

Article

Do We Need Different Urban Green Spaces Now? A Case Study of Preferences during Pandemics

Ieva Misiune

Institute of Geosciences, Vilnius University, M. K. Ciurlionio Str. 21/27, LT-03101 Vilnius, Lithuania;
ieva.misiune@chgf.vu.lt

Abstract: The role of public urban green spaces (UGSs) in providing various ecosystem services, especially those related to the physical and mental health of city dwellers, has increased during the COVID-19 pandemic. While research has analyzed shifts in UGS visitation and changes in people's attitudes, there remains a noticeable gap in our understanding of the necessary adaptations required within UGS environments. This paper presents the survey results of Vilnius city residents (Lithuania) conducted in the final days of the quarantine in 2021 and discusses the findings in the broader context of other studies. The survey is centered on preferences for UGS qualities clustered into four groups. The results provide empirical evidence that UGS users highly prioritize ergonomic and ecological characteristics related to comfort and naturalness. However, the preferences differ between those who live close to UGS and those who live further away. In contrast, aesthetic and social qualities are of relatively lesser significance for all. Similar preferences have been identified in international studies, underscoring the global nature of this phenomenon that urban planners must consider when designing or enhancing local UGS.

Keywords: urban parks; pull–push factors; visitation frequency; features; questionnaire



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1. Introduction

Urban green spaces (UGS), connected through green corridors, serve as the backbone of urban green infrastructure, and provide numerous valuable services for cities and their residents—more than half of the global population [1]. Previous research shows that UGSs provide a range of ecological and social benefits starting with regulating and cultural ecosystem services that facilitate human–nature interactions and ultimately improve the physical and mental health of people [2,3]. The importance of provisioning services in cities is also acknowledged, and related opportunities for healthy lifestyles and social cohesion are recognized [4,5].

The COVID-19 pandemic, however, has brought about a profound shift in people's attitudes toward urban green spaces and recent studies identify changes in temporal and spatial patterns of daily UGS use, e.g., [6–8]. Related lockdowns have led to a better understanding and new appreciation of how important local nature is to individual and collective health and the well-being of urban populations. Firstly, as restrictions on indoor activities and gatherings intensified, urban green spaces became a lifeline for individuals seeking safe outdoor respite, e.g., [6,9]. Secondly, the pandemic underscored the critical role of green spaces in supporting mental and emotional well-being, prompting a heightened appreciation for their therapeutic qualities [7,10]. Thirdly, the pandemic amplified the desire for open, spacious areas that enable social distancing, thereby increasing the appeal of larger urban green spaces over crowded indoor alternatives [8,11]. Finally, the pandemic has spurred a sense of collective responsibility, fostering a renewed commitment to preserving and enhancing these green areas within urban landscapes as essential resources for future well-being [12].

Given that public green spaces played a crucial role as sources of recreation in countries where they remained accessible during the pandemic, it becomes imperative to ascertain

what were the most attractive attributes of UGSs and what were the major problems during the visits. Previous studies identify the shift in a need for social distancing and other safety measures and so this potentially leads to new designs and practices in public green spaces [12]. While extensive research has analyzed shifts in UGS visitation and changes in people's attitudes, there remains a noticeable gap in our understanding regarding the necessary adaptations required within UGS environments [13]. These adaptations should not only be socially acceptable and appreciated but also provide opportunities for recreational activities while addressing safety requirements. This knowledge holds significant importance, especially as urbanization continues and the risk of further pandemics persists [14].

This empirical study seeks to identify the key attributes of public UGSs that held particular significance during visits, especially when access to alternative recreational areas was restricted due to the imposed limitations. Additionally, this study aims to uncover the primary challenges encountered by individuals during their visits. The main objective of this work is to present the results of the survey developed during the quarantine in Vilnius, Lithuania. The survey aimed to explore the use of public green spaces during the lockdown and investigate the characteristics and qualities of UGS that city dwellers found most important during their visits. Vilnius, having more than 40 percent of its territory covered with UGSs [15], serves as an excellent laboratory for such research.

Literature Review

The role of public UGS in providing various ecosystem services, especially related to the residents' physical and mental health, increased during the pandemic [16,17]. Multiple studies have highlighted the increased frequency of green space use during the periods of the pandemic restrictions and suggested that this was due to their multifunctionality and capacity to mitigate some of the negative effects of the pandemic on human health and well-being [6,18,19]. The benefits that UGSs provide became vital, especially when restrictions forced the closure of indoor sports facilities, recreational spaces, and limited access to the green spaces outside the city. Not only did the amount and distance from home or ease of access to the nearest UGS prove to be important, but apparently, other attributes that are related to the safety and health of visitors became significant during the pandemic [13].

The literature indicates that UGS characteristics and associated qualities can be categorized into distinct groups (see Table 1). In this research, following a comprehensive literature review, these characteristics or desirable qualities of UGS have been organized into four major groups. Prior studies have identified various attributes, often referred to as pull-push factors, that impact UGS usage [20,21]. Some of these attributes have significant influence over users' behavior and overall experience.

Proximity to home is identified as one of the most important attributes affecting park visitation frequency and the duration of these visits, e.g., [22,23]. However, not necessarily the closest park to the home will be the most frequently visited. Physical characteristics of UGSs like recreational infrastructure (benches, tracks, lighting) and various amenities (toilets, playgrounds, sports and dog-walking facilities) were found to encourage park visitation frequency [23–25]. All these characteristics are related to visitor comfort and allow for the more convenient enjoyment of UGSs. Thus, these ergonomic characteristics pertain to the design and layout of the park, optimizing human comfort, efficiency, and safety. This includes the abovementioned factors such as proximity to residential areas, accessibility, and the integration of existing infrastructure within the park.

Another group of characteristics that can be categorized pertains to the ecological characteristics of UGSs. Previous research highlights people's preferences for more natural environments. For example, individuals tend to favor green spaces with abundant vegetation, favorable microclimates, diverse landscapes, relief, and tranquility [11,18,20]. They may also show a preference for larger nature parks over smaller urban parks in central areas [19]. Therefore, the group of ecological characteristics encompasses all features related

to the park's naturalness, microclimate, landscape, as well as the presence of tranquility or silence.

