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Has the Pandemic Altered Public Perception of How Local Green Spaces Affect Quality of Life in the United Kingdom?

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Abstract: Green spaces unquestionably improve both physical and mental health, but there is little information on how they affect quality of life. This study investigates whether the public perception of how local green spaces and their impact on quality of life have altered as a result of restrictions imposed by the U.K.'s SARS-CoV-2 pandemic containment strategy. Qualitative data were collected using an online questionnaire distributed via social media platforms and postal flyers. The results clearly demonstrate that 90% of participants believe that green spaces improved their quality of life during the pandemic, with over 85% thinking that green spaces will continue to have a positive impact on their quality of life once the pandemic is over. Whether this is a permanent change in public thinking or a short-term adaptation to the stresses of the pandemic can be assessed in future research studies. More detailed research is required to understand more clearly the aspects and types of green spaces that are the most valuable for improving quality of life so that future ones can be designed to provide maximum benefits.

Keywords: green space; quality of life; usage of green spaces; mental health; essential workers

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1. Introduction

The SARS-CoV-2 pandemic has already had a worldwide impact that is unprecedented in extent [1]. According to several studies, the interruption of daily routine had significant consequences for mental health globally [2]. The possibility of infection, as well as the fear of dying or infecting others, had a detrimental impact on people's quality of life and mental health [3]. Studies have also reported that essential workers had a higher risk of anxiety and pandemic-related stress compared to non-essential workers [4–7].

As governments around the world responded to the public health threat by enacting social distancing protocols, economic shutdowns, and various forms of home quarantine, it has been speculated that these measures may have fundamentally altered the relationship between humans and public green spaces in terms of their use and perception [8]. In particular, authorities around the world shut down public parks and recreational areas to prevent the virus from spreading [9,10], but these decisions were not based on scientific evidence. Therefore, there is a plethora of evidence on the lack of access to local green spaces and the negative impacts on both physical and mental health [11].

Several recent green infrastructure studies have identified a diverse range of ecosystem functions and services that are critical to human well-being and urban resilience [12–14], which are now seen as especially important during health emergencies.

A study conducted in the United States revealed that tree-rich green spaces protected mental health during the pandemic, particularly in certain age groups, indicating that green space-related strategies can help mitigate the mental health burden [15]. On the other hand, nature and green spaces are often scarce in low-income and minority communities, which have been the hardest hit by the pandemic [16]. Using two datasets, researchers found inequality in greenness and park proximity across all urbanised areas in the United

States, and linked greenness and park access to COVID-19 case rates for ZIP codes in 17 states [16]. The authors reported that rates were higher and greenness lower in areas that had a majority of people of colour [16].

A recent review highlighted that urban blue-green spaces and surrounding nature are essential for mitigating the pandemic's detrimental effects on quality of life by offering a safe environment for activities as well as mental well-being benefits [17].

This is reinforced by another study carried out by Scotland's Nature Agency [18], which found that almost three-quarters (70%) of people felt that spending time outdoors within nature in 2020 helped them to de-stress, relax and unwind and 56% agreed that it improved their physical health [18]. During the peak of the pandemic, prolonged home confinement because of travel restrictions was a source of motivation that influenced city dwellers' behaviour and preference for parks and open spaces [19]. Several studies also reported a general increase in green space use during the pandemic [20–23]. According to an Australian study, females were more likely than men to adjust their green space visiting frequency during the pandemic, and they also placed a greater value on green spaces for social and familial relationships, as well as spiritual reasons [24].

In Asian cities, Lu et. al. (2021) [25] collated quantitative data on the usage of public green spaces by extracting geotagged social media data from different time points to form longitudinal panel datasets [25]. However, they did not measure any type of subjective data and therefore were unable to calculate any quality of life measurements [26].

Qualitative data are more appropriate when aiming to measure the perception of quality of life, as shown in the study conducted by Dushkova et al. (2021) [27], who found, via online surveys, that residents in both Perth and Moscow valued and relied on outdoor green-blue spaces to support their well-being, especially during the pandemic [27]. Historically, quality of life has been measured in economic terms. The indicator traditionally used as a measure of economic and social development is gross domestic product (GDP). GDP is one of the most common measures of the economic activity of a region or a country at a given time, and although it was not intended as an indicator of social progress, it has been considered to be closely linked to the well-being of citizens [28].

It has been widely acknowledged that measures of income and economic performance are poor proxies for quality of life [29].

Therefore, the Office of National Statistics (ONS) has developed four measures of personal well-being (i.e., life satisfaction, worthwhile, happiness, and anxiety) which they use to measure national quality of life [30].

Within landscape architecture, there is no dedicated tool for measuring quality of life. International and small-scale studies have been conducted to examine changes in quality of life during the pandemic [31–34]. At the time of writing, there has been no research that has looked at whether the pandemic has altered public perception of the impact of local green spaces on quality of life within the United Kingdom. This study aims to fill this research gap. It is therefore important that aspects of city life, such as public green spaces which improve societal well-being, are understood so that these can then be incorporated into future plans with maximal impact. Exploring how people perceive green spaces, particularly in times of crisis, is critical for rethinking the urban landscape and preparing our cities to become more biophilic and sustainable [35].

This research aims to determine whether the public's perception towards local green spaces and their impact on quality of life has altered, if at all, as a result of restrictions imposed by the U.K.'s pandemic containment strategy, compared to before national lockdowns were implemented. Finally, we compared the usage of public green spaces between essential workers and nonessential workers as well in females and males.

2. Materials and Methods

An online questionnaire available on JISC Online Survey was used to obtain qualitative data for this study. This questionnaire was developed after an investigation of research

questions used in similar studies and amending the questionnaire to be specific to this study's question.

It consisted of 35 questions (see Supplementary Material) and included four general components:

1. General demographic information (i.e., sex (male or female); age group; ethnicity; education; essential workers/nonessential workers as from the government list: https://www.gov.uk/guidance/essential-workers-prioritised-for-covid-19-testing, accessed on 27 June 2022).
2. Usage of green spaces.
3. Quality of life.
4. Predictions for the future.

The sample size required for the study was calculated at priori by using an online calculator (www.qualtrics.com, accessed on 27 June 2022) and with a 95% confidence interval and a 7% margin of error, the minimum sample size would be calculated to be 196. The sample was restricted to those over the age of 18 living in the U.K. with no physical disabilities. Several previous research studies reported poor survey response rates due to the ongoing effects of COVID-19 [36,37] hence, a non-probability sampling was used. Specifically, we used a virtual and a physical snowball sampling method [38] to reach essential and nonessential workers.

The survey was distributed in August 2021 via a URL link on Facebook, Instagram and then emailed to contacts or physically delivered as flyers to the homes of residents local to the researcher. Participants were actively sourced by the researchers, who encouraged them to share the survey online with their friends, families, and colleagues.

Data Analysis

Questionnaire data were analysed using MS Excel and JASP (version 0.16.12) [39]. In addition, as the questionnaire data tend to be composed of thoughts, feelings, and opinions, NVivo 12 Pro was used to analyse and organise the qualitative data and perform text analysis queries [40].

