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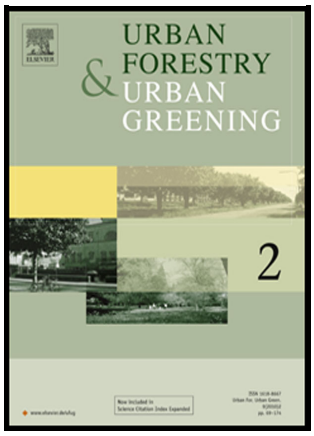
Urban Green Space Interaction and Wellbeing – Investigating the Experience of International Students in Berlin During the First COVID-19 Lockdown



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Urban Green Space Interaction and Wellbeing – Investigating the Experience of International Students in Berlin During the First COVID-19 Lockdown

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1. Introduction

The outbreak of COVID-19 and the resulting global pandemic at the start of 2020 led to an unprecedented recalibration of daily life, with governments across the world imposing measures such as lockdowns in an attempt to prevent the spread of the SARS-CoV-2 virus (Barton et al., 2020). In Germany, a nationwide lockdown to enforce social distancing was implemented on March 22nd, 2020 and relaxed gradually from May 6th, 2020 onwards (Ahrens et al. 2021; 141). Everyday activities, such as working, studying, socialising and exercising suddenly retreated to the home environment. Lockdown and stay-at-home orders across the world also resulted in a reduction in the frequency of visiting and using public green spaces (Slater et al., 2020; 1), which created a hindrance to certain outdoor leisure activities in particular for urban dwellers living in dense inner-city neighbourhoods (James et al. 2009; 66), who often do not have access to private gardens. Due to these restrictions, the largest secondary impacts (aside from the risk of infection) have been "social isolation, increased stress and negative socioeconomic effects" (Peters et al. 2020;

861). As long-term mental health impacts have escalated during the pandemic (Soga et al. 2021; 1), this paper focuses specifically on psychological and emotional wellbeing. Furthermore, students and adolescents in particular experienced a significant worsening in their mental health with higher numbers of recorded symptoms related to mental-ill health (e.g. depression) following the pandemic (Liu et al. 2022; 246) due to stressors such as social isolation and lack of emotional support (Elmer et al. 2020; 1). This study looks in detail at a small sample of international students (individuals who were studying in Berlin at the time of the first lockdown) aged between 20-30 to understand how they interacted with urban green space (UGS) to support their wellbeing during this time.

In light of the novel situation, studies around the world have investigated the importance of UGS access and UGS use to cope with challenges of the pandemic and the imposed measures (Poortinga et al, 2021; 9). Studies in the UK (ibid), Tokyo (Soga et al. 2021), Oslo (Venter et al. 2020), Italy (Ugolini et al. 2021), South Korea (Heo et al. 2021), Mexico City (Huerta and Cafagna, 2021), and other cities across the world (da Schio et al. 2020) all concluded similar evidence that "UGS use has served as a coping mechanism to decrease the effects of stress and isolation caused by the pandemic" (Huerta and Cafagna, 2021; 1). The constellation of restrictions, regulations, and new daily routines has also resulted in new use patterns, behaviours, and perceptions of UGS (Ugolini et al. 2020), with people turning to UGS to fulfil their everyday needs such as physical exercise, taking the dog out, and taking the kids outdoors (ibid; 6). These studies tended to survey a broad demographic without a specific focus on factors such as age, gender, or employment. An emphasis was also placed on studying nearby neighbourhood green spaces, rather than examining individuals' use of UGS further away from the home.

The present study is therefore unique in the sense that it places a lens on a specific population group whilst having an unrestricted focus on UGS use patterns to investigate whether the participants explored green spaces beyond their neighbourhood. However, many similarities can be drawn to previous (pre-pandemic) studies when identifying health outcomes - these often explore self-perceived health and subjective wellbeing and detail feelings of loneliness and isolation, which is a prevalent issue with regards to the COVID-19 pandemic.

In this paper green space is understood as "publicly accessible environments, which usually include grass, trees and/or shrubs, including parks, cemeteries and playing fields" (Dinnie et al., 2013; 104). Specifically in an urban context this encompasses a broad spectrum: vegetation barriers along streets, playgrounds, green roofs, parks, urban gardening facilities, and urban woodland (WHO, 2017; 6). UGS also "includes a diversity of biophysical structures and their ecological processes, which combine to support the city's "green infrastructure"" (Ugolini et al. 2021; 2), and providing valuable ecosystem and cultural services.

Both psychological restoration and stress relief may be improved by visiting UGS. Studies have shown that contact with green spaces can trigger a positive

physiological response in the body e.g. reduced blood pressure, heart rate, and muscle tension (Roe et al., 2013). Moreover, there is a general scientific consensus that UGS interaction also significantly contributes to improved mental health. These positive effects on human health are derived through three main mechanisms (ibid; 4087): increased physical activity, increased social contact and sense of community, and psychological restoration/reduction of stress and fatigue. Meanwhile, participating in physical activity outdoors results in greater feelings of subjective vitality and "feelings of energy, pleasure, and delight, and decreases in feelings of frustration, worry, confusion, depression, tension, and tiredness" (Coon et al. 2011; 1736). Elmer et al. (2020; 14) found that depression, stress, and loneliness worsened for students at the time of the COVID-19 crisis above the general trend, but "interacting with nature decreased negative feelings caused by the situation" (Puhakka, 2021; 3).

