

# Urban Green for Child- and Youth-Friendly Cities

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## Abstract

Urban green plays a central role in discussions about quality of life in urban areas. Young people have particular requirements of urban green, understanding of which is key in planning infrastructure and design aspects in cities. In order to support the spatial planning of child- and youth-friendly cities, including urban green, some questions must first be answered: (i) What kind of urban green is important? (ii) What kind of infrastructure elements are needed? (iii) What are the central characteristics and design aspects of urban green and its elements? (iv) How are they rated? The u3Green project aims to answer these questions by developing a survey app in cooperation with schools. The data gathered via the app will be analysed in order for recommendations to be made.

Preliminary research activities were conducted. (1) A literature review investigated children's and young people's requirements of urban green. (2) An online questionnaire asked about urban outdoor activities, liked places, and the personal meaning of favourite places. The survey confirmed the needs and requirements identified in the literature review, but also revealed a new and surprising category of activity: walking. (3) A number of workshops in schools revealed what young people consider as negative factors in urban areas, especially traffic.

## Keywords:

young people, liveable cities, cultural ecosystem services, participation, infrastructure and design of urban green

## 1 Background and research questions

Discussions about the quality of life in urban landscapes have increased in recent years. These include topics such as providing (more) liveable urban spaces, reducing environmental pollution and tackling climate change challenges. Since the situation for children and young people (up to 18 years old) in cities has changed for the worse (McMillan, 2013; UN-Habitat, 2004), there is a demand for child- and youth-friendly cities (Bartlett, 2002; Cushing, 2015; Malone, 2001; Masri, 2017). Regardless of the population group, 'urban green' (parks, wasteland, gardens, green verges, artificial and natural bodies of water, etc.) (BUND, 2012;

Jamali & Mosler, 2014) contributes significantly to (a higher) quality of life in cities (Carrus et al., 2015; Pretty et al., 2007; Scholz, 2011). Here, it is important to note that urban green is characterized by different infrastructure and design aspects depending on the type (e.g. benches, facilities nearby, sport opportunities, etc.). Despite its importance, urban green is in increasing competition with other uses of urban space, such as traffic, trade, industry and housing. This requires attention and measures that better take urban green into account in urban planning (Boulton et al., 2018; Boulton et al., 2020).

Urban green plays a more important role for young people than for adults: since they cannot ‘simply’ drive out of the city, they need suitable urban green within easy reach for recreation, sports and meeting friends. Young people’s requirements in terms of urban green differ from what adults consider relevant and important for them (Hennig & Vogler, 2016; Walters, 2019; Zhou et al., 2015) and their demands must be taken into consideration.

Some basic knowledge of these needs is therefore absolutely necessary in planning urban green. The roles played by the different types of urban green (including their infrastructure and design aspects) for young people also need to be understood. For this, the ecosystem services (ESS) approach is useful to identify and quantify the benefits and importance of urban green. ‘Cultural ESS’ refers to functions of nature with regard to recreation/leisure time, perception/experience of nature, education for sustainable development, and intellectual development; the other types of service are categorized as ‘supporting’ (soil formation, photosynthesis, etc.), ‘providing’ (food, water, etc.) and ‘regulating’ (water quality, etc.) (Albert et al., 2012; Bolund & Hunhammar, 1999; Grunewald et al., 2014; Kühne, 2014; Zwierzchowska et al., 2018)

The ESS concept aims to subject the services provided by nature to systematic consideration. It enables appropriate mediation, communication and sensitization of the population about the relevance of nature and nature conservation (Albert et al., 2012; Heiland et al., 2016; Klein et al., 2015; Kühne, 2014). This is important because many citizens are unaware of the value of the services that nature, including urban green, brings to society. Further, ESS can be (better) taken into account by planners and decision-makers if the importance and value of nature are stated explicitly (Grunewald et al., 2014; Kühne, 2014). To grasp the importance of urban green for society, the pivotal role played by cultural ESS in particular needs to be understood. Cultural ESS, however, are difficult to capture and evaluate, since their value varies between individuals and groups: nature is perceived and used differently depending by different socio-demographic groups (Anthem et al., 2016; Daniel et al., 2012; URBES, 2015). Knowledge of different population groups, their requirements, needs and value systems is therefore necessary for the concretization of cultural ESS.

Open questions need to be answered to support the spatial planning and implementation of more child- and youth-friendly cities in terms of urban green: (i) What kind of urban green is important to young people? (ii) What infrastructure elements are included and combined in these urban green spaces? (iii) What are the central characteristics and design issues of urban

green? (iv) How are these characteristics and design issues rated with respect to supporting cultural ESS?

The project ‘u3Green – Promotion of child- and youth-friendly urban landscapes through participatory research on urban green’ is dedicated to these questions. Running from October 2022 to September 2025, it focuses on urban green and its meaning for young people; it aims to support urban spatial planning in implementing (more) child- and youth-friendly cities. To reach this objective, u3Green focuses on (1) gathering basic knowledge about the importance of urban green for young people and how they actually use it; (2) developing a web-based, child- and youth-centric application to collect, evaluate and share information on urban green; (3) communicating the results on the importance of urban green for children and young people using suitable geovisualization platforms (e.g. interactive online maps and story maps).

With a spatial focus on Salzburg and the conception of the project as a participatory and citizen science project, the project team consists of numerous partners from in or near Salzburg, including schools, the scientific community and society at large. School students are involved in various ways: participation in workshops and focus groups, and contributing within the framework of different kinds of internship. The project team and the workflow for the various participation formats are presented in Figure 1. This paper deals with the first steps of the project workflow: gaining a basic understanding of the relationship between young people and urban green. This knowledge will serve as a basis for the next step, to develop a dedicated (location-centred) survey application.

