, whilst those who generally preferred farm land and forest were less likely to do so. Those who saw UGS as a source of wild foods were more likely to choose a lake, whilst respondents who preferred to read or do sports and gym activities in UGS were less likely to do so.

3.4.4. Medium-sized parks

A total of 12 key factors were identified concerning the likelihood of interviewed new-Swedes selecting a medium-sized park (0.5–3.0 ha) as a favourite UGS (Table 2). A medium-sized park was less likely to be selected if it lay at greater distances from respondents' residences (compared to forests), with meaningful effects observed at distances greater than 7.8 km. Those who lived in more densely populated settlements were also less likely to choose medium-sized parks, with meaningful effects observed at differences greater than 2321 persons per km². Those who generally preferred to visit churchyards and cemeteries were more likely to select a medium-sized park as a favorite UGS, whilst those who generally preferred wetlands or forests were less likely to do the same.

Respondents who associated UGS with criminal activity were less likely to choose a medium-sized park, as were those who did not perceive any problems at all in UGS. Those who used UGS once a month or less were less likely to select a medium-sized park compared to those who used UGS several times a week. Respondents who preferred to UGS for photography or for picking plants, berries or mushrooms were also less likely to select a medium-sized park, while those who liked to go swimming in UGS were more likely to do so.

3.4.5. Beach

Factors relating to UGS characteristics as well as respondents' immigration history, perceptions and activity preferences were amongst 14 key factors identified as relating to the selection of beaches as favourite UGS (Table 2). Respondents who had lived in Sweden for less than one year were much more likely to choose favourite places with beaches compared to those that had lived in the country for 5–10 years. Those who had grown up in a village were less likely than those who had grown up in cities to select beaches, as were those who had moved to Sweden for education purposes compared to refugees.

Respondents who usually visited UGS on foot were less likely to choose favourite places with a beach as were those who lived in denser

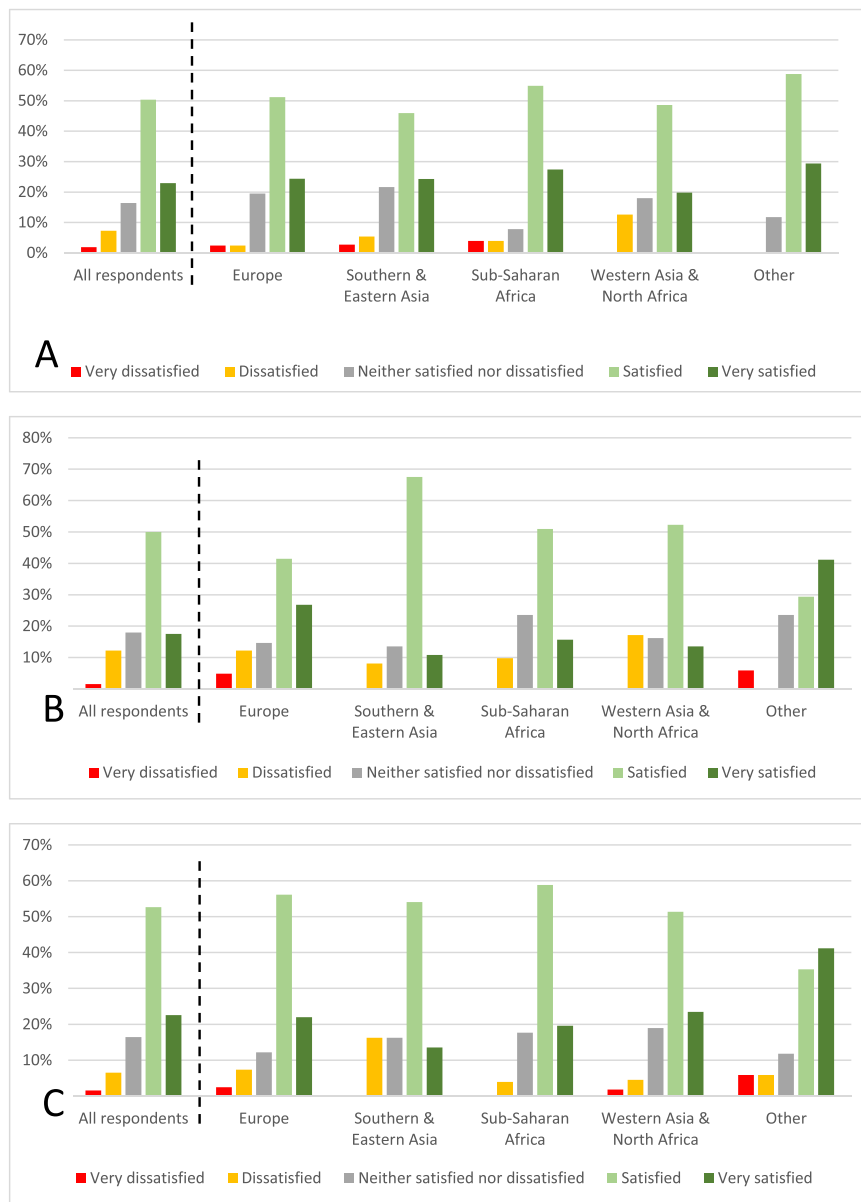


Fig. 5. Satisfaction of respondents with the quality (A), availability (B), and accessibility (C) of UGS in their town (N=261). The majority of respondents were satisfied or very satisfied with UGS, regardless of region of origin.