Regarding social contact Maas et al. (2009; 587) emphasise that green spaces provide a place to have a conversation or engage in joint group activities and "can also promote a general sense of community". Additionally, green and open spaces function as arenas for implementing the United Nations Sustainable Development Goal (SDG) 11 of inclusive urbanism (Pedro et al. 2020). Social contact does not necessarily have to be personal or direct, it can also take place "at a modest level" (Kazmierczak and James, 2007; 357) – being amongst others in open spaces fulfils an element of social contact in an undemanding way. This may also be relevant in the context of the COVID-19 lockdown as this was likely a significant factor for why people went to parks and other UGS, to hear and see people whilst being able to maintain physical distance (Slater et al. 2020; 2). After an intense period of social distancing and reliance on connecting through digital means, a key question is how we can "deeply re-connect with each other and with nonhuman nature in cities — in light of the socio-ecological crisis" (Artmann and Artmann, 2021); UGS can provide a safe environment in which to do so.

When interrogating why UGS allow for a kind of mental 'switching-off', perhaps it is not a question of what they provide (i.e. facilities), but rather a matter of what they do not contain. Parks, for example, are areas in which nature flourishes and urban features such as buildings do not exist – so resting and spending time in environments with minimal demands on cognitive attention can have a highly restorative potential (Kaplan and Kaplan, 1989; 182). These "restorative influences of nature [also] involve a shift towards a more positively-toned emotional state" (Ulrich, 1991; 201). However, the restorative potential of UGS is not inherently given, and does rely on certain factors to maximise its ability for relaxation, such as "retreats and secluded areas" (Heiland et al., 2019; 439) and "peacefulness" (de Vries et al., 2012; 10), which is linked to the crowdedness of the space. Seclusion and peacefulness are also essential for enabling a related pathway to restoration, namely place attachment. Repeated visits to a green space may allow for an individual to form a meaningful bond with it and identify it as being a highly important place, contributing to "feelings of familiarity, rootedness and self-esteem" (Subiza-Pérez et al. 2020; 2), which is vital when experiencing social isolation. Dzhambov (2018; 340)

found that “green space and blue space are psychologically restorative features in urban environments”. This is particularly relevant for university students aged between 18-35, as “young adulthood is associated with a high burden of mental disorders”, including high “anxiety and stress levels” (Yang et al., 2019; 2). This study of university students' interaction with UGS, Holt et al. (2019; 1), found that “students who frequently engage with green spaces in active ways report higher quality of life, better overall mood, and lower perceived stress”. However, they also note that “there is still limited research exploring the restorative benefits associated with differing types of green space use among students” (ibid.); this study of UGS interaction by university students therefore aims to add another layer of experiences and evidence about the potential of green space interaction to support wellbeing, particularly in times of stress and crisis.

During lockdown, many young adults found themselves working or studying from home from March 2020 onwards, whilst those far away from family and friends living in another country arguably suffered a double burden of social isolation and resulting deprivation (Ugolini et al, 2021; 7). Taking Germany as an example, many international students who planned to travel home were not able to as the lockdown coincided with the spring semester break. This population sub-group therefore are likely to have become more vulnerable during the lockdown period because they were faced with a high level of uncertainty, which “contributes to ill health by arousing stress” (Yang et al. 2019; 2). In combination with pre-existing stressors amongst young adults living abroad such as language barriers, financial concerns, or a lack of support network (Sherry et al. 2009), the added anxiety caused by the COVID-19 pandemic means that they are likely to have had a higher need for psychological restoration and stress relief – as provided for by UGS. Typical student living situations such as shared flats with little or no outdoor space is likely to have also influenced individuals’ need to leave the home and seek restoration in outdoor green space. Therefore, the question arises, if and in which way the functions and importance of UGS for international students as a particular part of the population might have changed due to and during the pandemic.

By answering this question, this paper aims to add a layer of voices and experience to existing and emerging research to reflect on how international students’ patterns of using UGS changed in Berlin, Germany, during the COVID-19 pandemic. To our knowledge, international students (and former students) have received limited research attention with regards to the importance of UGS during COVID-19 measures. This pilot study therefore employs an exploratory and discursive approach in order to generate further key findings about the relationship between interaction with UGS and improved wellbeing in a time of personal and societal crisis. Semi-structured interviews were carried out during late 2020 to document students’ experience of the pandemic and the related imposed measures, to investigate whether their use patterns and perceptions of UGS have changed, and whether interaction with these spaces during the first lockdown in Germany helped them to deal with negative mental health and wellbeing impacts.

Three research questions were to be answered:

1. How did the students' *routines* change as a result of the lockdown and how did this create opportunities to interact with UGS differently?