Previous research indicates that people's preferences for UGS can vary based on their visitor type and the activities that they engage in within these spaces. Notably, younger individuals tend to favor UGSs with qualities conducive to socializing with friends, as demonstrated by Palliwoda and Priess [26]. They also value spaces that provide a sense of safety and connection, as highlighted in studies by McCormack et al. [23] and Cohen et al. [27]. Therefore, social qualities encompass the park's role in facilitating social interactions, bolstering perceptions of safety, and alleviating feelings of isolation among park users.

Finally, aesthetic qualities encompass features that enhance the visual appeal and enjoyment of the park, including its design elements, natural features, size, and overall maintenance, all of which resonate positively with certain park visitors. Research identified that attributes such as water elements or good maintenance promote UGS use [23,28–30]. Evidently, various characteristics and qualities of UGSs have been recognized as influential, if not fundamental for their use.

Table 1. Summary of studies showing preferred UGS characteristics ¹.

Group	Characteristics Identified	Source
Ergonomic characteristics	Proximity to home, recreational infrastructure (benches, tracks, lighting); amenities (toilets, playgrounds, cafes, sports and dog-walking facilities).	Lau et al. [22]; Grilli et al. [28]; Chen et al. [24]; Dallimer et al. [31]; McCormack et al. [23]; Kaczynski et al. [25].
Ecological characteristics	Naturalness, abundant vegetation (e.g., high tree cover density), favorable microclimates, diverse landscapes, relief, tranquility, and silence.	Berdejo-Espinola et al. [18]; Phillips et al. [20]; Korpilo et al. [11]; Lu et al. [19]; Özgüner, H. [32].
Social qualities	Sense of safety and connection, ability to socialize with friends or family, no feelings of isolation.	Palliwoda and Priess [26]; Kabisch and Haase [33]; McCormack et al. [23]; Cohen et al. [27].
Aesthetic qualities	Design elements, specific natural features (e.g., old trees, river), size, maintenance (cleanliness).	Grilli et al. [28]; Madureira et al. [29]; Akpınar, [30]; Bertram and Rehdanz [34]; McCormack et al., [23].

¹ Some of the studies identified several characteristics from different groups, but a link is given to the most preferred ones.

2. Materials and Methods

2.1. Study Area

Vilnius is the capital city of Lithuania with over 600,000 inhabitants [35]. The city is constantly growing due to intensive internal rural-to-urban migration [36]. It is the only growing city in the country and thus experiences a growing demand for public green spaces. According to the data provided in the city's new master plan, a large portion of the city is covered with green infrastructure (GI). Public UGSs, as defined by the city's general plan, are divided into intensively used (having recreational infrastructure) and extensively used UGSs (without infrastructure, usually intended to serve as green corridors), covering over 3300 hectares (8.25%) of the city (Figure 1). This amounts to 55.74 m² of UGS per capita. A large portion of urban GI in the city comprises forests, which cover over 13,450 hectares (33.55%) and are open to the public for recreational use. Altogether, these elements of GI make up 16,750 hectares (42%) of the city's municipal area. Nearly 39% of the territory is urbanized, with 12% (4709 hectares) covered by impervious surfaces [37].

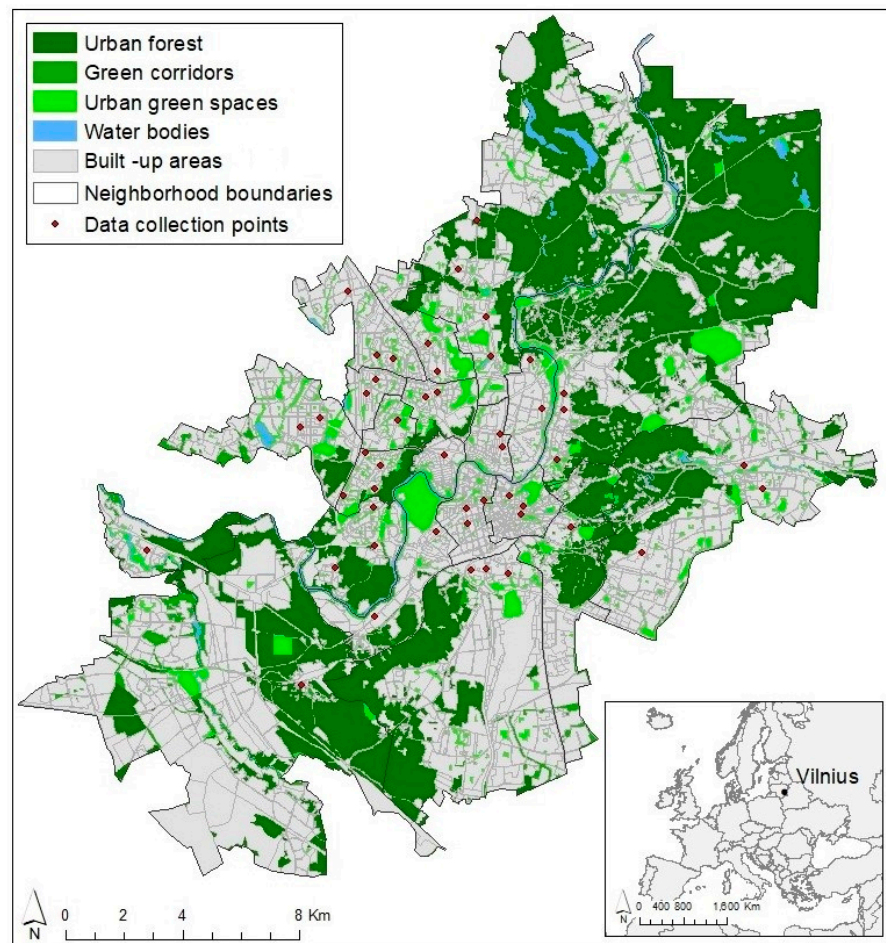


Figure 1. Urban green spaces in Vilnius, Lithuania and data collection points.

Open to the public UGSs in Vilnius vary according to size and infrastructure. Officially the Law on Greeneries classifies UGSs as urban parks (*parkas*: minimum 1 ha, including facilities for recreation, education, etc.); urban green squares (*skveras*: minimum 0.03 ha, open space with less vegetation, primarily used for short recreation); and urban greenery (*zeldynas*: minimum 0.01 ha area covered with vegetation, where there might be bodies of water, flower beds). Thus, parks are the main source of local recreation. In the central part of the city, there are smaller parks (between 2 and 8 ha) with good infrastructure, like walking paths, benches, toilets, and lights. Several larger forest-type parks are located in the periphery of the city. These parks are more natural, have less infrastructure (except for the largest Vingis Park), and their size varies from 30 ha to over 100 ha. A little less than 80% of intensively built-up residential areas meet the norm for green area accessibility within 300 m. [37].