As statistical methods are based on model assumptions [41], we first checked to see if the data were normally distributed using a Shapiro–Wilk test of normality in JASP. The data were found to be not normally distributed ($p < 0.001$), so to compare the usage of green space before and after the pandemic between essential workers and nonessential workers and between females and males we performed a non-parametric Mann–Whitney U test. We tested the null hypothesis that the two groups had identical distributions and the alternative hypothesis that the group medians were different [42,43]. The significance level was set at $p < 0.05$.

3. Results and Discussions

3.1. Demographics Variables

The study had 215 participants, the majority of whom were female. The age distribution was near normal with peaks in the 18–24 and 50–64 ranges. The most frequent age range of respondents was 50–64. Most respondents were White British (89.8%), nearly identical to the 87% that make up the White British population within the U.K. [44]. This slight increase can be accounted for by the fact that white people are more likely to participate in surveys than non-whites [45–47].

Ninety per cent of respondents identified as White British; full-time was the dominant employment category, where 42.3% were essential workers during the pandemic; 40% of respondents had a bachelor's degree, with an additional 23% having a master's or PhD/Doctorate (Table 1).

Almost 50% lived in rural locations, with over 90% having access to a private garden, and 98% having access to a public green space. The majority (84%) lived within a 10 min walk of a public green space, with public opinion split 50/50 on whether the closest green

space was also the participant's favourite; 91%. felt that there was adequate public green spaces within their local area.

Table 1. Sociodemographic information.

AGE		**ETHNICITY**		**EDUCATION**	
18–24	23%	White British	89.8%	Secondary School, no qualifications	1.4%
25–34	12%	Chinese	0.9%	GCSEs	7.9%
35–49	17%	British Asian	0.5%	A Levels	11.6%
50–64	36%	White European	0.9%	Trade/technical/vocational training	12.1%
65–80	12%	White Irish	0.9%	Bachelor's degree	41.9%
		Other	7%	Master's degree	18.1%
SEX				Doctoral degree	5.6%
Female	69%	Essential worker	43%	Other	1.4%
Male	31%	Nonessential worker	57%	Total (*n*)	215

Forty-three per cent of survey respondents self-identified as key workers during the pandemic, a 10% increase over the expected 33% of the total workforce (in 2019), who worked in key worker roles and industries [48]. As well as this higher proportion of essential workers, the higher rate of medical professionals was extreme. In the U.K. just 0.6% of the population are registered doctors, but they represented 10% of the study participants.

In addition, those who attained a university degree, of any level, represented an abnormally large percentage of participants. In 2017 the ONS showed that 42% of the U.K. population between 21–64 years old were graduates [49], compared to two-thirds of the survey respondents. A higher proportion of affluent and educated participants is to be expected in surveys [45,50,51], but this does not account for the high levels of medically educated professionals or those with university-level education. This was undoubtedly due to non-probability sampling.

The biggest difference in the surveyed participants compared to the average U.K. citizen is that a minority of respondents lived in urban locations. Half of all participants identified themselves as living in a rural environment, a hugely different representation from the most recent rural population estimates (2018), where just 17% of people lived in rural locations [52].

3.2. Coronaphobia in Green Spaces during the First Lockdown

"Coronaphobia" is a new emerging phobia specific to the pandemic, but is not limited to public places/situations/objects, where people come into contact with others [53]. In this study, a third of the people were concerned about developing COVID-19 during the first lockdown when people actively changing their habits to incorporate social distancing and hand hygiene when visiting green spaces. The potential risk of catching the virus as a perceived barrier to visiting green spaces during the pandemic has also been reported in previous research [54,55]. For example, a study conducted in New York City found that most respondents were concerned about a lack of social distancing and crowded urban green spaces, and those who shared these concerns were less likely to visit urban green spaces or had visited them less frequently [55].

In this study, the benefits that the public perceived they were gaining from being in a public green space seemed to outweigh any risks of contracting the virus (Figure 1) in each individual's cost–benefit analysis during the first lockdown.

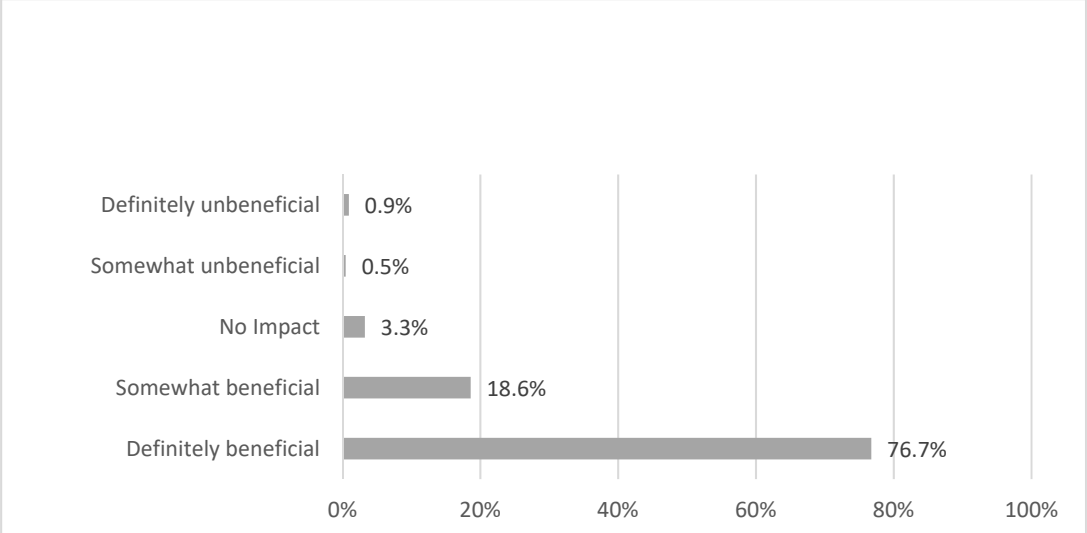

Figure 1. During the first lockdown (March–May 2020), did you think the benefits of being outside in a public green space outweighed the potential risk of catching the SARS-CoV-2 coronavirus?

3.3. Change in Visitation Local Green Space: Before the Pandemic vs. during the Pandemic

Two thirds of respondents visited their local green space most days or more frequently, with woodlands, local parks, and walkways being the most popular choices. Nine in ten of the respondents visited green spaces the same or more since the pandemic (Figure 2), with nearly half of them (47.4%) visiting more frequently.