2. How did the students' *experiences* in UGS change during the lockdown?

3. How did the students' *emotional responses and perception towards UGS* change during the lockdown and how did UGS interaction impact their wellbeing?

2. Methods

During the first lockdown starting in March 2020 in Germany, the government imposed a number of regulations to limit contact and maintain distance to other people (Bundesregierung, 2020). In Berlin it was only permitted to spend time outdoors alone with your household, or to meet one other person outdoors at a distance of 2 metres. The only permitted reasons to be outdoors were commuting, grocery shopping, medical appointments, exercising, and taking a walk. Hospitality venues were forced to close i.e. restaurants, cafes, bars; parties and large gatherings were prohibited both indoors and in public spaces. Playgrounds were also forced to close from mid-March and the use of outdoor recreational facilities e.g. outdoor gyms and seating areas was also restricted (rbb24, 2020). Berlin universities such as the Humboldt-Universität zu Berlin and many other German universities switched to digital teaching programmes and university buildings also closed for the public. Some of the lockdown measures were reversed in late spring (April and May 2020) with the opening of schools, kindergartens and also public playgrounds.

2.1 Data Sampling

Semi-structured interviews were conducted in English over the course of October to December 2020, varying in duration from around 25 minutes to 45 minutes. All of the participants are international students in Berlin, three of whom are from the US, two from the UK and the others from Argentina, Australia, Brazil, Poland, and South Korea. They are either currently studying in Berlin or had been a student for parts of the lockdown. They were recruited via social media channels and snowballing. The social media messaging service 'WhatsApp' was used for recruiting the initial participants, who were in a group related to a Masters program at the TU Berlin (of which the primary author is part of).

Following a Grounded Theory approach (Strauss & Corbin, 1998; Dinnie et al., 2013), in total we conducted 10 interviews, which provided enough empirical data for generating analytical codes, to draw conclusions, and to subsequently answer the research questions. The motivation for this research was based on the experience of one of the authors during the first lockdown in Berlin; conversations with friends and fellow students during this time highlighted that many sought escape and relief from the stresses of the pandemic by spending time outdoors in green space. This study

therefore employed an iterative approach, using Grounded Theory as a methodological framework in order to transform anecdotal evidence into a research design and generate key findings, which (at a later stage) could be used to further develop theoretical conclusions. The initial conversations that inspired the research were open, honest, and often filled with emotion. Because of this, the study employed qualitative methods to allow for emotive responses to be documented, rather than solely collecting statistics e.g. through a questionnaire, which can obscure nuanced personal experiences and feelings.

One main ethical consideration of the interview process was how to engage in a face-to-face conversation in a safe and socially distanced manner, as there was the possibility of viral transmission of COVID-19. In light of this, interviewees were offered the option of meeting in person, or conducting a virtual call. Two interviewees opted for a virtual call, whilst eight were interviewed in-person. The in-person interviews were conducted in line with the "AHA" (in German: *Abstand halten, Hygiene und Alltagsmaske*) rules set out by the German public health authorities[1]. In practice, this meant no physical contact i.e. not shaking hands, wearing a mouth/face covering when not sat down (in public places), and ensuring regular ventilation when sitting inside. The participants were free to choose or suggest an interview location - these were predominantly cafes around Berlin or outdoor public spaces (weather-dependent). The participants were asked for consent to record the interview and assured that their personal details would remain anonymous. Each audio recording and corresponding transcript was assigned a matching number ID (in order of interviewing) so that names were not needed for identification.

First, descriptive questions (Dunn, 2016; 106) were used to gather initial information about the interviewee's background e.g. *"Can you tell me a little bit about where you're from, how long you've been in Berlin, what you do here..."*. This largely helped to 'set the scene', whilst asking the participant about themselves also helped to further build trust and rapport.

Secondly, storytelling questions (ibid.) were used to prompt the interviewee to recall a sequence of events i.e. their experience of the lockdown. In this case, they were asked to cast their minds back to March 2020 and recount the ways in which their daily life and routine changed as a result of the pandemic-related restrictions e.g. *"How were your studies or your work impacted by the lockdown, were you still able to go to university/the office, or were you spending more time at home?".*

Thirdly, opinion-based questions (ibid.) were used to identify certain emotions, whether positive or negative. For example, *"Do you feel like people used the green*

[1] AHA rules: https://www.zusammengegencorona.de/aha/

"(Distance, hygiene and masks)"

spaces fairly during this time, how did the activities of other users of the green space make you feel?". As well as, *"If this lockdown were to happen again, do you hope that the parks would remain open for all, or do you think certain restrictions should be put in place?".* Such questions allowed the interviewees to further reflect on their own experiences, interactions, and behaviours and to contemplate future scenarios.