After the first COVID-19 cases in Europe, Lithuania imposed the strictest level of quarantine limitations from 16 March 2019 until 31 May 2019. Later the quarantine regime was repeated from 29 December 2020 until 31 May 2021. It was the longest quarantine period during the pandemic with strict mobility restrictions, however, the green spaces in the city were always open for visits to family members with clear warnings to keep distance from other people and to avoid any gatherings.

2.2. Questionnaire Development, Data Collection and Analysis

A questionnaire was developed based on a literature review and existing data on UGS use during the quarantine regime (see Supplementary File S1). The first four questions of the survey pertain to the respondent's general perception of UGSs in the city. Subsequently,

questions related to the perceived benefits provided by UGSs and their usage followed. The questionnaire also inquired about preferences for UGS characteristics and qualities. Specifically, respondents were asked to identify the most critical characteristic of UGSs that influenced their choice of the most frequently visited UGS. The latter question was organized around the four major groups of characteristics or desirable qualities of UGSs that emerged during the literature review: ecological characteristics encompassing features related to the park's naturalness, microclimate, diverse landscape and relief, and the presence of tranquility or silence; ergonomic characteristics including factors such as proximity to home, accessibility, and the presence of recreational infrastructure within the park; social qualities that addressed the park's suitability for education, playing with kids, walking a pet, or meeting friends, as well as a feeling of safety and a lack of a sense of isolation; and finally, aesthetic qualities including rich vegetation and significant natural or design elements, size, and overall maintenance. Additionally, respondents were asked to identify major inconveniences or barriers that disturbed their UGS visits during the quarantine.

Face-to-face data collection was completed during 1 and 12 June 2021 (Figure 1). These first two weeks of June were the last two weeks of a four month long quarantine. At that time quarantine restrictions were already relieved and gatherings between people outside were allowed. Face-to-face data collection was implemented on the streets, questioning random people in every eldership (the smallest administrative units similar to neighborhoods) of Vilnius. People were surveyed near the main social points, like bus stops, parks, parking lots, or libraries. In total, 403 residents of Vilnius participated in the survey. All of the questionnaires were complete and included in the analysis.

The data obtained through the questionnaires was analyzed with the IBM SPSS Statistics software (v 27). Frequencies and percentages were calculated for the socio-demographic data and for ordinal data on perceived nature benefits as well as preferences for UGS characteristics. Cross tabulation was used to display the multivariate frequency distribution of the variables and the Pearson chi-squared test was applied to the sets of categorical data, like UGS characteristics and age or visitation frequency, to evaluate if an observed difference between the sets was statistically significant. Categorical variables were reported using proportions.

3. Results

3.1. Population Sample Demographics

The total sample of 403 residents was balanced across gender, with slightly more female respondents, thus, 183 men and 220 women participated in the survey. The sample was well-balanced across the age groups, however, there were slightly less participants in the 45–65 years of age group (Table 2). As previously stated in the Materials and Methods Section, data collection encompassed all of the elderships within Vilnius. However, respondents were asked to specify their eldership of residence. Consequently, the data represents respondents from every eldership, with a range of 10 to 36 individuals from each eldership. It's important to note that all respondents are residents of Vilnius.

Around 51 percent of the respondents reported being in a favorable financial situation, as they have sufficient income not only for daily necessities but also for more expensive items. Among them, 6.5 percent mentioned that they can afford to purchase everything they desire. Conversely, six percent stated that they can meet their basic needs but face challenges when buying clothing or costlier items. Nearly 24 percent of the respondents indicated that they live alone, while among those who do not live alone, 29 percent mentioned having school-age children residing with them.

Table 2. Summary of the demographic characteristics of survey respondents as a percentage of the total survey population, compared to statistics from Vilnius.

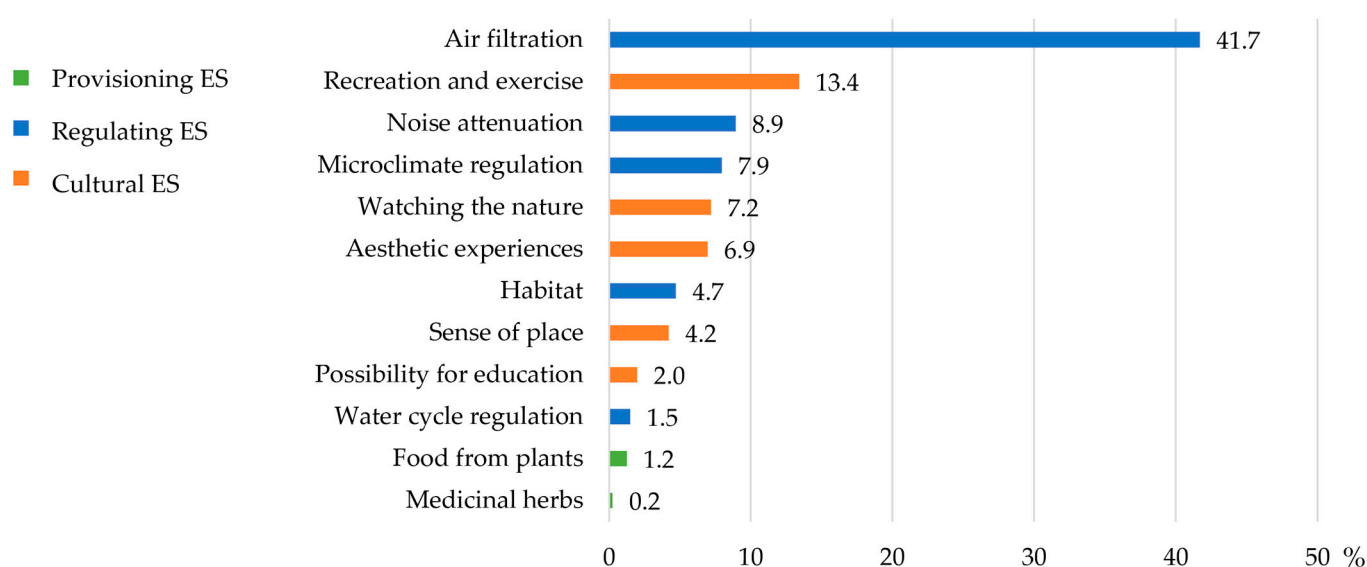
		Survey Participants (%)	Vilnius Population (%)
Gender (2021)			
	Female	54.6	55.6
	Male	45.4	44.4
Age			
	18–24	13.9	7.1
	25–34	18.9	18.2
	35–44	22.1	20.7
	45–54	11.9	16.3
	55–64	11.4	16.1
	≥65	21.8	21.7