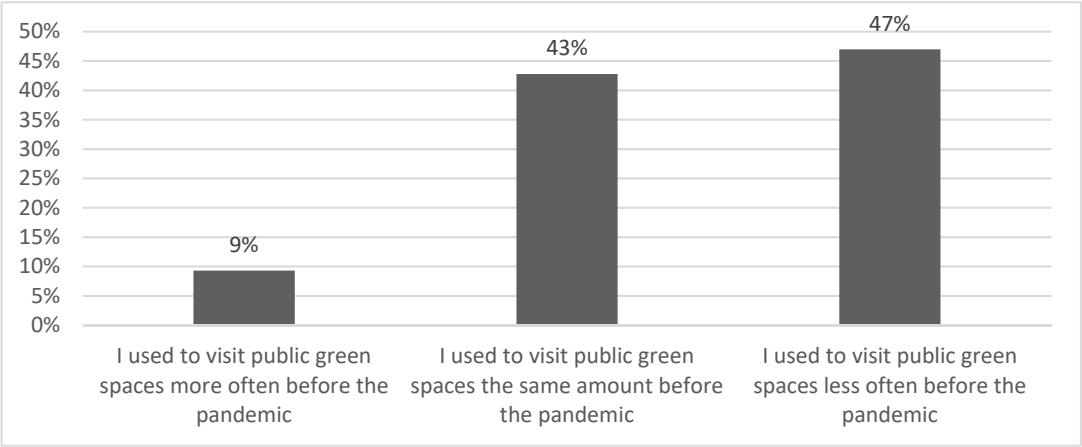

Figure 2. How has your usage of public green spaces changed since the pandemic?

There were no significant differences in the usage of public green spaces between essential workers and nonessential workers (p = 0.055). However, 51% of the essential workers used to visit green spaces the same amount before the pandemic. There were also no significant differences (p = 0.790) in usage between males and females but 47% of females reported they used to visit green spaces less often and 44% used to visit the same amount, while 47% of males used to visit green spaces less often and 41% the same amount. One participant commented, "Having been locked in and restricted to 1 h a day outside, I value the freedom of visiting any green space more than before the pandemic."

During the pandemic, the most common reasons for visiting a public green space were to socialise, for health and exercise, to enjoy the scenery and pleasant weather, to get fresh air, and to improve mental well-being and reduce stress (Figure 3). A participant reported, "Exercise is now part of my daily routine, and access to local green spaces has become part

of this." Physical exercise was also cited as the most common motivation in an international exploratory study on the use and perceptions of urban green space [8].

Figure 3. The most 100 frequent words to describe the main reasons for visiting local green spaces during the pandemic (Data processed using NVivo 12 Pro).

The most significant change because of the pandemic was a doubling of the number of people using green spaces to manage stress and improve mental health (Figure 4) from 32.6 to 65.6%.

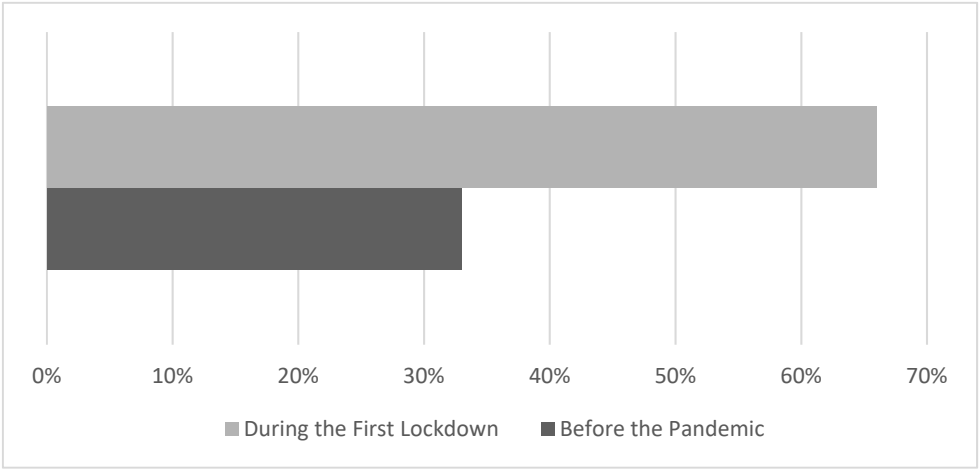

Figure 4. Percentage of people who used green spaces to manage stress.

The next biggest change was the amount of people using the space to relax and unwind and for peace and quiet (a 50% increase) followed by an approximate 30% increase in those using it to enjoy the scenery and wildlife.

Sixty four percent of people thought green spaces would be used more than before the pandemic, but not as much as during it. Similarly, over 85% of people thought that, on the whole, the public would use local green spaces more than before the pandemic.

Ninety per cent thought that visiting public green spaces improved their quality of life during the pandemic compared to 75% who thought so beforehand (Figure 5).

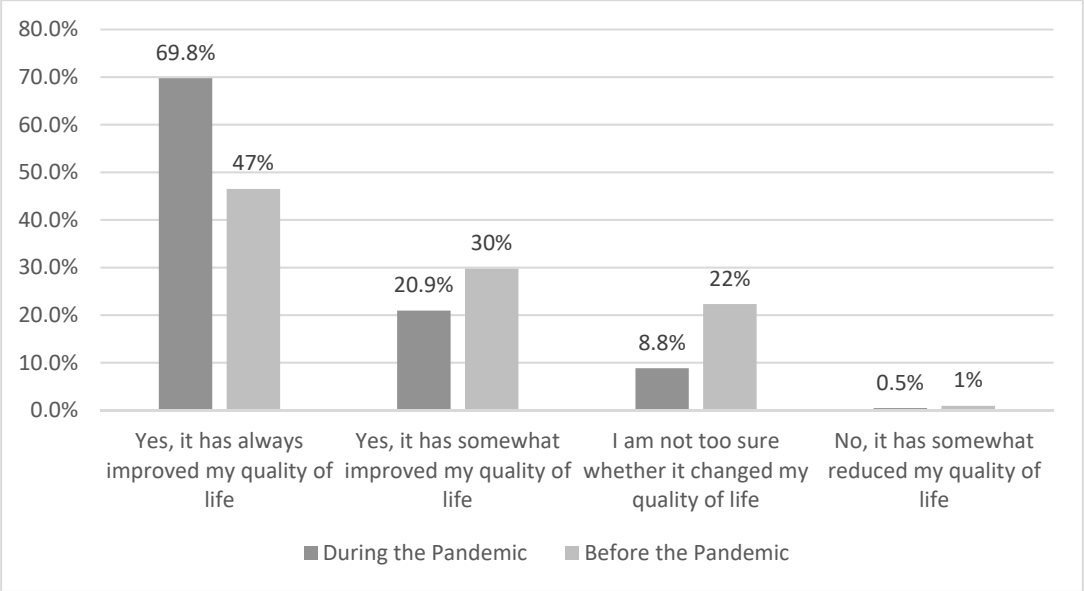

Figure 5. Do you think that visiting public green spaces improved your quality of life?

3.4. Green Spaces Post-Ppandemc

Nine in ten participants thought that, overall, the public would value local green spaces more than before the pandemic, with over two thirds valuing green spaces definitely more (48%) or somewhat more (24%) than they did before (Figure 6).