2.2 Data Analysis

All interviews were transcribed. Although a manual coding process was applied, the software package ATLAS.ti was used to organise and store the written transcripts, allowing for codes to be collected and compared in one place (Paulus and Lester, 2015; 1). The process of inductive coding was applied, which involved going back and forth between material, theory and ideas, to allow codes to emerge naturally from the text (Crang, 2005; 224). The recurring codes were then applied to the other interview transcripts. At first, many codes were generated that reflected the data, and then later either combined or deleted as necessary (Deterding and Waters, 2018).

3. Results

The interviewees discussed similar topics and shared similar experiences – therefore clear themes became apparent. These clear themes were used as main and sub-codes (presented in Table 1 below). Quotes taken directly from the interview transcripts are identified with their respective number e.g. [1].

Table 1. Coding table

Main theme/code group	**Individual codes**	**Overarching code**
Personal circumstances	Routine change	
	Vulnerability	
	● Housing situation	New UGS use pattern/ behaviour
	● Impact on mental health/wellbeing	
Experience in UGS	Individual Interaction	
	● Escape	

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	Social Interaction ● Meeting friends ● Party ● Other park users ● Policing
	UGS features ● Availability ● Qualities ● Usage restrictions and regulations
Emotional response and perception	Positive ● Wellbeing
	Negative
	New realisation/appreciation

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3.1 Personal Circumstances: Routine Change and Vulnerability

All of the interviewees stated that they had experienced a very sudden routine change, for example, *"Within the space of about three weeks my world really had receded into my bedroom"* [9]. They explained that their social lives were restricted as only essential activities such as grocery shopping were permitted outdoors, with all indoor spaces such as restaurants being forced to close[2]. Furthermore, the interviewees' living situation (generally shared flats with a single bedroom to

[2] European lockdown measures (Deutsche Welle, 14.04.2020) https://www.dw.com/en/coronavirus- what-are-the-lockdown-measures-across-europe/a-52905137

themselves, or in one case, a flat shared with their partner and children) often contributed to feelings of claustrophobia and tension, for example, *"[Normally] you have different schedule – like, you have the apartment while the other person is out and so, like, you're just always there together and sometimes you really just need that space"* [6].

During the interview process it quickly became apparent that all of the individuals had become more vulnerable to negative mental health impacts as a result of the circumstances. For example it has been stated:

- *"You're living with this, like, constant stress"* [2]
- *"I was quite depressed"* [10]
- Feeling *"cooped up"* and *"frustrated"* [4]
- *"I was having a really rough time and feeling really anxious"* [6]
- *"Some mornings I'd wake up and think, what's the point of getting out of bed?"* [5]

The participants also stated that social isolation contributed to feelings of loneliness and depression, particularly for those who live alone. Uncertainty about the regulations had also caused some fear and anxiety, while changes in behaviour and social distancing outside had become a *"high stress factor for parents"* [3], who had to ensure that their children were at a safe distance to others when playing outside.

However, these lifestyle changes also meant that some individuals created new routines and habits. For example, one interviewee would go on more regular walks with their dog to have more time outside and more contact with nature. Others also had access to gardening facilities, namely a *Kleingarten* (allotment) and a *Gemeinschaftsgarten* (community garden), which they started to visit more regularly i.e. up to four times a week [4] to tend to their plot and meet other friends and gardeners there.

Regarding availability and access to green space, new UGS use patterns appeared with varying experiences. Those interviewees living in the districts of Wedding and Lichtenberg stated that they had a very good level of UGS availability as well as a variety of e.g. parks, urban gardening facilities, green cemeteries, and other blue/green spaces. Those living in denser urban areas such as Mitte, Charlottenburg and Neukölln however often struggled to access UGS close to home or were not satisfied with the quality or size of the space. Because of this lack of access as well as the desire to explore new UGS, some interviewees mentioned that they walked or cycled to green spaces further away that offered a different environment to spend time in.

However, despite having the freedom to explore various green spaces, certain official regulations and restrictions resulted in people not being able to carry out all of their

usual activities. For example, playgrounds were closed during the majority of the lockdown period. This presented a challenge for one interviewee with children who stated *"The playgrounds were also closed for a time it wasn't possible to go to them [...] the private kind of Hinterhof areas were not officially closed so they were something we could still access"* [3]. Because of the usage restrictions they actively sought out alternative UGS, which are not usually frequented by the general public. these *'Hinterhof'* (backyard) spaces often contain grass, trees, and playground equipment so provided a *"substitute for the public parks even though they're not really public space"* [3].

Furthermore, as the use of public transport was discouraged, some of the interviewees stated that they walked through green spaces more frequently, either for recreational purposes or in order to reach a particular location on foot. Two green spaces in the city that were frequently mentioned are Hasenheide and Templehofer Feld, located in the area of Berlin Neukölln. For example, *"I would walk through Hasenheide and walk through Templehof three, four, five times a week because I was barely taking public transport"* [5], in order to meet up with friends who live on the other side of the green space.

3.2 Experiences in UGS

3.2.1 Individual Interaction

For many interviewees, parks had become *"an extension of personal space"* [2]. The notion of 'escaping' was also expressed by many of them as something they felt an urgent need to do. Being in green space was an *"escape from the restrictions and this whole repetitive life"* [8], as well as an escape from other people. Despite generally spending more time alone and being isolated during the pandemic, there was still a desire and a need to be alone in UGS to recharge and mentally switch off.