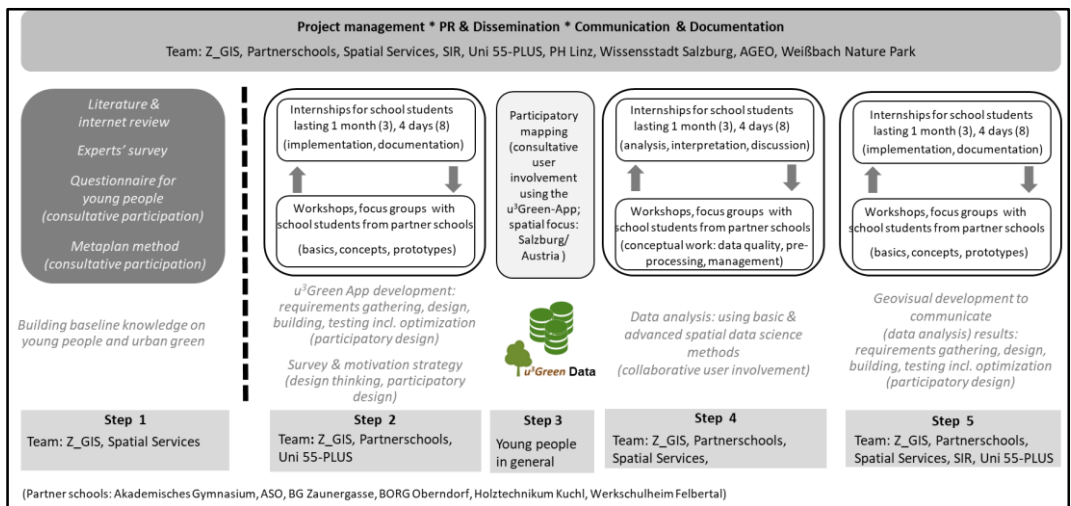


Figure 1: u3Green workflow and participation formats

To build this baseline knowledge of young people's needs and interests in the context of urban green, various analogue and digital methods were used for: a) a literature review summing up the state of knowledge regarding children's needs and urban green; b) an online survey investigating activities of young people in urban areas; c) the collection of young people's perceptions of urban issues in several in-classroom workshops. The methodological approaches and results of each of these activities are presented below.

## 2 Methods

### 2.1 Literature and internet review

The literature and internet review considered cultural ESS in relation to children's and young people's needs for urban green. The review started with a search for literature on Scopus using the terms 'urban AND green AND needs AND children' for 2018 to 2022. The results were narrowed down to the domain of urban planning and design, and to the articles that presented research on both children and urban green. This structured search was complemented by frequently cited older papers, a recent review article on child-friendly environments (Jansson et al., 2022), and additional internet references to urban-green planning projects where children and young people participated in the design.

The resulting studies were analysed first to identify the activities for which children and young people need urban green, the benefits derived from urban green, and conditions (e.g. accessibility) for using urban green. The second focus was on the elements that compose the environments and spaces of urban green – their design and combination, as well as support facilities. The third and final focus addressed ways of enhancing/adding value to urban green within the context of cultural ESS.

### 2.2 Online survey for school students

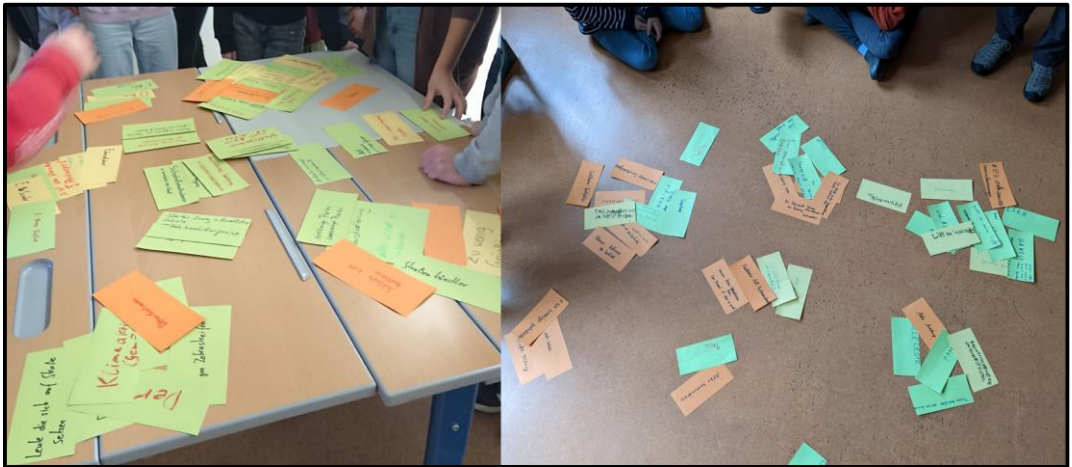
An online survey gathered information about the outdoor recreational activities of children and young people in urban areas. It included four open questions: (1) What have you been doing outdoors recently? (2) What sort of places do you like to go to? (3) What does your favourite place mean to you? (4) What is your favourite activity at your favourite place? Two further questions addressed demographic information about age (any number of years) and gender (female, male, other, or prefer not to say). Additionally, the survey included an introduction to the project and a statement that the data were being collected anonymously, without the possibility of being traced back to individuals. The online questionnaire was implemented using Survey 123 (<https://survey123.arcgis.com/>), an easy-to-use tool with functionality for on-the-fly visualization of results during interactive events.

The link to the online survey was shared between 16 November and 13 December 2022 during: (1) an online session 'u3green. Innerstädtisches Grün und dessen Bedeutung für Jugendliche' in the framework of GISday 2022 (<https://www.gisday.at/pages/programm-2022>) with 80 participations; (2) 8 spotlight workshops with u3Green partner schools (11 classes from 6 different schools, students aged between 13 and 17).

The validity of the data was checked by confirming that the answers were from people aged 18 or younger (defined as ‘children’ according to the UNICEF Convention on Rights of the Child), and that an answer had been given for each question. The youngest participants were aged 10. Participants were categorized into two age groups, 10 to 14 and 15 to 18, where the latter category includes children who also belong to the group ‘Youth and Young People’, defined as being 15–24 years of age (UNDESA n.d.). For each of the open questions, and for each age group, inductive content analysis according to Mayring (2010) generated a further set of categories and a count of responses. They were visualized in a chart indicating the share of responses per category (see section 3.2).

### 2.3 Spotlight workshops and affinity diagramming

The spotlight workshops were held with each partner-school class at the beginning of the project. The workshops introduced the project and disseminated the questionnaire. They also included moderated interactive discussions. Following the metaplan method (Schnelle, 1979), the students were asked to think about what they personally considered problematic in urban areas (in this case, Salzburg), and to note each problem on a separate index card. The workshops yielded 312 index cards, which were collected and clustered by topic in a moderated process adapted from the approach of affinity diagramming (ASQ 2023) (see Figure 2).