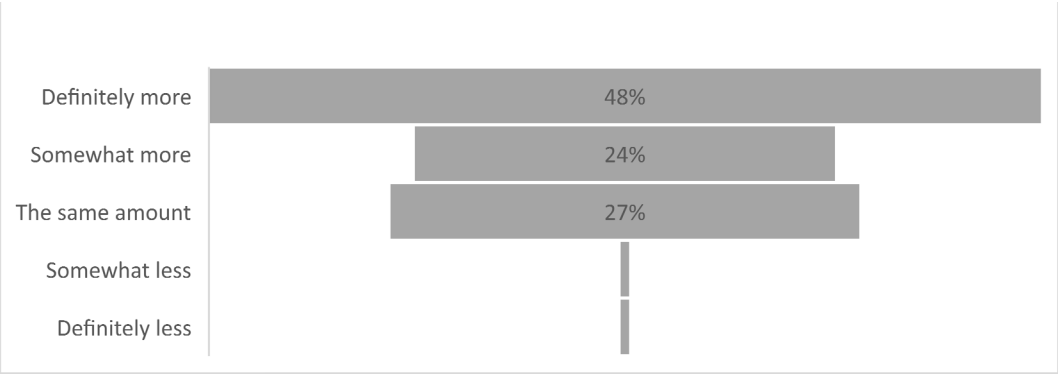

Figure 6. Do you value public green spaces more than you did before the pandemic?

A large proportion (87.4%) of respondents believed that regularly visiting their local green space would improve their quality of life, with 1% thinking it would decrease and the remaining 12.6% thinking it would stay the same (Figure 7).

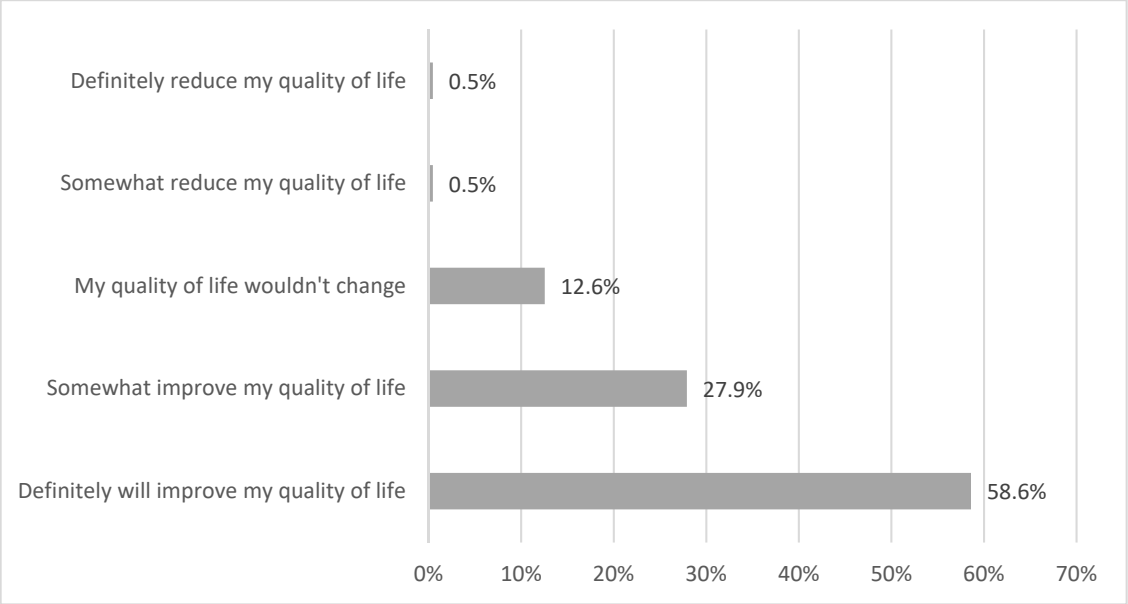

Figure 7. In the future, do you think that regularly visiting a local green space will improve your quality of life?

3.5. Contribution to the Field and Future Directions

At the time of writing, this study was the first to examine whether limitations imposed by the U.K.'s pandemic containment strategy had altered how the general public perceived public green spaces and their impact on quality of life. Our study strengthened the evidence of the value of green spaces for health and well-being. Furthermore, our findings, as well as those of other recent studies [56], highlighted the necessity of keeping green spaces open and accessible to everybody in the event of future pandemics. Thus, expanding and enhancing green spaces is critical for improving urban quality of life. Previous studies have shown that tiny gains in greenness can significantly enhance the lives of people in cities with lower per capita income, which is crucial from an environmental justice standpoint [57]. However, there is still social inequality in the use, distribution, and quality of green space in the U.K. [58]. Green space quality and typology play an important role in personal perception and willingness to visit them [59,60], but this was not investigated in the current study.

Aspects that negatively impact a green space's quality can then be "designed out" by landscape architects [61].

Previous research has also shown that green spaces enable positive social interactions that enhance community cohesiveness and improve health and well-being [60–63].

However, one aspect of green spaces that was not investigated in this study was the impact of community gardens and allotments on which organic produce is grown for local citizens [64,65]. The community gardening movement has blossomed in the last decade, with community gardens becoming increasingly popular [66,67].

The pandemic ignited a rise in popularity of small-scale agriculture [64,68] as people began growing their own food, mainly due to international food shortages, as large swaths of the population "panic bought" huge quantities of items to stockpile before supermarkets introduced restricted buying regulations [69,70].

However, many individuals do not have access to a home garden or public green spaces [71] as shown in our results. Community gardens could supply a safe way of generating healthy food at a minimal cost to people in need, even during pandemics, with adequate social distancing and sanitisation [72].

Such gardens would improve a citizen's overall quality of life, diet and mental well-being as well as ecosystems. Future studies should look into the benefits of community gardens within local green spaces, and whether this influences the quality of life for users.

3.6. Study Limitations

Respondents were recruited for this study by snowball sampling, a common technique used in qualitative research that has features of networking and recommendation at its core [73]. Rapid, low-cost non-probability sampling is ideal if a survey is intended to generate quick ideas, consult on opinions, or stimulate community interaction [74].

The researchers often begin with a limited number of initial contacts who meet the research requirements and are invited to participate. The willing participants are then asked to identify additional contacts who meet the research requirements and who may also be willing participants, who in turn may refer more possible respondents. As a result, researchers use their social networks to build initial connections, with sampling momentum emerging from these and collecting a growing chain of participants [73].

Participants for this study were recruited via several social media platforms, as well as through the researcher's personal contacts. All were asked to share the study with their own connections and on social media.

Participants all completed the survey online by clicking or typing on a link. A small proportion were recruited by flyers that were delivered within the local vicinity of the researcher. The flyers had both a QR code and the survey website address, which enabled the older population to complete the survey as they may not have been aware of the online circulated version.

The sample representation gave a reasonably reflective view of the adult population within the U.K. compared to ONS data. However, snowball sampling may not be representative of the U.K. population as a whole. In this study, there were differences at either end of the age spectrum. Those aged 80 and over accounted for 6% of the adult population, yet only 0.5% of the participants; 18–24-year-olds make up 11% of the adult population, but over 23% of the survey respondents [75]. This was not a surprise as younger people are more likely than older people to participate in surveys [76,77].