When talking about going for a walk in the park, one interviewee stated *"I think it's a good way to disconnect a little bit to get yourself back on track and I thank the parks for that"* [7]. Another participant described how they spent more time in their allotment, stating *"I think Kleingärten - they're so, so valuable, and I think that was an escape for a lot of people, and that meant that we could basically be somewhere where we could be away from lots of other contact and lots of other people and lots of normal routine"* [3]. This exemplifies how escaping then served a dual purpose – both to have a change of scene from the normal routine and to be further away from other social contact.

Others also mentioned the size of the green spaces that they visited as a factor that helped them to feel like they were escaping from the pressures or tension of living in a large city. Talking about being in Volkspark Friedrichshain, one interviewee stated *"It was more this relaxing getaway feeling because you could walk through it and you feel like you're not even in the city anymore"* [8]. For them, spending time in large UGS during the summer in a way facilitated the feeling of being on holiday and became a replacement for that.

3.2.2 Social Interaction

The interview results show that UGS in Berlin became a vital resource that enabled social gathering outside of the home. One interviewee stated *"And 'cause of the realities of the pandemic you realise that parks aren't escapist places, they're social melting pots, they're public spaces and they belong to everyone and that's why I felt drawn to them"* [9]. For them, UGS was rather an opportunity to feel a sense of connection and community rather than to escape and be alone. Therefore, the value that individuals got from green space exposure and their subsequent use patterns were dictated largely by their needs – whilst some craved a peaceful and restorative environment, others felt the need to remedy feelings of isolation.

According to some interviewees, UGS *"really became a social meet-up place"* [8] which often provided the *"only opportunity to interact with other humans"* [1]. They also mentioned several forms of social interaction that UGS facilitated, for example:

- Meeting friends in a larger group
- Acting as a replacement for indoor social venues: *"When things became uncertain it fulfilled the role of a bar a café"* [4]
- Meeting individual friends who were not comfortable with meeting up indoors: *"It created an opportunity to socialise with someone who was really really concerned"* [5]
- Doing shared activities outdoors: *"Now I start doing exercise with my friends, sometimes yoga"* [7]

Being outside in green spaces therefore became *"The new standard for social gatherings"* [3], as they fulfilled the new function of an *"all-purpose socialising space"* [4]. Several of the interviewees recalled that as the summer progressed, these gatherings became larger and the atmosphere became more celebratory, with a lot of *"parties and raves going on"* [6]. As a result of this, *"The whole atmosphere of those places was a lot different and the activities were a lot different as well"* [8]. Some interviewees stated that they had attended these parties as *"We had to release our energy"* [10] – they enabled people to have fun with friends, enjoy the summertime and ease stress/tension.

However, the interviewees stated that other park users did not always look upon these activities favourably. Whilst one interviewee enjoyed attending these events, they acknowledge that *"Some people, like, went too crazy there as well so, um, misused this space which is actually for recreation and not partying too for their own purposes"* [1]. Moreover, certain activities and flouting the AHA regulations triggered more intense policing of these spaces which affected the others' enjoyment and experience of the green space: *"Because of certain behaviour like being with a lot of people in a big group blasting loud music those were triggering police to come around and check"* [10] – causing a feeling of anxiety and of being watched or

monitored constantly.

Policing of green space was an issue that was mentioned repeatedly by the interviewees who recalled the police 'shutting down' social gatherings and asking people to leave the space. For example: *"It was in the evenings where the police would come and do a full clean out of the parks where they would remove everyone, that happened to us at least once or twice, we'd be there a bit too late and they would just say okay everyone go home"* [8]. Another interviewee described the policing style as *"very aggressive"* [6] and felt like they were only targeting space and social gatherings that were occupied by groups of young LGBT+ identifying people. They stated: *"They'd scare all of the queers out of the park and then you'd turn around and see those at least straight-appearing people or whatever having their party and being completely left alone"* [6]. They found this experience to be upsetting and unfair, particularly as UGS had taken on the role as a meeting space for the LGBT+ community in Berlin – providing a safe space to socialise outdoors.

The interviewees also mentioned how spaces such as the public park Hasenheide were left strewn with litter – mostly glass bottles and plastic food packaging. They mentioned how spaces were often very crowded, leading to them becoming *"overrun [and] destroyed"* [1], in turn also causing damage to the park's vegetation which was seen as a selfish behaviour that showed *"disrespect towards nature"* [1]. This particular individual therefore *"wished that people would be more conscious about their behaviour"* [1] to allow for an equitable, fair, and sustainable use of green space to enable other park users to enjoy it too.