**Figure 2:** metaplan and affinity diagramming in spotlight workshops

Grouping individual problems into broader subject areas allowed for thematically structured discussions and the collection of informal statements. These were documented by the researchers and used for further analysis. Following the inductive approach of qualitative content analysis (Mayring, 2010), these informal statements were generalized, categorized and clustered (see Table 1 for a coding example), and then quantified to generate an overall picture of issues that young people perceive as problematic in urban areas (in this case, Salzburg).

**Table 1:** Coding example for problems in urban areas collected from statements on index cards

text on index card	I never know if I'll catch my connecting bus when I have to change.
generalization	bus connections are uncertain
category	bad connections
cluster	traffic
sub-cluster (if needed)	public transport

### 3 Results

#### 3.1 Literature and internet review

The literature search in Scopus yielded 77 studies of which 14 fulfilled the eligibility criteria. Additionally, two much-cited older articles, one recent review article, and two internet references were included, resulting in a total of 19 studies to be analysed. The studies used different methods to gather information about what children and young people need and expect from urban green. The approaches included environmental psychology (Garau & Annunziata, 2019; Kytta, 2004), interviews through child-led walks (Jansson et al., 2016), online surveys and participatory planning (Kinder- und Jugendbüro Potsdam, 2022), and using empathy-based stories (Shu et al., 2022).

The studies identified a diverse set of needs that were categorized into activities in urban green, benefits from urban green, and conditions for using urban green (see Table 2). The activities in urban green comprised (1) play, sports, leisure & recreation, (2) learning, (3) social interaction, (4) eating, (5) contact with nature and exploration, (6) feelings and sensual experiences, and (7) rest and relaxation. The identified benefits of urban green were (1) connection with nature, (2) personal development in various dimensions (e.g. cognitive, social, emotional, cultural, intellectual), (3) health, (4) aesthetics, (5) environmental awareness, and (6) wellbeing. The conditions for using urban green included (1) accessibility, (2) independent mobility, (3) safety and convenience, (4) design and variety of recreational possibilities, (5) clean and healthy environment, (6) fairness and inclusion, (7) participation, and (8) ecological function.

**Table 2:** Needs of children and young people for urban green

Theme	Needs associated with urban green
Activities in urban green	<p>Play, sports, leisure and recreation (Cilliers &amp; Cornelius, 2018; El-Kholy et al., 2022; Garau &amp; Annunziata, 2019; Jansson et al., 2022; Kinder- und Jugendbüro Potsdam, 2022; Kyttä, 2004; Shu et al., 2022; Veitch et al., 2021; Vidal &amp; Castro Seixas, 2022; Yuniastuti &amp; Hasibuan, 2019; Zhang et al., 2022)</p> <p>Learning (Colding et al., 2020; Jansson et al., 2022; Shu et al., 2022)</p> <p>Daily travel / walking (Shu et al., 2022)</p> <p>Social interaction (Freeman et al., 2022; Jansson et al., 2022; Shu et al., 2022; Veitch et al., 2021)</p> <p>Eating (Shu et al., 2022)</p> <p>Contact with nature and exploration (Colding et al., 2020; Freeman et al., 2022; Garau &amp; Annunziata, 2019; Kyttä, 2004; Shu et al., 2022; Sundevall &amp; Jansson, 2020; Vidal &amp; Castro Seixas, 2022)</p> <p>Feelings and sensual experiences (Shu et al., 2022; Yuniastuti &amp; Hasibuan, 2019)</p> <p>Rest and relaxation (Shu et al., 2022)</p>
Benefits from urban green	<p>Connection with nature (Cilliers &amp; Cornelius, 2018; Colding et al., 2020; Freeman et al., 2022; Kyttä, 2004; Sundevall &amp; Jansson, 2020; Vidal &amp; Castro Seixas, 2022; Zhang et al., 2022)</p> <p>Personal Development (cognitive, social, emotional, cultural, intellectual etc.) (Cilliers &amp; Cornelius, 2018; Colding et al., 2020; Garau &amp; Annunziata, 2019; Krishnamurthy, 2019; Shu et al., 2022; Veitch et al., 2021; Vidal &amp; Castro Seixas, 2022; Yuniastuti &amp; Hasibuan, 2019)</p> <p>Health (Cilliers &amp; Cornelius, 2018; El-Kholy et al., 2022; Shu et al., 2022; Veitch et al., 2021; Vidal &amp; Castro Seixas, 2022)</p> <p>Aesthetics (Shu et al., 2022; Yuniastuti &amp; Hasibuan, 2019)</p> <p>Environmental awareness (Colding et al., 2020; Garau &amp; Annunziata, 2019; Shu et al., 2022)</p> <p>Wellbeing (Vidal &amp; Castro Seixas, 2022)</p>
Conditions for using urban green	<p>Accessibility (Dalpra, 2022; Jansson et al., 2022)</p> <p>Independent mobility (Kyttä, 2004)</p> <p>Safety and convenience (Cilliers &amp; Cornelius, 2018; Jansson et al., 2022; Shu et al., 2022; Sundevall &amp; Jansson, 2020; Vidal &amp; Castro Seixas, 2022; Yuniastuti &amp; Hasibuan, 2019; Zhang et al., 2022)</p> <p>Design elements and diverse recreational content (Dalpra, 2022; Shu et al., 2022)</p> <p>Clean and healthy environment (Jansson et al., 2022; Kinder- und Jugendbüro Potsdam, 2022; Shu et al., 2022; Sundevall &amp; Jansson, 2020)</p> <p>Fairness and inclusion (Dalpra, 2022; Jansson et al., 2022; Sundevall &amp; Jansson, 2020; Vidal &amp; Castro Seixas, 2022)</p> <p>Participation (Jansson et al., 2022; Kinder- und Jugendbüro Potsdam, 2022; Vidal &amp; Castro Seixas, 2022; Wake &amp; Zhan, 2019)</p> <p>Ecological function (Shu et al., 2022)</p>