3.2. UGS Availability and Perception of the Benefits That They Provide

Nearly 70 percent of the respondents expressed agreement on the availability of UGSs in the city, with one-quarter strongly agreeing and 44 percent somewhat agreeing. On the other hand, 11 percent strongly disagreed with this statement. Moreover, 67 percent of the respondents agreed that there are sufficient UGSs near their homes, while 13 percent strongly disagreed.

When asked if urban nature is important for the well-being of residents, almost 77 percent of the respondents evaluated that it is very important. Almost 65 percent said it is very important for mental health, and over 62 percent said it is very important for residents' physical health. Although a similar amount of the respondents agreed that urban nature is also important for aesthetics, less respondents believe that it is important for biodiversity support—56 percent agree that it is very important.

Over 40 percent of respondents identified a regulating ecosystem service (ES)—air filtration—as the most important service for human well-being that UGSs provide. Almost 14 percent identified a cultural ES—possibility of recreation and exercise as the most important; then another two regulating ES followed: almost 9 percent identified noise reduction and almost 8 percent—microclimate regulation. The least important were provisioning ES (Figure 2).

**Figure 2.** The most important ecosystem services (ESs) for human well-being that UGSs provide (%).

According to the survey, over 75 percent of the residents of Vilnius live up to 10 min away from UGSs. Only 3 percent live more than half an hour away from public UGSs.

During the quarantine 75 percent visited green spaces every day or several times per week. Up to 7 percent went to UGSs several times per year or never. Proximity to the green areas and visitation frequency was statistically significant (Table 3). The results indicate that the overwhelming majority of daily and weekly visitors reside in the closest proximity (up to 10 min) to the UGS. Conversely, individuals residing 10 min or more away tend to visit UGSs less frequently.

Table 3. Statistically significant crosstab of visitation frequency and proximity to UGS¹.

		Visitation Frequency				Total
		Daily	Weekly	Monthly	Several Times a Year or Never	
Proximity to UGSs by foot	Less than 5 min away	90 _a (62.1%)	39 _b (26.9%)	10 _c (6.9%)	6 _{b,c} (4.1%)	145 (100%)
	5–10 min	56 _a (35.4%)	65 _b (41.1%)	27 _{a,b} (17.1%)	10 _{a,b} (6.3%)	158 (100%)
	11–20 min	13 _a (19.7%)	22 _b (33.3%)	24 _c (36.4%)	7 _{b,c} (10.6%)	66 (100%)
	21–30 min	6 _a (28.6%)	5 _a (23.8%)	6 _{a,b} (28.6%)	4 _b (19.0%)	21 (100%)
	More than half an hour away	3 _a (23.1%)	4 _a (30.8%)	4 _a (30.8%)	2 _a (15.4%)	13 (100%)
Total		168 (41.7%)	135 (33.5%)	71 (17.6%)	29 (7.2%)	403

¹ Pearson chi-square $p < 0.05$. Letters _{a,b,c} denote the result of the z-test, which compares the sample mean to the population mean and determines if the difference between them is statistically significant.

From the beginning of the pandemic in March 2020, the majority of respondents mentioned that they maintained their usual outdoor activities. However, a slightly larger percentage of people (5.7 percent) reported spending significantly more time outdoors during the quarantine compared to those (3.7 percent) who mentioned spending significantly less time outside (Figure 3).

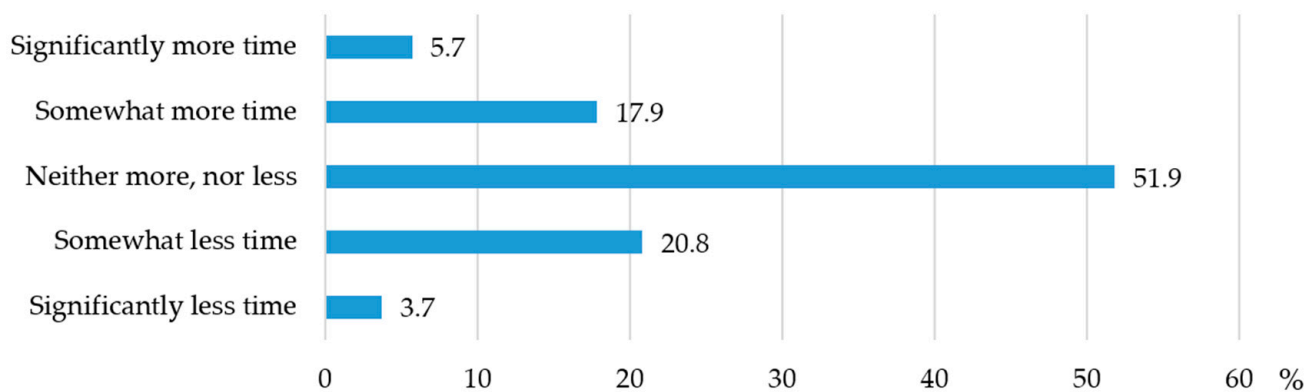


Figure 3. Time spent outside during the quarantine compared to pre-COVID times according to the respondents (%).

During the quarantine, people engaged in activities at UGSs that primarily focused on physical interactions (49 percent), followed by social interactions (19 percent), experiential and aesthetic activities (17 percent), and activities associated with provisioning and regulating ecosystem services (15 percent) (Figure 4).