The gender split of the U.K. is 50:50 [78], yet 69% of respondents were female; however this was to be expected as women tend to participate more in surveys [45,76]. In contrast to the most recent U.K. rural population estimates (2018), which showed that only 17% reside in rural areas, 50% of participants in this study identified themselves as living in a rural environment. Urban and rural residents have different experiences and relationships with green spaces, as types, locality, and usage vary. When compared to urban green spaces, exposure to nature in rural areas strengthens people's emotional and cognitive sense of connectedness and enhances feelings of relaxation and refreshment [79,80]. Rural lifestyles also provide unique opportunities to develop meaningful place identities that are more focused on recreation (e.g., outdoor activities) [79].

A limitation of this study is the exclusion of children or those with a physical disability. Several studies have found that school closures, stay-at-home orders, and the closure of playgrounds and other open spaces may have had a negative impact on children and adolescents [81,82].

Children have been excluded for both practical and ethical reasons. Children of a certain age should be accompanied by an adult to their local green space, meaning that factors such as time, activity and location are dictated by someone else. As adults frequently make decisions on behalf of children, children represent a unique section of the population that does not have autonomy over day-to-day decisions [83], and therefore would be unable to complete the questionnaire as it contains questions regarding time spent and usage of green spaces. As children are legally unable to consent themselves to a study this provides the additional challenge of ethical issues [84].

The usage of green spaces may also differ from that of the general population, as other factors such as access, facilities, ground level changes, quality and width of paths, and the amount of inclusive design features affect the perceived quality and value of a space. The frequency of visitation could also be reliant on a guardian or relative if someone were unable to travel independently or needed to be accompanied to use the space.

People with physical disabilities were excluded from this study as their relationship and usage of green spaces will be different from that of the rest of the population. The meaning of 'local' for people with a physical disability is likely to cover a smaller distance than able-bodied people. Green spaces within close proximity may still be considered too far. The frequency of visitation could also be reliant on a caregiver or relative if someone were unable to travel independently or needed accompaniment to use the space.

Research suggests that people with physical disabilities visit green spaces less frequently than does the general population [85], and little is known about the factors that lead to their generally low participation [86]. The results from this group would be categorically different to that of the general population, and therefore were excluded from this study.

If the findings are to be useful to the public health authority and policy makers during a pandemic, assessing the knowledge and perceptions of relevant populations must be done in a short time frame. However, a population-representative household survey using a probability sampling method typically takes many months of preparation and data collection [37,87]. Therefore, rapid online survey using a non-probability sampling method as in this study could be a useful tool for assessing public perceptions and knowledge during fast-moving infectious viral outbreaks [37]. Nevertheless, it is important that future government-funded research look into population-based surveys using probability sampling to reduce the risk of bias [74,88].

4. Conclusions

This research aimed to determine whether the public perception of local green spaces and their impact on quality of life had been altered, if at all, as a result of restrictions imposed by the U.K.'s pandemic containment strategy. It is clear from this study that the public believes that green spaces increase their quality of life and that their perceived value increased during the pandemic.

This study showed that 90% of participants perceive green spaces to have improved their quality of life during the pandemic, with over 85% thinking that they will continue to have a positive impact on their quality of life once the pandemic is over. However, this raises the question of whether this is a permanent change in public thinking or a short-term adaptation to the stresses of the pandemic.

This study highlighted the need for standardisation of the meaning and measurement of quality of life as it pertains to landscape architecture/urban design and this would enable future studies to have a consistent approach to the study of this crucial topic.

To better understand the implications of these results, further work investigating which aspects or types of green spaces contribute the most to the quality of life would be valuable. The understanding of the relationship between quality of life and public green spaces could revolutionise planning and design of green spaces so that they have the maximum impact. Future research could also address whether maximum benefit could be achieved by providing multiple, small, local green spaces or a larger, singular, space that can offer an intimacy with nature that perhaps could not be met so easily by small public areas.

This research uncovered a strong correlation between public green spaces and quality of life, especially during times of increased uncertainty and stress. These findings complement the plethora of previous research which found links between green spaces and improved physical and mental health, which contribute to a person's overall quality of life [57,89–91]. Together, these findings can be used in new national policies as government officials use this evidence to inform decision making, which relies on clear and concise research findings.

Studies monitoring the movement of people during the pandemic showed that the number of visits to green spaces increased. Green areas, without a doubt, promote both mental and physical well-being. International and small-scale studies have been carried out to investigate changes in quality of life throughout the pandemic. There has been no research on whether the pandemic changed popular perception of the influence of local

green spaces on quality of life in the U.K. This study filled the gap in the literature by clearly showing that the pandemic altered public perceptions of the impact of green spaces on their quality of life.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su14137946/s1, Project Research Questions.

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Conflicts of Interest: The authors declare no conflict of interest.

References

1. Sathyamala, C. COVID-19: The Political Economy of a Global Pandemic. *Dev. Change* **2022**. [CrossRef]
2. McMahon, G.; Douglas, A.; Casey, K.; Ahern, E. Disruption to well-being activities and depressive symptoms during the COVID-19 pandemic: The mediational role of social connectedness and rumination. *J. Affect. Disord.* **2022**, *309*, 274–281. [CrossRef]
3. Cavazzoni, F.; Pancake, R.; Veronese, G. Impact of COVID-19 Pandemic on Mental Health and Quality of Life. An Exploratory Study During the First Outbreak in Italy. *Psychol. Rep.* **2022**, 003329412110662. [CrossRef]
4. Bell, C.; Williman, J.; Beaglehole, B.; Stanley, J.; Jenkins, M.; Gendall, P.; Rapsey, C.; Every-Palmer, S. Challenges facing essential workers: A cross-sectional survey of the subjective mental health and well-being of New Zealand healthcare and 'other' essential workers during the COVID-19 lockdown. *BMJ Open* **2021**, *11*, e048107. [CrossRef] [PubMed]
5. Bond, A.E.; Wagler, K.; Anestis, M.D. Essential workers: Past month suicidal ideation and COVID-19 stress. *J. Clin. Psychol.* **2021**, *77*, 2849–2859. [CrossRef] [PubMed]
6. Garfin, D.R.; Djokovic, L.; Silver, R.C.; Holman, E.A. Acute stress, worry, and impairment in health care and non-health care essential workers during the COVID-19 pandemic. *Psychol. Trauma Theory Res. Pract. Policy* **2022**. [CrossRef] [PubMed]
7. Toh, W.L.; Meyer, D.; Phillipou, A.; Tan, E.J.; Van Rheenen, T.E.; Neill, E.; Rossell, S.L. Mental health status of healthcare versus other essential workers in Australia amidst the COVID-19 pandemic: Initial results from the collate project. *Psychiatry Res.* **2021**, *298*, 113822. [CrossRef]
8. Ugolini, F.; Massetti, L.; Calaza-Martínez, P.; Cariñanos, P.; Dobbs, C.; Ostoić, S.K.; Marin, A.M.; Pearlmutter, D.; Saaroni, H.; Šaulienė, I.; et al. Effects of the COVID-19 pandemic on the use and perceptions of urban green space: An international exploratory study. *Urban For. Urban Green.* **2020**, *56*, 126888. [CrossRef]
9. Herman, K.; Drozda, Ł. Green Infrastructure in the Time of Social Distancing: Urban Policy and the Tactical Pandemic Urbanism. *Sustainability* **2021**, *13*, 1632. [CrossRef]
10. Volenec, Z.M.; Abraham, J.O.; Becker, A.D.; Dobson, A.P. Public parks and the pandemic: How park usage has been affected by COVID-19 policies. *PLoS ONE* **2021**, *16*, e0251799. [CrossRef]
11. White, M.P.; Elliott, L.R.; Grellier, J.; Economou, T.; Bell, S.; Bratman, G.N.; Cirach, M.; Gascon, M.; Lima, M.L.; Lõhmus, M.; et al. Associations between green/blue spaces and mental health across 18 countries. *Sci. Rep.* **2021**, *11*, 8903. [CrossRef] [PubMed]
12. Staddon, C.; Ward, S.; De Vito, L.; Zuniga-Teran, A.; Gerlak, A.K.; Schoeman, Y.; Hart, A.; Booth, G. Contributions of green infrastructure to enhancing urban resilience. *Environ. Syst. Decis.* **2018**, *38*, 330–338. [CrossRef]
13. Andreucci, M.B.; Russo, A.; Olszewska-Guizzo, A. Designing Urban Green Blue Infrastructure for Mental Health and Elderly Wellbeing. *Sustainability* **2019**, *11*, 6425. [CrossRef]
14. Russo, A.; Cirella, G.T. Urban Sustainability: Integrating Ecology in City Design and Planning. In *Sustainable Human—Nature Relations: Environmental Scholarship, Economic Evaluation, Urban Strategies*; Cirella, G.T., Ed.; Springer: Singapore, 2020; pp. 187–204. ISBN 978-981-15-3049-4.
15. Wortzel, J.D.; Wiebe, D.J.; DiDomenico, G.E.; Visoki, E.; South, E.; Tam, V.; Greenberg, D.M.; Brown, L.A.; Gur, R.C.; Gur, R.E.; et al. Association Between Urban Greenspace and Mental Wellbeing During the COVID-19 Pandemic in a U.S. Cohort. *Front. Sustain. Cities* **2021**, *3*, 686159. [CrossRef]