The needs of children and young people build on a set of requirements for urban green: natural elements and environments; spaces; furniture and equipment; settings for activities; support infrastructure (Table 3). The urban green natural elements, spaces and environments were rated highly important. The natural elements included wilderness, biodiversity, vegetation and

urban nature, and more specifically trees, climbing trees, fruit trees, shrubs, animals, water, multi-use grassy areas, flowers and flower beds. Green spaces in general included forest, meadow, grassy areas, waterfront, riverbed, mountain, water bodies (river, sea, lake). The green elements can be grouped as settings that form hiding places, secret places, edible landscapes, or shady places. The spaces of urban green can be divided into planned and managed spaces (parks, playgrounds, streets, designated spaces for ball games, skate parks, graffiti wall, etc.), as well as under-used and derelict spaces (e.g. abandoned gardens, vacant lots, green verges or wasteland). The furniture and equipment for urban green include benches, seats, tables, decked areas, waste and recycling bins, playground equipment (swings, slides, seesaws, etc.), sports equipment (goals, basketball hoops, skate ramps, etc.), and stages and bandstands. The furniture and equipment allow urban green spaces to be used for a wide range of activities, including social gatherings, play (sand, water), and theatre and performance. Some of the infrastructure may be multi-purpose (e.g. decks as versatile elements, and multi-use grassy areas). Settings may refer to paths (e.g. clearly structured, hierarchical, for specific uses such as cycling). A final requirement is support infrastructure, consisting of pathways and lighting, buildings (e.g. public toilets), and Wi-Fi connection.

**Table 3:** Children's and young people's requirements in relation to urban green

Theme	Needs / requirements associated with urban green	References
Urban green natural elements, spaces and environments	<p>Environments: nature, wilderness, biodiversity, vegetation, urban nature, forest.</p> <p>Green spaces: forest, meadow, grassy areas, waterfront, riverbed, mountain, water bodies (river, sea, lake, etc.).</p> <p>Green elements: trees, climbing trees, fruit trees, shrubs, animals, water, multi-use grassy areas, flowers and flower beds.</p> <p>Settings of elements: hiding places, secret places, edible landscapes, shady places.</p>	El-Kholy et al., 2022; Garau & Annunziata, 2019; Jansson et al., 2022; Kinder- und Jugendbüro Potsdam, 2022; NJ State University - College of Design, 2012; Shu et al., 2022; Yuniastuti & Hasibuan, 2019
Spaces of urban green	<p>Planned and managed spaces: parks, playgrounds, streets, designated spaces (ball games, skate parks, graffiti wall etc.).</p> <p>Under-used and derelict spaces: abandoned gardens, vacant lots, green verges, wasteland etc.</p>	Dalpra, 2022; El-Kholy et al., 2022; Jansson et al., 2016; Kinder- und Jugendbüro Potsdam, 2022; NJ State University - College of Design, 2012; Shu et al., 2022; Veitch et al., 2021; Wake & Zhan, 2019; Zhang et al., 2022
Furniture and equipment for urban green	<p>Furniture: benches, seats, tables, decking etc.</p> <p>Waste and recycling bins</p> <p>Playground equipment: swings etc.</p> <p>Sports equipment: goals, basketball hoops, skate ramps etc.</p>	Dalpra, 2022; El-Kholy et al., 2022; Kinder- und Jugendbüro Potsdam, 2022; NJ State University - College of Design, 2012; Veitch et al., 2021; Yuniastuti &



	Stages and bandstands	Hasibuan, 2019
Settings for activities in urban green	Gathering settings Play settings (sand, water) Theatre and performance settings Decking (versatile and multi-purpose) Multi-use grassy areas Clearly structured, hierarchical pathways	El-Kholy et al., 2022; Kinder- und Jugendbüro Potsdam, 2022; Kyttä, 2004; NJ State University - College of Design, 2012; Veitch et al., 2021
Urban green support infrastructure	Pathways and lighting Buildings: public toilets, kiosks etc. Wifi connection	Kinder- und Jugendbüro Potsdam, 2022; NJ State University - College of Design, 2012; Zhang et al., 2022

Most of the studies did not go beyond identifying people's need for, and requirements of, urban green. A few, however, rated the quality of urban green, using two methods: (1) counting the frequency of mentions for the urban green elements being evaluated (Shu et al., 2022); (2) rating the quality of urban green on a Likert-type scale by survey participants (Veitch et al., 2021), which allows the relative importance of particular urban green elements for children and young people to be ascertained.

### 3.2 Online questionnaire

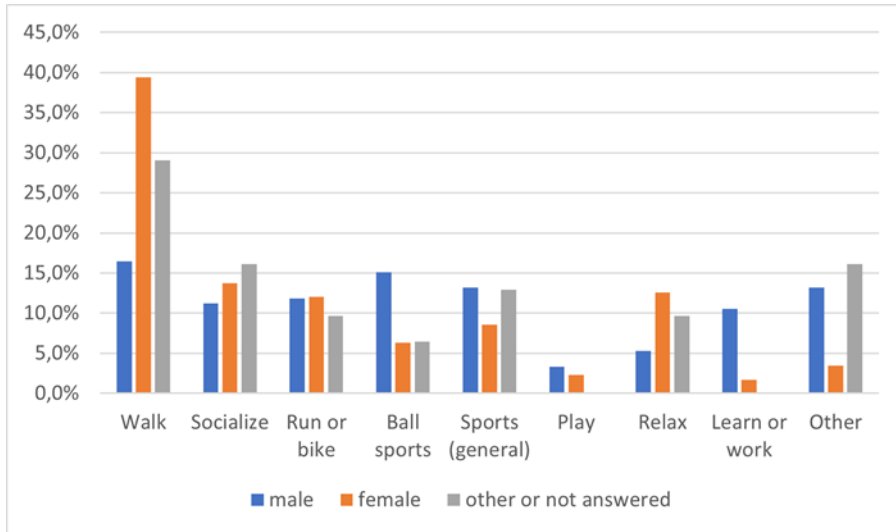
Our online survey yielded entries from 234 participants, which provided 215 valid responses. 19 were excluded because the participants were more than 18 years old or did not provide information about their age. Table 4 shows the gender and age distribution of the participants.