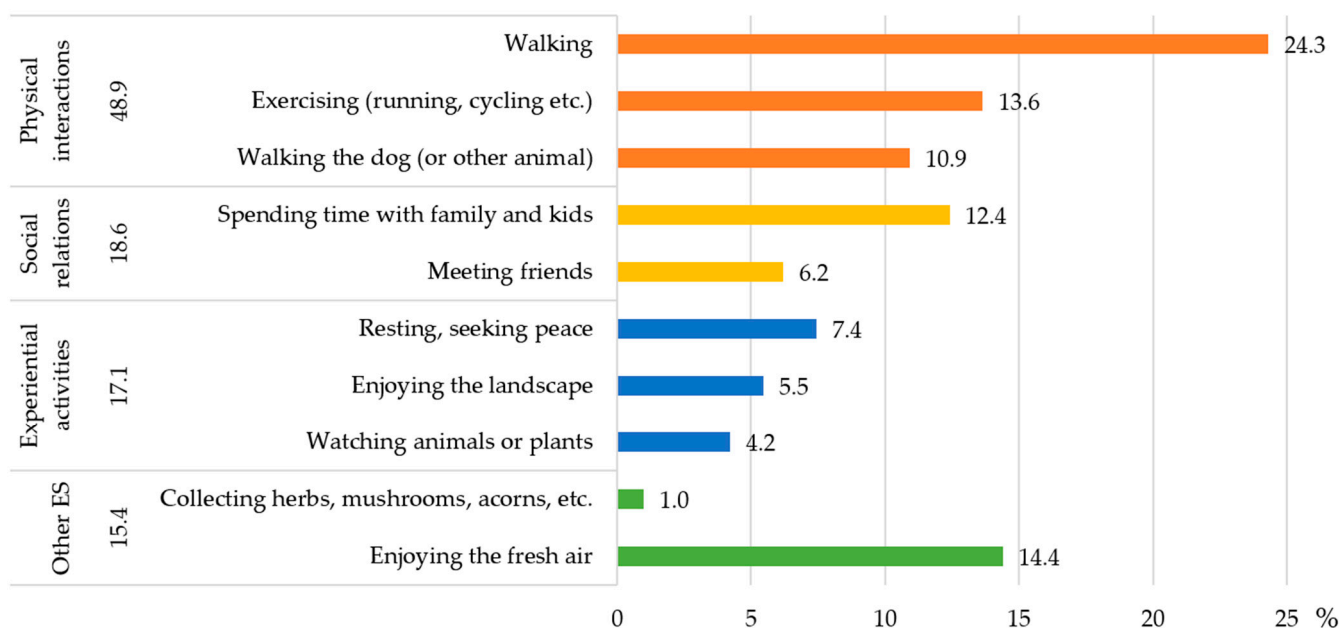


Figure 4. Activities that people were practicing at UGSs during the quarantine (%). Different colors identify different groups of activities.

3.3. The Preferences of UGS and the Desired Characteristics

Respondents were questioned about whether spending time in UGS helped them cope with the isolation and stress brought on by the pandemic. A total of 38 percent strongly agreed with the statement, while more than 46 percent somewhat agreed. In total, over 84 percent of individuals agreed that UGSs played a significant role in helping them manage isolation and stress. Only 2.5 percent strongly disagreed with the statement provided.

In response to inquiries about the green space that they frequented most often during the quarantine, 55 percent indicated that they consistently visited the same public UGS in the city. Additionally, 29 percent mentioned spending their time in the courtyard adjacent to their residence, while 16 percent revealed that they opted for a different UGS each time they were going out.

All respondents were asked to specify the primary characteristic that they preferred for their regular visits to UGSs (Figure 5). Several key characteristics emerged as particularly significant. A significant 22 percent of respondents identified a favorable UGS climate (clean air and a good microclimate) as their top priority, falling into the ecological characteristics category. Proximity to home, a feature categorized as ergonomic, was the next most important attribute, chosen by 21.8 percent of respondents. A tranquil, serene environment with fewer people (an ecological characteristic) and accessibility, enabling foot travel to UGS (an ergonomic characteristic), were the other two highly rated UGS characteristics.

Further analysis of variables that might influence individual preferences for different UGS characteristics was conducted. The visitor's age, proximity to home, visitation frequency, and the activities a person engages in at UGSs were examined. The applied Pearson chi-squared test revealed that only the activities a person engages in at UGSs significantly correlate with their most important UGS characteristics. This implies that there is a notable connection between the activities individuals choose to undertake in urban green spaces and the features of those spaces that they prioritize. The other variables—age, proximity to home, and visitation frequency—do not exhibit a statistically significant correlation with the UGS characteristics that individuals deem most crucial (Figure 6).

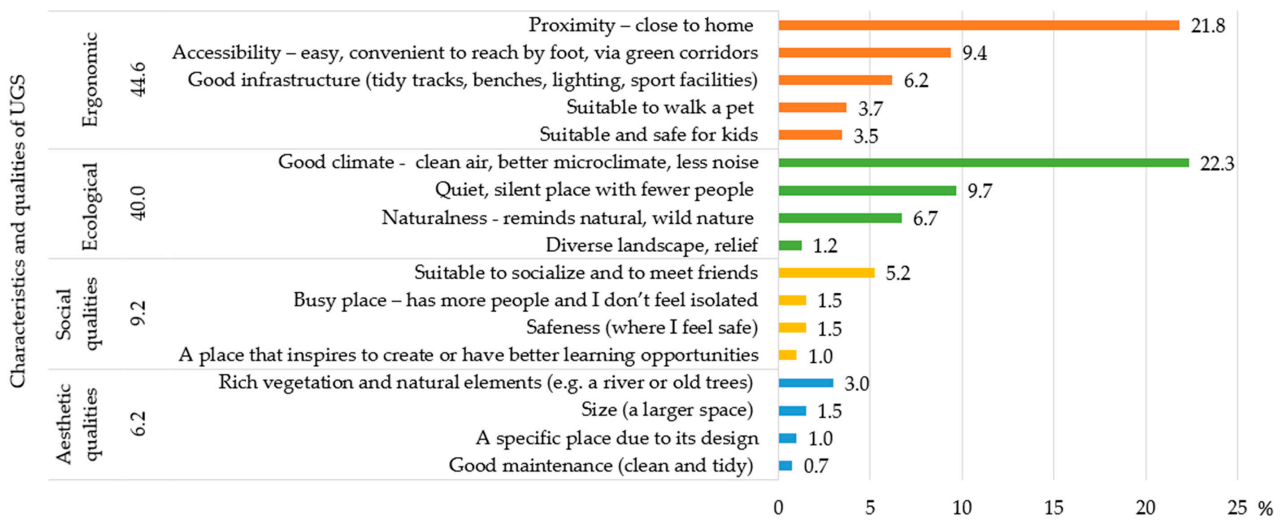


Figure 5. The most important UGS characteristics and qualities clustered into four groups (%). Different colors identify different groups of characteristics and qualities of UGS.