During this time, the interviewees also wished that they had had more knowledge and clarity about the regulations, which would have allowed them to feel more responsible and relaxed when spending time in UGS:

- *"I think it's important that we're informed about what's going on, I think it's important that there are certain rules put in place"* [5]
- *"I feel we'd go into the summer with a lot more knowledge and feeling of responsibility like we're in this situation again let's do it properly this time"* [8] - regarding the enforcement of clearer regulations
- *"I think just having very clear regulations which has been a part of the problem is that they change so often that no one is ever really sure about what they're really allowed to do"* [6]
- *"I wish there was less regulations"* [10] - felt very restricted and would have visited UGS more often if the situation had been more relaxed
- At the same time, there was an awareness that *"Restrictions and rules aren't really gonna' stop anyone"* [8]

3.3 Emotional Response to UGS Interaction

The emotional response to green space exposure during the lockdown was overwhelmingly positive. Whilst there were several negative experiences such as encounters with the police, these were more circumstantial and resulted from lockdown-related restrictions rather than UGS itself. Reflecting on UGS during this time, the interviewees, for example, stated:

- *"It became our, you know, permanent place to go […] suddenly it was an everyday thing, it was a very important part of our lives"* [3]
- *"I'm really one hundred percent sure that those green spaces and the opportunity to gather gave many people - sort of, at least - the feeling that everything is okayish, and it protected many people probably from going crazy"* [1]
- *"That one thing that is gonna' make you happy during the week, it's a good thing that these spaces were there"* [8]
- *"The people that didn't get a chance to go to the parks will regret it actually because for me it's like a memory box"* [7]

This positive response also had a positive impact on the participants' wellbeing, for example:

- Being in green space *"just reduced this stress and anxiety and unhappiness"* [1]
- *"When I'm outdoors I get that Vitamin D, sort of that surge of dopamine where it's like the wind is blowing, you feel good, the sun is shining on your skin"* [4]
- Being in green space *"was critical for my sanity during corona"* [5]
- *"I realised how good it was for me to actually leave the house and go to the park"* [7]
- *"Being outside is very important for like, to feel that you're doing something, it just makes your life more productive"* [10]

All interviewees expressed that they felt fortunate, *"incredibly grateful"* [6], and lucky to have had access to UGS during this time. The value that people derived from green space exposure and their importance for wellbeing seems to have increased: *"Suddenly the utility I got out of green spaces went up a lot this year"* [4]; *"I can say that green spaces have taken on a huge role for me in my life"* [5]. This can be interpreted in the sense that positive experiences and memories led to a new realisation of the benefits of UGS and an appreciation for the available green space in Berlin. Consequently, the interviewees also expressed how these new realisations will impact their future interaction with UGS e.g. *"next year maybe we won't spend so much time in the clubs on the weekends we actually wanna spend some time down by the river, we wanna go sit in a park"* [8]. This new-found or heightened importance

of UGS in the interviewees' lives means that they will continue to spend time in green spaces to support their personal and social wellbeing even after the pandemic.

4. Discussion

For the specific group of international students in Berlin who took part in this study, the results show that the lockdown provided new ways to interact with UGS, led individuals to create new routines (research question 1), increased positive perceptions towards these spaces (research question 2), and helped to support wellbeing in a time of societal crisis (research question 3). The qualitative investigation also provided several key findings, which are discussed in the following paragraphs.

First, the interviewed students living in Berlin **became more vulnerable regarding mental health and wellbeing as a result of their living conditions under lockdown.** This was due to cramped housing conditions, underlying stress-factors such as reduced social interaction, as well as anxieties related to the pandemic. In turn, green spaces became an extension of peoples' personal or private space, offering respite through the opportunity to spend time outside. Therefore, **the unique situation created by the COVID-19 lockdown in Berlin has led to new UGS routines and increased people's interaction with UGS**. This is supported by similar research findings (Derks et al. 2020, Venter et al. 2020), which also suggest that UGS use increased significantly in light of the pandemic.

Additionally, **UGS served a dual purpose as a space to escape to and also a place to connect with others**. The interviews have also shown how the social function/effects of UGS is fundamental for strengthening communities and offering spaces to meet. Although green spaces have always been inherently social spaces where communities interact, during the first lockdown in Berlin their social function became heightened. In a time where "social interaction [was] severely restricted" (Poortinga et al. 2021; 9), alongside the absence of nightlife, parks served as social hubs that allowed people to feel connected to one another, whether surrounded by strangers or meeting friends. In other words, green spaces were not always a place to escape to but often a crucial resource in which fragments of normal life played out "within a distinctly abnormal context" (Ugolini et al. 2021; 10).

This leads into another key finding: **the lockdown situation in Berlin created new use patterns, constellations, behaviours, and routines in UGS that are likely to remain** even once the regulations are eased. This also corresponds to research question 1 – the interviewees encountered new opportunities to experience UGS differently since the pandemic. For example, some may choose to walk or commute through green space rather than taking public transport, have a lunch break outdoors during the working day, or continue to visit their community garden/allotment on a regular basis. This corresponds with the findings of Ugolini et al. (2021), who found that "going on foot was the main way to reach UGS". Others also discovered new green spaces further afield, whilst people came to appreciate the green spaces "closer to home" (ibid; 4) e.g. their communal backyards. Especially as certain park

facilities were closed e.g. playgrounds and outdoor exercise facilities, these alternative green spaces allowed the interviewees to be creative and harness the potential benefits of neighbourhood green space, such as putting play equipment e.g. a trampoline in the shared *Hinterhof* to allow children a safe space to play in.