16. Spotswood, E.N.; Benjamin, M.; Stoneburner, L.; Wheeler, M.M.; Beller, E.E.; Balk, D.; McPhearson, T.; Kuo, M.; McDonald, R.I. Nature inequity and higher COVID-19 case rates in less-green neighbourhoods in the United States. *Nat. Sustain.* **2021**, *4*, 1092–1098. [CrossRef]
17. Mouratidis, K. How COVID-19 reshaped quality of life in cities: A synthesis and implications for urban planning. *Land Use Policy* **2021**, *111*, 105772. [CrossRef]
18. NatureScot Covid Drives Huge Increase in Use of Urban Greenspace. Available online: https://www.nature.scot/covid-drives-huge-increase-use-urban-greenspace (accessed on 15 May 2022).
19. Yap, K.K.L.; Soh, M.C.K.; Sia, A.; Chin, W.J.; Araib, S.; Ang, W.P.; Tan, P.Y.; Er, K.B.H. The influence of the COVID-19 pandemic on the demand for different shades of green. *People Nat.* **2022**, *4*, 505–518. [CrossRef]
20. Korpilo, S.; Kajosaari, A.; Rinne, T.; Hasanzadeh, K.; Raymond, C.M.; Kyttä, M. Coping with Crisis: Green Space Use in Helsinki Before and During the COVID-19 Pandemic. *Front. Sustain. Cities* **2021**, *3*, 713977. [CrossRef]
21. Berdejo-Espinola, V.; Suárez-Castro, A.F.; Amano, T.; Fielding, K.S.; Oh, R.R.Y.; Fuller, R.A. Urban green space use during a time of stress: A case study during the COVID-19 pandemic in Brisbane, Australia. *People Nat.* **2021**, *3*, 597–609. [CrossRef]
22. Venter, Z.S.; Barton, D.N.; Gundersen, V.; Figari, H.; Nowell, M.S. Back to nature: Norwegians sustain increased recreational use of urban green space months after the COVID-19 outbreak. *Landsc. Urban Plan.* **2021**, *214*, 104175. [CrossRef]
23. da Schio, N.; Phillips, A.; Fransen, K.; Wolff, M.; Haase, D.; Ostoić, S.K.; Živojinović, I.; Vuletić, D.; Derks, J.; Davies, C.; et al. The impact of the COVID-19 pandemic on the use of and attitudes towards urban forests and green spaces: Exploring the instigators of change in Belgium. *Urban For. Urban Green.* **2021**, *65*, 127305. [CrossRef] [PubMed]
24. Berdejo-Espinola, V.; Zahnow, R.; Suárez-Castro, A.F.; Rhodes, J.R.; Fuller, R.A. Changes in Green Space Use During a COVID-19 Lockdown Are Associated with Both Individual and Green Space Characteristics. *Front. Ecol. Evol.* **2022**, *10*, 804443. [CrossRef]
25. Lu, Y.; Zhao, J.; Wu, X.; Lo, S.M. Escaping to nature during a pandemic: A natural experiment in Asian cities during the COVID-19 pandemic with big social media data. *Sci. Total Environ.* **2021**, *777*, 146092. [CrossRef]
26. Creswell, J.W.; Poth, C.N. *Qualitative Inquiry and Research Design*, 4th ed.; SAGE Publications, Inc Published: Thousand Oaks, CA, USA, 2016; ISBN 9781412995313.
27. Dushkova, D.; Ignatieva, M.; Hughes, M.; Konstantinova, A.; Vasenev, V.; Dovletyarova, E. Human Dimensions of Urban Blue and Green Infrastructure during a Pandemic. Case Study of Moscow (Russia) and Perth (Australia). *Sustainability* **2021**, *13*, 4148. [CrossRef]
28. EUROSTAT Quality of Life Indicators—Measuring Quality of Life. Available online: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Quality_of_life_indicators_-_measuring_quality_of_life (accessed on 24 May 2022).
29. Boreham, P.; Povey, J.; Tomaszewski, W. An alternative measure of social wellbeing: Analysing the key conceptual and statistical components of quality of life. *Aust. J. Soc. Issues* **2013**, *48*, 151–172. [CrossRef]
30. ONS. Personal Well-Being in the UK QMI. Available online: https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/methodologies/personalwellbeingintheukqmi (accessed on 24 May 2022).
31. Sayin Kasar, K.; Karaman, E. Life in lockdown: Social isolation, loneliness and quality of life in the elderly during the COVID-19 pandemic: A scoping review. *Geriatr. Nurs.* **2021**, *42*, 1222–1229. [CrossRef] [PubMed]
32. Algahtani, F.D.; Hassan, S.-N.; Alsaif, B.; Zrieq, R. Assessment of the Quality of Life during COVID-19 Pandemic: A Cross-Sectional Survey from the Kingdom of Saudi Arabia. *Int. J. Environ. Res. Public Health* **2021**, *18*, 847. [CrossRef]
33. Lizana, P.A.; Vega-Fernadez, G.; Gomez-Bruton, A.; Leyton, B.; Lera, L. Impact of the COVID-19 Pandemic on Teacher Quality of Life: A Longitudinal Study from before and during the Health Crisis. *Int. J. Environ. Res. Public Health* **2021**, *18*, 3764. [CrossRef]
34. Said, C.M.; Batchelor, F.; Duque, G. The impact of the COVID-19 pandemic on physical activity, function, and quality of life. *Clin. Geriatr. Med.* **2022**. [CrossRef]
35. Marconi, P.L.; Perelman, P.E.; Salgado, V.G. Green in times of COVID-19: Urban green space relevance during the COVID-19 pandemic in Buenos Aires City. *Urban Ecosyst.* **2022**, *25*, 941–953. [CrossRef]
36. de Koning, R.; Egiz, A.; Kotecha, J.; Ciuculete, A.C.; Ooi, S.Z.Y.; Bankole, N.D.A.; Erhabor, J.; Higginbotham, G.; Khan, M.; Dalle, D.U.; et al. Survey Fatigue During the COVID-19 Pandemic: An Analysis of Neurosurgery Survey Response Rates. *Front. Surg.* **2021**, *8*, 690680. [CrossRef] [PubMed]
37. Geldsetzer, P. Use of Rapid Online Surveys to Assess People's Perceptions During Infectious Disease Outbreaks: A Cross-sectional Survey on COVID-19. *J. Med. Internet Res.* **2020**, *22*, e18790. [CrossRef] [PubMed]
38. Baltar, F.; Brunet, I. Social research 2.0: Virtual snowball sampling method using Facebook. *Internet Res.* **2012**, *22*, 57–74. [CrossRef]
39. Love, J.; Selker, R.; Marsman, M.; Jamil, T.; Dropmann, D.; Verhagen, J.; Ly, A.; Gronau, Q.F.; Smíra, M.; Epskamp, S.; et al. JASP: Graphical Statistical Software for Common Statistical Designs. *J. Stat. Softw.* **2019**, *88*, 1–17. [CrossRef]
40. Fiona Willtsher Qualitative Social Research. *Forum Qual. Sozialforsch. Forum Qual. Soc. Res.* **2011**, *12*, 345–357.
41. Shamsudheen, M.I.; Hennig, C. Should we test the model assumptions before running a model-based test? *arXiv* **2021**, arXiv:1908.02218.
42. King, A.P.; Eckersley, R.J. Inferential Statistics III: Nonparametric Hypothesis Testing. In *Statistics for Biomedical Engineers and Scientists*; Elsevier: Amsterdam, The Netherlands, 2019; pp. 119–145.
43. Ramachandran, K.M.; Tsokos, C.P. *Mathematical Statistics with Applications in R.*; Elsevier: Amsterdam, The Netherlands, 2021; ISBN 9780128178157.