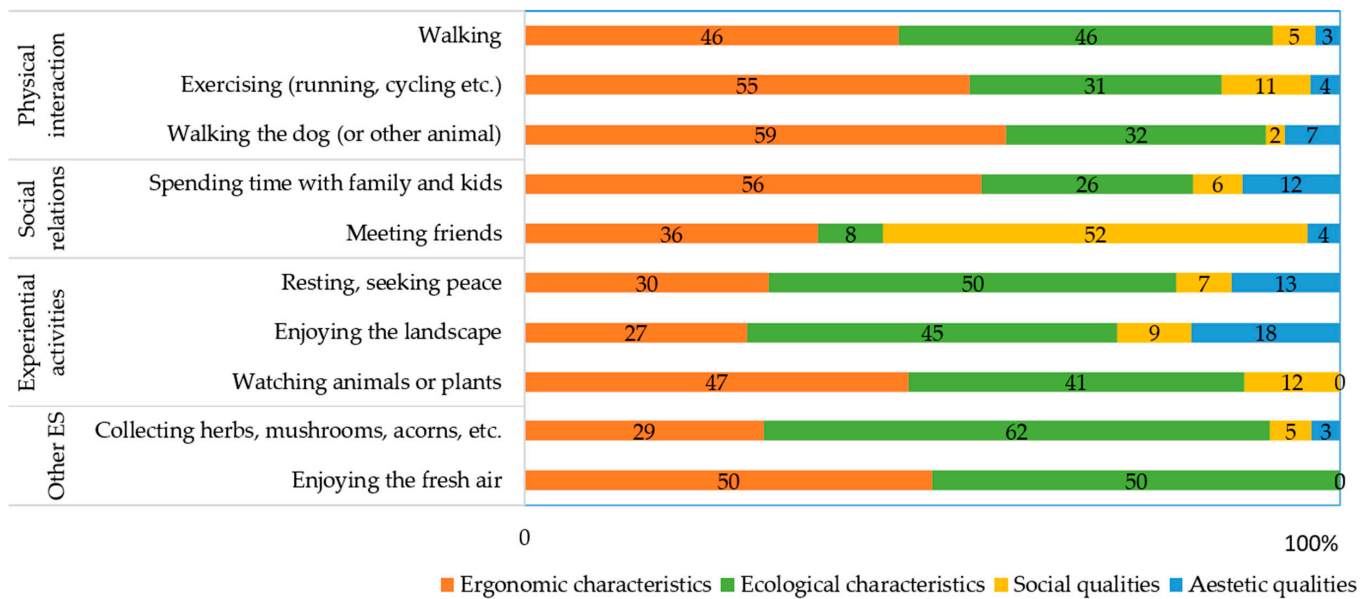


Figure 6. The most important UGS characteristics' groups according to the activities that are engaged in at UGSs (statistically significant as Pearson chi-square $p < 0.05$). Different colors identify different groups of characteristics and qualities of UGS.

Individuals who engage in physical activities, such as walking or exercising, tend to prioritize ergonomic UGS characteristics (with over 50% choosing one of the ergonomic characteristics as the most important) and ecological characteristics (over 38%, respectively). Social and aesthetic qualities receive comparatively less attention from this group.

People involved in social interactions exhibit more diverse preferences. However, ergonomic characteristics remain most important for them, with 49% choosing one as the most crucial. Social qualities come next in importance for social users, with 22%.

The remaining users, including those participating in experiential activities such as enjoying landscapes or resting, as well as those who come for regulating or provisioning ecosystem services, primarily value ecological characteristics (46% and 61%, respectively).

While age did not reach statistical significance, it exhibited a distinct trend wherein older individuals tended to place less value on social and aesthetic qualities. In contrast,

a different trend emerged concerning proximity: individuals residing farther away from the nearest UGS tended to prioritize social and aesthetic qualities more, with the highest preference being for ecological characteristics. Those living closest to UGS expressed a stronger preference for ergonomic characteristics.

3.4. Hindrances and Inconveniences of UGS Use

The final question regarding UGS use was related to the hindrances that users faced when visiting UGSs. Firstly, 10 percent of the respondents indicated that they did not face any hindrances or inconveniences. Further, the prevailing trend concerning the primary issues was as follows: 18 percent of the respondents identified quarantine restrictions as the key problem, encompassing the requirement for mask usage, closure of coffee places, and inoperative public toilets. The second major inconvenience, cited by 13 percent of the respondents, was related to poor infrastructure within UGSs (lack of benches, lighting, toilets); crowdedness (too many people) was mentioned by 11 percent. Next, 9 percent said they lacked a large UGS close to their home, and 7 percent indicated a lack of a yard next to their house or apartment building as the major inconveniences. Fear of being infected with the virus was mentioned by 5 percent of the respondents (Figure 7).