**Table 4:** Demographics of survey participants

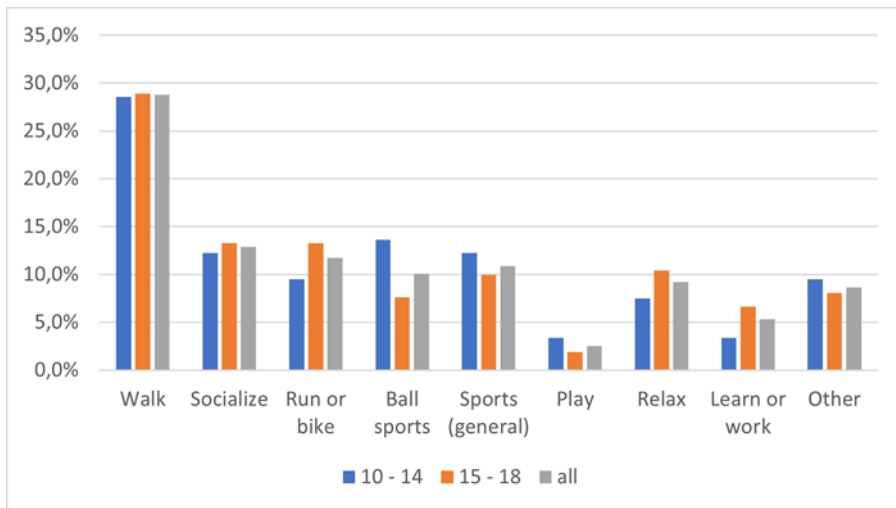
Demographics	Values
Age	10-14 years - 99 (46.0 %) 15-18 years - 116 (54.0 %)
Gender	female - 99 (46.0 %) male - 98 (45.6 %) other - 7 (3.3 %) did not answer - 11 (5.1 %)

For question 1, 'What have you been doing outdoors recently?', a total of 212 participants gave at least one answer. Nine categories were identified: walk (walking, walking the dog, walking with friends, walking to school, hiking), socialize (meeting friends, visiting locations or events, drinking), run or cycle, ball sports (football, volleyball, basketball, tennis), sports in general (including swimming, skiing, horse riding, skating and skateboarding), play (e.g. games, at a playground), relax (chill out, listen to music, read, have a picnic), learn or work (e.g. learn for school, gardening, washing the car), and other activities.

Figure 3 presents recent outdoor activities by gender as a percentage of the respective gender group. Figure 4 presents recent outdoor activities by age group.



**Figure 3:** Recent outdoor activities by gender (n = 358)



**Figure 4:** Recent outdoor activities by age (n = 358)

Walking had the highest frequency of answers across gender and age (103), which was almost as high as all sports activities combined (general sports, running & cycling, ball sports) (117). The vast majority of answers within the category of walking mentioned ‘walking’ as such (71); a few mentioned hiking (14); walking in specific locations (particular parks, along the river Salzach, through Vienna) (7); walking the dog (5); walking with friends (3); walking to school

(3). Among those who mentioned hiking, 2 also mentioned climbing, which could also be subsumed into the category of general sports.

Females performed walking quite frequently, followed by socializing and relaxing. For males, the sports activity groups gained the highest frequencies after walking. Ball sports seem to be more common for boys than for girls, as well as more common for the 10–14 age group than for the 15–18 one. Running or cycling, relaxing, and learning or working are more common in the older age group than in the younger one.

For question 2, ‘What are places where you like to go?’, 212 of the participants gave at least one answer. Nine place categories were identified: (1) nature (forest, lake, mountains, landscapes), (2) sports facilities, (3) home / a friend’s house, (4) parks and playgrounds, (5) locations for shopping, for events, for going out, (6) in the city, (7) school or work locations, (8) promenades, roads and trails, (9) other places.

Figure 5 presents liked places by gender; Figure 6 presents liked places by age group.

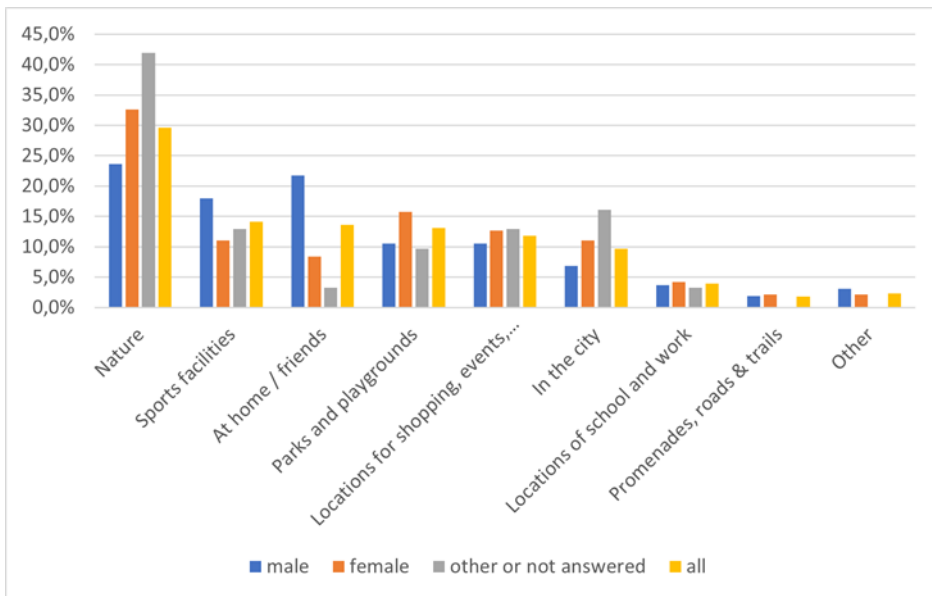
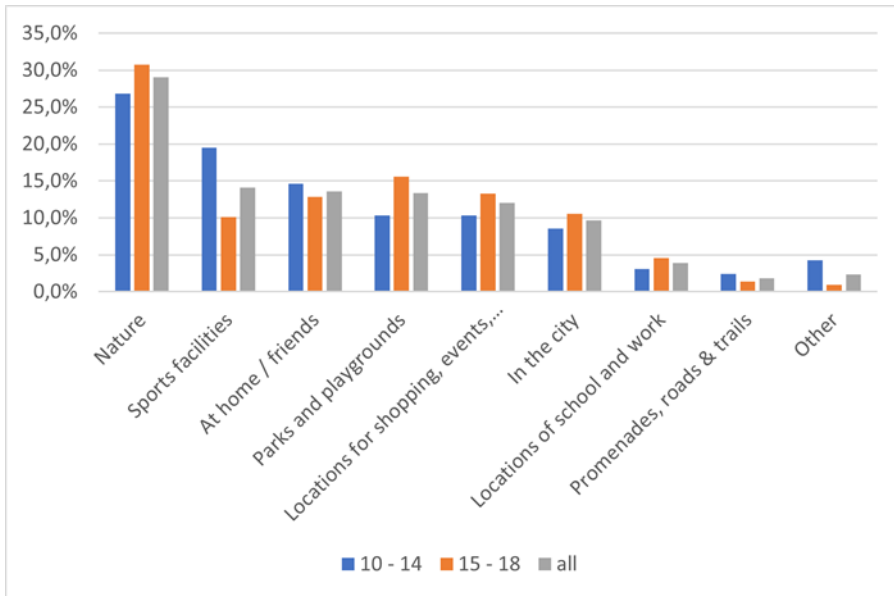