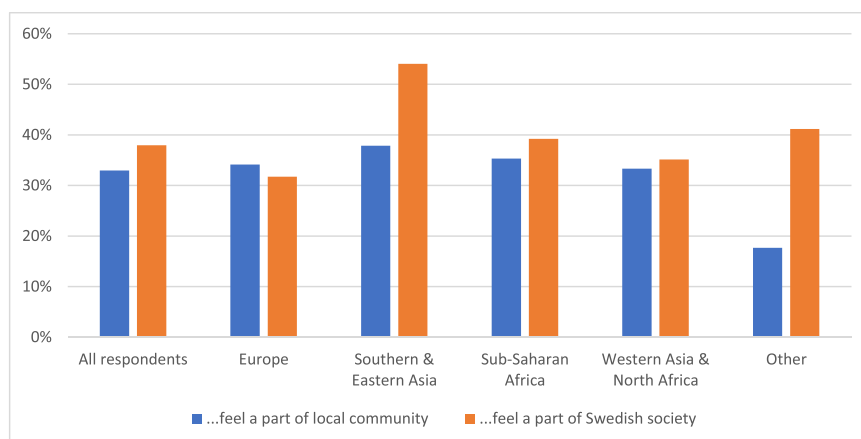


Fig. 6. Responses to survey questions as to whether local UGS were places where respondents felt part of the local community or part of Swedish society (N=261).

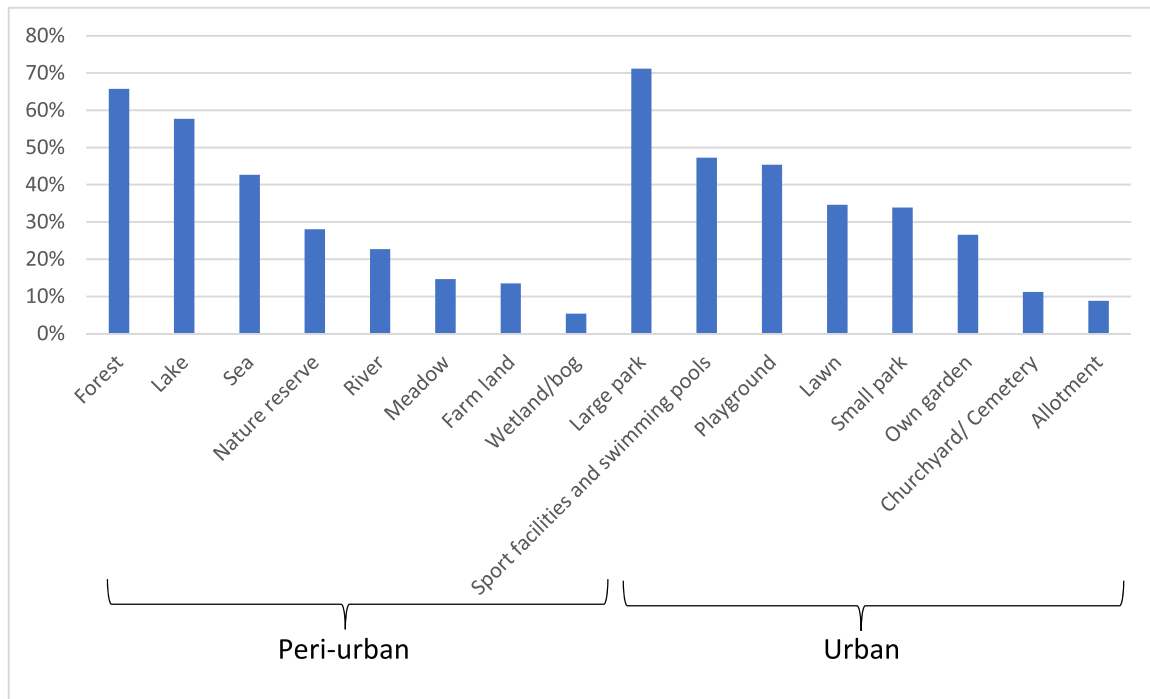


Fig. 7. General preferences amongst new-Swedes for different types of peri-urban and urban UGS.