44. Statista Population Size of the United Kingdom (UK) in 2011, by Ethnic Group. Available online: https://www.statista.com/statistics/661202/population-in-the-united-kingdom-uk-by-ethnicity/ (accessed on 24 May 2022).
45. Curtin, R.; Presser, S.; Singer, E. The Effects of Response Rate Changes on the Index of Consumer Sentiment. *Public Opin. Q.* **2000**, *64*, 413–428. [CrossRef]
46. Groves, R.M.; Singer, E.; Corning, A. Leverage-Saliency Theory of Survey Participation: Description and an Illustration. *Public Opin. Q.* **2000**, *64*, 299–308. [CrossRef]
47. Voigt, L.; Koepsell, T.; Daling, J. Characteristics of Telephone Survey Respondents According to Willingness to Participate. *Am. J. Epidemiol.* **2003**, *157*, 66–73. [CrossRef] [PubMed]
48. ONS Coronavirus and Key Workers in the UK. Available online: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/articles/coronavirusandkeyworkersintheuk/2020-05-15 (accessed on 24 May 2022).
49. ONS Graduates in the UK Labour Market: 2017. Available online: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/graduatesintheuklabourmarket/2017 (accessed on 24 May 2022).
50. Goyder, J.; Warriner, K.; Miller, S. Evaluating Socio-Economic Status (SES) Bias in Survey Nonresponse. *J. Off. Stat.* **2002**, *18*, 1–11.
51. Singer, E.; Van Hoewyk, J.; Maher, M.P. Experiments with Incentives in Telephone Surveys. *Public Opin. Q.* **2000**, *64*, 171–188. [CrossRef] [PubMed]
52. DEFRA. *Statistical Digest of Rural England: Population*; DEFRA: London, UK, 2021.
53. Arora, A.; Jha, A.K.; Alat, P.; Das, S.S. Understanding coronaphobia. *Asian J. Psychiatr.* **2020**, *54*, 102384. [CrossRef] [PubMed]
54. Burnett, H.; Olsen, J.R.; Mitchell, R. Green Space Visits and Barriers to Visiting during the COVID-19 Pandemic: A Three-Wave Nationally Representative Cross-Sectional Study of UK Adults. *Land* **2022**, *11*, 503. [CrossRef]
55. Lopez, B.; Kennedy, C.; Field, C.; Mcphearson, T. Who benefits from urban green spaces during times of crisis? Perception and use of urban green spaces in New York City during the COVID-19 pandemic. *Urban For. Urban Green.* **2021**, *65*, 127354. [CrossRef]
56. Burnett, H.; Olsen, J.R.; Nicholls, N.; Mitchell, R. Change in time spent visiting and experiences of green space following restrictions on movement during the COVID-19 pandemic: A nationally representative cross-sectional study of UK adults. *BMJ Open* **2021**, *11*, e044067. [CrossRef] [PubMed]
57. Giannico, V.; Spano, G.; Elia, M.; D'Este, M.; Sanesi, G.; Lafortezza, R. Green spaces, quality of life, and citizen perception in European cities. *Environ. Res.* **2021**, *196*, 110922. [CrossRef] [PubMed]
58. Public Health England. *Improving Access to Greenspace. A New Review for 2020*; Public Health England: London, UK, 2020.
59. Fongar; Aamodt; Randrup; Solfjeld Does Perceived Green Space Quality Matter? Linking Norwegian Adult Perspectives on Perceived Quality to Motivation and Frequency of Visits. *Int. J. Environ. Res. Public Health* **2019**, *16*, 2327. [CrossRef]
60. Knobel, P.; Maneja, R.; Bartoll, X.; Alonso, L.; Bauwelinck, M.; Valentin, A.; Zijlema, W.; Borrell, C.; Nieuwenhuijsen, M.; Dadvand, P. Quality of urban green spaces influences residents' use of these spaces, physical activity, and overweight/obesity. *Environ. Pollut.* **2021**, *271*, 116393. [CrossRef]
61. ASLA What Is Landscape Architecture? Available online: https://www.asla.org/aboutlandscapearchitecture.aspx (accessed on 6 February 2022).
62. Jennings, V.; Bamkole, O. The Relationship between Social Cohesion and Urban Green Space: An Avenue for Health Promotion. *Int. J. Environ. Res. Public Health* **2019**, *16*, 452. [CrossRef]
63. Wan, C.; Shen, G.Q.; Choi, S. Underlying relationships between public urban green spaces and social cohesion: A systematic literature review. *City Cult. Soc.* **2021**, *24*, 100383. [CrossRef]
64. Joshi, N.; Wende, W. Physically apart but socially connected: Lessons in social resilience from community gardening during the COVID-19 pandemic. *Landsc. Urban Plan.* **2022**, *223*, 104418. [CrossRef]
65. Okvat, H.A.; Zautra, A.J. Community Gardening: A Parsimonious Path to Individual, Community, and Environmental Resilience. *Am. J. Community Psychol.* **2011**, *47*, 374–387. [CrossRef] [PubMed]
66. Christensen, S.; Malberg Dyg, P.; Allenberg, K. Urban community gardening, social capital, and "integration"—A mixed method exploration of urban "integration-gardening" in Copenhagen, Denmark. *Local Environ.* **2019**, *24*, 231–248. [CrossRef]
67. Russo, A.; Cirella, G.T. Edible Green Infrastructure for Urban Regeneration and Food Security: Case Studies from the Campania Region. *Agriculture* **2020**, *10*, 358. [CrossRef]
68. Sofo, A.; Sofo, A. Converting Home Spaces into Food Gardens at the Time of Covid-19 Quarantine: All the Benefits of Plants in this Difficult and Unprecedented Period. *Hum. Ecol.* **2020**, *48*, 131–139. [CrossRef]
69. Benker, B. Stockpiling as resilience: Defending and contextualising extra food procurement during lockdown. *Appetite* **2021**, *156*, 104981. [CrossRef]
70. Cooper, M.A.; Gordon, J.L. Understanding Panic Buying Through an Integrated Psychodynamic Lens. *Front. Public Health* **2021**, *9*, 666715. [CrossRef]
71. Wolch, J.R.; Byrne, J.; Newell, J.P. Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough. ' *Landsc. Urban Plan.* **2014**, *125*, 234–244. [CrossRef]
72. Sardeshpande, M.; Rupprecht, C.; Russo, A. Edible urban commons for resilient neighbourhoods in light of the pandemic. *Cities* **2021**, *109*, 103031. [CrossRef]
73. Parker, C.; Scott, S.; Geddes, A. Snowball Sampling. In *Research Methods Foundations*; Atkinson, P., Delamont, S., Cernat, A., Sakshaug, J.W., Williams, R.A., Eds.; Sage: Newcastle upon Tyne, UK, 2019.