The intensified use of public UGS during the lockdown also had some negative repercussions such as littering, damage to nature, and increased policing. These issues often became negative factors that dissuaded the interviewees from visiting certain green spaces, either because they perceived them as unattractive or felt threatened by the strict regulations imposed by the police or park authority (*Parkaufsicht*). An associated issue was the missing clarity of the lockdown rules as they changed on a regular basis. This contributed to another key finding that interviewees **wished that the regulations surrounding behaviour in UGS had been communicated more clearly** so that they could be better informed and act in a safer and more responsible manner. In general the use patterns that played out over the summer act as a useful tool for making recommendations about the management of green spaces to ensure that all users benefit from the wellbeing services that they offer. This contributes to other studies carried out in light of the pandemic which suggest that on-going monitoring and maintenance of green spaces is essential to keep problems such as excess littering under control (Slater et al., 2020; 4).

During this time, **the interviewees' appreciation and perception of green space shifted towards seeing it as a valuable resource for mental health and an essential element of their daily lives**. Upon reflecting on the scenarios in their home countries, they mentioned feeling 'grateful' and 'lucky' to have spent time in Berlin during the pandemic because the regulations still allowed them the freedom to be outside. Pouso et al. (2021; 10) similarly found that "maintaining contact with nature" during the COVID-19 lockdown helped to "reduce the likelihood of reporting symptoms of depression and anxiety". UGS therefore "served as a coping mechanism to decrease the effects of stress and isolation caused by the pandemic" (Huerta and Cafagna, 2021; 1) and provided an opportunity for "stress relief" (Heo et al, 2021; 9). Fortunately, UGS in Berlin remained open and accessible to all through the lockdown periods, which was often not the case in other cities across the world. Closed green spaces in Mexico City, for example, led to reduced physical activity and heightened stress levels (ibid; 7). Szczepańska and Pietrzyka (2021) also found that student's physical activity in open public spaces reduced dramatically after lockdown measures had been implemented in Poland, with reduced activity levels being a potential trigger for mood disorders and depressive episodes. The interviewees also echoed these concerns when speaking about their home cities e.g. São Paulo, where green spaces were either closed or not sufficient, stating that their friends and family were often envious of the freedom to use these spaces in Berlin.

Furthermore, the lockdown period emphasised the fact that **green space is not just an environmental but also a social good,** which correlates with the finding by Rall et al. (2017; 83) that UGS offer vital cultural ecosystem services such as socialising

and maintaining cultural identity. The interviewees' experience with urban gardening, for example, allowed them to feel more productive, in control, and focussed. Because urban public/shared gardens provide social wellbeing and a sense of community as well as individual wellbeing, it is important that this is recognised in urban development policy. Previous research by Vierikko et al. (2020; 10) found that one of the main motivations for visiting UGS is to maintain social relations e.g. spending time with friends or watching people. In light of our research, we can say that this remained a key motivation during the COVID-19 lockdown. Therefore, UGS should be regarded as vital resources that, according to the interviewees, are undervalued and therefore under threat of being developed for profit-led purposes.

As Kaplan and Kaplan (1989; 198) already noted several decades ago, "It is rare to find an opportunity for such diverse and substantial benefits available at so modest a cost. Perhaps this resource for enhancing health, happiness, and wholeness has been neglected long enough". Therefore UGS, particularly on the local scale, will hopefully be recognised by the city authorities as an asset that not only needs to remain open, but also needs to be protected, maintained, and invested in for the benefit of the urban community's wellbeing. While this study does not seek to make concrete recommendations for future green space planning, the interviewees' responses provide valuable insights regarding required facilities/services in response to their experience over lockdown, including the need for more rubbish disposal facilities to combat littering, or improved lighting at night time which would enable use of UGS in the winter months, for example, for exercising, walking, and commuting.

Overall we found that international students in Berlin did become more vulnerable to negative self-perceived wellbeing during the first lockdown, with an added layer of vulnerability stemming from the fact that they were often far away from their families and loved-ones at home. To mitigate this, they spent an increased amount of time in UGS both alone and with others depending on their need for mental restoration/relaxation or interaction, respectively. The novelty of this study lies in the fact that iterative and qualitative methods were used to allow such findings to emerge. Whilst similar studies were conducted in China (Liu et al. 2022) and Poland (Szczepańska and Pietrzyka, 2021) that also focussed on student green space interaction during the pandemic, these employed online data collection methods with closed-ended questions. Whilst this study picks up on previous findings about the benefits of UGS contact for student wellbeing, it was conducted in a novel social context and employed different research methods to allow for a focussed and holistic representation of students' personal experiences and subsequent emotional responses. We found this to be particularly important in the context of mental health and wellbeing research because it allowed for rapport to be built between the researcher and interviewee and thus provides an open space in which emotions and sensitive topics could be explored iteratively, rather than restricting responses to closed answers and categories.