Figure 5: Liked places by gender (n = 382)

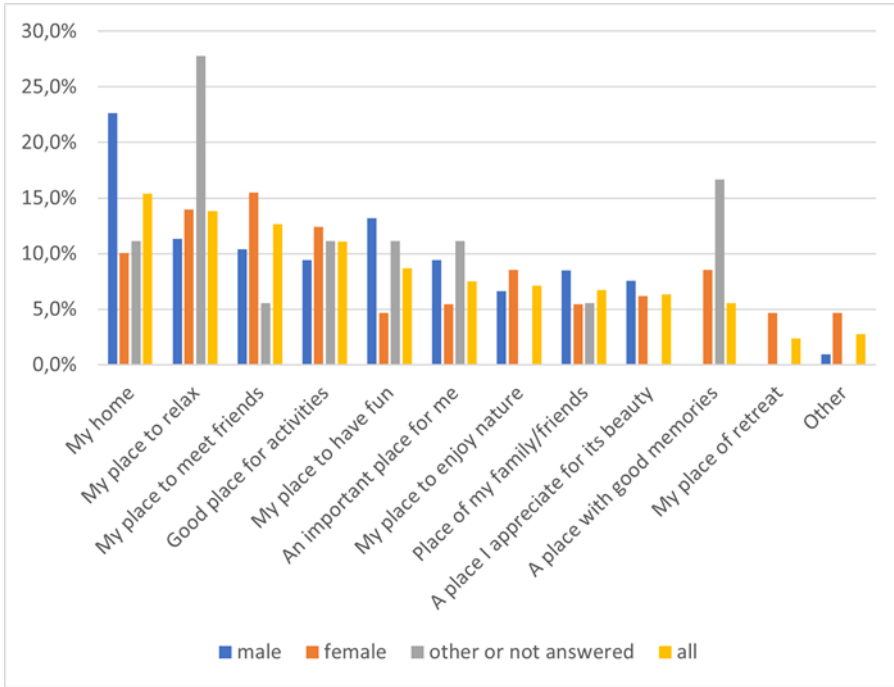


**Figure 6:** Liked places by age (n = 382)

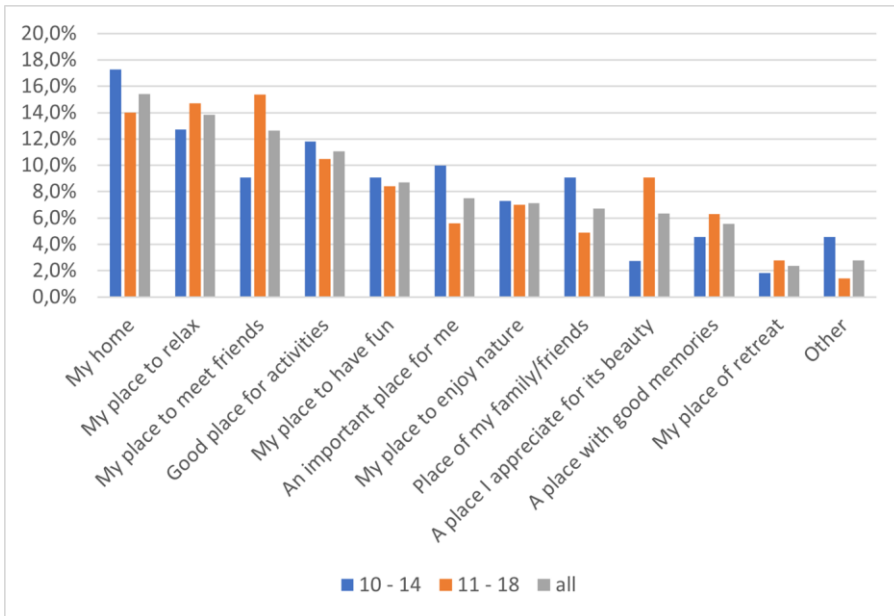
Nature was the most-liked place to go to for the children and young people who participated in our survey, followed by sports facilities, home/at a friend's, and parks and playgrounds. Of all the gender groups, boys have the strongest preferences for being at home/at a friend's, and sports facilities. The 10–14 age group also has a stronger preference for sports facilities and home/at a friend's when compared to the 15–18 age group. The older age group tends to go more often to nature, parks and playgrounds, locations for shopping, events, and into the city.

Since both questions 1 and 2 allowed multiple answers, there is no one-to-one relationship between a recent outdoor activity and a liked place. In addition, there was no explicit relationship, from the participants' perspective, between the two questions ('liked places' do not necessarily imply a relationship with 'recent outdoor activities'). For these reasons, no analysis of outdoor activities in relation to liked places was carried out.

For question 3, 'What does your favourite place mean to you?', 178 participants gave at least one answer. Twelve categories were identified: (1) home (including my residence, my origin), (2) my place to relax, (3) my place to meet friends, (4) a good place for my activities, (5) my place to have fun, (6) an important place for me, (7) my place to enjoy nature, (8) where my family/friends are, (9) a place I appreciate for its beauty, (10) a place with good memories, (11) my place of retreat, (12) other type of relevance.