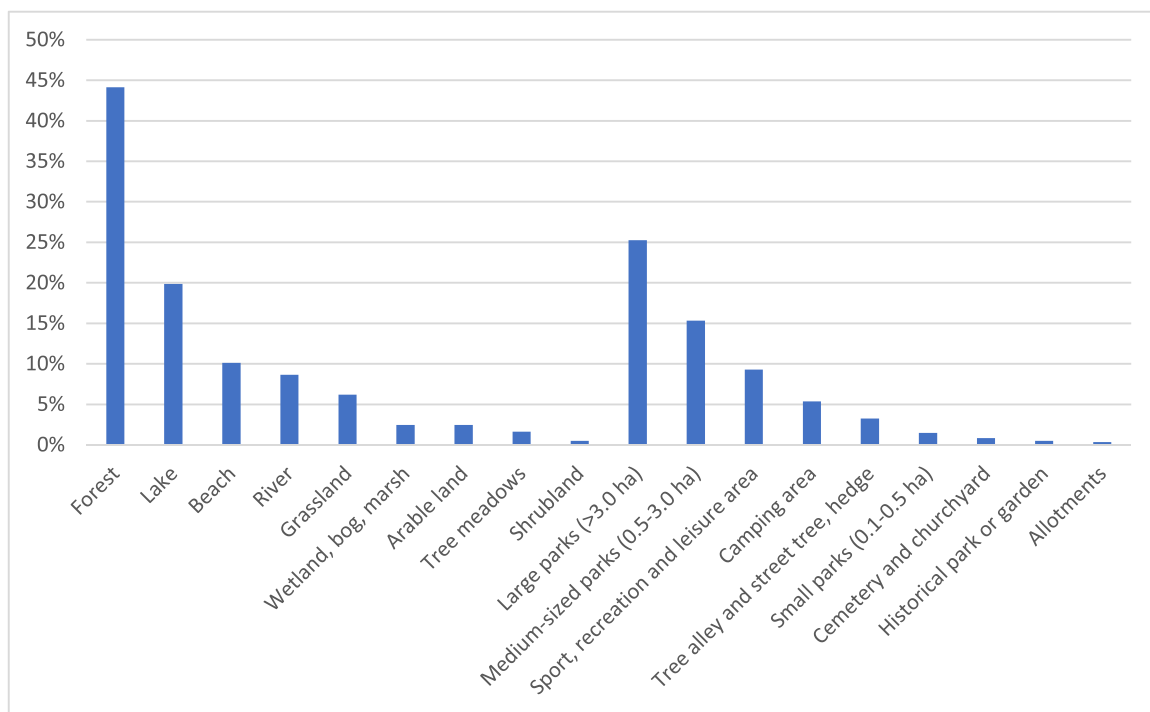


Fig. 8. Distribution of UGS types associated with respondents' favourite places in peri-urban and urban areas. Respondents were able to select up to 3 different favourite places. UGS types associated with favourite places were identified through spatial analyses of a 100 m buffer around each point.

settlements. However, those who generally preferred sport facilities and swimming pools were more likely to select a beach.

Respondents who stated that “nothing stops me” from using UGS were less likely to select a favourite UGS with a beach, as were those who identified a lack of someone to go with as a constraint while those who saw UGS as a place for social interaction were more likely to choose a beach. Respondents who preferred to use UGS for jogging and swimming were more likely to select a beach, whilst those who preferred to cycle or

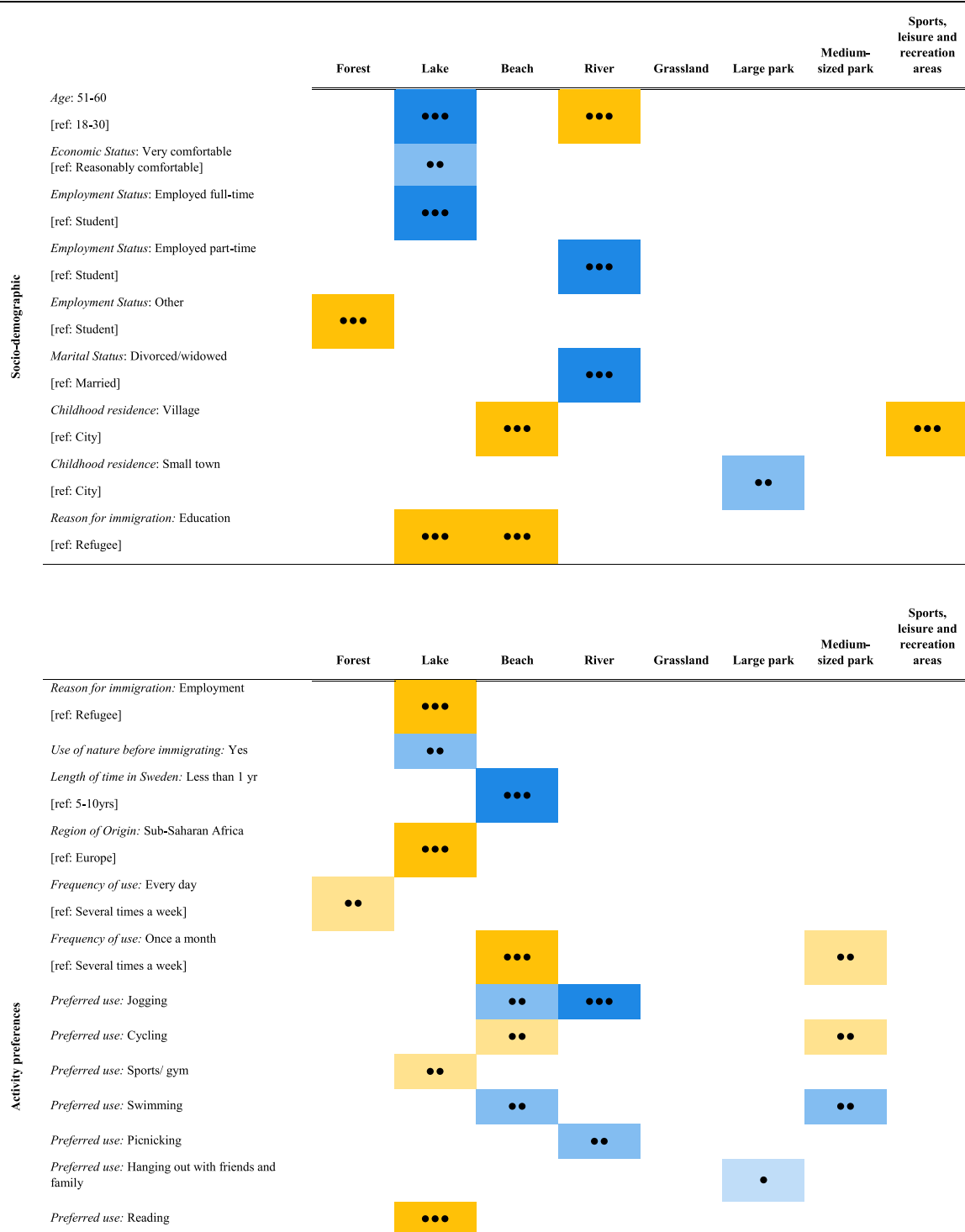
pick plants, berries and mushrooms were less likely to do so. Those who used UGS once a month were also less likely to select a beach compared to those who used it several times a week.