Limitations of the approach

In reflection of the data collection and analysis processes there are some aspects that could be improved if a similar study were to be conducted again. For example, one interview respondent stated that they felt somewhat unprepared for the interview and were not able to necessarily convey their feelings as openly as they would have liked. They mentioned that they would have found it helpful to have a list of questions beforehand so that they could prepare their answers or know what content to expect. Although this factor was not explicitly expressed by any of the other interviewees, it certainly would have been beneficial to hand out an interview outline in advance, to help the participants to feel more confident, informed, and prepared. However, we do not regard this as having a significant impact on the quality of the data collected.

Furthermore, the sample group was comparatively small and specific in terms of age and employment/student status and might therefore not be representative of the wider population in general. However, it is a pilot study. If the scope of the research project could be extended, it would have been beneficial and interesting to attract a greater number of respondents. Although the respondents' background (in terms of home country) had a well-distributed geographic spread, there was a lack of representation from several continents, particularly Africa. This echoes the sentiment of Kabisch et al. (2015; 27) that "large geographical knowledge gaps still exist", highlighting the fact that more diverse voices and lived experiences need to be collected to ensure representative accounts of experience in UGS.

Outlook

While this study has found that UGS provided an essential resource for supporting wellbeing during a time of crisis, the pandemic is (at the time of writing) still on-going and periodic lockdown restrictions remain. For this particular subgroup it is vital that green spaces remain open and accessible both for individual use and for meeting friends. The city must react to the new and intensified use patterns detailed in this study to develop a strategy for ensuring that green spaces remain accessible, are well managed, and provide adequate infrastructure to suit changing needs e.g. outdoor seating areas.

However, it must be acknowledged that the activities of certain population groups may also cause tension and conflict or affect the experience of UGS use by other groups, which poses an interesting topic for future research. For example, it would be interesting to observe whether certain activities become more prevalent in UGS – in the case of this study, larger gatherings and parties took place more frequently, but it would be beneficial to interrogate the reasons for this further e.g. need for social interaction or escape. Furthermore, interviews could be conducted with other UGS users to collect data about their experiences in UGS and whether their needs are met by the space, which in turn could influence the development and maintenance of the space. Future studies may also recruit a larger, more representative, and varied sample group to balance the interests and needs of the wider urban community.

Comparative research between pre- and post-pandemic studies (and across cities) could also reflect the changing needs and desires of urban dwellers – interviews and questionnaires would provide valuable data for identifying UGS users' changing use patterns and consequent demand e.g. for improved facilities or improved quality of green space. A fundamental need may simply be access to UGS. The pandemic has shown that at least for a small population sub-group there is the need to access safe and restorative outdoor space away from the home. From an environmental justice perspective, studies are required that interrogate underlying injustices regarding the availability of green spaces, which have the capacity to offer respite and improved mental and physical wellbeing in a close enough proximity to the home.

5. Conclusion

This study provided a focussed perspective on a specific sub-population (international students living in Berlin) who suddenly became more vulnerable than usual due to the imposed lockdown restrictions.

In light of the research questions, we found that the participants' daily routines shifted, with a significantly greater amount of time spent indoors and isolated from their social networks. However, this ultimately allowed them to interact with UGS differently because they felt the need to escape the home and spend time outdoors, whether alone or with friends, both in their neighbourhood and further afield (research question 1). These spaces took on a new purpose and significance, fulfilling the role of indoor socialising spaces and providing unique constellations of social gatherings which resulted in new experiences and use patterns within Berlin's green spaces (research question 2). UGS became a lifeline for connection and restoration, resulting in a positive emotional response and renewed appreciation for their potential to mitigate the negative mental health impacts brought about by the lockdown (research question 3).

Regardless of the pathway through which individual's experienced restoration through interaction with UGS, all of the participants recognised the value of UGS in Berlin for supporting their wellbeing. It provided a safer arena to escape, to exercise, to socialise, and - most importantly - to have fun, allowing them to form tangible memories of spring/summer 2020, alongside providing hope and respite from a stressful and isolating situation. While UGS provided the only opportunity for meeting in a safe and socially distanced way, it is unclear how this developed towards the winter months and whether green space continued to be used as intensely compared to the first lockdown; this presents another opportunity for further study. It also remains to be seen how the pandemic situation will unfold, but this research has shown that at least for a certain sub-group of the population UGS is a reliable constant, which will undoubtedly mitigate some of the long-term mental health impacts that the pandemic has created. Furthermore, as this novel situation has shifted individuals' interaction with UGS, the important question now is how new attitudes, behaviours, and needs can be recognised and accommodated in the city's future urban green space planning and maintenance.

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Appendix

Interview guide of semi-structured questions

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Author Statement

Charlotte Collins: Conceptualisation, Methodology, Formal Analysis, Investigation, Data Curation, Writing - Original Draft, Writing - Review & Editing

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Declaration of interests

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

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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