74. Pierce, M.; McManus, S.; Jessop, C.; John, A.; Hotopf, M.; Ford, T.; Hatch, S.; Wessely, S.; Abel, K.M. Says who? The significance of sampling in mental health surveys during COVID-19. *Lancet Psychiatry* **2020**, *7*, 567–568. [CrossRef]
75. Clark, D. Population of the UK 2020, by Age. Available online: https://www.statista.com/statistics/281174/uk-population-by-age/ (accessed on 24 May 2022).
76. Smith, W.G. *Does Gender Influence Online Survey Participation? A Record-Linkage Analysis of University Faculty Online Survey Response Behavior*; ERIC Document Reproduction Service No. ED 501717; San Jose State University: San Jose, CA, USA, 2008.
77. Goyder, J. Surveys on Surveys: Limitations and Potentialities. *Public Opin. Q.* **1986**, *50*, 27–41. [CrossRef]
78. Clark, D. Population of the United Kingdom from 1953 to 2020, by Gender. Available online: https://www.statista.com/statistics/281240/population-of-the-united-kingdom-uk-by-gender/ (accessed on 24 May 2022).
79. Belanche, D.; Casaló, L.V.; Rubio, M.Á. Local place identity: A comparison between residents of rural and urban communities. *J. Rural Stud.* **2021**, *82*, 242–252. [CrossRef]
80. Wyles, K.J.; White, M.P.; Hattam, C.; Pahl, S.; King, H.; Austen, M. Are Some Natural Environments More Psychologically Beneficial Than Others? The Importance of Type and Quality on Connectedness to Nature and Psychological Restoration. *Environ. Behav.* **2019**, *51*, 111–143. [CrossRef]
81. Quinn, A.; Russo, A. Adaptive school grounds design in response to COVID-19: Findings from six primary schools in South East England. *Build. Environ.* **2022**, *215*, 108946. [CrossRef]
82. Hazlehurst, M.F.; Muqueeth, S.; Wolf, K.L.; Simmons, C.; Kroshus, E.; Tandon, P.S. Park access and mental health among parents and children during the COVID-19 pandemic. *BMC Public Health* **2022**, *22*, 800. [CrossRef]
83. Stejskal, J.; Hajek, P.; Cerny, P. A novel methodology for surveying children for designing library services: A case study of the Municipal Library of Prague. *J. Librariansh. Inf. Sci.* **2021**, *53*, 307–320. [CrossRef]
84. Haines, D. Ethical considerations in qualitative case study research recruiting participants with profound intellectual disabilities. *Res. Ethics* **2017**, *13*, 219–232. [CrossRef]
85. Stigsdotter, U.K.; Corazon, S.S.; Ekholm, O. A nationwide Danish survey on the use of green spaces by people with mobility disabilities. *Scand. J. Public Health* **2018**, *46*, 597–605. [CrossRef]
86. Corazon, S.S.; Gramkow, M.C.; Poulsen, D.V.; Lygum, V.L.; Zhang, G.; Stigsdotter, U.K. I Would Really like to Visit the Forest, but it is Just Too Difficult: A Qualitative Study on Mobility Disability and Green Spaces. *Scand. J. Disabil. Res.* **2019**, *20*, 1–13. [CrossRef]
87. Gong, W.; Taighoon Shah, M.; Firdous, S.; Jarrett, B.A.; Moulton, L.H.; Moss, W.J.; Hayford, K.; O'Brien, K.L.; Chandir, S. Comparison of three rapid household survey sampling methods for vaccination coverage assessment in a peri-urban setting in Pakistan. *Int. J. Epidemiol.* **2019**, *48*, 583–595. [CrossRef]
88. Bornstein, M.H.; Jager, J.; Putnick, D.L. Sampling in developmental science: Situations, shortcomings, solutions, and standards. *Dev. Rev.* **2013**, *33*, 357–370. [CrossRef] [PubMed]
89. Lõhmus, M.; Balbus, J. Making green infrastructure healthier infrastructure. *Infect. Ecol. Epidemiol.* **2015**, *5*, 30082. [CrossRef] [PubMed]
90. Derose, K.P.; Wallace, D.D.; Han, B.; Cohen, D.A. Effects of park-based interventions on health-related outcomes: A systematic review. *Prev. Med.* **2021**, *147*, 106528. [CrossRef] [PubMed]
91. Dadvand, P.; Bartoll, X.; Basagaña, X.; Dalmau-Bueno, A.; Martinez, D.; Ambros, A.; Cirach, M.; Triguero-Mas, M.; Gascon, M.; Borrell, C.; et al. Green spaces and General Health: Roles of mental health status, social support, and physical activity. *Environ. Int.* **2016**, *91*, 161–167. [CrossRef] [PubMed]