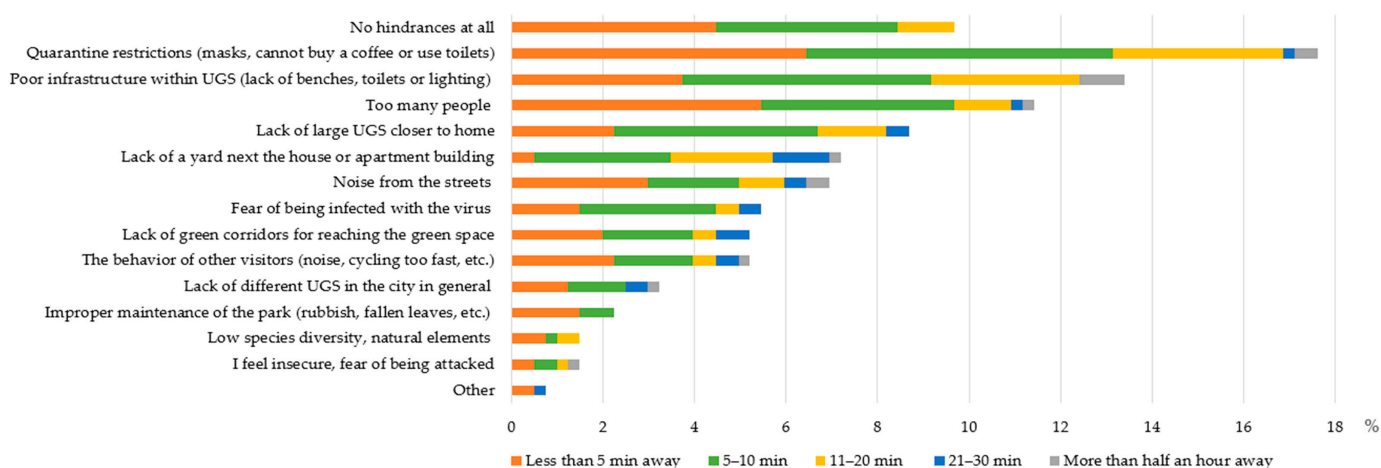


Figure 7. Major problems that emerged during UGS visits according to the proximity to home (%) (statistically significant as Pearson chi-square $p < 0.05$).

Further analysis was conducted to explore which variable relates to the perception of hindrances. Once again, visitor's age, proximity to home, visitation frequency, and the activities a person engages in at UGSs were examined. The applied Pearson chi-squared test revealed that proximity was the only statistically significant variable. This suggests that there is evidence to support the idea that the problems people encounter during their park visits were related to the proximity to their homes. It means people living closer to the park were more likely to encounter similar issues or have different perceptions of problems compared to those living farther away.

For individuals residing in the closest proximity to UGSs (less than 5 min away), major concerns included improper maintenance, a lack of naturalness, and crowdedness. Specifically, 67%, 50%, and 48% of the total responses related to improper maintenance, lack of naturalness, and crowdedness, respectively, were contributed by this group. Meanwhile, those that live farthest (21–30 min or more than half an hour away) did not see these as a concern at all: respectively, 0%, 0%, 4% of the total responses were contributed to these problems by this group. Furthermore, this group identified the general absence of UGSs in the city and the lack of a yard adjacent to their homes as primary issues. The last group of people (those who live 11–20 min away) identified a lack of naturalness, the absence of a yard adjacent to their homes, and poor infrastructure as key issues (33%, 31%, 24% of the total responses were contributed to these problems by this group).

4. Discussion

The primary objective of this study was to investigate the use and preferred attributes of UGSs under restrictions. The research findings confirmed that the usage of public UGSs slightly increased during the pandemic. Users believe that these spaces assist in coping with isolation and stress, thereby contributing not only to the physical but also to the mental well-being of city residents. Additionally, the most important UGS characteristics, as identified by users, were those associated with comfort and usability, such as proximity to home and accessibility, as well as ecological aspects like favorable microclimate and natural surroundings. Further discussion delves into the preferred qualities of UGSs, as well as the challenges related to their utilization.

4.1. Public UGS Use during the Pandemic

Although more than half of the respondents stated that they spent the same amount of time outside, a slightly larger percentage of people reported spending significantly more time outdoors during the quarantine compared to those who mentioned spending significantly less time outside. It is interesting to note, however, that 42% of the respondents reported being daily visitors to UGSs in Vilnius. Previous research conducted before the pandemic in the spring of 2019 [21] indicated that there were 17% of daily UGS visitors in Vilnius. While not the same population was surveyed in 2019 as in the current research, this provides an idea about the change in daily visits to UGSs.

This research, along with existing literature, highlights that UGS usage experienced changes during the pandemic, and these changes were largely influenced by quarantine regulations. At least a slight increase in UGS use reported by the respondents during this research was not exclusive to Vilnius. Similar trends were observed in other regions, such as Belgium [6] and Oslo, Norway, where there was a substantial surge during the initial months of the pandemic [8]. Conversely, some studies reported no increase and, in fact, a decrease in UGS usage. For instance, research conducted in Madrid revealed an 8% decrease in daily users (from 36% to 28%), with 30% of people discontinuing their UGS visits altogether [9]. A comparative study of UGS users in Portugal and Spain also confirmed the decreasing usage trends [7]. These notable variations can be linked to varying quarantine regulations, as public UGSs remained accessible in Lithuania, Belgium, and Norway, while the opposite was observed on the Iberian Peninsula.

The results of this study suggest that the value ascribed to UGSs has increased during the pandemic, accompanied by a shift in the activities that people engage in there. Notably, it is worth mentioning that, prior to the COVID-19 pandemic, both park-level research [38] and city-level studies [21] in Vilnius showed that very few people, if any, mentioned coming to UGSs to observe nature, such as animals or plants, or to appreciate the scenic landscape. However, during the pandemic, nearly 10 percent of individuals indicated that observing nature became their primary UGS activity. Although, again, the population that participated in the current research is not the same population that participated in the previous research, this still implies that constraints and limitations on recreational opportunities led more people to visit UGSs more frequently and potentially fostered a greater appreciation for the beauty of species and landscapes than before. These findings align with the idea that the value of urban nature and its ecosystem services is closely tied to people's interactions with nature and their UGS visitation frequency [21,39,40]. One strategy to increase visitation frequency and enhance the value people attribute to urban nature is to make public green spaces more attractive by addressing preferred UGS characteristics.

4.2. Prioritizing Comfort While Emphasizing Ecology

This research reveals that in Vilnius, two distinct groups of characteristics hold greater importance for UGS users compared to others. Firstly, the group of ergonomic characteristics, which encompasses elements related to user comfort, such as convenient accessibility, garnered the highest overall score. However, the single most crucial quality identified is a favorable microclimate, which falls within the second most significant group in this

study—ecological characteristics. Aesthetic qualities appeared to be of lesser importance to UGS users in Vilnius city.

The analysis and comparison of current and other research developed during the pre-pandemic era and the pandemic period or beyond suggests a potential shift in visitor preferences for UGS qualities and characteristics. For instance, research developed before the pandemic illustrated that frequent UGS use was more likely when a park was in close proximity to one's residence, emphasizing the significance of ergonomic characteristics [31]. Indeed, this research confirms that the majority of daily visitors are those who live in close proximity to UGSs. Interestingly, the level of naturalness, indicated by tree cover and variety of bird species, did not significantly influence usage patterns—an ecological aspect of the environment [31]. Aesthetic qualities of UGSs, however, were of utmost importance, with attributes like cleanliness, botanical diversity, the size of the UGS, and the presence of bodies of water topping the list of features in increasing park visitation [28,29]. Additionally, ergonomic characteristics such as restroom facilities, cafes, and gym amenities were also identified as factors contributing to the overall utility of UGSs [28,32]. Thus, with some caution, one can observe that before the pandemic, people tended to favor qualities more aligned with the ergonomic and aesthetic categories outlined in this research rather than ecological ones.