3.4.6. Sport, recreation and leisure areas

Our regression analysis identified three key explanatory factors amongst the predictor variables relating to the selection of sport, recreation and leisure areas as favorite UGS (Table 2). Respondents who

Table 2

Key factors explaining new-Swedes' selection of favourite UGS, identified using multiple binary logistic regression analysis. All key factors were significant ($p < 0.05$) and had either small (●), medium (●●) or large effect (●●●). Key factors with positive coefficients are in light blue to dark blue, whilst those with negative coefficients are in light yellow to yellow. Darker colors indicate a stronger effect. For continuous variables, effects are shown over the widest range of values. Reference cohorts (ref) for key factors are provided in [parenthesis], where relevant.



(continued on next page)

Table 2 (continued)

	Forest	Lake	Beach	River	Grassland	Large park	Medium-sized park	Sports, leisure and recreation areas
Perceptions	<i>Preferred use: Photography</i>							
	<i>Preferred use: Enjoying the view</i>							
	<i>Preferred use: Picking plants, berries or mushrooms</i>							
	<i>Perceived benefit ... provide a source of wild foods, e.g. fish, wild herbs, berries, mushrooms, etc</i>							
	<i>Perceived benefit ... provide a place for social interaction</i>							
	<i>Perceived benefit ...make the town more attractive</i>							
	<i>Perceived constraint: Lack of suitable transport</i>							
	<i>Perceived constraint: Lack of time</i>							
	<i>Perceived constraint: Lack of someone to go together with</i>							
	<i>Perceived constraint: Nothing stops me</i>							
	<i>Perceived problem: Litter</i>							
	<i>Perceived problem: It is used for criminal activity</i>							
	<i>Perceived problem: Noisy people</i>							
	<i>Perceived problem: Do not see any problem</i>							
UGS Characteristics	<i>Distance to favourite UGS [ref: same distance to Forest]</i>							
	<i>Population density</i>							
	<i>Transport mode: Walk</i>							
	<i>Transport Mode: Bike</i>							
	<i>Transport mode: Car</i>							
	<i>Generally preferred type: Forest</i>							
	<i>Generally preferred type: Lake</i>							
	<i>Generally preferred type: River</i>							
	<i>Generally preferred type: Wetland/bog</i>							
	<i>Generally preferred type: Large park</i>							
	<i>Generally preferred type: Farm land</i>							
	<i>Generally preferred type: Small park</i>							
	<i>Generally preferred type: Sport facilities and swimming pools</i>							
	<i>Generally preferred type: Allotment</i>							
<i>Generally preferred type: Churchyard/ Cemetery</i>								

had grown up in a village were less likely to select such UGS compared to those who had grown up in a city. Those for whom a lack of suitable transport was perceived as a constraint to using UGS were also less likely to choose this type of UGS, as were respondents who saw UGS as a source of wild foods.

3.4.7. River

A total of 11 key factors were identified explaining the selection of rivers as a favourite UGS (Table 2). Respondents aged 51–60 years were less likely to select a river as a favourite compared to those aged 18–30 years. Divorced or widowed respondents were much more likely compared to married respondents, as were part-time employees

compared to students. Rivers were more likely to be included in favourite places for respondents who usually travelled to UGS on foot, by bike or by car. Respondents who generally preferred to visit large parks or rivers were more likely to select a river as a favourite place. Concerning activity preferences, those who liked to jog or picknick in UGS were more likely to select a favourite place by a river, whilst those who went to UGS to enjoy the view were less likely to do the same.

3.4.8. Grassland

Five key factors were linked to the selection of grassland as a favourite UGS (Table 2). Respondents who lived in denser settlements were less likely to choose a favourite place containing grassland, whilst those who generally preferred small parks were more likely to do so. Those who identified litter as a problem in UGS or stated that lack of time prevented them from using UGS were less likely to choose grassland, as were respondents who did not perceive any problems at all in UGS.