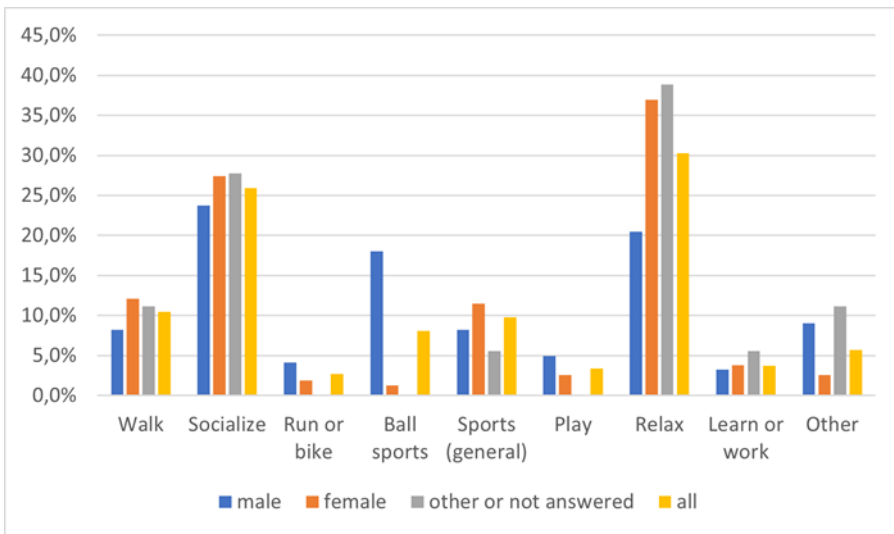
**Figure 7:** Personal meaning of favourite place by gender (n = 253)



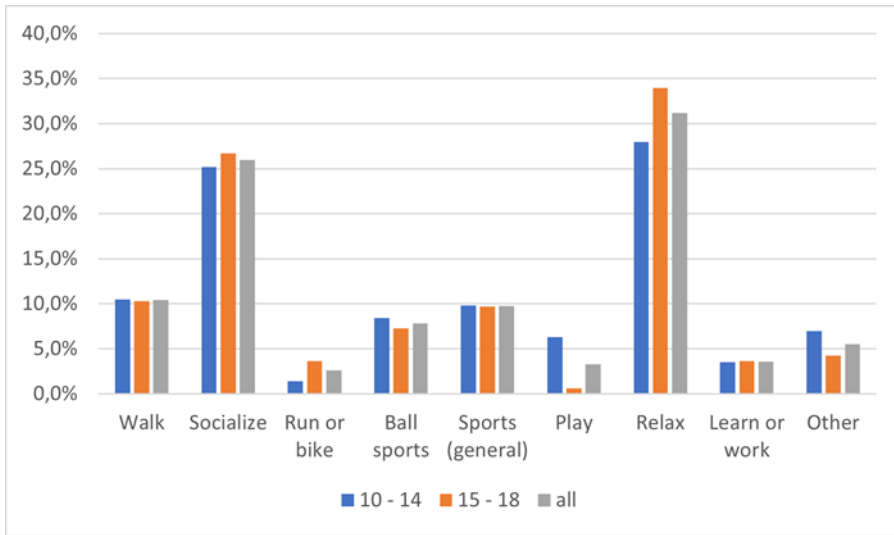
**Figure 8:** Personal meaning of favourite place by age (n = 253)

Most frequently, the meaning of the favourite place fell into categories (1) to (5). For boys, the first and last of these (home and a place to have fun) were relatively more important than for girls. For the girls, the main categories were a place to relax, a place to meet friends, and a good place for activities. Females also used categories that males did not use (a place with good memories, a place of retreat). The 10- to 14-year-olds tended to identify their favourite place more often as their place of residence, origin, home, where their family/friends are, or (put simply) stated that it was an important place to them. The 15–18 age group explained relatively often that their favourite place was where they meet friends, or somewhere that they appreciate for its beauty.

For question 4, ‘What is your favourite activity at your favourite place?’, 297 participants gave at least one answer. The same categories as for question 1 were used.



**Figure 9:** Favourite activity at favourite place by gender (n = 297)



**Figure 10:** Favourite activity at favourite place by age (n = 297)

The pattern of activities at the favourite place (Figures 9 and 10) is somewhat different from that for recent outdoor activities (Figures 3 and 4), with less importance placed on physical activities, and more on relaxing and socializing. For boys, ball sports are a frequent favourite activity at their favourite place. One 14-year-old male responded about the meaning of his favourite place with the words ‘It means everything to me because it is where I play volleyball’ (original German: ‘Alles, weil da spiel ich Volleyball.’).

### 3.3 Qualitative content analysis of affinity diagramming results

As described in section 2.3, workshops held in schools yielded a differentiated picture of issues considered problematic and/or disturbing by young people (school students in this case). Of the 312 responses recorded on index cards, the qualitative content analysis identified 23 as invalid (too general, not city-related, or outside the topic of urban life). A deeper analysis and categorizing of the 289 valid replies showed that traffic (130 replies) is by far the most significant problematic issue, followed by: pollution (40), people and their behaviour (30), the lack of opportunities for leisure-time activities (29), infrastructure (20), not enough green spaces (15), lack of security (13), a lack of aesthetics (12), economic discontents (urban life is expensive) (12), and lack of places designed specifically for children and teenagers (8).

Due to the heterogeneity of the data, sub-categories (and sub-sub-categories in the case of traffic) were created to generate a more differentiated picture. In summarizing the data, a lower bound of 20 mentions was defined. Table 5 shows the overall results of the categories and sub-categories and their corresponding numbers of mentions.