Current research, however, alongside other post-pandemic analyses, indicates that in addition to ergonomic characteristics, people have placed equal importance on ecological characteristics rather than aesthetic qualities. These ecological characteristics include naturalness, favorable microclimates, and tranquil environments. For instance, Korpilo et al. [11] conducted a public participation GIS survey during the pandemic in Helsinki, Finland. Their findings revealed an altered visitation pattern, with residents demonstrating a stronger tendency to visit UGSs closer to their homes, particularly those that have high tree cover density. Notably, proximity and naturalness, which are key attributes of ergonomic and ecological UGS characteristics, were highlighted as essential factors. Research in Brisbane, Australia further supports these trends, revealing disparities in the UGS characteristics favored during the COVID-19 pandemic compared to the pre-pandemic period [18]. Notably, individuals opted for green spaces closer to their homes, signifying the growing importance of proximity. Additionally, people leaned toward UGSs with more vegetation, characterized by increased grass cover and foliage height diversity. This highlights the continued significance of both ecological and ergonomic characteristics [18].

The preferences for ecological characteristics can be attributed to the availability and quality of ecosystem services offered by large natural ecosystems like forests. The lockdown measures imposed during the pandemic led to heightened stress and feelings of isolation, disrupting daily routines and impacting individual and community well-being [41–43]. Prior research emphasizes that large natural areas, such as forests and urban woodlands, exert a significant positive influence on recovery and stress relief, making them ideal ecosystems for promoting mental well-being and aiding in stress recovery [44–50], which became especially crucial during the lockdowns.

In light of this, urban planners should acknowledge the unique ecosystem services provided by large natural areas, often referred to as urban wilderness [51]. Making these extensive urban green spaces as accessible as possible to a broader urban population is imperative, particularly during times of crisis. One strategy is to enhance sustainable urban mobility options, such as greenways, which enable people to walk to their preferred green spaces while avoiding public transport when social distancing is required. On the other hand, if there are no possibilities to make large natural areas accessible, one should consider possible adaptations of accessible small UGSs to make them resemble natural forest areas: leave old trees, form natural layers by planting an understory made up of bushes and shrubs, and leave some dead plant material such as fallen leaves to form the floor.

4.3. Available Qualities and Size for a Better Experience

This research clearly indicates that access or proximity is one of the most important determinants in UGS use as a majority of people who did not face any problems during the pandemic where those living closest to UGSs in Vilnius. However, some people who live closest complained about quarantine requirements, like mandatory mask wearing, and crowdedness in the UGSs. This aligns well with other research that indicated a lack of social distancing and crowded UGSs as a main concern, for instance in New York City [52]. Empirical research in Taiwan showed that two-thirds of the urban planning area suffers from unequal access to UGSs, and this unequal access has been stressed during the lockdowns [53]. A study in Malaysia showed that the size of existing UGSs is insufficient in terms of compliance with the parameters, especially Malaysia's social distancing requirements [54]. These analyses confirm that not only equal access and proximity to UGSs are important, but again the size of the UGSs becomes extremely important during the crises. Large natural areas not only ensure better recovery and stress relief for visitors but also guarantee social distancing, which was particularly important during the pandemic and quarantine. Additionally, larger UGSs ensure ecological characteristics, like better climate [15,55], which this research proved to be more important during the crises.

The other group of people who live further from UGSs complained not only about the quarantine restrictions but also about the lack of UGSs close to home and poor infrastructure within the UGSs. The last two complaints might be related in a sense that if the closest UGS to their homes lacks the desired qualities, people chose either not to visit it at all or they travel further to other UGSs that have the qualities they prefer [20]. This is especially important and must be addressed when planning and implementing a UGS network in the city. It appears that small and isolated UGSs, like those in the center of Vilnius, will not replace the functions and ecosystem services that large UGSs established in the outskirts can provide for the users [56]. Thus, if there is no possibility to establish large UGSs in some areas, city planners must ensure good accessibility to the larger UGSs in the outskirts, for instance, via green corridors, which were missed mostly by those respondents who live farthest from UGSs. This finding confirms the results of other studies that emphasize the need to identify ways to strengthen the green networks in the city that allow connecting larger and smaller UGSs [20].

5. Conclusions

This research presents an analysis of UGS use, the desirable qualities of these spaces, and the problems that people encountered during their visits to UGSs during the pandemic. The main findings confirm that UGS use has slightly increased and suggest that the desirable qualities of UGSs are mainly related to comfort and naturalness. Visitation frequency depends significantly on the proximity of UGSs to the home—daily visitors are those who live closest to UGSs.

The characteristics and qualities of UGSs were grouped into four main categories in this research. A key finding of this study is that two distinct groups of characteristics hold greater significance for UGS users, a trend consistent with findings from other research. Ergonomic characteristics, associated with the convenience of UGS use, as well as ecological characteristics, were most important. The preferred characteristics depend on the activities that people engage in during their visits: visitors preferring physical and social activities favor ergonomic characteristics first, while others prioritize ecological characteristics. In contrast, aesthetic and social qualities were less important for all visitors.

The main problems that people encountered were related to quarantine restrictions and poor infrastructure of UGSs. Proximity to UGSs was also important in the perception of these problems: those who live closest had a different perception than those who live farther.

The findings of this research hold some implications for policy makers and urban planners when designing urban green infrastructure. This study's central focus is not on the quantity or equal distribution of UGSs throughout the city but rather centers on the

specific qualities of green spaces that people prefer. The pandemic, coupled with increased UGS usage, has stressed the importance of incorporating ergonomic characteristics into urban green spaces, enhancing the overall convenience of public visits. Furthermore, it is essential to make adaptations to smaller UGSs to improve their naturalness and, where possible, improve access to larger UGSs, which encompass more ecological characteristics and provide additional ecosystem services.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/land12122106/s1>, Supplementary File S1: A questionnaire about the use and preferences of Vilnius green spaces during COVID-19 pandemic.

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