4. Discussion

4.1. Preferences of new-Swedes for UGS types and key factors

Our survey and participatory mapping data reveals that first generation immigrants to Sweden – *new-Swedes* – appreciate and use a wide spectrum of UGS, including peri-urban and urban, natural and modified, larger and smaller, terrestrial and aquatic types. New-Swedes appear to be relatively frequent users of UGS, with 90% of respondents stating that they visit UGS at least once a week even though 24% of respondents stated that they did not use UGS at all before moving to Sweden. New-Swedes also appear to be generally satisfied with UGS in the settlements where they live in Sweden, with a clear majority of respondents expressing satisfaction with the quality (73%), availability (68%) and accessibility (76%) of UGS.

Our regression analysis tested 105 predictor variables and identified 51 key factors that had a meaningful effect on the likelihood of respondents selecting different types of UGS as favourite places. Key factors were distributed relatively evenly across blocks of explanatory variables concerning socio-demographic factors, characteristics of UGS, activity preferences, and perceptions of UGS. These results support previous studies indicating that individual user preferences for UGS emerge from interactions between a large number of different factors (e.g., Farahani and Maller, 2018).

More specifically, our findings offer several useful insights for understanding the UGS preferences of new-Swedes. First, we found only minor differences concerning frequency of use, satisfaction, and sense of belonging in UGS between new-Swedes from different regions of origin. We identified only one key factor explicitly concerning respondents' ethnocultural background – respondents from sub-Saharan Africa were found to be less likely to select favourite places associated with lakes compared with those from Europe. Moreover, our respondents' preferences for UGS types appear to be broadly comparable with those observed in the general population in Sweden (Elbakidze et al. 2022). Respondents' reason for immigrating to Sweden was the most common immigration-related key factor, with refugees more likely to select lakes and beaches compared with those who came to Sweden for education or employment purposes. Place of childhood residence, length of time in Sweden, employment and economic status were other key socio-demographic factors linked to respondents' preferences for UGS type. These results are similar to those in Lisberg and Ouis, 2014, who found that the outdoor recreational habits of immigrants in Sweden depended more on factors relating to immigrants' pre-migration lifestyles rather than ethnicity. Jay and Schraml (2014) also point to lifestyle as a pivotal influence on recreational practices of immigrants.

Second, the most preferred UGS were larger types – including forests, large parks and lakes – according to both survey and participatory mapping results. However, we were unable to identify common key

factors across these larger types, and study area-specific data related to size of UGS were too skewed to include in the regression (see *Limitations*). One potential explanation could be that that new-Swedes' visits to favourite UGS are linked with longer visits and/or special occasions, for which larger, more varied types may be preferred (Fredman et al. 2019). It could also be that many new-Swedes live in overcrowded residences (Boverket, 2016) and may use forests, lakes and large parks to temporarily expand their living space (e.g., Folkhälsomyndigheten., 2021). Another possible explanation relates to the COVID-19 pandemic. Data for this study was collected in 2021–22 and it is possible that respondents' stronger preference for larger UGS was influenced by government guidance to avoid close contact during the pandemic or by concerns for their personal health (see *Limitations*). Several studies from Nordic countries have shown the influence of the pandemic on UGS usage. Venter et al. (2020), for example, found that use increased during the pandemic and that users preferred more remote areas, while Samuelsson et al. (2021) showed that people associated forests and waterbodies with wellbeing benefits during the pandemic.

Third, our key factor results relating to activity preferences and perceptions of UGS show that respondents who used UGS or perceived benefits associated with wild foods and/or who perceived litter to be a problem in UGS – i.e., presumed indicators of a preference for more natural types of UGS and environmental concern (e.g., Nisbet and Zelenski, 2013, Dawson et al. 2023) – were more likely to select favourite places with forests and lakes, but less likely to select beaches, medium-sized parks or sports, leisure and recreation areas. Similarly, respondents who preferred to photograph in UGS and to enjoy the view were less likely to select medium-sized parks and rivers. In the opposite direction, respondents who saw UGS as places for social interaction e.g., for picknicking or hanging out with friends and family, were more likely to select large parks, beaches and rivers as favourite UGS. While previous findings have linked immigrant groups with stronger preferences for social activities in UGS compared to native groups (e.g., Kloek et al. 2013, 2016), our findings highlight that new-Swedes are a heterogeneous group who select different UGS ranging from more natural to more social types based on a diverse set of activity preferences that encompasses both social and more individual-focused activities. The observed correlation between types of activities and preferred types of UGS suggests that nature-connectedness might be an important determinant of new-Swedes' UGS preferences. However, while the influence of nature-connectedness on user preferences has been highlighted in both Sweden (Elbakidze et al. 2022, Dawson et al. 2023) and other contexts (e.g. Lin et al. 2014), we did not directly explore this concept as a predictor variable. While our results in this regard are therefore not conclusive, we suggest a need to further explore the relationship between nature-connectedness and immigrant perspectives on UGS. It is also possible that these results are an artefact of the relative accessibility of peri-urban contra urban UGS. For example, new-Swedes who are able to access areas further from urban centres may have a greater interest in or opportunity for gathering wild foods, whilst those for whom peri-urban areas remain inaccessible may pursue other activities in areas closer to home.