**Table 5:** Results of the qualitative content analysis of the 312 index cards collected in workshops in schools: issues considered problematic and/or disturbing by young people

Categories built	mentions (total)	mentions (in %)
traffic	110	35.26%
public transport	57	18.27%
bad connections	13	4.17%
delays	10	3.21%
frequency	8	2.56%
too crowded	7	2.24%
connection to rural areas	6	1.92%
others / in general	13	4.17%
too much traffic	19	6.09%
traffic jam	11	3.53%
bad or not enough cycle lanes	11	3.53%
others / in general	12	3.85%
pollution	40	12.82%
too much waste	21	6.73%
air and environmental pollution	16	5.13%
noise	3	0.96%
people and their behaviour	30	9.62%
rude and intolerant people	13	4.17%
demonstrations and activism	5	1.60%
too many tourists	4	1.28%
others / in general	8	2.56%
lack of free-time activity opportunities	29	9.29%
not enough shopping and food opportunities	8	2.56%
not enough activity opportunities/places	7	2.24%
not enough sport opportunities/places	6	1.92%
others / in general	8	2.56%
infrastructure	20	6.41%
too many buildings/dense development	7	2.24%
bad internet connection	5	1.60%
shop opening times	3	0.96%
too many building sites	3	0.96%



not enough public rubbish bins	2	0.64%
not enough green spaces	15	4.81%
lack of security	13	4.17%
aesthetics/unattractive sites	12	3.85%
economic discontents (expensive urban life)	12	3.85%
shortage of places specifically for children and teenagers	8	2.56%
invalid replies (too general, not city-related)	23	7.37%

## 4 Discussion, conclusion and outlook

The survey results in combination with the youth-specific problems in urban areas identified by young people themselves broaden the literature analysis results and generate a differentiated overall picture of issues. This much richer picture, including as it does young people's perceptions and the meanings they attribute to places, should be taken into account when researching the requirements of young people in relation to urban green.

The questionnaire identified walking as an outdoor activity of children and young people; it also found nature as the top outdoor place to go. While the literature review clearly identified nature and natural environments as relevant, it did not capture the activity of walking as clearly significant. Shu et al. (2022) identified walking as a means of getting to/from school and other destinations but did not draw attention to walking as an activity in its own right. Walking seems to be new as an activity recognized by young people. One reason might be the Covid-19 pandemic, during which restrictions limited activities to ones carried out alone or in small groups (like walking), prohibited people from gathering in numbers, and did not allow indoor pursuits. Initially, perhaps, children and young people chose walking because of the lack of other options or because it appeared to be one of the last remaining opportunities to meet friends. Having perceived certain benefits of walking, they might subsequently have kept up the habit. This is a possible implication of several conversations that took place in the workshops held in schools.

The benefits of walking probably include the health (and/or mental health) benefits that result from contact with nature or urban green. Urban green's positive impact on (mental) health is well attested in the literature, and contact with nature has been identified as a need of children and young people; Vidal & Castro Seixas (2022) stressed that the pandemic highlighted the protective role of urban green. Wortzel et al. (2021) found that young people experienced fewer Covid-related worries if they had better access to urban green. However, more research would be needed to find out whether young people's motivations in walking were in any way affected by the pandemic.

The evaluation of urban green specifically by children and young people and in the context of cultural ESS was rarely addressed in the literature reviewed. Our questionnaire focused on gathering qualitative values of urban green as the basis for a quantitative approach to the evaluation of cultural ESS. It gathered statements about the meanings and values attributed by

children and young people to their favourite place(s), thereby providing a qualitative description of the value that urban green has for them. Here, the questionnaire results are compared to the types of urban green needs that emerged from the literature review.

Some of the categories of personal meaning of favourite places can be paired with activities in urban green: ‘my place to meet friends’ (social interaction); ‘my place to relax’, ‘my place of retreat’ (relaxation and restoration); ‘a good place for my activities’ (playing, sports, leisure); ‘my place to have fun’ (feelings and sensual experiences). Further categories can be paired with benefits derived from urban green: ‘my home’, ‘where my family/friends are’, ‘a place with good memories’ have an identity-establishing meaning that points towards benefits for personal and social development; ‘my place to enjoy nature’ is related to connection with nature; and ‘a place I appreciate for its beauty’ is related to aesthetics. Categories for unspecified values are ‘an important place for me’ and ‘my place of other type of relevance’.

The children and young people explained the meaning of their favourite place quite directly, referring to the activities they do there and the benefits they derive from the place. In order to develop this *qualitative* description of urban green value towards a *quantitative* valuation of cultural ESS, a diverse set of methods are available from different conceptual backgrounds (Cheng et al., 2019), which we recommend combining. These backgrounds include ‘economic valuation’ that treats values as assigned values, and ‘social valuation’ where the value of an object is a measure of relative importance to an individual or group in a given social context (Scholte et al., 2015).

The reasons for evaluating cultural ESS need to be understood, be it to achieve a better understanding of the motivation of users, to enhance acceptance of planning decisions, or to set policies and measure the progress towards achieving them (Schmidt et al., 2017). However, the ‘personal meaning of the favourite place’ cannot be used *directly* as a basis for developing methods for evaluating cultural ESS in relation to children and young people. Nevertheless, in this context, assessing urban green’s cultural ESS may include the following: (1) gaining a better understanding why children and young people use urban green; (2) whether a proposed design for an urban green area finds support among these groups; (3) whether the currently available urban green of a specific city is already sufficient for the full implementation of children’s rights.

Combining these insights with the issues in urban life perceived as problems by young people, some interesting coherencies show up. Even if the relative lack of green areas does not seem a particularly crucial issue (<5% of all mentions), urban green indirectly plays a pivotal role for activities of young people in urban areas, since green spaces are places that counteract the most crucial problems in urban areas identified by young people (traffic, pollution and noise, people and their behaviour in crowded areas). It can also be inferred that urban green areas (especially larger ones like parks) need to fulfil further criteria if they are to be perceived positively. In addition to the absence of traffic, pollution, noise and too many people, (perceived) security and infrastructural features (good Wi-Fi and mobile phone connectivity, toilets, possibilities to buy basic supplies, seating) are also important to young people, as confirmed in several in-depth conversations that took place during the workshops in schools (see section 2.3).

The links between urban green and young people’s requirements are important for the next stage of the u3Green project – to design a suitable location-based survey application, with

direct participation by pupils in the context of internships (see Figure 1). But even beyond this project, the knowledge gained is valuable for any research addressing urban life, since some issues (notably the high importance of walking as an urban activity) were not known before.

## Acknowledgement

The project ‘u3green. Promotion of child- and youth-friendly urban landscapes through participatory research on urban green’ is funded by the Austrian Federal Ministry of Education, Science and Research (BMBWF) in the ‘Sparkling Science 2.0’ programme.

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