4.2. Implications for urban greenspace planning to enhance social integration

In Sweden as in many European countries, municipalities have both a core responsibility for urban planning, including a primary role for UGS, as well as for social service implementation to support integration (Cetrez et al. 2020). This confluence suggests an opportunity to integrate UGS planning considerations with other municipal responsibilities concerning social integration of immigrants. Taken together, and from a social integration perspective, our results indicate that new-Swedes appreciate and use a wide spectrum of UGS which they generally perceived to be accessible and available. The frequency of reported use suggests that UGS in Sweden supports the overall well-being and quality

of life of immigrants. The diversity of functions and activities for which new-Swedes reported using different types of UGS also indicates that UGS in Sweden is largely sufficient to meet the needs, values, and preferences of different groups of new-Swedes. At the same time, our study highlights the heterogeneity of UGS preferences amongst new-Swedes. In line with several recent studies (e.g., Egerer et al. 2019, Elbakidze et al. 2022, Edge et al. 2023, Gunnarsson and Hedblom, 2023), this implies the need for planning authorities to ensure the availability and accessibility of a diverse set of UGS types to support structural social integration, including a mix of both more modified types and more natural UGS and variety in terms of size and configuration. Further, the heterogeneity of preferences amongst new-Swedes revealed by our study underlines the importance of developing more inclusive planning processes where the values and needs of immigrants are considered. Importantly, the broad comparability of new-Swedes' preferences with those of the general population in Sweden suggests that urban planners may not need to make fundamental changes to UGS in order to support integration. Below we highlight further specific implications of our study concerning planning of UGS to support different dimensions of social integration in Sweden and similar contexts.

4.2.1. Supporting structural integration

Despite high reported frequency of use and satisfaction levels, our findings indicate a potential need to improve the relative accessibility of UGS in peri-urban areas. Although UGS close to residences have been suggested as having greatest potential for social integration (Faskunger, 2020), peri-urban UGS play an important role for a number of environmental and sustainable urban development policies in Sweden (Naturvårdsverket, 2019). However, our study identified several key factors including distance, mode of transport and population density that were more frequently associated with UGS types that are typically located in peri-urban areas. This suggests that new-Swedes may associate such areas with poorer accessibility. Further, although our study highlights that forest and lakes were amongst the most popular, our respondents were nevertheless less likely to select peri-urban UGS types compared with the general population in Sweden (see Elbakidze et al. 2022), and were more likely to select modified types that are typically found in urban spaces (e.g., large parks, sports facilities). Amongst many possible solutions to promote accessibility of peri-urban UGS, one potentially simple measure could be to encourage and enable bicycle use amongst new-Swedes. Our study showed that people who biked to UGS were more likely to choose forests and rivers as favourite places. At the same time, some studies indicate that use of bicycles for urban transport is more limited among some groups of immigrants (e.g., women) (Welsch et al. 2018, Hausteina et al. 2020). Bicycle training courses for this group could be conducted in and around UGS, offering a number of simultaneous benefits (e.g., Van Der Kloof et al. 2014).

Our results also highlight the potential role of larger UGS to support social integration, particularly in more densely-populated and/or larger settlements where distances to large peri-urban UGS are greater and accessibility diminished. Given the relatively good overall availability of UGS in Sweden, large UGS are often identified as legitimate targets for urban densification even in the most heavily populated areas (Boverket, 2010, Naturvårdsverket, 2019). However, we showed that larger UGS such as forest and large parks are among the most popular types across different groups. Further, we found that new-Swedes in more densely populated settlements were less likely to select several types of UGS as favourite places, including forests, beaches, rivers and medium-sized parks, and were more likely to select large parks. Elbakidze et al. (2022) similarly linked the density of built-up areas with lower UGS visitation frequency. Supporting previous studies (e.g., Fors et al. 2019, Jansson and Schneider, 2023), these findings imply a need for context-based planning approaches that consider both the potentially negative consequences of densification in terms of lost UGS, and also the temporal dynamism of UGS preferences that are likely to change as urban settlements become denser, i.e., as large UGS disappear, more

users are likely to want them.

4.2.2. Supporting interactive integration

Echoing Wan et al. (2021), our study indicates that some types of UGS may be more conducive than others for social interaction. For example, new-Swedes who perceive UGS as a place for social activities prefer large and medium parks, beaches, sports, leisure and recreation areas, and to a lesser extent rivers. These types of UGS may therefore offer arenas for developing "places of encounter" where positive, non-threatening social interactions can take place, either between individuals who already know each other (i.e., strengthening existing social relations) or between strangers (i.e., creating new relations) (Gentin et al. 2019). Such encounters are especially important for immigrants, who need to build new networks to prosper (e.g., for finding housing, jobs) but also to establish social bonds (e.g., to find friends, partners, etc) (Cetrez et al. 2020). However, given the often cursory nature of interpersonal interactions in UGS (Kloek et al. 2013, Krellenberg et al. 2014), there may be a need for municipalities to support more meaningful interactions between groups in these more "social" types of UGS (e.g., Leikkilä et al. 2013), for example through organised group activities (Gentin et al., 2018, Singleton 2021), employment schemes for immigrants (Johnson et al. 2017), or by developing options for outdoor language or vocational training (Naturvårdsverket, 2019). The diversity of preferences observed in our study highlights the importance of tailoring such approaches to the preferences of different groups of immigrants. For example, activities in popular UGS types such as large parks might be developed to attract more reluctant users, beaches might be used to develop activities for newly arrived new-Swedes, etc.

4.2.3. Supporting cultural and identificational integration

While development of a sense of belonging is a core aspect of social integration, our results indicate that most new-Swedes, regardless of region of origin, do not experience UGS as places where they feel a part of the local community or Swedish society. At the same time, similarities in preferences for different types of UGS between new-Swedes and the general population in Sweden indicate an opportunity for popular natural types of UGS to support cultural learning amongst immigrants and non-immigrants (e.g., Pitkänen et al. 2017, Stodolska et al. 2017). For example, large parks with recreation areas can serve as a platform for immigrants to express their cultural traditions, practices, and arts, allowing them to showcase and share their cultural heritage with the wider community. Such cultural expression can promote intercultural contact and learning with native and other groups (Faskunger, 2020). In the opposite direction, urban forests may offer opportunities as 'interactive green classrooms' for immigrants concerning user rights and obligations, which may be less well understood by immigrants (Jay and Schraml, 2009, Naturvårdsverket, 2019), and Nordic cultural perspectives, e.g., concerning a strong connection to nature (Grah and Stigsdotter, 2010, Beery, 2013). In this way, urban forest may contribute towards a greater sense of social membership and belonging for immigrants in their new country (*sensu* Cetrez et al. 2020).

Finally, although social integration is increasingly recognized in both policy and research as a two-way process requiring change from both immigrants and host societies (e.g., European Commission, 2020, Klarerbeek, 2021), it is important to acknowledge that conceptualisations of social integration often imply an onus on immigrants to internalize the cultural norms of the host country. This assumes that assimilation is inherently desirable, which is strongly debated (e.g., Byrne and Wolch, 2009, Singleton, 2021). Particularly cultural and identificational dimensions of social integration, with their emphasis on cultural learning and belonging risk being interpreted as supporting one-way processes of assimilation. While our brief discussion of how UGS might be used to support social integration is not exhaustive, we underline the importance of urban planners remaining open to the different cultural meanings that immigrants may attach to UGS and for the use of UGS to promote learning amongst members of the host society concerning such

meanings.

4.3. Limitations

Concerning spatial analyses, the main limitations pertain to point accuracy and different thematic and spatial resolutions of available geodata. During participatory mapping, respondents were asked to place a point identifying the location of their favourite UGS. The precise location of each point was then used in subsequent spatial analyses. Inaccurate placement could therefore have an implication on our results. However, we employed a 100-meter buffer zones around each point. We expect that our use of these buffers significantly reduces risks relating to inaccurate point locations. However, although we used threshold values to ensure identification of smaller UGS types, some UGS types included both relatively large and very small objects and were difficult to clearly assign a threshold value. For example, *sports and leisure facilities* included both small objects such as beach volleyball courts in a park, but also larger objects such as football pitches. For this reason, some smaller UGS objects may be somewhat under-identified, although when respondents specifically placed points directly on the object, there was typically enough area within a buffer to ensure identification. Finally, conflicts in the underlying geodata led in some cases to imperfect fit and coverage and limited possibilities for field verification. Where different geodata layers conflicted, we prioritized the OSM layer.

Concerning the statistical analyses, we identify five potential limitations to the methods we deployed. First, respondents were recruited using non-probability sampling methods. These methods do not systematically target all sections of the population. To avoid large biases, we therefore used a mix of sampling methods to ensure a sufficiently representative sample in terms of gender, age, and region of origin. Recruitment was conducted outside of UGS and was not dependent on whether potential respondents were interested in using UGS or not. However, some groups may have been overlooked, e.g., new-Swedes with insufficient proficiency in Swedish or English. Also, as participation in the survey and mapping exercise was voluntary, it is possible that less frequent UGS users may have refused to participate more often than frequent users. Second, as the survey was presented to respondents in a fixed order there was a risk of unintended priming effects (Head, 1991). However, we believe this risk to be minimal due to the large amount of questions included in the survey for each group of variables. Third, while our combined survey and participatory mapping method was an efficient means of collecting multiple types of data in the field, it limited the sample size for our quantitative study. This led to small frequencies in multiple survey questions and for certain types of UGS. We therefore used a minimum events per (predictor) variable of 10 (van Smedel et al., 2016) and did not consider UGS types with a selection rate lower than 30 to reduce the likelihood of false positives in the statistical analysis. However, this meant that we could not analyse all types of UGS and their association with certain predictor variables. Further, by only reporting significant findings with a high enough effect size, we also sought to decrease the likelihood of reporting false positives. Fourth, due to large skewness in relative land coverage of UGS types, we were not able to analyse associations between the available area of UGS types in each study area and their selection by respondents. This, along with other place-based characteristics, remains to be investigated in future studies. Lastly, our data was collected in 2021–22, during the COVID-19 pandemic. Although there were few or no restrictions at this time in Sweden, and although our questions concerned general behaviours, it is possible that respondents UGS preferences were influenced by considerations relating to the pandemic, e.g., using UGS more or less frequently than pre-pandemic or using different types to avoid congestion etc.

Lastly, although our survey indicates that many new-Swedes are frequent UGS users, our survey questions did *not* include information about the seasonality of usage. However, previous studies have shown lower use of UGS by ethnic minority groups in Northern Europe during

winter months (McEachan et al. 2018, Cronin-de-Chavez et al. 2019). Future studies should consider seasonal differences in Sweden and similar contexts where cold winters require both previous experience, suitable clothing and equipment.

5. Conclusions

This study used data from a face-to-face survey and participatory mapping exercise to explore the UGS preferences of 261 first-generation immigrants with diverse ethno-cultural origin to Sweden, i.e., foreign-born *new-Swedes*. Overall, our results indicate that these preferences are broadly comparable with those of the general population in Sweden in terms of preferred types of UGS, frequency of UGS use and satisfaction regarding the quality and availability of UGS. Both survey and mapping data indicated that new-Swedes use a diverse array of UGS types, although most respondents preferred larger types including forest, lakes and large parks. Our regression analysis linked the UGS preferences of new-Swedes with a large number of key factors, which were distributed relatively evenly across blocks of explanatory variables concerning socio-demographic factors, characteristics of UGS, activity preferences, and perceptions of UGS. Key factor results relating to activity preferences and perceptions of UGS suggest a need to further explore the relationship between nature-connectedness and immigrant perspectives on UGS. However, while reason for immigration and length of time in Sweden were key factors, we found little evidence to suggest that ethnocultural factors played a major role in the preferences of our respondents.

Our study supports previous findings concerning the need for urban planners to retain and maintain a diversity of UGS, particularly larger areas, to improve the social integration of immigrants in Sweden and similar contexts. For example, more modified types appeared more conducive for developing “places of encounter”, while more natural types might offer opportunities for cultural learning and development of a sense of belonging to the local community and society more generally. Further, our findings indicate a potential need to improve the relative accessibility of UGS for new-Swedes, particularly in peri-urban areas.

Importantly, our results show the heterogeneity of UGS preferences within and across different groups. This supports previous calls for new analytical frames and for more inclusive UGS planning regimes that account for, and are capable of integrating, a more heterogeneous set of user preferences and perspectives to support social integration objectives without reducing the multifaceted identities of immigrants to ethnic stereotypes (Leikkilä et al. 2013, Rutt and Gulrud, 2016, Wan et al. 2021, Calderón-Argelich et al. 2021). While we found that, on the whole, ethnicity may not be a strong driver of preferences for UGS amongst new-Swedes, the current lack of knowledge concerning UGS and social integration increases the risk for ethnocultural essentialism (e.g., Colley et al. 2022). The inclusion of intersectional justice perspectives in UGS planning and management may therefore be important to better account for how complex interactions between different aspects of identity (such as gender, class, race/ethnicity, sexuality or disability, among others) influence UGS planning, and to support more representative and legitimate decision-making processes that embrace contrasting perspectives in the face of growing socio-economic and cultural heterogeneity in European cities (Calderón-Argelich et al. 2021, Plüschke-Altöf and Sooväli-Sepping, 2022). Such approaches and greater overall involvement of immigrants in different aspects of UGS planning may help to address issues of procedural justice.

Taken together, a crucial implication of our study is that the use of UGS to support social integration may contribute to the rapidly increasing complexity of the UGS planning and management challenge – ensuring delivery of a growing list of social and ecological benefits for an increasingly diverse set of users whose preferences are influenced by complex sets of interacting factors (Ives et al. 2017, Boverket, 2019, Engström., 2023). Despite this, many municipalities in Sweden, particularly smaller ones, lack adequate resources for strategic planning and

management of UGS (Randrup et al. 2017, Wiström and Östberg, 2022). Although investments in UGS can be seen as investments in social integration, without robust measures to address and engage with complexity, greening strategies and activities to promote social integration risk being viewed as unjust to other ethnic groups, including native populations, and may inadvertently contribute to segregation and exclusion instead of fostering integration (Haase et al. 2017). Aside from more resources, this implies the need for a systems perspective in UGS research, policy-making, planning and management, e.g., to consider UGS as part of an integrated urban social-ecological system and to coordinate measures across sectors. Further, the diversity of key factors that we identified in relation to new-Swedes' preferences supports previous calls for more granular knowledge about what different groups of users want (Wiström and Östberg, 2022) and, importantly, for greater diversity amongst UGS planners and managers in order to better "hear" the views and needs of different groups of users, to design and implement appropriate communication and marketing and to provide a suitable range of experiences (e.g., Kloek et al. 2013, Elbakidze et al. 2015, Haase et al. 2017).

CRedit authorship contribution statement

Lucas Dawson: Conceptualization, Methodology, Investigation, Data curation, Writing – original draft, Writing – review & editing, Visualization, Funding acquisition. **Marine Elbakidze:** Conceptualization, Methodology, Investigation, Writing – review & editing, Project administration, Funding acquisition. **Taras Yamelynets:** Spatial data curation, Spatial analyses, Writing – review & editing. **LE Kraft van Ermel:** Formal analysis, Data curation, Writing – review & editing. **Christina Schaffer:** Methodology, Writing – review & editing. **Karl-Erik Johansson:** Methodology.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Declarations of interest

None.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.ufug.2024.128310](https://doi.org/10.1016/j.ufug.2024.128310).

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